**OHIO VALLEY ELECTRIC CORPORATION**
3932 U. S. Route 23
P. O. Box 468
Piketon, Ohio 45661
740-289-7200

WRITER'S DIRECT DIAL NO:
740-289-7259

January 30, 2026

**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- Clifty Creek Station**
**2025 Annual Groundwater Monitoring and Corrective Action Report**

Dear Mr. Woods:

As required by 40 CFR 257.106(h)(1), Indiana-Kentucky Electric Corporation (IKEC) is providing notification to the Commissioner of the Indiana Department of Environmental Management (IDEM) that the ninth Annual CCR Groundwater Monitoring and Corrective Actions Report has been completed in compliance with 40 CFR 257.90(e) for IKEC's Clifty Creek Station. The groundwater monitoring and corrective action report was prepared by AGES, Inc., the site's hydrogeologist, summarizing the findings for 2025. The report has been placed in the facility's operating record in accordance with 40 CFR 257.105(h)(1), as well as, on the company's publicly accessible internet site in accordance with 40 CFR 257.107(h)(1), 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, or you can contact Gabe Coriell at (740) 289-7267.

Sincerely,

Jeremy Galloway
Environmental Specialist

JDG: zsh

Stantec Consulting Services Inc.
10200 Alliance Road, Suite 300
Cincinnati OH 45242-4754

January 30, 2026

Project/File: 173411098

**Mr. Jeremy Galloway**
Ohio Valley Electric Corporation
Indiana-Kentucky Electric Corporation
3932 U.S. Route 23
P.O. Box 468
Piketon, Ohio 45661

**Reference: 2025 Annual Groundwater Monitoring and Corrective Action Report**
**EPA Final Coal Combustion Residuals (CCR) Rule**
**Clifty Creek Generating Station**
**Madison, Indiana**

Dear Mr. Galloway,

The EPA Final CCR Rule requires owners or operators of existing CCR landfills and surface impoundments to prepare an 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 40 CFR 257.90(e). For the Indiana-Kentucky Electric Corporation (IKEC), this applies to the Clifty Creek Station's West Boiler Slag Pond, Landfill Runoff Collection Pond, and CCR Landfill.

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

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;
2. 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;
3. 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;
4. 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 level); and
5. Other information required to be included in the annual report as specified in §§257.90 through 257.98.

**Reference:** **2025 Annual Groundwater Monitoring and Corrective Action Report**
**EPA Final Coal Combustion Residuals (CCR) Rule**
**Clifty Creek Generating Station**
**Madison, Indiana**

6. 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:

   i. 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;

   ii. 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;

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

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

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

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

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

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

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

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

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

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

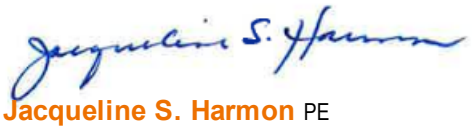
IKEC has retained Applied Geology and Environmental Science, Inc. of Clinton, Pennsylvania (AGES) to perform the Clifty Creek Station's groundwater monitoring and corrective action support under the EPA Final CCR Rule. The 2025 CCR Regulation Groundwater Monitoring and Corrective Action Report (GWCAR) was prepared by AGES to present the annual groundwater monitoring at the West Boiler Slag Pond, Landfill Runoff Collection Pond, and CCR Landfill of the Clifty Creek Station. Stantec Consulting Services Inc. (Stantec) has reviewed AGES (2026), and it meets the requirements specified in 40 CFR 257.90(e).

**Reference:** **2025 Annual Groundwater Monitoring and Corrective Action Report**
**EPA Final Coal Combustion Residuals (CCR) Rule**
**Clifty Creek Generating Station**
**Madison, Indiana**

Please contact us with any questions or concerns. We appreciate the opportunity to continue to work with the Clifty Creek Generating Station and the Indiana-Kentucky Electric Corporation.

Regards,

**STANTEC CONSULTING SERVICES INC.**



**Jacqueline S. Harmon** PE
Project Manager
Phone: (513) 842-8200 EXT 8220
jacqueline.harmon@stantec.com

Attachment: AGES (2026). Coal Combustion Residuals Regulation, 2025 Groundwater Monitoring and Corrective Action Report, Indiana-Kentucky Electric Corporation. Clifty Creek Station, Madison, Indiana, January.

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AGES
Applied Geology And Environmental Science, Inc.

2402 Hookstown Grade Road, Suite 200
Clinton, PA 15026
www.appliedgeology.net
P 412. 264. 6453
F 412. 264. 6567

# COAL COMBUSTION RESIDUALS REGULATION
# 2025 GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

## INDIANA-KENTUCKY ELECTRIC CORPORATION
## CLIFTY CREEK STATION
## MADISON, INDIANA

**JANUARY 2026**

**Prepared for:**

**INDIANA-KENTUCKY ELECTRIC CORPORATION**

**Prepared by:**

**APPLIED GEOLOGY AND ENVIRONMENTAL SCIENCE, INC.**

# COAL COMBUSTION RESIDUALS REGULATION
# 2025 GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
# INDIANA-KENTUCKY ELECTRIC CORPORATION
# CLIFTY CREEK STATION
# MADISON, INDIANA

**JANUARY 2026**

**Prepared for:**

**INDIANA-KENTUCKY ELECTRIC CORPORATION**

**Prepared by:**

**APPLIED GEOLOGY AND ENVIRONMENTAL SCIENCE, INC.**

**Bethany Flaherty**
Principal Scientist I

**Robert W. King, L.P.G. #1237**
Chief Hydrogeologist

**COAL COMBUSTION RESIDUALS REGULATION**
**2025 GROUNDWATER MONITORING AND**
**CORRECTIVE ACTION REPORT**
**INDIANA-KENTUCKY ELECTRIC CORPORATION**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

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# CLIFTY CREEK STATION
# MADISON, INDIANA

## LIST OF ACRONYMS

| | |
|---|---|
| ACM | Assessment of Corrective Measures |
| AGES | Applied Geology and Environmental Science, Inc. |
| ASD | Alternate Source Demonstration |
| CCR | Coal Combustion Residuals |
| GMPP | Groundwater Monitoring Program Plan |
| GWPS | Groundwater Protection Standard |
| IDEM | Indiana Department of Environmental Management |
| IKEC | Indiana-Kentucky Electric Corporation |
| LRCP | Landfill Runoff Collection Pond |
| MCL | Maximum Contaminant Level |
| MW | Megawatt |
| OVEC | Ohio Valley Electric Corporation |
| RCRA | Resource Conservation and Recovery Act |
| StAP | Statistical Analysis Plan |
| SSI | Statistically Significant Increase |
| Stantec | Stantec Consulting Services Inc. |
| Type I Landfill | Type I Residual Waste Landfill |
| S.U. | Standard Unit |
| ug/L | micrograms per liter |
| U.S. EPA | United States Environmental Protection Agency |
| WBSP | West Boiler Slag Pond |

# COAL COMBUSTION RESIDUALS REGULATION
# 2025 GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
# INDIANA-KENTUCKY ELECTRIC CORPORATION
# CLIFTY CREEK STATION
# MADISON, INDIANA

## EXECUTIVE SUMMARY

The Clifty Creek Station, located in Madison, Indiana, is a 1,304-megawatt (MW) coal-fired generating plant operated by the Indiana-Kentucky Electric Corporation (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. Beginning in 1955, ash products were sluiced to disposal ponds located in the plant site. During the course of plant operations, Coal Combustion Residuals (CCRs) have been managed and disposed of in various units at the station. There are three (3) CCR units at the Clifty Creek Station:

- Type I Residual Waste Landfill (Type I Landfill);
- Landfill Runoff Collection Pond (LRCP); and
- West Boiler Slag Pond (WBSP).

Under the CCR program, IKEC installed a groundwater monitoring system at each unit in accordance with the requirements of the CCR Rule; the Type I Landfill and LRCP are included in a multi-unit monitoring system. The units are discussed separately in this executive summary.

A brief overview of the current status of groundwater monitoring and corrective action programs for the CCR units is provided below:

### Type I Landfill

At the start of this 2025 reporting period, the Type I Landfill was operating under the Assessment Monitoring program in accordance with §257.95 of the CCR Rule. Based on exceedances of the Groundwater Protection Standards (GWPS) for Appendix IV constituents (Arsenic in well CF-15-07 and Molybdenum in well CF-15-08), an Assessment of Corrective Measures (ACM) was initiated on December 26, 2024. An ACM Report was completed on March 25, 2025; a public meeting for this unit is pending.

In 2025, the 2$^{nd}$ and 3$^{rd}$ rounds of Assessment Monitoring were conducted in March and September, respectively. Based on the sampling results, it was determined that there were Appendix III Statistically Significant Increases (SSIs) of constituents over background. SSIs were confirmed in wells CF-15-08 (Boron, Chloride, Sulfate, and Total Dissolved Solids [TDS]) and CF-15-09 (Boron) for the March and September 2025 Assessment Monitoring Events. For

Appendix IV constituents, Arsenic in well CF-15-07 exceeded the GWPS during the March 2025 Assessment Monitoring Event and Molybdenum in well CF-15-08 exceeded the GWPS during both Assessment Monitoring Events.

Arsenic and Molybdenum did not exceed the GWPS in wells located at the property boundary downgradient of the Type I Landfill indicating that Arsenic and Molybdenum exceedances are confined to the site. To support the selection of a remedy, field monitoring activities, including the collection of water level measurements and ongoing groundwater sampling, were performed during 2025. Although a remedy was not selected pursuant to §257.97 of the CCR Rule during this current annual reporting period, the continued evaluation of remedial activities pursuant to §257.97 and §257.98 of the CCR Rule will continue during the 2026 annual reporting period.

Based on these results, the Type I Landfill will remain operating under the Assessment Monitoring program in accordance with §257.95 of the CCR Rule.

**LRCP**

At the start of this 2025 reporting period, the LRCP was operating under the Assessment Monitoring program in accordance with §257.95 of the CCR Rule. Based on exceedances of the GWPS for an Appendix IV constituent (Molybdenum at wells CF-15-08 and CF-15-09), an ACM was initiated on May 15, 2019. An ACM Report was completed on September 19, 2019 (Revision 1.0, November 2020; Addendum No. 1, March 2025); a public meeting was held on November 7, 2019.

In 2025, the 14$^{th}$ and 15$^{th}$ rounds of Assessment Monitoring were conducted in March and September, respectively. Based on the sampling results, it was determined that there were Appendix III SSIs of constituents over background. SSIs were confirmed in wells CF-15-08 (Boron, Chloride, Sulfate, and TDS) and CF-15-09 (Boron) for the March and September 2025 Assessment Monitoring Events. For Appendix IV constituents, Arsenic in well CF-15-07 exceeded the GWPS during the March 2025 Assessment Monitoring Event and Molybdenum in well CF-15-08 exceeded the GWPS during both Assessment Monitoring Events.

Arsenic and Molybdenum did not exceed the GWPS in wells located at the property boundary downgradient of the LRCP indicating that Arsenic and Molybdenum exceedances are confined to the site. To support the selection of a remedy, field monitoring activities, including the collection of water level measurements and ongoing groundwater sampling, were performed during 2025. Although a remedy was not selected pursuant to §257.97 of the CCR Rule during this current annual reporting period, the continued evaluation of remedial activities pursuant to §257.97 and §257.98 of the CCR Rule will continue during the 2026 annual reporting period. The unit is currently undergoing closure in place activities.

Based on these results, the LRCP will remain operating under the Assessment Monitoring program in accordance with §257.95 of the CCR Rule.

**WBSP**

At the start of this 2025 reporting period, the WSBP was operating under the Assessment Monitoring program in accordance with §257.95 of the CCR Rule. Based on exceedances of the GWPS for an Appendix IV constituent (Arsenic at wells WBSP-15-07, WBSP-15-08, and WBSP-15-09), an ACM was initiated in May 2023. An ACM Report was completed on October 27, 2023, and an addendum to the ACM Report was completed in March 2025 and included the property boundary well installation results, testing and sampling, and an update on the site characterization. A public meeting for this unit is pending

In 2025, the 6$^{th}$ and 7$^{th}$ rounds of Assessment Monitoring were conducted in March and September, respectively. Based on the sampling results, it was determined that there was an Appendix III SSI of a constituent over background for Fluoride in well WBSP-15-09 during both Assessment Monitoring Events and Boron in wells WBSP-15-04a, WBSP-15-05a, and WBSP-15-06a during the September 2025 Assessment Monitoring Event. Arsenic, an Appendix IV constituent, exceeded the GWPS in downgradient wells WBSP-15-07, WBSP-15-08, and WBSP-15-09 during both Assessment Monitoring events and in well WBSP-15-06a during the September 2025 Assessment Monitoring Event. Arsenic was detected above the GWPS at property boundary wells WBSP-24-02, WBSP-24-03, and WBSP-24-04 during both Assessment Monitoring events.

To support the selection of a remedy, field monitoring activities, including the collection of water level measurements and ongoing groundwater sampling, were performed during 2025. Although a remedy was not selected pursuant to §257.97 of the CCR Rule during this current annual reporting period, the continued evaluation of remedial activities pursuant to §257.97 and §257.98 of the CCR Rule will continue during the 2026 annual reporting period. The unit is currently undergoing closure by removal activities.

Based on these results, the WBSP will remain operating under the Assessment Monitoring program in accordance with §257.95 of the CCR Rule.

# COAL COMBUSTION RESIDUALS REGULATION
# 2025 GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT
# INDIANA-KENTUCKY ELECTRIC CORPORATION
# CLIFTY CREEK STATION
# MADISON, INDIANA

## 1.0 INTRODUCTION

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. Because the rule was promulgated under Subtitle D of RCRA, it does not require regulated facilities to obtain permits, does not require state adoption, and cannot be enforced by U.S. EPA.

This Groundwater Monitoring and Corrective Action Report has been prepared in accordance with §257.90 (e) of the CCR Rule and documents the status of the groundwater monitoring and corrective action program for each CCR unit, summarizes the key actions completed during 2025, describes any problems encountered, discusses actions to resolve the problems, and outlines key activities for the upcoming year.

## 2.0 BACKGROUND

The Clifty Creek Station, located in Madison, Indiana, is a 1,304-megawatt (MW) coal-fired generating plant operated by the Indiana-Kentucky Electric Corporation (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. Beginning in 1955, ash products were sluiced to disposal ponds located in the plant site. During the course of plant operations, CCRs have been managed and disposed of in various units at the station. There are three (3) CCR units at the Clifty Creek Station (Figure 1):

- Type I Residual Waste Landfill (Type I Landfill);
- Landfill Runoff Collection Pond (LRCP); and
- West Boiler Slag Pond (WBSP).

A discussion of the status of the groundwater monitoring program for each CCR unit is presented in the following sections of this report. Under the CCR program, IKEC installed a groundwater monitoring system at each unit in accordance with the requirements of the CCR Rule; the Type I

Landfill and LRCP are included in a multi-unit monitoring system. The units are discussed separately in this report.

## 3.0 TYPE I LANDFILL

The Type I Landfill and LRCP occupy an approximately 166-acre area situated within an eroded bedrock channel (Figures 1 and 2). Beginning in 1955, ash products were sluiced to disposal ponds located in the plant site. 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 landfill from a Type III landfill to a Type I landfill. The application was approved in 2008, and construction began that year.

The Landfill consists of approximately 109 acres and has been approved by IDEM as a Type I Residual Waste Landfill. The 57 acres consist of the LRCP located at the southwest end of the Type I Landfill (Figures 1 and 2). The LRCP is discussed in Section 4.0.

### 3.1 Assessment of Corrective Measures Report: March 2025

During the March and September 2024 Assessment Monitoring Sampling Events, it was confirmed that Arsenic exceeded the GWPS in well CF-15-07 and Molybdenum exceeded the GWPS in well CF-15-08. In accordance with §257.95(g), an ACM Report was prepared to determine potential remedial options regarding the Arsenic and Molybdenum exceedances. The ACM Report provided an assessment of the effectiveness of potential corrective measures in achieving the criteria provided in §257.96(c) (Applied Geology and Environmental Science, Inc. [AGES] 2025a). The ACM Report for the Type I Landfill was placed in the facility's operating record, as well as uploaded to IKEC's CCR Rule Compliance internet site, in March 2025**.**

### 3.2 Groundwater Monitoring Network

As detailed in the Monitoring Well Installation Report (AGES 2018), the CCR groundwater monitoring network for the Type I Landfill consists of the following ten (10) monitoring 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);
- WBSP-15-02 (Background);
- CF-19-14 (Downgradient/Boundary); and
- CF-19-15 (Downgradient/Boundary).

The locations of the wells in the groundwater monitoring network are shown on Figure 2. As listed above and shown on Table 3-1, the CCR groundwater monitoring network includes five (5) background and three (3) downgradient monitoring wells, which satisfies the requirements of the CCR Rule. Two (2) wells (CF-19-14 and CF-19-15) are located at the property boundary downgradient from the Type I Landfill.

Groundwater levels measured in 2025 are included in Table A-1 of Appendix A. A generalized flow map for the area (Figure B-1) and groundwater flow maps for the two (2) monitoring events completed in 2025 are included in Appendix B. As shown on the figures, groundwater generally flows to the southwest toward the Ohio River.

## 3.3 Groundwater Sampling

In accordance with §257.95 of the CCR Rule, the 2nd and 3rd rounds of Assessment Monitoring were conducted in March and September 2025, respectively.

All groundwater samples were collected in accordance with the Groundwater Monitoring Program Plan (GMPP) (AGES 2024). The Assessment Monitoring samples were analyzed for Appendix III and Appendix IV constituents, which are listed in Appendix C. In accordance with §257.90(e)(3), Table 3-2 presents a sampling summary, including the dates the groundwater samples were collected and whether the sample was required by the Assessment Monitoring program. Table 3-3 summarizes the measurements of field parameters collected at the completion of purging immediately prior to collection of each sample. All samples were shipped to an analytical laboratory to be analyzed.

## 3.4 Analytical Results

Upon receipt of the March and September 2025 analytical results, the groundwater monitoring data were statistically evaluated in accordance with §257.93(f) of the CCR Rule and the Clifty Creek Station CCR Statistical Analysis Plan (StAP) (Stantec Consulting Services Inc. [Stantec] 2021). Appendix D summarizes the analytical results for groundwater samples collected in 2025.

### 3.4.1 Analytical Results-Appendix III Constituents

The statistical evaluation of the data identified potential SSIs in wells CF-15-08 (Boron, Chloride, Sulfate, and TDS) and CF-15-09 (Boron) for the March and September 2025 Assessment Monitoring Events (Table 3-4). A potential SSI for Calcium was also identified at well CF-15-08 in March 2025. In accordance with the StAP, resampling for the potential SSIs was conducted in wells CF-15-08 and CF-15-09 in June and December 2025. Except for the potential Calcium SSI at well CF-15-08, all of the other potential SSIs were confirmed in both wells for both events (Table 3-4).

### 3.4.2 Analytical Results-Appendix IV Constituents

Based on previous detections of Appendix IV constituents in groundwater at the Type I Landfill, IKEC established a GWPS for each detected Appendix IV constituent in accordance with the §257.95(h)(1) through §257.95(h)(3) as follows:

*(1) For constituents for which the U.S. EPA has established a Maximum Contaminant Level (MCL), the GWPS shall be the MCL for that constituent.*

*(2) On July 30, 2018, the U.S. EPA published alternate limits to be used for several constituents that did not have previously established MCLs to be used as the GWPS for those constituents.*

*(3) For constituents for which the background level is higher than the MCL or the alternate limit, the background concentration shall be the GWPS for that constituent.*

Table 3-5 presents the list of GWPS values for the Assessment Monitoring program at the Type I Landfill that were developed in accordance with the above requirements.

It was confirmed that Arsenic exceeded the GWPS of 10 ug/L in well CF-15-07 during the 2nd (March 2025) Assessment Monitoring Event, and Molybdenum exceeded the GWPS of 100 ug/L in well CF-15-08 during the 2nd (March 2025) and 3rd (September 2025) Assessment Monitoring Events (Table 3-6). Neither Arsenic nor Molybdenum concentrations exceeded the GWPS at the wells located at the property boundary downgradient from the Type I Landfill (CF-19-14 and CF-19-15). These results indicate that Arsenic and Molybdenum concentrations in the uppermost aquifer exceeding the GWPS are confined to the site and are not reaching the Ohio River.

## 3.5 Assessment of Corrective Measures

Based on the Arsenic and Molybdenum exceedances, IKEC continues to conduct additional groundwater sampling to characterize the nature and extent of the release at the Type I Landfill and has initiated an ACM in accordance with §257.95(g).

## 3.6 Alternate Source Demonstration (ASD)

For the March 2025 and September 2025 Assessment Monitoring Events, IKEC prepared ASD Reports that indicated that the Boron detected in groundwater came from a source other than the Type I Landfill. The ASD Reports are provided in Appendices E and F.

# 4.0 LRCP

The Type I Landfill and LRCP occupy an approximately 160-acre area situated within an eroded bedrock channel (Figures 1 and 2). The Landfill, which is discussed above in Section 3.0, consists of approximately 109 acres, and the 57 acres consist of the LRCP located at the southwest end of the Type I Landfill. The unit is currently undergoing closure in place activities.

## 4.1 Assessment of Corrective Measures Report: Addendum No. 1 - March 2025

During the March and September 2024 Assessment Monitoring Sampling Events, it was confirmed that Arsenic exceeded the GWPS in well CF-15-07 and Molybdenum exceeded the GWPS in well CF-15-08. In accordance with §257.95(g), an Addendum No.1 to the ACM Report (AGES 2025b) provided an assessment of the effectiveness of potential corrective measures in achieving the criteria provided in §257.96(c) for Arsenic and Molybdenum. Addendum No.1 to the ACM Report for the LRCP was placed in the facility's operating record, as well as uploaded to IKEC's CCR Rule Compliance internet site, in March 2025.

## 4.2 Groundwater Monitoring Network

As detailed in the Monitoring Well Installation Report (AGES 2018) and 2019 Groundwater Monitoring and Corrective Action Report (AGES 2020), the CCR groundwater monitoring network for the LRCP consisted of the following ten (10) monitoring 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);
- WBSP-15-02 (Background);
- CF-19-14 (Downgradient/Boundary); and
- CF-19-15 (Downgradient/Boundary).

The locations of the wells in the groundwater monitoring network are shown on Figure 2. As listed above and shown on Table 4-1, the CCR groundwater monitoring network includes five (5)

background and three (3) downgradient monitoring wells, which satisfies the requirements of the CCR Rule. Two (2) wells (CF-19-14 and CF-19-15) are located at the property boundary downgradient from the LRCP.

Groundwater levels measured in 2025 are included in Table A-2 of Appendix A. Groundwater flow maps for the two (2) monitoring events completed in 2025 are included in Appendix B. As shown on the figures, groundwater generally flows to the southwest toward the Ohio River.

## 4.3 Groundwater Sampling

In accordance with §257.95 of the CCR Rule, the 14th and 15th rounds of Assessment Monitoring were conducted in March and September 2025, respectively.

All groundwater samples were collected in accordance with the GMPP (AGES 2024). The Assessment Monitoring samples were analyzed for Appendix III and Appendix IV constituents, which are listed in Appendix C. In accordance with §257.90(e)(3), Table 4-2 presents a sampling summary, including the dates the groundwater samples were collected and whether the sample was required by the Assessment Monitoring program. Table 4-3 summarizes the measurements of field parameters collected at the completion of purging, immediately prior to collection of each sample. All samples were shipped to an analytical laboratory to be analyzed.

## 4.4 Analytical Results

Upon receipt, the groundwater monitoring data were statistically evaluated in accordance with §257.93(f) of the CCR Rule and the Clifty Creek Station CCR StAP (Stantec 2021). Appendix D summarizes the analytical results for groundwater samples collected in 2025.

### 4.4.1 Analytical Results-Appendix III Constituents

The statistical evaluation of the data identified potential SSIs in wells CF-15-08 (Boron, Chloride, Sulfate, and TDS) and CF-15-09 (Boron) for the March and September 2025 Assessment Monitoring Events (Table 4-4). A potential SSI for Calcium was also identified at well CF-15-08 in March 2025. In accordance with the StAP, resampling for the potential SSIs was conducted in wells CF-15-08 and CF-15-09 in June and December 2025. Except for the potential Calcium SSI at well CF-15-08, all of the other potential SSIs were confirmed in both wells for both events (Table 4-4).

### 4.4.2 Analytical Results-Appendix IV Constituents

Based on previous detections of Appendix IV constituents in groundwater at the LRCP, IKEC established a GWPS for each detected Appendix IV constituent in accordance with the §257.95(h)(1) through §257.95(h)(3) as follows:

*(4) For constituents for which the U.S. EPA has established a Maximum Contaminant Level (MCL), the GWPS shall be the MCL for that constituent.*

*(5) On July 30, 2018, the U.S. EPA published alternate limits to be used for several constituents that did not have previously established MCLs to be used as the GWPS for those constituents.*

*(6) For constituents for which the background level is higher than the MCL or the alternate limit, the background concentration shall be the GWPS for that constituent.*

Table 4-5 presents the list of GWPS values for the Assessment Monitoring program at the LRCP that were developed in accordance with the above requirements.

It was confirmed that Arsenic exceeded the GWPS of 10 ug/L in well CF-15-07 during the 14th (March 2025) Assessment Monitoring Event, and Molybdenum exceeded the GWPS of 100 ug/L in well CF-15-08 during the 14th (March 2025) and 15th (September 2025) Assessment Monitoring Events (Table 4-6). Neither Arsenic nor Molybdenum concentrations exceeded the GWPS at the wells located at the property boundary downgradient from the Type I Landfill (CF-19-14 and CF-19-15). These results indicate that Arsenic and Molybdenum concentrations in the uppermost aquifer exceeding the GWPS are confined to the site and are not reaching the Ohio River.

## 4.5 Assessment of Corrective Measures

Based on the Arsenic and Molybdenum exceedances, IKEC continues to conduct additional groundwater sampling to characterize the nature and extent of the release at the LRCP and has initiated an ACM in accordance with §257.95(g).

# 5.0 WBSP

The WBSP historically served as a settling facility for sluiced boiler slag produced at the plant. The pond is formed by natural grade to the north, east, and west, and a southern dike that runs along the bank of the Ohio River. The Devil's Backbone borders the northern side of the WBSP (Figures 1 and 3). The unit is currently undergoing closure by removal activities.

## 5.1 Assessment of Corrective Measures Report: Addendum No. 1 – March 2025

In 2023, it was confirmed that Arsenic exceeded the GWPS at wells WBSP-15-07, WBSP-15-08, and WBSP-15-09. In accordance with §257.95(g), an ACM Report was prepared to determine potential remedial options regarding Arsenic exceedances. The ACM Report (AGES 2023) provided an assessment of the effectiveness of potential corrective measures in achieving the criteria provided in §257.96(c). The ACM Report for the Clifty Creek WBSP was placed in the

facility's operating record, as well as uploaded it to IKEC's CCR Rule Compliance internet site, in October 2023.

Due to regulatory access issues, the property boundary wells (as required by the CCR Rule) could not be installed at the WBSP during the site characterization that was conducted in 2023. Therefore, during the first quarter of 2024, property boundary wells were installed at the unit and sampled. Addendum No. 1 to the ACM Report, which includes the property boundary well installation results and other potential remedial options, was placed in the facility's operating record, as well as uploaded it to IKEC's CCR Rule Compliance internet site in March 2025 (AGES 2025c).

## 5.2 Groundwater Monitoring Network

As detailed in the Monitoring Well Installation Report (AGES 2018), the 2021 Groundwater Monitoring and Corrective Action Report, and the Addendum No. 1 to the ACM Report (AGES 2025c), the CCR groundwater monitoring network for the WBSP includes the following 16 wells:

- CF-15-04 (Background);
- CF-15-05 (Background);
- CF-15-06 (Background);
- WBSP-15-01 (Upgradient);
- WBSP-15-02 (Upgradient);
- WBSP-15-03 (Upgradient);
- WBSP-15-04a (Downgradient);
- WBSP-15-05a (Downgradient);
- WBSP-15-06a (Downgradient);
- WBSP-15-07 (Downgradient);
- WBSP-15-08 (Downgradient);
- WBSP-15-09 (Downgradient);
- WBSP-15-10 (Downgradient);
- WBSP-24-02 (Downgradient);
- WBSP-24-03 (Downgradient); and
- WBSP-24-04 (Downgradient).

The locations of the wells in the groundwater monitoring network are shown on Figures 2 and 3. Replacement wells WBSP-15-04a, WBSP-15-05a, and WBSP-15-06a have been sampled a total of nine (9) times and have been determined to be representative of the previously abandoned wells. Given this information, these three (3) wells have been added to the groundwater monitoring network for the WBSP.

As listed above and shown on Table 5-1, the CCR groundwater monitoring network for the WBSP includes six (6) background and upgradient wells and seven (7) downgradient wells, which

satisfies the requirements of the CCR Rule. Three (3) property boundary wells are included in the network.

Groundwater levels measured in 2025 are included in Table A-3 of Appendix A. Groundwater flow maps for the two (2) monitoring events completed in 2025 are included in Appendix B. As background wells WBSP-15-01, WBSP-15-02, and WBSP-15-03 are not screened in the uppermost aquifer at the unit, groundwater flow directions are based on the groundwater elevations in downgradient wells and the typical elevation of the nearby Ohio River. As shown on the figures in Appendix B, groundwater generally flows to the southeast toward the Ohio River.

## 5.3 Groundwater Sampling

In accordance with §257.95 of the CCR Rule, the 6$^{th}$ and 7$^{th}$ rounds of Assessment Monitoring were conducted in March and September 2025, respectively.

All groundwater samples were collected in accordance with the GMPP (AGES 2024). The Assessment Monitoring samples were analyzed for Appendix III and Appendix IV constituents, which are listed in Appendix C. In accordance with §257.90(e)(3), Table 5-2 presents a sampling summary, including the dates the groundwater samples were collected and whether the sample was required by the Assessment Monitoring program. Table 5-3 summarizes the measurements of field parameters collected at the completion of purging, immediately prior to collection of each sample. All samples were shipped to an analytical laboratory to be analyzed.

## 5.4 Analytical Results

Upon receipt of the March and September 2025 analytical results, the groundwater monitoring data were statistically evaluated in accordance with §257.93(f) of the CCR Rule and the Clifty Creek Station CCR StAP (Stantec 2021). Appendix D summarizes the analytical results for groundwater samples collected in 2025.

### 5.4.1 Analytical Results-Appendix III Constituents

Potential SSIs in well WBSP-15-09 (Fluoride) were identified in the March and September 2025 Assessment Monitoring Events (Table 5-4). Potential SSIs for Boron were also identified in wells WBSP-15-04a, WBSP-15-05a, and WBSP-15-06a during the September 2025 Assessment Monitoring Event (Table 5-4). In accordance with the StAP, resampling for the potential SSIs was conducted in well WBSP-15-09 in June and December 2025 and in wells WBSP-15-04a, WBSP-15-05a, and WBSP-15-06a in December 2025. Based on the resampling results, the SSI was confirmed for Fluoride in well WBSP-15-09 for both Assessment Monitoring Events and for Boron in wells WBSP-15-04a, WBSP-15-05a, and WBSP-15-06a for the September 2025 Assessment Monitoring Event (Table 5-4).

### 5.4.2 Analytical Results-Appendix IV Constituents

IKEC established a GWPS for each detected Appendix IV constituent in accordance with the §257.95(h)(1) through §257.95(h)(3) as follows:

*(7) For constituents for which the U.S. EPA has established a Maximum Contaminant Level (MCL), the GWPS shall be the MCL for that constituent.*
*(8) On July 30, 2018, the U.S. EPA published alternate limits to be used for several constituents that did not have previously established MCLs to be used as the GWPS for those constituents.*

*(9) For constituents for which the background level is higher than the MCL or the alternate limit, the background concentration shall be the GWPS for that constituent.*

Table 5-5 presents the list of GWPS values for the Assessment Monitoring program at the WBSP that were developed in accordance with the above requirements.

During the 6th (March 2025) and 7th (September 2025) rounds of Assessment Monitoring, it was confirmed that Arsenic in downgradient wells WBSP-15-06a (September 2025 only), WBSP-15-07, WBSP-15-08, and WBSP-15-09 and in downgradient/boundary wells WBSP-24-02, WBSP-24-03, and WBSP-24-04 exceeded the GWPS of 10 ug/L (Table 5-6).

## 5.5 Assessment of Corrective Measures

Based on the Arsenic exceedances, IKEC continues to conduct additional groundwater sampling to characterize the nature and extent of the release at the WBSP and has initiated an ACM in accordance with §257.95(g).

# 6.0 PROBLEMS ENCOUNTERED

During the September 2025 Sampling Event, wells CF-15-06 and WBSP-15-01 were dry and samples could not be collected. Additionally, in the same event, well WBSP-15-02 ran dry during sample collection and was not able to be analyzed for all Appendix III and Appendix IV constituents.

There were no other problems encountered during the 2025 groundwater monitoring program at Clifty Creek Station.

## 7.0 PROJECTED ACTIVITIES FOR 2026

The Type I Landfill will remain in Assessment Monitoring and continue to be sampled on a semi-annual basis. As described above, an ACM Report has been completed for this unit for Arsenic and Molybdenum, and the process of the selection of remedy for the Type I Landfill will continue.

The LRCP will remain in Assessment Monitoring and continue to be sampled on a semi-annual basis. As described above, an ACM Report has been completed for this unit for Molybdenum, including an Addendum to the ACM Report to include Arsenic, and the process of the selection of remedy for the LRCP will continue.

The WBSP will remain in Assessment Monitoring and continue to be sampled on a semi-annual basis. As described above, an ACM Report has been completed for this unit for Arsenic, including an Addendum to the ACM Report to include property boundary wells, and the process of the selection of remedy for the WBSP will continue.

## 8.0 REFERENCES


Applied Geology and Environmental Science, Inc. (AGES) 2025a. Coal Combustion Residuals Regulation Assessment of Corrective Measures Report, Type I Landfill, Indiana -Kentucky Electric Corporation, Clifty Creek Station, Madison, Jefferson County, Indiana. March 2025.

Applied Geology and Environmental Science, Inc. (AGES) 2025b. Coal Combustion Residuals Regulation, Addendum No. 1 to the Assessment of Corrective Measures Report, Landfill Runoff Collection Pond, Indiana -Kentucky Electric Corporation, Clifty Creek Station, Madison, Jefferson County, Indiana. March 2025.

Applied Geology and Environmental Science, Inc. (AGES) 2025c. Coal Combustion Residuals Regulation, Addendum No. 1 to the Assessment of Corrective Measures Report, West Boiler Slag Pond, Indiana -Kentucky Electric Corporation, Clifty Creek Station, Madison, Jefferson County, Indiana. March 2025.

Applied Geology and Environmental Science, Inc. (AGES) 2024. Coal Combustion Residuals Regulation Groundwater Monitoring Program Plan, Indiana-Kentucky Electric Corporation, Clifty Creek Station, Madison, Jefferson County, Indiana. Revision 2.0. January 2024.

Applied Geology and Environmental Science, Inc. (AGES) 2023. Coal Combustion Residuals Regulation Assessment of Corrective Measures Report for the West Boiler Slag Pond, Indiana-Kentucky Electric Corporation, Clifty Creek Station, Madison, Jefferson County, Indiana. October 2023.

Applied Geology and Environmental Science, Inc. (AGES) 2020b. Coal Combustion Residuals Regulation 2019 Groundwater Monitoring and Corrective Action Report, Indiana-Kentucky Electric Corporation, Clifty Creek Station, Madison, Jefferson County, Indiana. January 2020.

Applied Geology and Environmental Science, Inc. (AGES) 2020a. Coal Combustion Residuals Regulation Assessment of Corrective Measures Report Landfill Runoff Collection Pond, Indiana-Kentucky Electric Corporation, Clifty Creek Station, Madison, Jefferson County, Indiana. Revision 1.0. November 2020.

Applied Geology and Environmental Science, Inc. (AGES) 2018. Coal Combustion Residuals Regulation Monitoring Well Installation Report, Indiana-Kentucky Electric Corporation, Clifty Creek Station, Madison, Jefferson County, Indiana. Revision 1.0. November 2018.

Stantec Consulting Services Inc. (Stantec) 2021. Coal Combustion Residuals Regulation Statistical Analysis Plan, Indiana-Kentucky Electric Corporation, Clifty Creek Station, Madison, Jefferson County, Indiana. July 2021.

# TABLES

**TABLE 3-1**
**GROUNDWATER MONITORING NETWORK**
**TYPE I RESIDUAL WASTE LANDFILL**
**CCR GROUNDWATER MONITORING PROGRAM**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

| Monitoring Well ID | Designation | Date of Installation | Coordinates | | Ground Elevation (ft)[2] | Top of Casing Elevation (ft)[2] | Top of Screen Elevation (ft) | Base of Screen Elevation (ft) | Total Depth From Top of Casing (ft) |
|---|---|---|---|---|---|---|---|---|---|
| | | | Northing | Easting | | | | | |
| **CF-15-04** | Background | 12/3/2015 | 451482.81 | 569307.19 | 465.55 | 468.03 | 439.55 | 429.55 | 38.48 |
| **CF-15-05** | Background | 12/1/2015 | 447491.91 | 565533.64 | 439.85 | 442.58 | 422.85 | 412.85 | 29.73 |
| **CF-15-06** | Background | 11/30/2015 | 447026.92 | 565190.31 | 437.49 | 440.40 | 431.49 | 421.49 | 18.91 |
| **CF-15-07** | Downgradient | 11/23/2015 | 443135.08 | 562259.25 | 438.61 | 441.11 | 432.61 | 422.61 | 18.50 |
| **CF-15-08** | Downgradient | 11/19/2015 | 443219.57 | 562537.29 | 460.33 | 462.79 | 430.33 | 420.33 | 42.46 |
| **CF-15-09** | Downgradient | 11/25/2015 | 443445.96 | 562871.69 | 456.73 | 459.45 | 447.73 | 442.73 | 16.72 |
| **WBSP-15-01** | Background | 11/30/2015 | 449072.27 | 566322.12 | 466.93 | 469.36 | 458.93 | 448.93 | 20.43 |
| **WBSP-15-02** | Background | 11/11/2015 | 449803.91 | 566987.30 | 473.83 | 476.76 | 457.83 | 452.83 | 23.93 |
| **CF-19-14** | Downgradient | 3/8/2019 | 443401.75 | 562901.93 | 452.29 | 454.88 | 440.05 | 430.05 | 24.83 |
| **CF-19-15** | Downgradient | 3/13/2019 | 442704.78 | 562483.02 | 441.10 | 443.61 | 415.19 | 405.19 | 38.42 |

Notes:
1. The Well locations are referenced to the North American Datum (NAD83), east zone coordinate system.
2. Elevations are referenced to the North American Vertical Datum (NAVD) 1988.

**TABLE 3-2**
**SUMMARY OF SAMPLES COLLECTED DURING 2025**
**TYPE I RESIDUAL WASTE LANDFILL**
**CCR GROUNDWATER MONITORING PROGRAM**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

| Well ID | Designation | Mar-25 | Jun-25 | Sep-25 | Dec-25 |
|---|---|---|---|---|---|
| **CF-15-04** | Background | AM | NS | AM | NS |
| **CF-15-05** | Background | AM | NS | AM | NS |
| **CF-15-06** | Background | AM | NS | Dry | NS |
| **CF-15-07** | Downgradient | AM | AM | AM | AM |
| **CF-15-08** | Downgradient | AM | AM | AM | AM |
| **CF-15-09** | Downgradient | AM | AM | AM | AM |
| **WBSP-15-01** | Background | AM | NS | Dry | NS |
| **WBSP-15-02** | Background | AM | NS | AM | NS |
| **CF-19-14** | Downgradient | AM | NS | AM | NS |
| **CF-19-15** | Downgradient | AM | NS | AM | NS |

Notes:
1. AM: Assessment Monitoring.
2. Dry: Well Dry and Not Sampled.
3. NS: Not Sampled; Not Required.

**TABLE 3-3**
**SUMMARY OF MEASURED FIELD PARAMETERS DURING 2025**
**TYPE I RESIDUAL WASTE LANDFILL**
**CCR GROUNDWATER MONITORING PROGRAM**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

| Sample ID | Date | Temperature (°C) | Conductivity (µohms/cm) | pH (S.U.) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/L) | Turbidity (NTUs) |
|---|---|---|---|---|---|---|---|
| **CF-15-04** | Mar-25 | 9.20 | 556 | 7.59 | 126 | 11.2 | 0.00 |
| **CF-15-05** | Mar-25 | 13.72 | 875 | 7.58 | 212 | 0.84 | 4.65 |
| **CF-15-06** | Mar-25 | 11.79 | 1110 | 7.53 | 202 | 4.21 | 3.76 |
| **CF-15-07** | Mar-25 | 8.93 | 1140 | 7.48 | -39 | 1.14 | 3.71 |
| **CF-15-08** | Mar-25 | 13.48 | 2180 | 7.48 | 268 | 5.45 | 4.38 |
| **CF-15-09** | Mar-25 | 22.19 | 743 | 7.15 | 326 | 4.11 | 1.19 |
| **WBSP-15-01** | Mar-25 | 11.51 | 999 | 7.10 | 325 | 16.5 | 4.80 |
| **WBSP-15-02** | Mar-25 | 15.02 | 1590 | 7.00 | 313 | 15.42 | 4.90 |
| **CF-19-14** | Mar-25 | 10.02 | 1050 | 7.18 | 217 | 3.16 | 4.48 |
| **CF-19-15** | Mar-25 | 10.94 | 1300 | 7.15 | 237 | 2.67 | 3.98 |
| **CF-15-07** | Jun-25 | 17.26 | 1710 | 7.30 | -123 | 0.55 | 2.89 |
| **CF-15-08** | Jun-25 | 17.91 | 2410 | 6.81 | 378 | 10.47 | 0.00 |
| **CF-15-09** | Jun-25 | 19.30 | 1460 | 6.56 | 308 | 1.66 | 0.00 |
| **CF-15-04** | Sep-25 | 17.36 | 689 | 6.76 | 374 | 5.43 | 4.71 |
| **CF-15-05** | Oct-25 | 17.42 | 973 | 6.48 | 292 | 0.00 | 4.80 |
| **CF-15-06** | WELL DRY | | | | | | |
| **CF-15-07** | Sep-25 | 18.32 | 1200 | 6.50 | -82 | 0.52 | 4.72 |
| **CF-15-08** | Sep-25 | 20.95 | 2230 | 6.95 | 382 | 5.73 | 4.68 |
| **CF-15-09** | Sep-25 | 21.72 | 758 | 7.14 | 339 | 2.48 | 1.21 |
| **WBSP-15-01** | WELL DRY | | | | | | |
| **WBSP-15-02** | Sep-25 | 18.57 | 1640 | 6.79 | 325 | 1.09 | 4.88 |
| **CF-19-14** | Oct-25 | 17.07 | 1080 | 6.60 | 404 | 2.78 | 4.82 |
| **CF-19-15** | Sep-25 | 15.73 | 1470 | 6.36 | 420 | 3.26 | 3.98 |
| **CF-15-07** | Dec-25 | 8.26 | 1130 | 7.07 | -35 | 0.67 | 4.36 |
| **CF-15-08** | Dec-25 | 8.22 | 1010 | 6.61 | 329 | 1.87 | 2.01 |
| **CF-15-09** | Dec-25 | 8.35 | 1110 | 7.03 | 135 | 1.00 | 3.93 |

Notes:
1. °C: Degrees Celsius.
2. µohms/cm: Micro-ohms per centimeter.
3. S.U.: Standard Units.
4. mV: Millivolts.
5. mg/L: Milligrams per liter.
6. NTUs: Nephelometric Turbidity Units.

**TABLE 3-4**
**SUMMARY OF POTENTIAL AND CONFIRMED APPENDIX III SSIs**
**TYPE I RESIDUAL WASTE LANDFILL**
**CCR GROUNDWATER MONITORING PROGRAM**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

| Well ID | Potential SSI Parameter (Units) | 2nd Assessment Monitoring Sampling Event March 2025 | | 2nd Assessment Monitoring Resampling Event June 2025 | | 3rd Assessment Monitoring Sampling Event September 2025 | | 3rd Assessment Monitoring Resampling Event December 2025 | |
|---|---|---|---|---|---|---|---|---|---|
| | | Potential SSI Result | UTL | Potential SSI Result | Confirmed SSI (Yes/No) | Potential SSI Result | UTL | Potential SSI Result | Confirmed SSI (Yes/No) |
| CF-15-08 | Boron (mg/L) | 7.1 | 0.19 | 6.3 | Yes | 5.0 | 0.19 | 7.6 | Yes |
| | Calcium (mg/L) | 390 | 315 | 250 | No | NA | NA | NA | NA |
| | Chloride (mg/L) | 160 | 66 | 110 | Yes | 150 | 66 | 120 | Yes |
| | Sulfate (mg/L) | 1100 | 508 | 720 | Yes | 830 | 508 | 760 | Yes |
| | TDS (mg/L) | 1900 | 1300 | NS | Yes | 1700 | 1300 | 1500 | Yes |
| CF-15-09 | Boron (mg/L) | 3.0 | 0.19 | 3.0 | Yes | 3.4 | 0.19 | 3.3 | Yes |

Notes:
1. SSI: Statistically Significant Increase.
2. UTL: Upper Tolerance Limit
3. mg/L: Milligrams per liter.
4. NA: Not Applicable.

**TABLE 3-5**
**GROUNDWATER PROTECTION STANDARDS**
**TYPE I LANDFILL**
**CCR GROUNDWATER MONITORING PROGRAM**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

| Appendix IV Constituents | | | |
|---|---|---|---|
| **Constituent (Units)** | **Background** | **MCL/SMCL** | **GWPS** |
| Antimony, Sb (µg/L) | 5 | 6 | 6 |
| Arsenic, As (µg/L) | 6 | 10 | 10 |
| Barium, Ba (µg/L) | 89 | 2000 | 2000 |
| Beryllium, Be (µg/L) | 15 | 4 | 15 |
| Cadmium, Cd (µg/L) | 2 | 5 | 5 |
| Chromium, Cr (µg/L) | 3 | 100 | 100 |
| Cobalt, Co (µg/L) | 2.7 | 6* | 6 |
| Fluoride, F (mg/L) | 0.66 | 4 | 4 |
| Lead, Pb (µg/L) | 2.6 | 15* | 15 |
| Lithium, Li (mg/L) | 0.1 | 0.04* | 0.1 |
| Mercury, Hg (µg/L) | 5 | 2 | 2 |
| Molybdenum, Mo (µg/L) | 6 | 100* | 100 |
| Radium 226 & 228 (combined) (pCi/L) | 4 | 5 | 5 |
| Selenium, Se (µg/L) | 5 | 50 | 50 |
| Thallium, Tl (µg/L) | 1 | 2 | 2 |

Notes:
1. MCL: Maximum Contaminant Level.
2. SMCL: Secondary Maximum Contaminant Level.
3. *: Established by U.S. EPA as part of 2018 decision.
4. GWPS: Groundwater Protection Standard.
5. µg/L: Micrograms per liter.
6. mg/L: Milligrams per liter.
7. pCi/L: Picocuries per liter.

**TABLE 3-6**
**SUMMARY OF GWPS EXCEEDANCES**
**TYPE I LANDFILL**
**CCR GROUNDWATER MONITORING PROGRAM**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

| Well ID | Potential Exceedance Parameter (Units) | 2nd Assessment Monitoring Sampling Event March 2025 | | 2nd Assessment Monitoring Resampling Event June 2025 | | 3rd Assessment Monitoring Sampling Event September 2025 | | 3rd Assessment Monitoring Resampling Event December 2025 | |
|---|---|---|---|---|---|---|---|---|---|
| | | Potential Exceedance Result | GWPS | Potential Exceedance Result | Confirmed Exceedance (Yes/No) | Potential Exceedance Result | GWPS | Potential Exceedance Result | Confirmed Exceedance (Yes/No) |
| **CF-15-07** | Arsenic (ug/L) | 15 | 10 | 19 | **Yes** | 16 | 10 | 10 | No |
| **CF-15-08** | Molybdenum (ug/L) | 250 | 100 | 260 | **Yes** | 270 | 100 | 390 | **Yes** |

Notes:
1. GWPS: Groundwater Protection Standard.
2. µg/L: Micrograms per liter.

**TABLE 4-1**
**GROUNDWATER MONITORING NETWORK**
**LANDFILL RUNOFF COLLECTION POND**
**CCR GROUNDWATER MONITORING PROGRAM**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

| Monitoring Well ID | Designation | Date of Installation | Coordinates | | Ground Elevation (ft)[2] | Top of Casing Elevation (ft)[2] | Top of Screen Elevation (ft) | Base of Screen Elevation (ft) | Total Depth From Top of Casing (ft) |
|---|---|---|---|---|---|---|---|---|---|
| | | | Northing | Easting | | | | | |
| **CF-15-04** | Background | 12/3/2015 | 451482.81 | 569307.19 | 465.55 | 468.03 | 439.55 | 429.55 | 38.48 |
| **CF-15-05** | Background | 12/1/2015 | 447491.91 | 565533.64 | 439.85 | 442.58 | 422.85 | 412.85 | 29.73 |
| **CF-15-06** | Background | 11/30/2015 | 447026.92 | 565190.31 | 437.49 | 440.40 | 431.49 | 421.49 | 18.91 |
| **CF-15-07** | Downgradient | 11/23/2015 | 443135.08 | 562259.25 | 438.61 | 441.11 | 432.61 | 422.61 | 18.50 |
| **CF-15-08** | Downgradient | 11/19/2015 | 443219.57 | 562537.29 | 460.33 | 462.79 | 430.33 | 420.33 | 42.46 |
| **CF-15-09** | Downgradient | 11/25/2015 | 443445.96 | 562871.69 | 456.73 | 459.45 | 447.73 | 442.73 | 16.72 |
| **WBSP-15-01** | Background | 11/30/2015 | 449072.27 | 566322.12 | 466.93 | 469.36 | 458.93 | 448.93 | 20.43 |
| **WBSP-15-02** | Background | 11/11/2015 | 449803.91 | 566987.30 | 473.83 | 476.76 | 457.83 | 452.83 | 23.93 |
| **CF-19-14** | Downgradient | 3/8/2019 | 443401.75 | 562901.93 | 452.29 | 454.88 | 440.05 | 430.05 | 24.83 |
| **CF-19-15** | Downgradient | 3/13/2019 | 442704.78 | 562483.02 | 441.10 | 443.61 | 415.19 | 405.19 | 38.42 |

Notes:
1. The Well locations are referenced to the North American Datum (NAD83), east zone coordinate system.
2. Elevations are referenced to the North American Vertical Datum (NAVD) 1988.

**TABLE 4-2**
**SUMMARY OF SAMPLES COLLECTED DURING 2025**
**LANDFILL RUNOFF COLLECTION POND**
**CCR GROUNDWATER MONITORING PROGRAM**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

| Well ID | Designation | Mar-25 | Jun-25 | Sep-25 | Dec-25 |
|---|---|---|---|---|---|
| **CF-15-04** | Background | AM | NS | AM | NS |
| **CF-15-05** | Background | AM | NS | AM | NS |
| **CF-15-06** | Background | AM | NS | Dry | NS |
| **CF-15-07** | Downgradient | AM | AM | AM | AM |
| **CF-15-08** | Downgradient | AM | AM | AM | AM |
| **CF-15-09** | Downgradient | AM | AM | AM | AM |
| **WBSP-15-01** | Background | AM | NS | Dry | NS |
| **WBSP-15-02** | Background | AM | NS | AM | NS |
| **CF-19-14** | Downgradient | AM | NS | AM | NS |
| **CF-19-15** | Downgradient | AM | NS | AM | NS |

Notes:
1. AM: Assessment Monitoring.
2. Dry: Well Dry and Not Sampled.
3. NS: Not Sampled; Not Required.

**TABLE 4-3**
**SUMMARY OF MEASURED FIELD PARAMETERS DURING 2025**
**LANDFILL RUNOFF COLLECTION POND**
**CCR GROUNDWATER MONITORING PROGRAM**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

| Sample ID | Date | Temperature (°C) | Conductivity (µohms/cm) | pH (S.U.) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/L) | Turbidity (NTUs) |
|---|---|---|---|---|---|---|---|
| **CF-15-04** | Mar-25 | 9.20 | 556 | 7.59 | 126 | 11.2 | 0.00 |
| **CF-15-05** | Mar-25 | 13.72 | 875 | 7.58 | 212 | 0.84 | 4.65 |
| **CF-15-06** | Mar-25 | 11.79 | 1110 | 7.53 | 202 | 4.21 | 3.76 |
| **CF-15-07** | Mar-25 | 8.93 | 1140 | 7.48 | -39 | 1.14 | 3.71 |
| **CF-15-08** | Mar-25 | 13.48 | 2180 | 7.48 | 268 | 5.45 | 4.38 |
| **CF-15-09** | Mar-25 | 22.19 | 743 | 7.15 | 326 | 4.11 | 1.19 |
| **WBSP-15-01** | Mar-25 | 11.51 | 999 | 7.10 | 325 | 16.5 | 4.80 |
| **WBSP-15-02** | Mar-25 | 15.02 | 1590 | 7.00 | 313 | 15.42 | 4.90 |
| **CF-19-14** | Mar-25 | 10.02 | 1050 | 7.18 | 217 | 3.16 | 4.48 |
| **CF-19-15** | Mar-25 | 10.94 | 1300 | 7.15 | 237 | 2.67 | 3.98 |
| **CF-15-07** | Jun-25 | 17.26 | 1710 | 7.30 | -123 | 0.55 | 2.89 |
| **CF-15-08** | Jun-25 | 17.91 | 2410 | 6.81 | 378 | 10.47 | 0.00 |
| **CF-15-09** | Jun-25 | 19.30 | 1460 | 6.56 | 308 | 1.66 | 0.00 |
| **CF-15-04** | Sep-25 | 17.36 | 689 | 6.76 | 374 | 5.43 | 4.71 |
| **CF-15-05** | Oct-25 | 17.42 | 973 | 6.48 | 292 | 0.00 | 4.80 |
| **CF-15-06** | WELL DRY | | | | | | |
| **CF-15-07** | Sep-25 | 18.32 | 1200 | 6.50 | -82 | 0.52 | 4.72 |
| **CF-15-08** | Sep-25 | 20.95 | 2230 | 6.95 | 382 | 5.73 | 4.68 |
| **CF-15-09** | Sep-25 | 21.72 | 758 | 7.14 | 339 | 2.48 | 1.21 |
| **WBSP-15-01** | WELL DRY | | | | | | |
| **WBSP-15-02** | Sep-25 | 18.57 | 1640 | 6.79 | 325 | 1.09 | 4.88 |
| **CF-19-14** | Oct-25 | 17.07 | 1080 | 6.60 | 404 | 2.78 | 4.82 |
| **CF-19-15** | Sep-25 | 15.73 | 1470 | 6.36 | 420 | 3.26 | 3.98 |
| **CF-15-07** | Dec-25 | 8.26 | 1130 | 7.07 | -35 | 0.67 | 4.36 |
| **CF-15-08** | Dec-25 | 8.22 | 1010 | 6.61 | 329 | 1.87 | 2.01 |
| **CF-15-09** | Dec-25 | 8.35 | 1110 | 7.03 | 135 | 1.00 | 3.93 |

Notes:
1. °C: Degrees Celsius.
2. µohms/cm: Micro-ohms per centimeter.
3. S.U.: Standard Units.
4. mV: Millivolts.
5. mg/L: Milligrams per liter.
6. NTUs: Nephelometric Turbidity Units.

**TABLE 4-4**
**SUMMARY OF POTENTIAL AND CONFIRMED APPENDIX III SSIs**
**LANDFILL RUNOFF COLLECTION POND**
**CCR GROUNDWATER MONITORING PROGRAM**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

| Well ID | Potential SSI Parameter (Units) | 14th Assessment Monitoring Sampling Event March 2025 | | 14th Assessment Monitoring Resampling Event June 2025 | | 15th Assessment Monitoring Sampling Event September 2025 | | 15th Assessment Monitoring Resampling Event December 2025 | |
|---|---|---|---|---|---|---|---|---|---|
| | | Potential SSI Result | UTL | Potential SSI Result | Confirmed SSI (Yes/No) | Potential SSI Result | UTL | Potential SSI Result | Confirmed SSI (Yes/No) |
| CF-15-08 | Boron (mg/L) | 7.1 | 0.19 | 6.3 | **Yes** | 5.0 | 0.19 | 7.6 | **Yes** |
| | Calcium (mg/L) | 390 | 315 | 250 | No | NA | NA | NA | NA |
| | Chloride (mg/L) | 160 | 66 | 110 | **Yes** | 150 | 66 | 120 | **Yes** |
| | Sulfate (mg/L) | 1100 | 508 | 720 | **Yes** | 830 | 508 | 760 | **Yes** |
| | TDS (mg/L) | 1900 | 1300 | NS | **Yes** | 1700 | 1300 | 1500 | **Yes** |
| CF-15-09 | Boron (mg/L) | 3.0 | 0.19 | 3.0 | **Yes** | 3.4 | 0.19 | 3.3 | **Yes** |

Notes:
1. SSI: Statistically Significant Increase.
2. UTL: Upper Tolerance Limit (Pooled Interwell UTL).
3. mg/L: Milligrams per liter.
4. NA: Not Applicable.

**TABLE 4-5**
**GROUNDWATER PROTECTION STANDARDS**
**LANDFILL RUNOFF COLLECTION POND**
**CCR GROUNDWATER MONITORING PROGRAM**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

| Appendix IV Constituents | | | |
|---|---|---|---|
| **Constituent (Units)** | **Background** | **MCL/SMCL** | **GWPS** |
| Antimony, Sb (µg/L) | 5 | 6 | 6 |
| Arsenic, As (µg/L) | 6 | 10 | 10 |
| Barium, Ba (µg/L) | 89 | 2000 | 2000 |
| Beryllium, Be (µg/L) | 15 | 4 | 15 |
| Cadmium, Cd (µg/L) | 2 | 5 | 5 |
| Chromium, Cr (µg/L) | 3 | 100 | 100 |
| Cobalt, Co (µg/L) | 2.7 | 6* | 6 |
| Fluoride, F (mg/L) | 0.66 | 4 | 4 |
| Lead, Pb (µg/L) | 2.6 | 15* | 15 |
| Lithium, Li (mg/L) | 0.1 | 0.04* | 0.1 |
| Mercury, Hg (µg/L) | 5 | 2 | 2 |
| Molybdenum, Mo (µg/L) | 6 | 100* | 100 |
| Radium 226 & 228 (combined) (pCi/L) | 4 | 5 | 5 |
| Selenium, Se (µg/L) | 5 | 50 | 50 |
| Thallium, Tl (µg/L) | 1 | 2 | 2 |

Notes:
1. MCL: Maximum Contaminant Level.
2. SMCL: Secondary Maximum Contaminant Level.
3. *: Established by U.S. EPA as part of 2018 decision.
4. GWPS: Groundwater Protection Standard.
5. µg/L: Micrograms per liter.
6. mg/L: Milligrams per liter.
7. pCi/L: Picocuries per liter.

**TABLE 4-6**
**SUMMARY OF GWPS EXCEEDANCES**
**LANDFILL RUNOFF COLLECTION POND**
**CCR GROUNDWATER MONITORING PROGRAM**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

| Well ID | Potential Exceedance Parameter (Units) | 14th Assessment Monitoring Sampling Event March 2025 | | 14th Assessment Monitoring Resampling Event June 2025 | | 15th Assessment Monitoring Sampling Event September 2025 | | 15th Assessment Monitoring Resampling Event December 2025 | |
|---|---|---|---|---|---|---|---|---|---|
| | | Potential Exceedance Result | GWPS | Potential Exceedance Result | Confirmed Exceedance (Yes/No) | Potential Exceedance Result | GWPS | Potential Exceedance Result | Confirmed Exceedance (Yes/No) |
| **CF-15-07** | Arsenic (ug/L) | 15 | 10 | 19 | **Yes** | 16 | 10 | 10 | No |
| **CF-15-08** | Molybdenum (ug/L) | 270 | 100 | 260 | **Yes** | 270 | 100 | 390 | **Yes** |

Notes:
1. GWPS: Groundwater Protection Standard.
2. µg/L: Micrograms per liter.

**TABLE 5-1**
**GROUNDWATER MONITORING NETWORK**
**WEST BOILER SLAG POND**
**CCR GROUNDWATER MONITORING PROGRAM**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

| Monitoring Well ID | Designation | Date of Installation | Coordinates | | Ground Elevation (ft)[2] | Top of Casing Elevation (ft)[2] | Top of Screen Elevation (ft) | Base of Screen Elevation (ft) | Total Depth From Top of Casing (ft) |
|---|---|---|---|---|---|---|---|---|---|
| | | | Northing | Easting | | | | | |
| **CF-15-04** | Background | 12/3/2015 | 451482.81 | 569307.19 | 465.55 | 468.03 | 439.55 | 429.55 | 38.48 |
| **CF-15-05** | Background | 12/1/2015 | 447491.91 | 565533.64 | 439.85 | 442.58 | 422.85 | 412.85 | 29.73 |
| **CF-15-06** | Background | 11/30/2015 | 447026.92 | 565190.31 | 437.49 | 440.40 | 431.49 | 421.49 | 18.91 |
| **WBSP-15-01** | Upgradient | 11/30/2015 | 449072.27 | 566322.12 | 466.93 | 469.36 | 458.93 | 448.93 | 20.43 |
| **WBSP-15-02** | Upgradient | 11/11/2015 | 449803.91 | 566987.30 | 473.83 | 476.76 | 457.83 | 452.83 | 23.93 |
| **WBSP-15-03** | Upgradient | 12/4/2015 | 451181.98 | 568093.60 | 484.91 | 488.03 | 476.91 | 471.91 | 16.12 |
| **WBSP-15-04a** | Downgradient | 7/28/2021 | 450669.20 | 568855.3 | 472.03 | 474.47 | 418.47 | 408.47 | 68.44 |
| **WBSP-15-05a** | Downgradient | 8/4/2021 | 450072.00 | 568895.20 | 473.66 | 476.20 | 413.20 | 402.20 | 76.54 |
| **WBSP-15-06a** | Downgradient | 8/6/2021 | 449478.8 | 568659.8 | 471.96 | 475.12 | 399.12 | 389.12 | 89.16 |
| **WBSP-15-07** | Downgradient | 11/23/2015 | 448947.93 | 567946.39 | 468.82 | 471.31 | 426.82 | 416.82 | 54.49 |
| **WBSP-15-08** | Downgradient | 11/25/2015 | 448625.46 | 567343.24 | 468.56 | 471.06 | 415.76 | 405.76 | 65.30 |
| **WBSP-15-09** | Downgradient | 1/6/2016 | 448359.31 | 566711.13 | 471.21 | 470.69 | 421.21 | 410.21 | 59.48 |
| **WBSP-15-10** | Downgradient | 1/5/2016 | 448125.51 | 566225.21 | 471.21 | 470.69 | 425.21 | 435.21 | 55.48 |
| **WBSP-24-02** | Downgradient | 2/27/2024 | 448397.38 | 567242.77 | 438.33 | 440.46 | 413.11 | 403.11 | 37.35 |
| **WBSP-24-03** | Downgradient | 2/28/2024 | 448164.66 | 566796.42 | 434.10 | 436.29 | 409.89 | 399.89 | 36.40 |
| **WBSP-24-04** | Downgradient | 2/28/2024 | 447933.77 | 566314.71 | 435.70 | 437.60 | 417.95 | 407.95 | 29.65 |

Notes:
1. The Well locations are referenced to the North American Datum (NAD83), east zone coordinate system.
2. Elevations are referenced to the North American Vertical Datum (NAVD) 1988.

**TABLE 5-2**
**SUMMARY OF SAMPLES COLLECTED DURING 2025**
**WEST BOILER SLAG POND**
**CCR GROUNDWATER MONITORING PROGRAM**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

| Well ID | Designation | Mar-25 | Jun-25 | Sep-25 | Dec-25 |
|---|---|---|---|---|---|
| **CF-15-04** | Background | AM | NS | AM | NS |
| **CF-15-05** | Background | AM | NS | AM | NS |
| **CF-15-06** | Background | AM | NS | Dry | NS |
| **WBSP-15-01** | Upgradient | AM | NS | Dry | NS |
| **WBSP-15-02** | Upgradient | AM | NS | AM | NS |
| **WBSP-15-03** | Upgradient | AM | NS | AM | NS |
| **WBSP-15-04a** | Downgradient | AM | AM | AM | AM |
| **WBSP-15-05a** | Downgradient | AM | AM | AM | AM |
| **WBSP-15-06a** | Downgradient | AM | AM | AM | AM |
| **WBSP-15-07** | Downgradient | AM | AM | AM | AM |
| **WBSP-15-08** | Downgradient | AM | AM | AM | AM |
| **WBSP-15-09** | Downgradient | AM | AM | AM | AM |
| **WBSP-15-10** | Downgradient | AM | AM | AM | NS |
| **WBSP-24-02** | Downgradient | AM | NS | AM | AM |
| **WBSP-24-03** | Downgradient | AM | AM | AM | AM |
| **WBSP-24-04** | Downgradient | AM | AM | AM | AM |

Notes:
1. AM: Assessment Monitoring.
2. Dry: Well Dry and Not Sampled.
3. NS: Not Sampled; Not Required.

**TABLE 5-3**
**SUMMARY OF MEASURED FIELD PARAMETERS DURING 2025**
**WEST BOILER SLAG POND**
**CCR GROUNDWATER MONITORING PROGRAM**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

| Sample ID | Date | Temperature (°C) | Conductivity (µohms/cm) | pH (S.U.) | Oxidation Reduction Potential (mV) | Dissolved Oxygen (mg/L) | Turbidity (NTUs) |
|---|---|---|---|---|---|---|---|
| **CF-15-04** | Mar-25 | 9.20 | 556 | 7.59 | 126 | 11.2 | 0.00 |
| **CF-15-05** | Mar-25 | 12.72 | 875 | 7.58 | 212 | 0.84 | 4.65 |
| **CF-15-06** | Mar-25 | 11.79 | 1110 | 7.53 | 202 | 4.21 | 3.76 |
| **WBSP-15-01** | Mar-25 | 11.51 | 999 | 7.10 | 325 | 16.5 | 4.80 |
| **WBSP-15-02** | Mar-25 | 15.02 | 1590 | 7.00 | 313 | 15.42 | 4.90 |
| **WBSP-15-03** | Mar-25 | 12.20 | 875 | 7.29 | 220 | 17.42 | 3.50 |
| **WBSP-15-04a** | Mar-25 | 18.94 | 913 | 7.09 | 228 | 6.49 | 22.5 |
| **WBSP-15-05a** | Mar-25 | 19.42 | 952 | 7.52 | 104 | 0.00 | 0.00 |
| **WBSP-15-06a** | Mar-25 | 24.15 | 777 | 7.14 | -154 | 0.00 | 4.20 |
| **WBSP-15-07** | Mar-25 | 15.99 | 1190 | 6.75 | -105 | 3.07 | 164 |
| **WBSP-15-08** | Mar-25 | 18.91 | 730 | 6.57 | -94 | 12.52 | 264 |
| **WBSP-15-09** | Mar-25 | 17.58 | 609 | 6.80 | -122 | 2.94 | 94.2 |
| **WBSP-15-10** | Mar-25 | 10.33 | 570 | 6.18 | 10 | 0.00 | 54.1 |
| **WBSP-24-02** | Mar-25 | 9.81 | 636 | 6.68 | -64 | 5.15 | 37.1 |
| **WBSP-24-03** | Mar-25 | 13.06 | 1010 | 6.64 | -113 | 0.67 | 98.7 |
| **WBSP-24-04** | Mar-25 | 8.55 | 1240 | 6.52 | -150 | 0.00 | 21.9 |
| **WBSP-15-04a** | Jun-25 | 17.01 | 1260 | 6.90 | 313 | 0.90 | 2.00 |
| **WBSP-15-05a** | Jun-25 | 24.16 | 1200 | 7.41 | 130 | 1.06 | 0.00 |
| **WBSP-15-06a** | Jun-25 | 24.87 | 1060 | 6.50 | -119 | 0.90 | 0.00 |
| **WBSP-15-07** | Jun-25 | 17.04 | 1560 | 7.47 | -155 | 0.00 | 3.30 |
| **WBSP-15-08** | Jun-25 | 23.34 | 919 | 7.12 | -155 | 0.00 | 4.70 |
| **WBSP-15-09** | Jun-25 | 28.74 | 737 | 7.34 | -164 | 0.00 | 4.70 |
| **WBSP-15-10** | Jun-25 | 24.90 | 713 | 6.26 | -15 | 0.56 | 0.00 |
| **WBSP-24-03** | Jun-25 | 24.31 | 1360 | 6.78 | -158 | 0.36 | 2.31 |
| **WBSP-24-04** | Jun-25 | 24.10 | 1530 | 6.64 | -162 | 0.26 | 3.92 |
| **CF-15-04** | Sep-25 | 17.36 | 689 | 6.76 | 374 | 5.43 | 4.71 |
| **CF-15-05** | Oct-25 | 17.42 | 973 | 6.48 | 292 | 0.00 | 4.80 |
| **CF-15-06** | WELL DRY | | | | | | |
| **WBSP-15-01** | WELL DRY | | | | | | |
| **WBSP-15-02** | Sep-25 | 18.57 | 1640 | 6.79 | 325 | 1.09 | 4.88 |
| **WBSP-15-03** | Sep-25 | 17.83 | 1240 | 6.51 | 390 | 1.78 | 4.30 |
| **WBSP-15-04a** | Sep-25 | 24.20 | 916 | 6.70 | 397 | 3.41 | 18.7 |
| **WBSP-15-05a** | Sep-25 | 25.60 | 876 | 7.31 | 286 | 3.89 | 3.18 |
| **WBSP-15-06a** | Sep-25 | 15.92 | 1040 | 7.34 | -164 | 0.67 | 3.58 |
| **WBSP-15-07** | Sep-25 | 29.97 | 1320 | 6.76 | -95 | 1.16 | 45.2 |
| **WBSP-15-08** | Sep-25 | 21.10 | 755 | 7.11 | -186 | 0.27 | 4.63 |
| **WBSP-15-09** | Sep-25 | 19.82 | 647 | 7.12 | -188 | 0.46 | 4.89 |
| **WBSP-15-10** | Sep-25 | 18.03 | 637 | 6.57 | -55 | 1.30 | 3.98 |
| **WBSP-24-02** | Sep-25 | 24.14 | 1410 | 6.64 | -184 | 0.40 | 4.70 |
| **WBSP-24-03** | Sep-25 | 22.83 | 899 | 7.22 | -189 | 0.48 | 7.78 |
| **WBSP-24-04** | Sep-25 | 20.82 | 1620 | 6.58 | -203 | 0.33 | 4.43 |
| **WBSP-15-04a** | Dec-25 | 8.64 | 1050 | 7.25 | 338 | 1.37 | 4.19 |
| **WBSP-15-05a** | Dec-25 | 8.12 | 1000 | 7.08 | 346 | 1.85 | 3.97 |
| **WBSP-15-06a** | Dec-25 | 8.32 | 950 | 7.10 | 61 | 1.14 | 4.53 |
| **WBSP-15-07** | Dec-25 | 8.39 | 1340 | 7.37 | -133 | 0.66 | 3.19 |
| **WBSP-15-08** | Dec-25 | 8.45 | 758 | 7.15 | -163 | 0.59 | 4.05 |
| **WBSP-15-09** | Dec-25 | 8.66 | 717 | 7.25 | -110 | 0.83 | 3.86 |
| **WBSP-24-02** | Dec-25 | 9.67 | 1370 | 6.68 | -150 | 1.71 | 4.12 |
| **WBSP-24-03** | Dec-25 | 9.36 | 1410 | 6.69 | -148 | 0.45 | 2.85 |
| **WBSP-24-04** | Dec-25 | 8.38 | 1540 | 6.68 | -157 | 0.45 | 3.67 |

Notes:
1. °C: Degrees Celsius.
2. µohms/cm: Micro-ohms per centimeter.
3. S.U.: Standard Units.
4. mV: Millivolts.
5. mg/L: Milligrams per liter.
6. NTUs: Nephelometric Turbidity Units.

**TABLE 5-4**
**SUMMARY OF POTENTIAL AND CONFIRMED APPENDIX III SSIs**
**WEST BOILER SLAG POND**
**CCR GROUNDWATER MONITORING PROGRAM**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

| Well ID | Potential SSI Parameter (Units) | 6th Assessment Monitoring Sampling Event March 2025 | | 6th Assessment Monitoring Resampling Event June 2025 | | 7th Assessment Monitoring Sampling Event September 2025 | | 7th Assessment Monitoring Resampling Event December 2025 | |
|---|---|---|---|---|---|---|---|---|---|
| | | Potential SSI Result | UTL | Potential SSI Result | Confirmed SSI (Yes/No) | Potential SSI Result | UTL | Potential SSI Result | Confirmed SSI (Yes/No) |
| **WBSP-15-04a** | Boron (mg/L) | NA | NA | NA | NA | 0.39 | 0.21 | 0.44 | **Yes** |
| **WBSP-15-05a** | | NA | NA | NA | NA | 1.7 | | 1.7 | **Yes** |
| **WBSP-15-06a** | | NA | NA | NA | NA | 0.90 | | 1.1 | **Yes** |
| **WBSP-15-09** | Fluoride (mg/L) | 0.72 | 0.59 | 0.77 | **Yes** | 0.72 | 0.59 | 0.64 | **Yes** |

Notes:
1. SSI: Statistically Significant Increase.
2. UTL: Upper Tolerance Limit (Pooled Interwell UTL).
3. mg/L: Milligrams per liter.
4. NA: Not Applicable.

**TABLE 5-5**
**GROUNDWATER PROTECTION STANDARDS**
**WEST BOILER SLAG POND**
**CCR GROUNDWATER MONITORING PROGRAM**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

| Appendix IV Constituents | | | |
|---|---|---|---|
| **Constituent (Units)** | **Background** | **MCL/SMCL** | **GWPS** |
| Antimony, Sb (µg/L) | 2 | 6 | 6 |
| Arsenic, As (µg/L) | 6.0 | 10 | 10 |
| Barium, Ba (µg/L) | 94 | 2000 | 2000 |
| Beryllium, Be (µg/L) | 1.1 | 4 | 4 |
| Cadmium, Cd (µg/L) | 1.0 | 5 | 5 |
| Chromium, Cr (µg/L) | 5 | 100 | 100 |
| Cobalt, Co (µg/L) | 1.6 | 6* | 6 |
| Fluoride, F (mg/L) | 0.62 | 4 | 4 |
| Lead, Pb (µg/L) | 2.6 | 15* | 15 |
| Lithium, Li (mg/L) | 0.03 | 0.04* | 0.04 |
| Mercury, Hg (µg/L) | 1.2 | 2 | 2 |
| Molybdenum, Mo (µg/L) | 5 | 100* | 100 |
| Radium 226 & 228 (combined) (pCi/L) | 8 | 5 | 8 |
| Selenium, Se (µg/L) | 5 | 50 | 50 |
| Thallium, Tl (µg/L) | 1.0 | 2 | 2 |

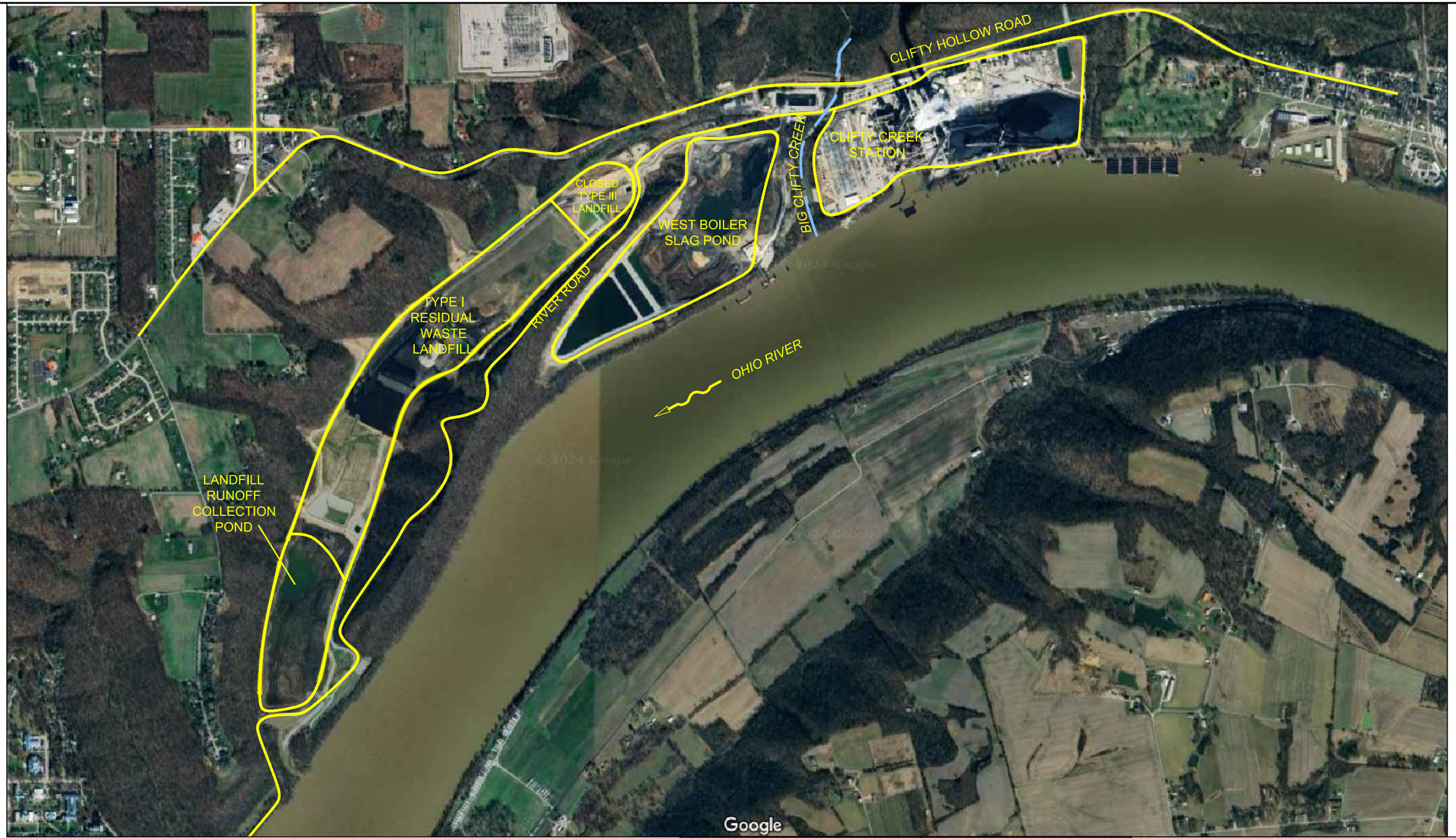
Notes:
1. MCL: Maximum Contaminant Level.
2. SMCL: Secondary Maximum Contaminant Level.
3. *: Established by U.S. EPA as part of 2018 decision.
4. GWPS: Groundwater Protection Standard.
5. µg/L: Micrograms per liter.
6. mg/L: Milligrams per liter.
7. pCi/L: Picocuries per liter.

**TABLE 5-6**
**SUMMARY OF GWPS EXCEEDANCES**
**WEST BOILER SLAG POND**
**CCR GROUNDWATER MONITORING PROGRAM**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

| Well ID | Potential Exceedance Parameter (Units) | 6th Assessment Monitoring Sampling Event March 2025 | | 6th Assessment Monitoring Resampling Event June 2025 | | 7th Assessment Monitoring Sampling Event September 2025 | | 7th Assessment Monitoring Resampling Event December 2025 | |
|---|---|---|---|---|---|---|---|---|---|
| | | Potential Exceedance Result | GWPS | Potential Exceedance Result | Confirmed Exceedance (Yes/No) | Potential Exceedance Result | GWPS | Potential Exceedance Result | Confirmed Exceedance (Yes/No) |
| **WBSP-15-04a** | Cobalt (ug/L) | NA | NA | NA | NA | 7.8 | 6 | 4.9 | No |
| **WBSP-15-06a** | Arsenic (ug/L) | NA | NA | NA | NA | 19 | 10 | 25 | **Yes** |
| **WBSP-15-07** | Arsenic (ug/L) | 45 | 10 | 57 | **Yes** | 35 | 10 | 24 | **Yes** |
| **WBSP-15-08** | Arsenic (ug/L) | 69 | 10 | 95 | **Yes** | 91 | 10 | 21 | **Yes** |
| | Combined Radium 226/228 (pCi/L) | NA | NA | NA | NA | 8.05 | 8 | 5 U | No |
| **WBSP-15-09** | Arsenic (ug/L) | 14 | 10 | 26 | **Yes** | 20 | 10 | 12 | **Yes** |
| **WBSP-15-10** | Cobalt (ug/L) | 10 | 6 | 2.3 | No | NA | NA | NA | NA |
| **WBSP-24-02** | Arsenic (ug/L) | 25 | 10 | 18 | **Yes** | 49 | 10 | 48 | **Yes** |
| **WBSP-24-03** | | 42 | | 51 | **Yes** | 61 | | 27 | **Yes** |
| **WBSP-24-04** | | 70 | | 74 | **Yes** | 79 | | 99 | **Yes** |

Notes:
1. GWPS: Groundwater Protection Standard.
2. pCi/L: Picocuries per liter.
3. U: Non-detect.
4. ug/L: Micrograms per liter.

**FIGURES**




1200' 0' 1200' 2400'

SCALE: 1"= 1200'

| | |
|---|---|
| DRAWN BY | JM, MST |
| DATE | |
| CHECKED BY | |
| JOB NO. | 2024087-5-CLI |
| DWG FILE | 1_IDEM_Clifty_NEendAssess2024_SiteLoc.dwg |
| DRAWING SCALE | AS SHOWN |

AGES
Applied Geology And Environmental Science, Inc.
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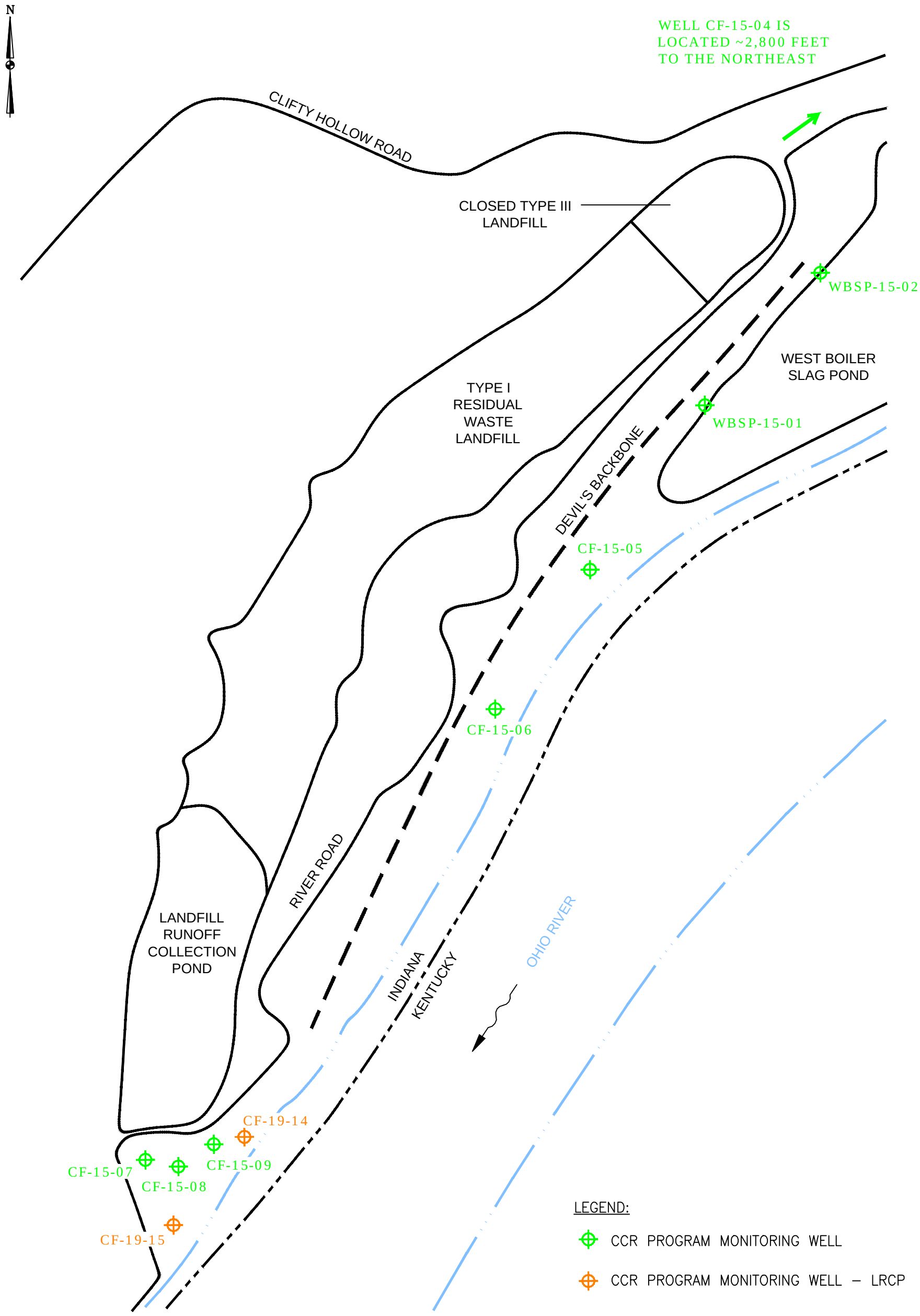
INDIANA-KENTUCKY ELECTRIC CORPORATION

CLIFTY CREEK STATION
MADISON, INDIANA
SITE LOCATION MAP

| DRAWING NAME | REV. |
|---|---|
| FIGURE 1 | 0 |




| | |
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| DRAWN BY | JM |
| DATE | |
| CHECKED BY | |
| JOB NO. | 2020010-CLIFTY |
| DWG FILE | 2_2020_IKEC_Clifty_GW MW LOCs_LANDFILL b01.dwg |
| DRAWING SCALE | NOT TO SCALE |

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INDIANA–KENTUCKY ELECTRIC CORPORATION

CLIFTY CREEK STATION
MADISON, INDIANA
TYPE I RESIDUAL WASTE LANDFILL AND
LANDFILL RUNOFF COLLECTION POND
MONITORING WELL LOCATION MAP

| DRAWING NAME | REV. |
|---|---|
| FIGURE 2 | 0 |

CLIFTY HOLLOW ROAD

WBSP-15-03

WBSP-15-04a

CREEK

CLIFTY

CLIFTY CREEK
STATION

N

WBSP-15-05a

BIG

CLOSED TYPE III
LANDFILL

WBSP-15-02

WBSP-15-06a

WEST BOILER
SLAG POND

TYPE I RESIDUAL
WASTE LANDFILL

RIVER ROAD

WBSP-15-07

WBSP-15-01

WBSP-15-08

DEVIL'S BACKBONE

WBSP-15-09

WBSP-24-02

INDIANA

KENTUCKY

WBSP-15-10

WBSP-24-03

OHIO RIVER

WBSP-24-04

LEGEND:

CCR PROGRAM MONITORING WELL

CCR PROGRAM PROPERTY BOUNDARY MONITORING WELL

400' 0' 400' 800'

SCALE: 1"= 400'

| | |
|---|---|
| DATE | |
| CHECKED BY | |
| JOB NO. | 2022013-CLI |
| DWG FILE | 3_2022_IKEC-IDEM_WBSP_2022 GW+CA rpt_MWs.dwg |
| DRAWING SCALE | AS SHOWN |

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INDIANA-KENTUCKY ELECTRIC CORPORATION

CLIFTY CREEK STATION
MADISON, INDIANA
WEST BOILER SLAG POND
MONITORING WELL LOCATION MAP

DRAWING NAME: FIGURE 3

REV.: 0

Plot: 12/21/2022 14:19 _PROGRAMS-IKEC\Clifty Creek-CCR Program\CAD\2022 GW Monitoring-Corrective Action Rpt\3_2025_IKEC-IDEM_WBSP_2025 GW+CA rpt_MWs\well loc

# APPENDIX A

# GROUNDWATER ELEVATIONS

**TABLE A-1**
**SUMMARY OF GROUNDWATER ELEVATION DATA DURING 2025**
**TYPE I RESIDUAL WASTE LANDFILL**
**CCR GROUNDWATER MONITORING PROGRAM**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

| Well ID | Mar-25 | Jun-25 | Sep-25 | Dec-25 |
|---|---|---|---|---|
| | Groundwater Elevation (feet) | | | |
| **CF-15-04** | 438.64 | 438.20 | 437.59 | 438.22 |
| **CF-15-05** | 436.18 | 433.14 | 430.07 | 427.71 |
| **CF-15-06** | 428.39 | 423.45 | DRY | DRY |
| **CF-15-07** | 437.71 | 438.40 | 438.08 | 439.00 |
| **CF-15-08** | 450.01 | 451.25 | 450.67 | 449.72 |
| **CF-15-09** | 451.02 | 450.39 | 449.74 | 447.96 |
| **WBSP-15-01** | 458.66 | 452.33 | DRY | 450.58 |
| **WBSP-15-02** | 469.15 | 463.05 | 458.65 | 454.68 |
| **CF-19-14** | 448.84 | 447.59 | 445.89 | 444.37 |
| **CF-19-15** | 423.62 | 428.03 | 420.13 | 420.45 |

**TABLE A-2**
**SUMMARY OF GROUNDWATER ELEVATION DATA DURING 2025**
**LANDFILL RUNOFF COLLECTION POND**
**CCR GROUNDWATER MONITORING PROGRAM**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

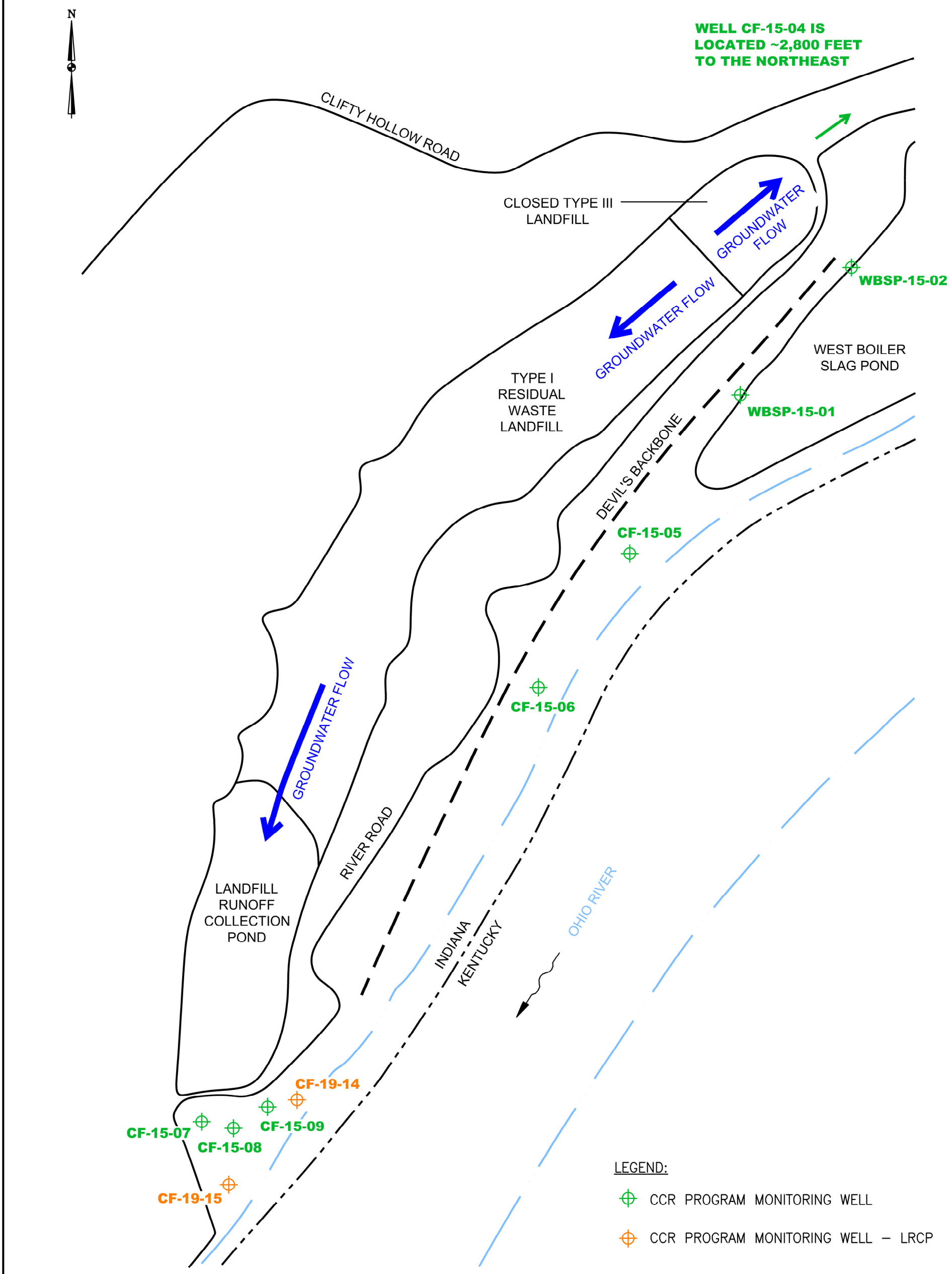
| Well ID | Mar-25 | Jun-25 | Sep-25 | Dec-25 |
|---|---|---|---|---|
| | Groundwater Elevation (feet) | | | |
| **CF-15-04** | 438.64 | 438.20 | 437.59 | 438.22 |
| **CF-15-05** | 436.18 | 433.14 | 430.07 | 427.71 |
| **CF-15-06** | 428.39 | 423.45 | DRY | DRY |
| **CF-15-07** | 437.71 | 438.40 | 438.08 | 439.00 |
| **CF-15-08** | 450.01 | 451.25 | 450.67 | 449.72 |
| **CF-15-09** | 451.02 | 450.39 | 449.74 | 447.96 |
| **WBSP-15-01** | 458.66 | 452.33 | DRY | 450.58 |
| **WBSP-15-02** | 469.15 | 463.05 | 458.65 | 454.68 |
| **CF-19-14** | 448.84 | 447.59 | 445.89 | 444.37 |
| **CF-19-15** | 423.62 | 428.03 | 420.13 | 420.45 |

**TABLE A-3**
**SUMMARY OF GROUNDWATER ELEVATION DATA DURING 2025**
**WEST BOILER SLAG POND**
**CCR GROUNDWATER MONITORING PROGRAM**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

| Well ID | Mar-25 | Jun-25 | Sep-25 | Dec-25 |
|---|---|---|---|---|
| | Groundwater Elevation (feet) | | | |
| **CF-15-04** | 438.64 | 438.20 | 437.59 | 438.22 |
| **CF-15-05** | 436.18 | 433.14 | 430.07 | 427.71 |
| **CF-15-06** | 428.39 | 423.45 | DRY | DRY |
| **WBSP-15-01** | 458.66 | 452.33 | DRY | 450.58 |
| **WBSP-15-02** | 469.15 | 463.05 | 458.65 | 454.68 |
| **WBSP-15-03** | 476.78 | 476.82 | 474.68 | 476.70 |
| **WBSP-15-04a** | 421.92 | 421.23 | 417.93 | 418.78 |
| **WBSP-15-05a** | 424.25 | 423.59 | 420.39 | 420.24 |
| **WBSP-15-06a** | 424.55 | 423.92 | 420.77 | 421.28 |
| **WBSP-15-07** | 427.92 | 430.63 | 429.98 | 427.88 |
| **WBSP-15-08** | 430.17 | 431.96 | 431.89 | 430.57 |
| **WBSP-15-09** | 428.34 | 429.46 | 429.13 | 427.23 |
| **WBSP-15-10** | 422.69 | 429.87 | 428.79 | 426.77 |
| **WBSP-24-02** | 429.06 | 429.38 | 428.67 | 427.15 |
| **WBSP-24-03** | 428.24 | 427.26 | 421.18 | 419.35 |
| **WBSP-24-04** | 426.60 | 426.31 | 425.11 | 423.11 |

# APPENDIX B

# GROUNDWATER FLOW MAPS




| | |
|---|---|
| DRAWN BY | JM |
| DATE | |
| CHECKED BY | |
| JOB NO. | 2022013–CLIFTY |
| DWG FILE | B–1_IKEC_Clifty_GW Flow_Appx B_LANDFILL_MAR–SEPT 2022.dwg |
| DRAWING SCALE | NOT TO SCALE |

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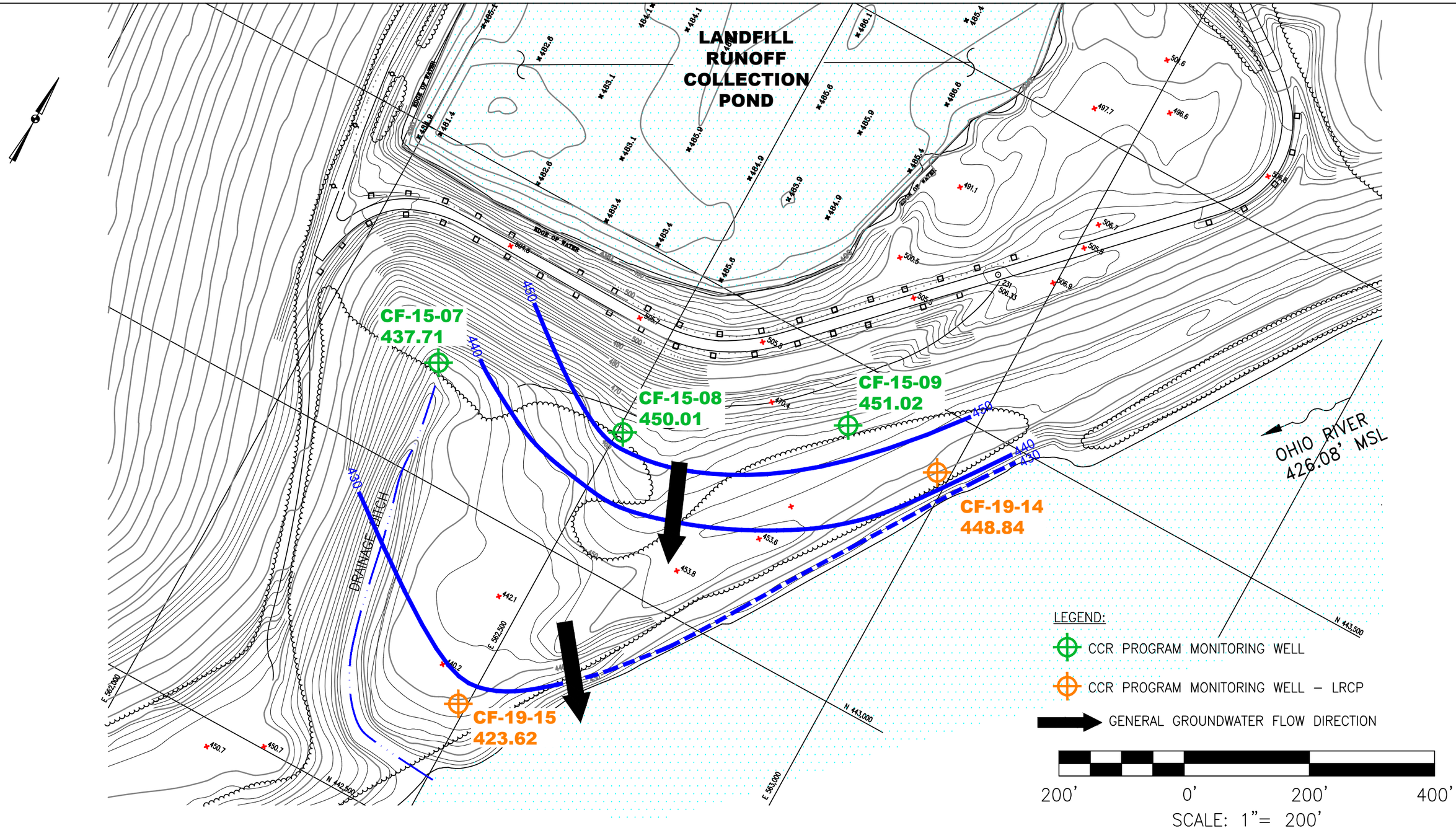
CLIFTY CREEK STATION
MADISON, INDIANA
TYPE I RESIDUAL WASTE LANDFILL AND
LANDFILL RUNOFF COLLECTION POND
GENERALIZED GROUNDWATER FLOW
UPPERMOST AQUIFER – MARCH 2025/SEPTEMBER 2025

| DRAWING NAME | REV. |
|---|---|
| FIGURE B–1 | 0 |

Plot: 12/21/2022 14:24 \Clifty Creek–CCR Program\CAD\2022 GW Monitoring & Corrective Action Rpt\B–1_IKEC_Clifty GW Flow_Appx B_LANDFILL_MAR–SEPT 2022.dwg




NOTE:
WELLS CF-19-14 AND CF-19-15 WERE INSTALLED IN MARCH 2019 DURING THE CHARACTERIZATION OF THE LRCP.

| | |
|---|---|
| DRAWN BY | GRM |
| DATE | 12-17-2025 |
| CHECKED BY | |
| JOB NO. | 2025023 |
| DWG FILE | 2025023_B-2_IKEC_CLIFTY_ASD 8 LF_GW FLOW_2025.DWG |
| DRAWING SCALE | AS SHOWN |

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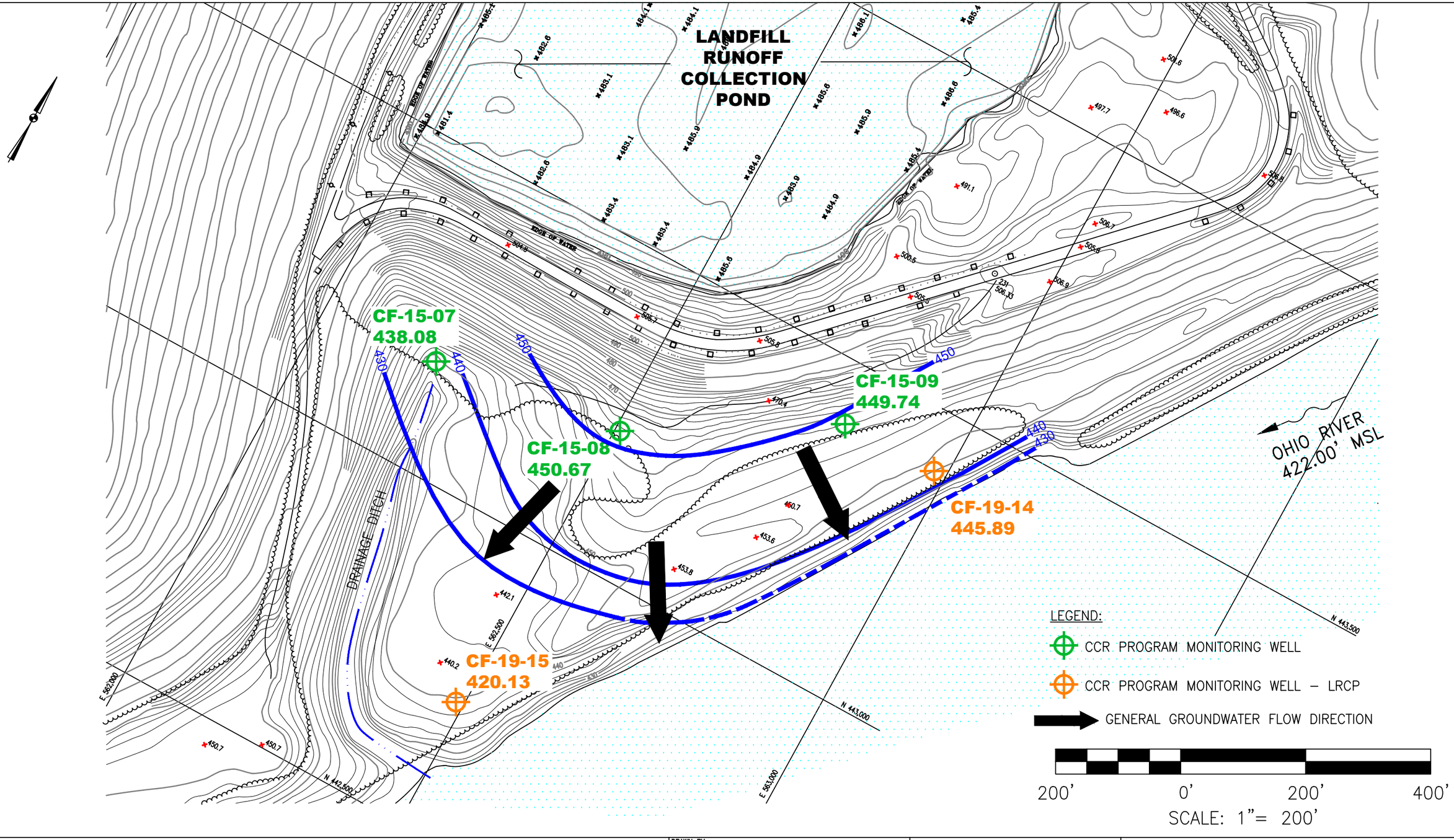
CLIFTY CREEK STATION
MADISON, INDIANA
CCR PROGRAM
TYPE I RESIDUAL WASTE LANDFILL AND
LANDFILL RUNOFF COLLECTION POND
GROUNDWATER FLOW – UPPERMOST AQUIFER
MARCH 2025

| DRAWING NAME | REV. |
|---|---|
| FIGURE B-2 | 0 |

PLOTTED: 1/7/2026 C:\USERS\TRAVISSITKO\APPDATA\LOCAL\MICROSOFT\WINDOWS\INETCACHE\CONTENT.OUTLOOK\2QRAL6OT\2025023_B-2_IKEC_CLIFTY_ASD 8 LF_GW FLOW_2025.DWG




NOTE:
WELLS CF-19-14 AND CF-19-15 WERE INSTALLED IN MARCH 2019 DURING THE CHARACTERIZATION OF THE LRCP.

| | |
|---|---|
| DRAWN BY | GRM |
| DATE | 12-26-2024 |
| CHECKED BY | |
| JOB NO. | 2025023 |
| DWG FILE | 2025023_B-3_IKEC_CLIFTY_ASD 9 LRCP_GW FLOW_2025.DWG |
| DRAWING SCALE | AS SHOWN |

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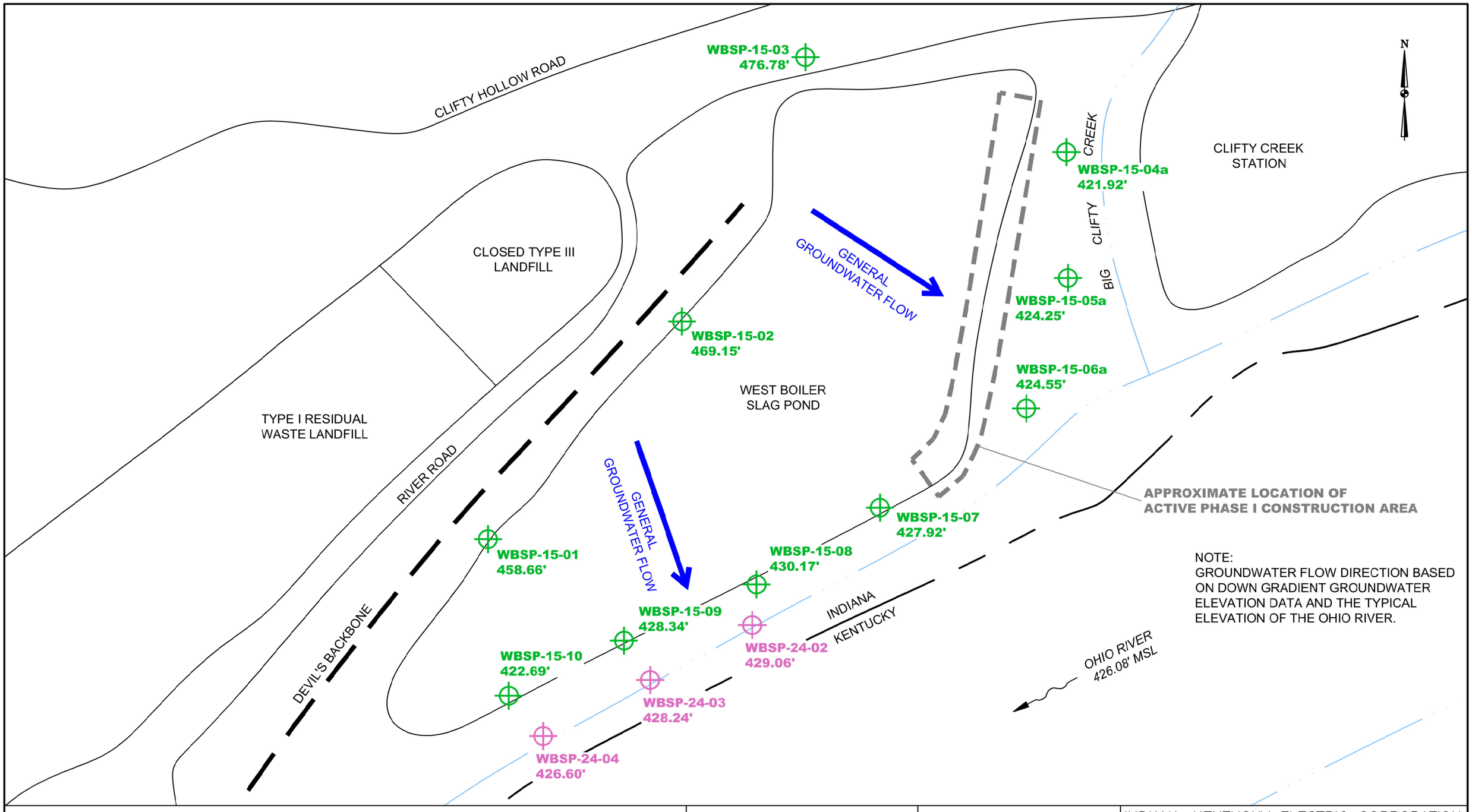
CLIFTY CREEK STATION
MADISON, INDIANA
CCR PROGRAM
TYPE I RESIDUAL WASTE LANDFILL AND
LANDFILL RUNOFF COLLECTION POND
GROUNDWATER FLOW – UPPERMOST AQUIFER
SEPTEMBER 2025

| DRAWING NAME | REV. |
|---|---|
| FIGURE B-3 | 0 |

PLOTTED: 1/7/2026 C:\USERS\TRAVISSITKO\APPDATA\LOCAL\MICROSOFT\WINDOWS\INETCACHE\CONTENT.OUTLOOK\2QRAL6OT\2025023_B-3_IKEC_CLIFTY_ASD 9 LRCP_GW FLOW_2025.DWG




LEGEND:

- CCR PROGRAM MONITORING WELL
- CCR PROGRAM BOUNDARY MONITORING WELL
- GROUNDWATER FLOW DIRECTION

400' 0' 400' 800'

SCALE: 1"= 400'

| | |
|---|---|
| DATE | |
| CHECKED BY | |
| JOB NO. | 2022013-CLI |
| DWG FILE | B-4_IKEC-Clifty_GW Flow_Appx B_Annual GW Rpt_MAR22_WBSP.dwg |
| DRAWING SCALE | AS SHOWN |

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CLIFTY CREEK STATION
MADISON, INDIANA
WEST BOILER SLAG POND
GROUNDWATER LEVELS AND FLOW DIRECTION
MARCH 2025

DRAWING NAME: FIGURE B-4

REV. 0

Plot: 01/09/2024 14:47 _PROGRAMS-IKEC\IKEC-CCR Program\CAD\2023 GW Monitoring-Corrective Action Rpt\B-4_IKEC-Clifty_GW Flow_Appx B_Annual GW Rpt_MAR23_WBSP\well loc

CLIFTY HOLLOW ROAD

WBSP-15-03
474.68'

CLOSED TYPE III
LANDFILL

TYPE I RESIDUAL
WASTE LANDFILL

RIVER ROAD

DEVIL'S BACKBONE

WBSP-15-02
458.65'

WBSP-15-01
DRY

WBSP-15-10
428.79'

WBSP-24-03
421.18'

WBSP-24-04
425.11'

GENERAL
GROUNDWATER FLOW

GENERAL
GROUNDWATER FLOW

WEST BOILER
SLAG POND

CLIFTY CREEK

BIG CLIFTY CREEK

WBSP-15-04a
417.93'

WBSP-15-05a
420.39'

WBSP-15-06a
420.77'

WBSP-15-07
429.98'

WBSP-15-08
431.89'

WBSP-15-09
429.13'

WBSP-24-02
428.67'

INDIANA
KENTUCKY

OHIO RIVER
422.00' MSL

CLIFTY CREEK
STATION

N

APPROXIMATE LOCATION OF
ACTIVE PHASE I CONSTRUCTION AREA

NOTE:
GROUNDWATER FLOW DIRECTION BASED ON DOWN GRADIENT GROUNDWATER ELEVATION DATA AND THE TYPICAL ELEVATION OF THE OHIO RIVER.

LEGEND:

- CCR PROGRAM MONITORING WELL
- CCR PROGRAM BOUNDARY MONITORING WELL
- GROUNDWATER FLOW DIRECTION

400' 0' 400' 800'
SCALE: 1"= 400'

| | |
|---|---|
| DATE | |
| CHECKED BY | |
| JOB NO. | 2022013-CLI |
| DWG FILE | B-4_IKEC-Clifty_GW Flow_Appx B_Annual GW Rpt_MAR22_WBSP.dwg |
| DRAWING SCALE | AS SHOWN |

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INDIANA-KENTUCKY ELECTRIC CORPORATION

CLIFTY CREEK STATION
MADISON, INDIANA
WEST BOILER SLAG POND
GROUNDWATER LEVELS AND FLOW DIRECTION
SEPTEMBER 2025

DRAWING NAME: FIGURE B-5

REV. 0

Plot: 01/09/2024 14:47 _PROGRAMS-IKEC\IKEC-CCR Program\CAD\2023 GW Monitoring-Corrective Action Rpt\B-4_IKEC-Clifty_GW Flow_Appx B_Annual GW Rpt_MAR23_WBSP\well loc

# APPENDIX C

# APPENDIX III AND APPENDIX IV CONSTITUENTS

**APPENDIX III AND APPENDIX IV CONSTITUENTS**
**TYPE I RESIDUAL WASTE LANDFILL AND LANDFILL RUNOFF COLLECTION POND AND WEST BOILER SLAG POND**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

| Appendix III Constituents |
|---|
| Boron, B |
| Calcium, Ca |
| Chloride, Cl |
| Fluoride, F |
| pH (units=SU) |
| Sulfate, SO4 |
| Total Dissolved Solids (TDS) |
| **Appendix IV Constituents** |
| Antimony, Sb |
| Arsenic, As |
| Barium, Ba |
| Beryllium, Be |
| Cadmium, Cd |
| Chromium, Cr |
| Cobalt, Co |
| Fluoride, F |
| Lithium, Li |
| Lead, Pb |
| Mercury, Hg |
| Molybdenum, Mo |
| Radium 226 & 228 (combined)(units=pCi/L) |
| Selenium, Se |
| Thallium, Tl |

# APPENDIX D

# ANALYTICAL RESULTS

**CF-15-04**
**SUMMARY OF 2025 ANALYTICAL RESULTS**
**Indiana-Kentucky Electric Corporation**
**Clifty Creek Station**
**Madison, Indiana**

| Parameter | Units | Mar-25 | Sep-25 |
|---|---|---|---|
| **Appendix III Constituents** | | | |
| Boron, B | mg/L | 0.024 | 0.054 |
| Calcium, Ca | mg/L | 64 | 81 |
| Chloride, Cl | mg/L | 49 | 50 |
| Fluoride, F | mg/L | 0.14 | 0.19 |
| pH | s.u. | 7.59 | 6.76 |
| Sulfate, SO4 | mg/L | 30 | 40 |
| Total Dissolved Solids (TDS) | mg/L | 310 | 370 |
| **Appendix IV Constituents** | | | |
| Antimony, Sb | ug/L | 1 U | 1 U |
| Arsenic, As | ug/L | 1 U | 0.39 J |
| Barium, Ba | ug/L | 43 | 52 |
| Beryllium, Be | ug/L | 0.70 U | 0.70 U |
| Cadmium, Cd | ug/L | 0.50 U | 0.50 U |
| Chromium, Cr | ug/L | 1.5 U | 1.5 U |
| Cobalt, Co | ug/L | 0.19 J | 0.13 J |
| Fluoride, F | mg/L | 0.14 | 0.19 |
| Lead, Pb | ug/L | 0.26 J | 1 U |
| Lithium, Li | mg/L | 0.004 U | 0.0014 J |
| Mercury, Hg | ug/L | 0.20 U | 0.20 U |
| Molybdenum, Mo | ug/L | 1.1 | 1.1 |
| Radium 226 & 228 (combined) | pCi/L | 5 U | 5 U |
| Selenium, Se | ug/L | 1 U | 0.44 J |
| Thallium, Tl | ug/L | 0.082 J | 0.2 U |

**CF-15-05**
**SUMMARY OF 2025 ANALYTICAL RESULTS**
**Indiana-Kentucky Electric Corporation**
**Clifty Creek Station**
**Madison, Indiana**

| Parameter | Units | Mar-25 | Sep-25 |
|---|---|---|---|
| **Appendix III Constituents** | | | |
| Boron, B | mg/L | 0.11 | 0.13 |
| Calcium, Ca | mg/L | 110 | 110 |
| Chloride, Cl | mg/L | 30 | 31 |
| Fluoride, F | mg/L | 0.52 | 0.58 |
| pH | s.u. | 7.58 | 6.48 |
| Sulfate, SO4 | mg/L | 45 | 47 |
| Total Dissolved Solids (TDS) | mg/L | 490 | 520 |
| **Appendix IV Constituents** | | | |
| Antimony, Sb | ug/L | 1 U | 5 U |
| Arsenic, As | ug/L | 0.82 J | 5 U |
| Barium, Ba | ug/L | 54 | 43 |
| Beryllium, Be | ug/L | 0.70 U | 3.5 U |
| Cadmium, Cd | ug/L | 0.50 U | 2.5 U |
| Chromium, Cr | ug/L | 3.9 | 7.5 U |
| Cobalt, Co | ug/L | 1.2 | 0.53 J |
| Fluoride, F | mg/L | 0.52 | 0.58 |
| Lead, Pb | ug/L | 0.97 J | 5 U |
| Lithium, Li | mg/L | 0.017 | 0.018 J |
| Mercury, Hg | ug/L | 0.20 U | 0.20 U |
| Molybdenum, Mo | ug/L | 0.59 J | 5 U |
| Radium 226 & 228 (combined) | pCi/L | 1.35 | 5 U |
| Selenium, Se | ug/L | 1 U | 5 U |
| Thallium, Tl | ug/L | 0.20 U | 1 U |

Notes:
NS: Well not sampled.

**CF-15-06**
**SUMMARY OF 2025 ANALYTICAL RESULTS**
**Indiana-Kentucky Electric Corporation**
**Clifty Creek Station**
**Madison, Indiana**

| Parameter | Units | Mar-25 | Sep-25 |
|---|---|---|---|
| **Appendix III Constituents** | | | |
| Boron, B | mg/L | 0.084 | NS |
| Calcium, Ca | mg/L | 130 | NS |
| Chloride, Cl | mg/L | 3.8 | NS |
| Fluoride, F | mg/L | 0.3 | NS |
| pH | s.u. | 7.53 | NS |
| Sulfate, SO4 | mg/L | 69 | NS |
| Total Dissolved Solids (TDS) | mg/L | 530 | NS |
| **Appendix IV Constituents** | | | |
| Antimony, Sb | ug/L | 1 U | NS |
| Arsenic, As | ug/L | 1 U | NS |
| Barium, Ba | ug/L | 32 | NS |
| Beryllium, Be | ug/L | 0.70 U | NS |
| Cadmium, Cd | ug/L | 0.50 U | NS |
| Chromium, Cr | ug/L | 1.5 U | NS |
| Cobalt, Co | ug/L | 0.38 | NS |
| Fluoride, F | mg/L | 0.3 | NS |
| Lead, Pb | ug/L | 1 U | NS |
| Lithium, Li | mg/L | 0.011 | NS |
| Mercury, Hg | ug/L | 0.20 U | NS |
| Molybdenum, Mo | ug/L | 0.32 J | NS |
| Radium 226 & 228 (combined) | pCi/L | 5 U | NS |
| Selenium, Se | ug/L | 2 | NS |
| Thallium, Tl | ug/L | 0.20 U | NS |

Notes:
NS: Well not sampled.

**CF-15-07**
**SUMMARY OF 2025 ANALYTICAL RESULTS**
**Indiana-Kentucky Electric Corporation**
**Clifty Creek Station**
**Madison, Indiana**

| Parameter | Units | Mar-25 | Jun-25 | Sep-25 | Dec-25 |
|---|---|---|---|---|---|
| **Appendix III Constituents** | | | | | |
| Boron, B | mg/L | 0.035 | NA | 0.052 | NA |
| Calcium, Ca | mg/L | 170 | NA | 170 | NA |
| Chloride, Cl | mg/L | 4 | NA | 5.6 | NA |
| Fluoride, F | mg/L | 0.3 | NA | 0.38 | NA |
| pH | s.u. | 7.48 | NA | 6.5 | NA |
| Sulfate, SO4 | mg/L | 3.5 J | NA | 2.9 J | NA |
| Total Dissolved Solids (TDS) | mg/L | 630 | NA | 670 | NA |
| **Appendix IV Constituents** | | | | | |
| Antimony, Sb | ug/L | 1 U | NA | 5 U | NA |
| Arsenic, As | ug/L | 15 | 19 | 16 | 10 |
| Barium, Ba | ug/L | 91 | NA | 86 | NA |
| Beryllium, Be | ug/L | 0.70 U | NA | 3.5 U | NA |
| Cadmium, Cd | ug/L | 0.50 U | NA | 2.5 U | NA |
| Chromium, Cr | ug/L | 1.5 U | NA | 7.5 U | NA |
| Cobalt, Co | ug/L | 2.6 | NA | 2.4 | NA |
| Fluoride, F | mg/L | 0.3 | NA | 0.38 | NA |
| Lead, Pb | ug/L | 1 U | NA | 5 U | NA |
| Lithium, Li | mg/L | 0.004 U | NA | 0.02 U | NA |
| Mercury, Hg | ug/L | 0.20 U | NA | 0.20 U | NA |
| Molybdenum, Mo | ug/L | 5.5 | NA | 6.4 | NA |
| Radium 226 & 228 (combined) | pCi/L | 5 U | NA | 5 U | NA |
| Selenium, Se | ug/L | 1 U | NA | 5 U | NA |
| Thallium, Tl | ug/L | 0.20 U | NA | 1 U | NA |

Notes:
NA: Sampling not required for this parameter.
Due to access restrictions (construction) in September, well CF-15-07 was sampled in November and resampling occurred in January 2024.

**CF-15-08**
**SUMMARY OF 2025 ANALYTICAL RESULTS**
**Indiana-Kentucky Electric Corporation**
**Clifty Creek Station**
**Madison, Indiana**

| Parameter | Units | Mar-25 | Jun-25 | Sep-25 | Dec-25 |
|---|---|---|---|---|---|
| **Appendix III Constituents** | | | | | |
| Boron, B | mg/L | 7.1 | 6.3 | 5 | 7.6 |
| Calcium, Ca | mg/L | 390 | 250 | 220 | NA |
| Chloride, Cl | mg/L | 160 | 110 | 150 | 120 |
| Fluoride, F | mg/L | 0.41 | NA | 0.43 | NA |
| pH | s.u. | 7.48 | NA | 6.95 | NA |
| Sulfate, SO4 | mg/L | 1100 | 720 | 830 | 760 |
| Total Dissolved Solids (TDS) | mg/L | 1900 | NA | 1700 | 1500 |
| **Appendix IV Constituents** | | | | | |
| Antimony, Sb | ug/L | 1 U | NA | 1 U | NA |
| Arsenic, As | ug/L | 0.45 J | NA | 0.47 J | NA |
| Barium, Ba | ug/L | 47 | NA | 26 | NA |
| Beryllium, Be | ug/L | 0.70 U | NA | 0.70 U | NA |
| Cadmium, Cd | ug/L | 0.11 J | NA | 0.12 J | NA |
| Chromium, Cr | ug/L | 1.5 U | NA | 1.8 | NA |
| Cobalt, Co | ug/L | 0.19 J | NA | 0.18 J | NA |
| Fluoride, F | mg/L | 0.41 | NA | 0.43 | NA |
| Lead, Pb | ug/L | 1 U | NA | 1 U | NA |
| Lithium, Li | mg/L | 0.026 | NA | 0.019 | NA |
| Mercury, Hg | ug/L | 0.20 U | NA | 0.20 U | NA |
| Molybdenum, Mo | ug/L | 250 | 260 | 270 | 390 |
| Radium 226 & 228 (combined) | pCi/L | 5 U | NA | 5 U | NA |
| Selenium, Se | ug/L | 0.92 J | NA | 3.2 | NA |
| Thallium, Tl | ug/L | 0.20 U | NA | 0.14 J | NA |

Notes:
NA: Sampling not required for this parameter.

**CF-15-09**
**SUMMARY OF 2025 ANALYTICAL RESULTS**
**Indiana-Kentucky Electric Corporation**
**Clifty Creek Station**
**Madison, Indiana**

| Parameter | Units | Mar-25 | Jun-25 | Sep-25 | Dec-25 |
|---|---|---|---|---|---|
| **Appendix III Constituents** | | | | | |
| Boron, B | mg/L | 3 | 3 | 3.4 | 3.3 |
| Calcium, Ca | mg/L | 140 | NA | 200 | NA |
| Chloride, Cl | mg/L | 31 | NA | 36 | NA |
| Fluoride, F | mg/L | 0.24 | NA | 0.33 | NA |
| pH | s.u. | 7.15 | NA | 7.14 | NA |
| Sulfate, SO4 | mg/L | 120 | NA | 190 | NA |
| Total Dissolved Solids (TDS) | mg/L | 540 | NA | 740 | NA |
| **Appendix IV Constituents** | | | | | |
| Antimony, Sb | ug/L | 1 U | NA | 1 U | NA |
| Arsenic, As | ug/L | 1 U | NA | 1 U | NA |
| Barium, Ba | ug/L | 13 | NA | 18 | NA |
| Beryllium, Be | ug/L | 0.70 U | NA | 0.11 J | NA |
| Cadmium, Cd | ug/L | 0.50 U | NA | 0.50 U | NA |
| Chromium, Cr | ug/L | 1.5 U | NA | 1.5 U | NA |
| Cobalt, Co | ug/L | 0.088 J | NA | 0.089 J | NA |
| Fluoride, F | mg/L | 0.24 | NA | 0.33 | NA |
| Lead, Pb | ug/L | 1 U | NA | 1 U | NA |
| Lithium, Li | mg/L | 0.0092 | NA | 0.014 | NA |
| Mercury, Hg | ug/L | 0.20 U | NA | 0.20 U | NA |
| Molybdenum, Mo | ug/L | 70 | NA | 91 | NA |
| Radium 226 & 228 (combined) | pCi/L | 5 U | NA | 5 U | NA |
| Selenium, Se | ug/L | 1 U | NA | 1 U | NA |
| Thallium, Tl | ug/L | 0.20 U | NA | 0.20 U | NA |

Notes:
NA: Sampling not required for this parameter.

**CF-19-14**
**SUMMARY OF 2025 ANALYTICAL RESULTS**
**Indiana-Kentucky Electric Corporation**
**Clifty Creek Station**
**Madison, Indiana**

| Parameter | Units | Mar-25 | Sep-25 |
|---|---|---|---|
| **Appendix IV Constituents** | | | |
| Arsenic, As | ug/L | 0.82 J | 5 U |
| Molybdenum, Mo | ug/L | 52 | 37 |

**CF-19-15**
**SUMMARY OF 2025 ANALYTICAL RESULTS**
**Indiana-Kentucky Electric Corporation**
**Clifty Creek Station**
**Madison, Indiana**

| Parameter | Units | Mar-25 | Sep-25 |
|---|---|---|---|
| **Appendix IV Constituents** | | | |
| Arsenic, As | ug/L | 0.45 J | 1 U |
| Molybdenum, Mo | ug/L | 0.92 J | 0.69 J |

**WBSP-15-01**
**SUMMARY OF 2025 ANALYTICAL RESULTS**
**Indiana-Kentucky Electric Corporation**
**Clifty Creek Station**
**Madison, Indiana**

| Parameter | Units | Mar-25 | Sep-25 |
|---|---|---|---|
| **Appendix III Constituents** | | | |
| Boron, B | mg/L | 0.074 | NS |
| Calcium, Ca | mg/L | 160 | NS |
| Chloride, Cl | mg/L | 10 | NS |
| Fluoride, F | mg/L | 0.49 | NS |
| pH | s.u. | 7.1 | NS |
| Sulfate, SO4 | mg/L | 130 | NS |
| Total Dissolved Solids (TDS) | mg/L | 580 | NS |
| **Appendix IV Constituents** | | | |
| Antimony, Sb | ug/L | 0.48 J | NS |
| Arsenic, As | ug/L | 1 U | NS |
| Barium, Ba | ug/L | 15 | NS |
| Beryllium, Be | ug/L | 0.70 U | NS |
| Cadmium, Cd | ug/L | 0.50 U | NS |
| Chromium, Cr | ug/L | 1.5 U | NS |
| Cobalt, Co | ug/L | 0.066 J | NS |
| Fluoride, F | mg/L | 0.49 | NS |
| Lead, Pb | ug/L | 1 U | NS |
| Lithium, Li | mg/L | 0.012 | NS |
| Mercury, Hg | ug/L | 0.20 U | NS |
| Molybdenum, Mo | ug/L | 0.29 J | NS |
| Radium 226 & 228 (combined) | pCi/L | 5 U | NS |
| Selenium, Se | ug/L | 1 U | NS |
| Thallium, Tl | ug/L | 0.20 U | NS |

Notes:
NS: Well not sampled.

**WBSP-15-02**
**SUMMARY OF 2025 ANALYTICAL RESULTS**
**Indiana-Kentucky Electric Corporation**
**Clifty Creek Station**
**Madison, Indiana**

| Parameter | Units | Mar-25 | Sep-25 |
|---|---|---|---|
| **Appendix III Constituents** | | | |
| Boron, B | mg/L | 3.8 | NS |
| Calcium, Ca | mg/L | 260 | NS |
| Chloride, Cl | mg/L | 8.3 | 10 |
| Fluoride, F | mg/L | 0.85 | 0.45 |
| pH | s.u. | 7 | 6.79 |
| Sulfate, SO4 | mg/L | 500 | 500 |
| Total Dissolved Solids (TDS) | mg/L | 1200 | 1200 |
| **Appendix IV Constituents** | | | |
| Antimony, Sb | ug/L | 0.41 J | NS |
| Arsenic, As | ug/L | 1 U | NS |
| Barium, Ba | ug/L | 23 | NS |
| Beryllium, Be | ug/L | 0.70 U | NS |
| Cadmium, Cd | ug/L | 0.50 U | NS |
| Chromium, Cr | ug/L | 1.5 U | NS |
| Cobalt, Co | ug/L | 0.11 J | NS |
| Fluoride, F | mg/L | 0.85 | 0.45 |
| Lead, Pb | ug/L | 1 U | NS |
| Lithium, Li | mg/L | 0.076 | NS |
| Mercury, Hg | ug/L | 0.20 U | NS |
| Molybdenum, Mo | ug/L | 3.7 | NS |
| Radium 226 & 228 (combined) | pCi/L | 5 U | NS |
| Selenium, Se | ug/L | 1 U | NS |
| Thallium, Tl | ug/L | 0.20 U | NS |

**WBSP-15-03**
**SUMMARY OF 2025 ANALYTICAL RESULTS**
**Indiana-Kentucky Electric Corporation**
**Clifty Creek Station**
**Madison, Indiana**

| Parameter | Units | Mar-25 | Sep-25 |
|---|---|---|---|
| **Appendix III Constituents** | | | |
| Boron, B | mg/L | 0.054 | 0.17 |
| Calcium, Ca | mg/L | 110 | 210 |
| Chloride, Cl | mg/L | 62 | 36 |
| Fluoride, F | mg/L | 0.25 | 0.3 |
| pH | s.u. | 7.29 | 6.51 |
| Sulfate, SO4 | mg/L | 140 | 240 |
| Total Dissolved Solids (TDS) | mg/L | 500 | 840 |
| **Appendix IV Constituents** | | | |
| Antimony, Sb | ug/L | 1 U | 1 U |
| Arsenic, As | ug/L | 1 U | 1 U |
| Barium, Ba | ug/L | 8.9 | 20 |
| Beryllium, Be | ug/L | 0.70 U | 0.70 U |
| Cadmium, Cd | ug/L | 0.50 U | 0.50 U |
| Chromium, Cr | ug/L | 1.5 U | 1.5 U |
| Cobalt, Co | ug/L | 0.30 U | 0.30 U |
| Fluoride, F | mg/L | 0.25 | 0.3 |
| Lead, Pb | ug/L | 1 U | 1 U |
| Lithium, Li | mg/L | 0.0093 | 0.015 |
| Mercury, Hg | ug/L | 0.20 U | 0.20 U |
| Molybdenum, Mo | ug/L | 16 | 0.74 J |
| Radium 226 & 228 (combined) | pCi/L | 5 U | 5 U |
| Selenium, Se | ug/L | 1 U | 1 U |
| Thallium, Tl | ug/L | 0.20 U | 0.20 U |

Notes:
NA: Sampling not required for this parameter.

**WBSP-15-04a**
**SUMMARY OF 2025 ANALYTICAL RESULTS**
**Indiana-Kentucky Electric Corporation**
**Clifty Creek Station**
**Madison, Indiana**

| Parameter | Units | Mar-25 | Jun-25 | Sep-25 | Dec-26 |
|---|---|---|---|---|---|
| **Appendix III Constituents** | | | | | |
| Boron, B | mg/L | 0.42 | 0.39 | 0.39 | NA |
| Calcium, Ca | mg/L | 150 | NA | 150 | NA |
| Chloride, Cl | mg/L | 24 | NA | 23 | NA |
| Fluoride, F | mg/L | 0.16 | NA | 0.14 | NA |
| pH | s.u. | 7.09 | NA | 6.7 | NA |
| Sulfate, SO4 | mg/L | 81 | NA | 77 | NA |
| Total Dissolved Solids (TDS) | mg/L | 540 | NA | 570 | NA |
| **Appendix IV Constituents** | | | | | |
| Antimony, Sb | ug/L | 1 U | NA | 1 U | NA |
| Arsenic, As | ug/L | 0.77 J | NA | 0.78 J | NA |
| Barium, Ba | ug/L | 80 | NA | 76 | NA |
| Beryllium, Be | ug/L | 0.70 U | NA | 0.70 U | NA |
| Cadmium, Cd | ug/L | 0.12 J | NA | 0.15 J | NA |
| Chromium, Cr | ug/L | 1.5 U | NA | 1.2 J | NA |
| Cobalt, Co | ug/L | 7.8 | 5.3 | 7.8 | 4.9 |
| Fluoride, F | mg/L | 0.16 | NA | 0.14 | NA |
| Lead, Pb | ug/L | 1 | NA | 1.1 | NA |
| Lithium, Li | mg/L | 0.0018 J | NA | 0.002 J | NA |
| Mercury, Hg | ug/L | 0.20 U | NA | 0.20 U | NA |
| Molybdenum, Mo | ug/L | 0.46 J | NA | 0.32 J | NA |
| Radium 226 & 228 (combined) | pCi/L | 5 U | NA | 5 U | NA |
| Selenium, Se | ug/L | 0.61 J | NA | 0.85 J | NA |
| Thallium, Tl | ug/L | 0.20 U | NA | 0.20 U | NA |

Notes:
NA: Sampling not required for this parameter.

**WBSP-15-05a**
**SUMMARY OF 2025 ANALYTICAL RESULTS**
**Indiana-Kentucky Electric Corporation**
**Clifty Creek Station**
**Madison, Indiana**

| Parameter | Units | Mar-25 | Jun-25 | Sep-25 |
|---|---|---|---|---|
| **Appendix III Constituents** | | | | |
| Boron, B | mg/L | 2.1 | 1.8 | 1.7 |
| Calcium, Ca | mg/L | 150 | NA | 150 |
| Chloride, Cl | mg/L | 27 | NA | 29 |
| Fluoride, F | mg/L | 0.2 | NA | 0.21 |
| pH | s.u. | 7.52 | NA | 7.31 |
| Sulfate, SO4 | mg/L | 280 | NA | 200 |
| Total Dissolved Solids (TDS) | mg/L | 620 | NA | 600 |
| **Appendix IV Constituents** | | | | |
| Antimony, Sb | ug/L | 1 U | NA | 1 U |
| Arsenic, As | ug/L | 1 U | NA | 0.82 J |
| Barium, Ba | ug/L | 100 | NA | 100 |
| Beryllium, Be | ug/L | 0.7 U | NA | 0.70 U |
| Cadmium, Cd | ug/L | 0.5 U | NA | 0.50 U |
| Chromium, Cr | ug/L | 1.5 U | NA | 1.7 |
| Cobalt, Co | ug/L | 1 | NA | 1.6 |
| Fluoride, F | mg/L | 0.3 | NA | 0.21 |
| Lead, Pb | ug/L | 1 U | NA | 0.48 J |
| Lithium, Li | mg/L | 0.41 | NA | 0.032 |
| Mercury, Hg | ug/L | 0.20 U | NA | 0.20 U |
| Molybdenum, Mo | ug/L | 26 | NA | 22 |
| Radium 226 & 228 (combined) | pCi/L | 5 U | NA | 5 U |
| Selenium, Se | ug/L | 1 U | NA | 1 U |
| Thallium, Tl | ug/L | 0.20 U | NA | 0.096 J |

Notes:
NA: Sampling not required for this parameter.

**WBSP-15-06a**
**SUMMARY OF 2025 ANALYTICAL RESULTS**
**Indiana-Kentucky Electric Corporation**
**Clifty Creek Station**
**Madison, Indiana**

| Parameter | Units | Mar-25 | Jun-25 | Sep-25 | Dec-26 |
|---|---|---|---|---|---|
| **Appendix III Constituents** | | | | | |
| Boron, B | mg/L | 1.9 | 1.9 | 0.9 | NA |
| Calcium, Ca | mg/L | 99 | NA | 79 | NA |
| Chloride, Cl | mg/L | 62 | NA | 24 | NA |
| Fluoride, F | mg/L | 0.27 | NA | 0.22 | NA |
| pH | s.u. | 7.14 | NA | 7.34 | NA |
| Sulfate, SO4 | mg/L | 74 | NA | 7.9 | NA |
| Total Dissolved Solids (TDS) | mg/L | 470 | NA | 350 | NA |
| **Appendix IV Constituents** | | | | | |
| Antimony, Sb | ug/L | 1 U | NA | 1 U | NA |
| Arsenic, As | ug/L | 19 | 20 | 19 | 25 |
| Barium, Ba | ug/L | 220 | NA | 180 | NA |
| Beryllium, Be | ug/L | 0.70 U | NA | 0.70 U | NA |
| Cadmium, Cd | ug/L | 0.50 U | NA | 0.50 U | NA |
| Chromium, Cr | ug/L | 1.5 U | NA | 1.5 U | NA |
| Cobalt, Co | ug/L | 0.73 | NA | 0.3 | NA |
| Fluoride, F | mg/L | 0.27 | NA | 0.22 | NA |
| Lead, Pb | ug/L | 1 U | NA | 1 U | NA |
| Lithium, Li | mg/L | 0.003 J | NA | 0.0022 J | NA |
| Mercury, Hg | ug/L | 0.20 U | NA | 0.20 U | NA |
| Molybdenum, Mo | ug/L | 32 | NA | 12 | NA |
| Radium 226 & 228 (combined) | pCi/L | 0.827 | NA | 5 U | NA |
| Selenium, Se | ug/L | 1 U | NA | 1 U | NA |
| Thallium, Tl | ug/L | 0.20 U | NA | 0.20 U | NA |

Notes:
NA: Sampling not required for this parameter.

**WBSP-15-07**
**SUMMARY OF 2025 ANALYTICAL RESULTS**
**Indiana-Kentucky Electric Corporation**
**Clifty Creek Station**
**Madison, Indiana**

| Parameter | Units | Mar-25 | Jun-25 | Sep-25 | Dec-25 |
|---|---|---|---|---|---|
| **Appendix III Constituents** | | | | | |
| Boron, B | mg/L | 0.02 | NA | 0.02 | NA |
| Calcium, Ca | mg/L | 190 | NA | 200 | NA |
| Chloride, Cl | mg/L | 11 | NA | 12 | NA |
| Fluoride, F | mg/L | 0.56 | NA | 0.36 | NA |
| pH | s.u. | 6.75 | NA | 6.76 | NA |
| Sulfate, SO4 | mg/L | 4 | NA | 5.5 J | NA |
| Total Dissolved Solids (TDS) | mg/L | 730 | NA | 770 | NA |
| **Appendix IV Constituents** | | | | | |
| Antimony, Sb | ug/L | 1 U | NA | 1 U | NA |
| Arsenic, As | ug/L | 45 | 57 | 35 | 24 |
| Barium, Ba | ug/L | 420 | NA | 300 | NA |
| Beryllium, Be | ug/L | 0.70 U | NA | 0.70 U | NA |
| Cadmium, Cd | ug/L | 0.50 U | NA | 0.50 U | NA |
| Chromium, Cr | ug/L | 1.5 U | NA | 1.5 U | NA |
| Cobalt, Co | ug/L | 1.1 | NA | 1.3 | NA |
| Fluoride, F | mg/L | 0.56 | NA | 0.36 | NA |
| Lead, Pb | ug/L | 1 U | NA | 1 U | NA |
| Lithium, Li | mg/L | 0.004 U | NA | 0.004 U | NA |
| Mercury, Hg | ug/L | 0.20 U | NA | 0.20 U | NA |
| Molybdenum, Mo | ug/L | 4.2 | NA | 9.6 | NA |
| Radium 226 & 228 (combined) | pCi/L | 5 U | NA | 5 U | NA |
| Selenium, Se | ug/L | 1 U | NA | 1 U | NA |
| Thallium, Tl | ug/L | 0.20 U | NA | 0.20 U | NA |

Notes:
NA: Sampling not required for this parameter.

**WBSP-15-08**
**SUMMARY OF 2025 ANALYTICAL RESULTS**
**Indiana-Kentucky Electric Corporation**
**Clifty Creek Station**
**Madison, Indiana**

| Parameter | Units | Mar-25 | Jun-25 | Sep-25 | Dec-25 |
|---|---|---|---|---|---|
| **Appendix III Constituents** | | | | | |
| Boron, B | mg/L | 0.025 | NA | 0.031 | NA |
| Calcium, Ca | mg/L | 84 | NA | 90 | NA |
| Chloride, Cl | mg/L | 17 | NA | 17 | NA |
| Fluoride, F | mg/L | 0.24 | NA | 0.24 | NA |
| pH | s.u. | 6.57 | NA | 7.11 | NA |
| Sulfate, SO4 | mg/L | 0.77 J | NA | 4 U | NA |
| Total Dissolved Solids (TDS) | mg/L | 320 | NA | 340 | NA |
| **Appendix IV Constituents** | | | | | |
| Antimony, Sb | ug/L | 1 U | NA | 1 U | NA |
| Arsenic, As | ug/L | 69 | 95 | 91 | 21 |
| Barium, Ba | ug/L | 300 | NA | 330 | NA |
| Beryllium, Be | ug/L | 0.70 U | NA | 0.70 U | NA |
| Cadmium, Cd | ug/L | 0.50 U | NA | 0.50 U | NA |
| Chromium, Cr | ug/L | 1.5 U | NA | 1.5 U | NA |
| Cobalt, Co | ug/L | 1.2 | NA | 1.2 | NA |
| Fluoride, F | mg/L | 0.24 | NA | 0.24 | NA |
| Lead, Pb | ug/L | 1 U | NA | 1 U | NA |
| Lithium, Li | mg/L | 0.004 U | NA | 0.004 U | NA |
| Mercury, Hg | ug/L | 0.20 U | NA | 0.20 U | NA |
| Molybdenum, Mo | ug/L | 1.4 | NA | 1.7 | NA |
| Radium 226 & 228 (combined) | pCi/L | 5 U | NA | 8.05 | 5 U |
| Selenium, Se | ug/L | 1 U | NA | 1 U | NA |
| Thallium, Tl | ug/L | 0.20 U | NA | 0.20 U | NA |

Notes:
NA: Sampling not required for this parameter.

**WBSP-15-09**
**SUMMARY OF 2025 ANALYTICAL RESULTS**
**Indiana-Kentucky Electric Corporation**
**Clifty Creek Station**
**Madison, Indiana**

| Parameter | Units | Mar-25 | Jun-25 | Sep-25 | Dec-25 |
|---|---|---|---|---|---|
| **Appendix III Constituents** | | | | | |
| Boron, B | mg/L | 0.02 U | NA | 0.017 J | NA |
| Calcium, Ca | mg/L | 79 | NA | 85 | NA |
| Chloride, Cl | mg/L | 6.6 | NA | 6.5 | NA |
| Fluoride, F | mg/L | 0.72 | 0.77 | 0.72 | 0.64 |
| pH | s.u. | 6.8 | NA | 7.12 | NA |
| Sulfate, SO4 | mg/L | 0.82 J | NA | 4 U | NA |
| Total Dissolved Solids (TDS) | mg/L | 320 | NA | 340 | NA |
| **Appendix IV Constituents** | | | | | |
| Antimony, Sb | ug/L | 1 U | NA | 1 U | NA |
| Arsenic, As | ug/L | 14 | 26 | 20 | 12 |
| Barium, Ba | ug/L | 160 | NA | 180 | NA |
| Beryllium, Be | ug/L | 0.70 U | NA | 0.70 U | NA |
| Cadmium, Cd | ug/L | 0.50 U | NA | 0.50 U | NA |
| Chromium, Cr | ug/L | 1.5 U | NA | 1.5 U | NA |
| Cobalt, Co | ug/L | 0.26 J | NA | 0.14 J | NA |
| Fluoride, F | mg/L | 0.72 | NA | 0.72 | 0.64 |
| Lead, Pb | ug/L | 1 U | NA | 1 U | NA |
| Lithium, Li | mg/L | 0.004 U | NA | 0.004 U | NA |
| Mercury, Hg | ug/L | 0.20 U | NA | 0.20 U | NA |
| Molybdenum, Mo | ug/L | 9.8 | NA | 8.7 | NA |
| Radium 226 & 228 (combined) | pCi/L | 5 U | NA | 5 U | NA |
| Selenium, Se | ug/L | 1 U | NA | 1 U | NA |
| Thallium, Tl | ug/L | 0.20 U | NA | 0.20 U | NA |

Notes:
NA: Sampling not required for this parameter.

**WBSP-15-10**
**SUMMARY OF 2025 ANALYTICAL RESULTS**
**Indiana-Kentucky Electric Corporation**
**Clifty Creek Station**
**Madison, Indiana**

| Parameter | Units | Mar-25 | Jun-25 | Sep-25 |
|---|---|---|---|---|
| **Appendix III Constituents** | | | | |
| Boron, B | mg/L | 0.025 | NA | 0.019 J |
| Calcium, Ca | mg/L | 98 | NA | 94 |
| Chloride, Cl | mg/L | 22 | NA | 22 |
| Fluoride, F | mg/L | 0.29 | NA | 0.31 |
| pH | s.u. | 6.18 | NA | 6.57 |
| Sulfate, SO4 | mg/L | 63 | NA | 73 |
| Total Dissolved Solids (TDS) | mg/L | 350 | NA | 410 |
| **Appendix IV Constituents** | | | | |
| Antimony, Sb | ug/L | 0.37 J | NA | 1 U |
| Arsenic, As | ug/L | 9.1 | NA | 1.5 |
| Barium, Ba | ug/L | 320 | NA | 180 |
| Beryllium, Be | ug/L | 0.63 J | NA | 0.70 U |
| Cadmium, Cd | ug/L | 0.21 J | NA | 0.50 U |
| Chromium, Cr | ug/L | 16 | NA | 1.5 U |
| Cobalt, Co | ug/L | 10 | 2.3 | 4 |
| Fluoride, F | mg/L | 0.29 | NA | 0.31 |
| Lead, Pb | ug/L | 8.1 | NA | 0.25 J |
| Lithium, Li | mg/L | 0.01 | NA | 0.0018 J |
| Mercury, Hg | ug/L | 0.20 U | NA | 0.20 U |
| Molybdenum, Mo | ug/L | 1.8 | NA | 0.96 J |
| Radium 226 & 228 (combined) | pCi/L | 1.22 | NA | 5 U |
| Selenium, Se | ug/L | 1 U | NA | 1 U |
| Thallium, Tl | ug/L | 0.2 | NA | 0.20 U |

Notes:
NA: Sampling not required for this parameter.

**WBSP-24-02**
**SUMMARY OF 2025 ANALYTICAL RESULTS**
**Indiana-Kentucky Electric Corporation**
**Clifty Creek Station**
**Madison, Indiana**

| Parameter | Units | Mar-25 | Jun-25 | Sep-25 | Dec-25 |
|---|---|---|---|---|---|
| **Appendix IV Constituents** | | | | | |
| Arsenic, As | ug/L | 25 | 18 | 49 | 48 |

Notes:
NA: Sampling not required for this parameter.

**WBSP-24-03**
**SUMMARY OF 2025 ANALYTICAL RESULTS**
**Indiana-Kentucky Electric Corporation**
**Clifty Creek Station**
**Madison, Indiana**

| Parameter | Units | Mar-25 | Jun-25 | Sep-25 | Dec-25 |
|---|---|---|---|---|---|
| **Appendix IV Constituents** | | | | | |
| Arsenic, As | ug/L | 42 | 51 | 61 | 27 |

Notes:
NA: Sampling not required for this parameter.

**WBSP-24-04**
**SUMMARY OF 2025 ANALYTICAL RESULTS**
**Indiana-Kentucky Electric Corporation**
**Clifty Creek Station**
**Madison, Indiana**

| Parameter | Units | Mar-25 | Jun-25 | Sep-25 | Dec-25 |
|---|---|---|---|---|---|
| **Appendix IV Constituents** | | | | | |
| Arsenic, As | ug/L | 70 | 74 | 79 | 99 |

Notes:
NA: Sampling not required for this parameter.

# APPENDIX E

# ALTERNATE SOURCE DEMONSTRATION MARCH 2025
# TYPE I LANDFILL

AGES
Applied Geology And Environmental Science, Inc.

2402 Hookstown Grade Road, Suite 200
Clinton, PA 15026
www.appliedgeology.net
P 412. 264. 6453
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# COAL COMBUSTION RESIDUALS REGULATION
# ALTERNATE SOURCE DEMONSTRATION REPORT
# MARCH 2025 ASSESSMENT MONITORING EVENT
# TYPE I RESIDUAL WASTE LANDFILL
# INDIANA-KENTUCKY ELECTRIC CORPORATION
# CLIFTY CREEK PLANT
# MADISON, JEFFERSON COUNTY, INDIANA

**OCTOBER 2025**

**Prepared for:**

**INDIANA-KENTUCKY ELECTRIC CORPORATION (IKEC)**

**Prepared by:**

**APPLIED GEOLOGY AND ENVIRONMENTAL SCIENCE, INC. (AGES)**

# COAL COMBUSTION RESIDUALS REGULATION
# ALTERNATE SOURCE DEMONSTRATION REPORT
# MARCH 2025 ASSESSMENT MONITORING EVENT
# TYPE I RESIDUAL WASTE LANDFILL
# INDIANA KENTUCKY ELECTRIC CORPORATION
# CLIFTY CREEK PLANT
# MADISON, JEFFERSON COUNTY, INDIANA

**OCTOBER 2025**

**Prepared for:**

**INDIANA-KENTUCKY ELECTRIC CORPORATION (IKEC)**

**Prepared by:**


**APPLIED GEOLOGY AND ENVIRONMENTAL SCIENCE, INC. (AGES)**

**Bethany Flaherty**
Principal Scientist I

**Robert W. King, L.P.G. #1237**
Chief Hydrogeologist/Senior Consultant

# COAL COMBUSTION RESIDUALS REGULATION
# ALTERNATE SOURCE DEMONSTRATION REPORT
# MARCH 2025 ASSESSMENT MONITORING EVENT
# TYPE I RESIDUAL WASTE LANDFILL
# INDIANA-KENTUCKY ELECTRIC CORPORATION
# CLIFTY CREEK PLANT
# MADISON, JEFFERSON COUNTY, INDIANA

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# INDIANA-KENTUCKY ELECTRIC CORPORATION
# CLIFTY CREEK PLANT
# MADISON, JEFFERSON COUNTY, INDIANA

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# INDIANA-KENTUCKY ELECTRIC CORPORATION
# CLIFTY CREEK PLANT
# MADISON, JEFFERSON COUNTY, INDIANA

## 1.0 INTRODUCTION

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 the Resource Conservation and Recovery Act (RCRA) and became effective six (6) months from the date of its publication (April 2015) in the Federal Register, referred to as the "CCR Rule."

The Indiana-Kentucky Electric Corporation (IKEC) contracted with Applied Geology and Environmental Science, Inc. (AGES) to administer the CCR Rule groundwater monitoring program at the Clifty Creek Station located in Madison, Jefferson County, Indiana. There are three (3) CCR units at the Clifty Creek Station (Figure 1):

- Type I Residual Waste Landfill (Type I Landfill);
- Landfill Runoff Collection Pond (LRCP); and,
- West Boiler Slag Pond (WBSP).

Under the CCR program, the Type I Landfill and LRCP are being monitored under one (1) multi-unit groundwater monitoring system. During the March 2018 Detection Monitoring event, Boron Statistically Significant Increases (SSIs) were confirmed in two (2) wells located downgradient of the Type I Landfill and LRCP and these CCR units entered into Assessment Monitoring in September 2018. Based on a successful Alternate Source Demonstration (ASD) (AGES 2019a), IKEC determined that the Type I Landfill was not the source of the Boron. Therefore, the Type I Landfill returned to Detection Monitoring in January 2019. During the March 2019, October 2019, March 2020, September 2020, March 2021, September 2021, March 2022, September 2022, March 2023, and September 2023 Detection Monitoring sampling events, SSIs for Boron were again confirmed in wells located downgradient of the unit. Based on successful ASDs for these nine (9) Detection Monitoring events (AGES 2019b, AGES 2020a, AGES 2020b, AGES 2021a, AGES 2021b, AGES 2022a, AGES 2022b, AGES 2023b, AGES 2023a and AGES 2024b), the Type I Landfill remained in Detection Monitoring. As an alternate source for Boron at the LRCP could not be established, the LRCP remains in Assessment Monitoring.

During the March 2024 Detection Monitoring sampling event, Boron SSIs were not identified; however, a SSI was confirmed in well CF-15-08 for Chloride. The Type I Landfill entered Assessment Monitoring in October 2024.

During the September 2024 Assessment Monitoring Sampling Event, Boron SSIs were confirmed in wells CF-15-08 and CF-15-09 located downgradient of the Type I Landfill; SSIs for Calcium, Chloride, and Sulfate were also confirmed in well CF-15-08. IKEC prepared a successful ASD to show that the Type I Landfill was not the source of the Boron (AGES 2024).

During the March 2025 Assessment Monitoring Sampling Event, Boron SSIs were confirmed in wells CF-15-08 and CF-15-09 located downgradient of the Type I Landfill; SSIs for Chloride, Sulfate, and Total Dissolved Solids (TDS) were also confirmed in well CF-15-08. IKEC has prepared this ASD to show that the Type I Landfill is not the source of the Boron. Details regarding this evaluation are presented in this report.

## 1.1 Background

In accordance with §257.91(d) of the CCR Rule, as detailed in the Well Installation Report (AGES 2018), because the LRCP is directly adjacent to the southwest (downgradient) of the Type I Landfill, and because of the hydrogeologic conditions of the site, IKEC installed a multi-unit groundwater monitoring system to monitor groundwater quality directly downgradient of the Type I Landfill and LRCP. As described above, the Type I Landfill entered Assessment Monitoring in October 2024. In accordance with §257.95 of the CCR Rule, IKEC completed the groundwater monitoring requirements of the Assessment Monitoring Program at the Type I Landfill as described below.

The 2nd round of Assessment Monitoring groundwater samples was collected between March 12 and 28, 2025 from monitoring wells at the Type I Landfill (Figure 1). All samples were collected in accordance with the Groundwater Monitoring Program Plan (GMPP) (AGES 2024a) and analyzed for Appendix III and Appendix IV constituents.

Upon receipt, the groundwater monitoring data were statistically evaluated in accordance with §257.93(f) of the CCR Rule and the Clifty Creek Station CCR Statistical Analysis Plan (StAP) (Stantec 2021). The initial statistical evaluation identified potential SSIs for Boron in monitoring wells CF-15-08 and CF-15-09 at the Type I Landfill. The results of the statistical evaluation are summarized in Table 1.

In accordance with the StAP, IKEC resampled the well for Boron on June 9, 2025. Based on the result of the resampling event, the SSIs for Boron were confirmed in monitoring wells CF-15-08 and CF-15-09 (Table 1).

### 1.2 Purpose of This Report

The purpose of this report is to present an ASD and provide sufficient evidence that the SSIs identified for Boron in wells CF-15-08 and CF-15-09 resulted from a source other than the Type I Landfill.

The CCR Rule does not contain specific requirements for an ASD beyond what is stated, as follows, in §257.94(e)(2):

*"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 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."*

In addition to the above requirements of the CCR Rule, this ASD has been conducted and presented using guidance and documentation recommendations included in the U.S. EPA document Solid Waste Disposal Facility Criteria Technical Manual EPA 530-R-93-017 (U.S. EPA 1993).

A detailed discussion of the confirmed SSIs and a technical justification that the exceedance results are from a source other than the Type I Landfill are presented in the following sections of this report.

## 2.0 DESCRIPTION OF THE TYPE I LANDFILL

### 2.1 Unit Description

The Type I Landfill and LRCP occupy an approximately 166-acre area situated within an eroded bedrock channel. The Landfill consists of approximately 109 acres that were approved as a Type I residual waste landfill by the Indiana Department of Environmental Management (IDEM) in 2007. The 57 acres consist of the LRCP located at the southwest end of the Type I Landfill (Figures 1 and 2).

Beginning in 1955, ash products were sluiced to a disposal pond located in the bedrock channel at the plant site. To allow for more disposal capacity, an on-site fly ash pond was developed into a Type III residual landfill in 1988. All required permits for the Type III Residual Waste Landfill (Type III Landfill) were obtained from IDEM. The Type III Landfill was permitted to be constructed and to serve as closure for the historic fly ash pond. The Type III Landfill is located at the northeast end of the bedrock channel and went operational in 1991.

After IDEM approval, IKEC upgraded the Type III Landfill to a Type I residual waste landfill (Type I Landfill). As a result, the Type III Landfill was closed and the Type I Landfill was designed and constructed to serve as the cap for the closed Type III Landfill. The Type I Landfill, which went operational in 2010, is completely separated from the closed Type III Landfill by a geosynthetic clay liner and an engineered clay liner on top of the Type III Landfill to serve as a cap.

## 2.2 Hydrogeology

Based on information in the Hydrogeologic Study Report (AGES 2007), bedrock beneath the Type I Landfill and the closed Type III Landfill consists of impermeable limestone and shale of the Ordovician Dillsboro formation which is overlain by approximately 20 to 35 feet of gray clay. The gray clay is directly overlain by fly ash that had been historically hydraulically placed in the area. A generalized cross section showing the proposed final limits of the Type I Landfill & LRCP, the location and limits of the closed Type III Landfill, and the extent of the historic, hydraulically placed fly ash is presented in Figure 3. A limestone ridge known as the Devil's Backbone runs northeast to southwest along the length of the Type I Landfill & LRCP and the closed Type III Landfill. The Devil's Backbone acts as an impermeable barrier that forces groundwater passing beneath both of the landfills to flow either toward the northeast or toward the southwest. A detailed hydrogeologic study determined that a groundwater flow divide is present near the northeast end of the bedrock channel and that all groundwater beneath the active Type I Landfill flows toward the southwest (AGES 2007) (Figure 4). As detailed in the Monitoring Well Installation Report (AGES 2018), an aquifer does not exist beneath either of the landfills. Therefore, alluvial deposits located southwest of the LRCP are designated as the uppermost aquifer for the Type I Landfill & LRCP.

The Type I Landfill was constructed using a geosynthetic clay liner to prevent water from the Type I Landfill from entering the underlying layers. Water in the Type I Landfill is collected by a leachate system and discharged into the low volume waste treatment system.

In November and December 2015, groundwater monitoring wells were installed for the CCR groundwater monitoring network at the site. The CCR groundwater monitoring network for the Type I Landfill consists of eight (8) monitoring wells (Figure 1). Three (3) monitoring wells (CF-15-07, CF-15-08 and CF-15-09) were installed in the alluvial deposits (uppermost aquifer) located southwest of the LRCP. Based on exploratory soil borings and historical data, there were no

suitable upgradient locations for the Type I Landfill. Well CF-15-04 was installed northeast of and outside the hydrologic influence of the Type I Landfill and the closed Type III Landfill to serve as a background monitoring well. Wells CF-15-05 and CF-15-06 were also installed in alluvial deposits along the Ohio River to serve as background monitoring wells. Wells WBSP-15-01 and WBSP-15-02 are located southeast of the impermeable Devil's Backbone and are hydraulically separated from groundwater flowing beneath the Type I Landfill. Because these wells are outside the hydraulic influence of the Type I Landfill, these wells were designated as background wells. Table 2 presents construction details for the monitoring wells in the groundwater monitoring network for the Type I Landfill. Two (2) additional wells (CF-19-14 and CF-19-15) were installed southwest of the Type I Landfill during the characterization of the LRCP and are now also part of the monitoring system for the Type I Landfill. Groundwater elevation data from the wells has been used to support the development of flow maps for the area.

Based on groundwater levels collected at the site since 1994, groundwater in the uppermost aquifer southwest (downgradient) of the Type I Landfill typically flows to the southwest toward the Ohio River. Historic groundwater data also indicates that groundwater flow at the southwest end of the property is affected by the elevation of the adjacent Ohio River. Evidence of routine, brief flow reversals (i.e., groundwater flows from the Ohio River back toward the southwest end of the property) and periodic flooding of the southwest end of the property have also been observed.

Groundwater contour maps for the uppermost aquifer southwest of the Type I Landfill in March 2025 (Assessment Monitoring Event) and June 2025 (Resampling Event) are included in Appendix A (Figures A-1 and A-2). Groundwater generally flows to the southwest toward the Ohio River.

## 3.0 ALTERNATE SOURCE DEMONSTRATION

As noted above, Boron was identified as a confirmed SSI in wells CF-15-08 and CF-15-09 downgradient of the Type I Landfill. Based on a review of the current and historic data, AGES/IKEC have determined that the active Type I Landfill is not the source of the Boron SSIs reported in the CCR monitoring wells and that historic fly ash that had been sluiced into the valley beginning in 1955 is the alternate source for the Boron SSIs. As discussed in detail below, this conclusion is based on the following lines of evidence:

- Ash that was historically sluiced into the bedrock valley in the 1950s is a known source of Boron and is hydraulically connected to groundwater downgradient of the Type I Landfill;
- Boron has been detected in groundwater downgradient from the hydraulically-placed ash (and the Type I Landfill) in IDEM program wells CF-9405, CF-9406 and CF-9407 (located near wells CF-15-08 and CF-15-09) since 1994, which is 17 years prior to operation of the Type I Landfill; and
- Given the extremely low groundwater flow velocity at the landfill, the travel time for a release of Boron from the Type I Landfill to reach wells CF-15-08 and CF-15-09 is

estimated at 120 years. As the Type I Landfill has only been in operation for 12 years, the landfill cannot be the source of the Boron.

Details to support these conclusions are presented below.

## 3.1 Alternate Source Demonstration Method

The evaluation of the alternate source for Boron in wells CF-15-08 and CF-15-09 was assessed in general accordance with guidelines presented in the Solid Waste Disposal Facility Criteria Technical Manual (U.S. EPA 1993) using the following methods:

- Identify a potential alternate source;
- Establish that a hydraulic connection exists between the alternate source and the wells with the confirmed SSIs;
- Establish that constituents of concern are present at the alternate source; and
- Establish that the concentrations observed in the compliance wells could not have resulted from the CCR unit given the hydrogeologic conditions at the site.

## 3.2 Alternate Source Identification

The initial groundwater investigation conducted for the former Type III Landfill (beginning in 1994) focused on the fly ash that had been hydraulically placed in the bedrock channel beginning in 1955. The Type III Landfill was permitted to serve as the closure for the hydraulically placed fly ash.

After IDEM approval, IKEC upgraded the Type III Landfill to a Type I Landfill and the Type I Landfill was permitted as the closure for a significant portion of the original Type III landfill footprint. The active Type I Landfill was constructed with a geosynthetic liner and an engineered clay liner on top of the Type III Landfill to serve as a cap. The two (2) liners create an effective hydraulic barrier between the active Type I Landfill and the closed Type III Landfill, which precludes the migration of leachate from the Type I Landfill. The portions of the Type III landfill closed in accordance with the state-approved closure plan are not subject to the 2015 CCR Rule.

Both landfills were constructed on top of the historic, hydraulically placed fly ash which extends the length of the bedrock channel (Figure 3) beneath the LRCP to the embankment at the southwestern end of the LRCP (Figure 5). Although the base of the LRCP contains historic, hydraulically placed fly ash, the LRCP does not receive CCR and the existing historic CCR is not actively managed. Therefore, the LRCP is considered an inactive CCR unit, and is currently undergoing closure.

Due to the age and extent of the historic, hydraulically placed ash, this material was identified as the alternate source for the Boron detected in wells CF-15-08 and CF-15-09.

### 3.3 Establish a Hydraulic Connection

A review of the permit drawings, construction drawings, and a figure from the Initial Structural Stability Assessment Landfill Runoff Collection Pond Report (Stantec 2016) (Appendix B) indicated that material from the closed Type III Landfill and the historic, hydraulically placed fly ash are located beneath the active Type I Landfill & LRCP (Figure 3). The base of the layer of "hydraulically placed fly ash" is located between elevations 445 feet mean sea level (ft msl) and 500 ft msl.

When the fly ash was originally emplaced in the bedrock channel, there were no impermeable liners constructed to separate the fly ash from the underlying "foundation soils." The CCR and IDEM groundwater monitoring wells are screened in these "foundation soils," which consist of alluvial deposits of silt, sand and gravel. These alluvial deposits extend from beneath the LRCP and the hydraulically placed fly ash southwest to the Ohio River and provide a direct hydraulic connection between the historic, hydraulically placed fly ash and the groundwater monitoring wells (Figure 5).

### 3.4 Constituents Are Present at the Alternate Source

Both the closed Type III Landfill and the Type I Landfill are currently being monitored under an IDEM groundwater monitoring program. In 1994, three (3) monitoring wells (CF-9405, CF-9406, and CF-9407) were installed south of the LRCP as a condition of a pH variance for the former Type III Landfill granted by IDEM. From June 1994 through February 1995, 17 biweekly background events were conducted. Since June 1995, routine quarterly and semi-annual monitoring of these wells has been conducted.

In 2009, three (3) additional wells (CF-07-06D, CF-07-08, and CF-07-09) were installed per IDEM to monitor groundwater quality during the year prior to the start of operations of the Type I Landfill in 2011. Wells in the IDEM groundwater monitoring network are located south of the LRCP and screened in the same "foundation soils" as the wells in the CCR monitoring network (Figure 6).

During quarterly and semi-annual sampling events from June 1995 through 2011, Boron was detected in well CF-9406 (adjacent to well CF-15-08) at concentrations ranging from 9.9 milligrams per liter (mg/L) to 18 mg/L and in well CF-9407 (adjacent to well CF-15-09) at concentrations ranging from 1.19 mg/L to 7.5 mg/L (Table 3 and Figure 7). This demonstrates that Boron was present in groundwater downgradient of the eventual location of the Type I Landfill 17 years prior to its operation. Boron concentrations in downgradient CCR wells have ranged from 3.9 mg/L to 13 mg/L in well CF-15-08, and from 3.0 mg/L to 7.59 mg/L in well CF-15-09 (Table 3 and Figure 7). These concentrations are similar to historic Boron concentrations observed in wells CF-9406 and CF-9407 from June 1995 through 2011.

Because Boron concentrations similar to those observed in CCR wells CF-15-08 and CF-15-09 were detected in IDEM wells CF-9406 and CF-9407 prior to construction of the Type I Landfill, the historic, hydraulically placed ash is the source of the detected Boron.

### 3.5 Hydrogeologic Conditions and Groundwater Flow Velocity

As presented in the Evaluation of Potential Risk to Supply Well Fields Report (AGES 2006), a groundwater flow velocity of 45 feet per year (ft/yr) was calculated for alluvial deposits, which are designated as the uppermost aquifer for these CCR units. Based on the most recent topographical survey conducted of the Type I Landfill (Appendix C), the current limit of waste for the active Type I Landfill is located approximately 5,400 feet (more than one [1] mile) northeast of the three (3) CCR groundwater monitoring wells (CF-15-07, CF-15-08, and CF-15-09) (Figure 8). Based on this data, it was calculated that it will take 120 years for groundwater to flow from the current limit of waste in the Type I Landfill to the CCR monitoring wells. Waste placement in the Type I Landfill began in early 2011. Given the two (2) constructed liners, the distance and the flow rate, water from the Type I Landfill should not be able to enter the groundwater, and groundwater has not had enough time to reach the CCR monitoring wells.

Based on the calculations presented above, the active Type I Landfill cannot be the source of Boron detected in the CCR monitoring wells.

## 4.0 CONCLUSIONS AND RECOMMENDATIONS

The ASD has been completed in general accordance with guidelines presented in the Solid Waste Disposal Facility Criteria Technical Manual (U.S. EPA 1993).

Based on a review of the current and historic data, AGES/IKEC have determined that the Type I Landfill is not the source of Boron detected in the CCR monitoring wells CF-15-08 and CF-15-09. This conclusion is supported by the following evidence:

- "Foundation soils" that extend from beneath the LRCP and the hydraulically placed fly ash southwest to the Ohio River provide a direct hydraulic connection between the historic, hydraulically placed fly ash and the CCR groundwater monitoring wells CF-15-08 and CF-15-09.
- Historic data from the IDEM groundwater monitoring program indicate that Boron concentrations similar to those observed in CCR wells CF-15-08 and CF-15-09 were detected in IDEM wells CF-9406 and CF-9407 for 17 years prior to operation of the Type I Landfill, indicating that the Boron is associated with the historic, hydraulically placed fly ash.
- Using the previously calculated groundwater flow velocity of 45 ft/yr, it is estimated that it would take 120 years for groundwater flowing beneath the Type I Landfill to reach the CCR monitoring wells.

Based on the demonstration presented above, the Type I Landfill is not the source of the Boron detected in CCR monitoring wells CF-15-08 and CF-15-09.

# 5.0 REFERENCES


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# TABLES

**TABLE 1**
**SUMMARY OF POTENTIAL AND CONFIRMED APPENDIX III SSIs**
**TYPE I RESIDUAL WASTE LANDFILL**
**CCR GROUNDWATER MONITORING PROGRAM**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

| Well ID | Potential SSI Parameter (Units) | 2nd Assessment Monitoring Sampling Event March 2025 | | 2nd Assessment Monitoring Resampling Event June 2025 | |
|---|---|---|---|---|---|
| | | Potential SSI Result | UTL | Potential SSI Result | Confirmed SSI (Yes/No) |
| CF-15-08 | Boron (mg/L) | 7.1 | 0.19 | 6.3 | Yes |
| | Calcium (mg/L) | 390 | 315 | 250 | No |
| | Chloride (mg/L) | 160 | 66 | 110 | Yes |
| | Sulfate (mg/L) | 1100 | 508 | 720 | Yes |
| | TDS (mg/L) | 1900 | 1300 | NS | Yes |
| CF-15-09 | Boron (mg/L) | 3.0 | 0.19 | 3.0 | Yes |

Notes:
SSI: Statistically Significant Increase
UTL: Upper Tolerance Limit (Pooled Interwell UTL)
mg/L: Milligrams per liter
NS: Not sampled; SSI result confirmed

**TABLE 2**
**GROUNDWATER MONITORING NETWORK**
**TYPE I LANDFILL**
**CCR GROUNDWATER MONITORING PROGRAM**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

| Monitoring Well ID | Designation | Date of Installation | Coordinates | | Ground Elevation (ft)[2] | Top of Casing Elevation (ft)[2] | Top of Screen Elevation (ft) | Base of Screen Elevation (ft) | Total Depth From Top of Casing (ft) |
|---|---|---|---|---|---|---|---|---|---|
| | | | Northing | Easting | | | | | |
| **CF-15-04** | Background | 12/3/2015 | 451482.81 | 569307.19 | 465.55 | 468.03 | 439.55 | 429.55 | 38.48 |
| **CF-15-05** | Background | 12/1/2015 | 447491.91 | 565533.64 | 439.85 | 442.58 | 422.85 | 412.85 | 29.73 |
| **CF-15-06** | Background | 11/30/2015 | 447026.92 | 565190.31 | 437.49 | 440.40 | 431.49 | 421.49 | 18.91 |
| **CF-15-07** | Downgradient | 11/23/2015 | 443135.08 | 562259.25 | 438.61 | 441.11 | 432.61 | 422.61 | 18.50 |
| **CF-15-08** | Downgradient | 11/19/2015 | 443219.57 | 562537.29 | 460.33 | 462.79 | 430.33 | 420.33 | 42.46 |
| **CF-15-09** | Downgradient | 11/25/2015 | 443445.96 | 562871.69 | 456.73 | 459.45 | 447.73 | 442.73 | 16.72 |
| **WBSP-15-01** | Background | 11/30/2015 | 449072.27 | 566322.12 | 466.93 | 469.36 | 458.93 | 448.93 | 20.43 |
| **WBSP-15-02** | Background | 11/11/2015 | 449803.91 | 566987.30 | 473.83 | 476.76 | 457.83 | 452.83 | 23.93 |
| **CF-19-14** | Downgradient/Boundary | 3/8/2019 | 443401.75 | 562901.93 | 452.29 | 454.88 | 440.05 | 430.05 | 24.83 |
| **CF-19-15** | Downgradient/Boundary | 3/13/2019 | 442704.78 | 562483.02 | 441.10 | 443.61 | 415.19 | 405.19 | 38.42 |

Notes:
1. The Well locations are referenced to the North American Datum (NAD83), east zone coordinate system.
2. Elevations are referenced to the North American Vertical Datum (NAVD) 1988.
3. Boundary Monitoring Wells CF-19-14 and CF-19-15 were added to the Monitoring Network in December 2024

**TABLE 3**
**HISTORIC BORON CONCENTRATIONS: IDEM WELLS CF-9406 & CF-9407 AND CCR WELLS CF-15-08 & CF-15-09**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

| Boron Concentrations in IDEM Wells (1994 through 2015) | | | | | |
|---|---|---|---|---|---|
| **Date** | **CF-9406** | **CF-9407** | **Date** | **CF-9406** | **CF-9407** |
| **6/8/1994** | 10 | 2.9 | **11/19/2002** | 16.2 | 5.92 |
| **6/22/1994** | 9.8 | 4.7 | **5/14/2003** | 13.7 | 3.83 |
| **7/6/1994** | 11 | 6.3 | **11/12/2003** | 14.7 | 5.4 |
| **7/20/1994** | 12 | 8.4 | **5/11/2004** | 14.2 | 3.86 |
| **8/3/1994** | 10 | 6.3 | **11/9/2004** | 17.1 | 5.28 |
| **8/17/1994** | 9 | 6.4 | **5/9/2005** | 15.2 | 7.16 |
| **8/31/1994** | 12 | 7.7 | **11/8/2005** | 14.3 | DRY |
| **9/14/1994** | 9.8 | 6.9 | **5/17/2006** | 12.8 | 7.4 |
| **9/28/1994** | 9.7 | 5.9 | **11/15/2006** | 15 | 5.69 |
| **10/12/1994** | 12 | 7.3 | **5/9/2007** | 13.7 | 4.71 |
| **10/26/1994** | 12 | 6.8 | **11/14/2007** | 14.6 | DRY |
| **11/9/1994** | 11 | 6.7 | **5/13/2008** | 15 | 3.21 |
| **11/30/1994** | 11 | 5 | **11/12/2008** | 15.6 | DRY |
| **12/7/1994** | 10 | 3.6 | **5/19/2009** | 14.7 | 4.75 |
| **12/21/1994** | 11 | 2.5 | **11/16/2009** | 14.7 | 7.23 |
| **1/18/1995** | 11 | 3 | **12/16/2009** | NM | NM |
| **2/22/1995** | 13 | 3.6 | **01/14/2010** | NM | NM |
| **6/14/1995** | 13 | 4.5 | **02/23/2010** | NM | NM |
| **12/21/1995** | 14 | 4.7 | **03/16/2010** | NM | NM |
| **6/26/1996** | 14 | 3.3 | **04/15/2010** | NM | NM |
| **12/23/1996** | 12 | 5.3 | **5/19/2010** | 14.1 | 6.77 |
| **4/30/1997** | **9.9** | 6.9 | **06/23/2010** | NM | NM |
| **6/30/1997** | 12 | 5.9 | **07/15/2010** | NM | NM |
| **10/7/1997** | 15 | DRY | **08/24/2010** | NM | NM |
| **12/16/1997** | 14 | **7.5** | **09/14/2010** | NM | NM |
| **4/16/1998** | 14 | 6.5 | **10/19/2010** | NM | NM |
| **6/24/1998** | 13 | 6.5 | **11/3/2010** | 16.9 | DRY |
| **9/23/1998** | 14 | DRY | **Type I Landfill Operational** | | |
| **1/21/1999** | 13 | 5.1 | **5/17/2011** | 12.3 | 4.21 |
| **3/31/1999** | 12 | 4.3 | **11/28/2011** | 16.2 | **1.19** |
| **6/30/1999** | 13 | 7.5 | **5/7/2012** | 14.5 | 5.09 |
| **10/7/1999** | DRY | DRY | **11/13/2012** | 15.9 | DRY |
| **1/6/2000** | 15 | 4.4 | **3/30/2013** | 15 | 5.25 |
| **6/6/2000** | 15 | 7.2 | **9/23/2013** | 14.2 | DRY |
| **1/10/2001** | 16 | 7.4 | **5/21/2014** | 12.63 | 5.646 |
| **5/15/2001** | 15 | 6.6 | **11/11/2014** | 14.58 | DRY |
| **11/26/2001** | **18** | 7.3 | **5/9/2015** | 15.47 | DRY |
| **5/15/2002** | 13.5 | 5.1 | **11/3/2015** | 13.8 | DRY |

**TABLE 3**
**HISTORIC BORON CONCENTRATIONS: IDEM WELLS CF-9406 & CF-9407 AND CCR WELLS CF-15-08 & CF-15-09**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

| Boron Concentrations in IDEM and CCR Wells (2016 through 2025) | | | | |
|---|---|---|---|---|
| **Date** | **CF-9406** | **CF-9407** | **CF-15-08** | **CF-15-09** |
| **January 2016** | NM | NM | 8.64 | 6.86 |
| **March 2016** | NM | NM | 8.24 | 5.78 |
| **May 2016** | 10.6 | 2.48 | 9.34 | 6.58 |
| **July 2016** | NM | NM | 9.65 | 7.01 |
| **August 2016** | NM | NM | 9.63 | 6.73 |
| **November 2016** | 15.3 | DRY | 10.9 | DRY |
| **March 2017** | NM | NM | 9.29 | 6.78 |
| **May 2017** | 7.46 | 5.4 | NM | NM |
| **June 2017** | NM | NM | **7.62** | 6.3 |
| **August 2017** | NM | NM | 9.04 | 6.81 |
| **November 2017** | 11.7 | 7.58 | NM | NM |
| **March 2018** | NM | NM | 8.5 | 5.86 |
| **May 2018** | 13.8 | 7.25 | 8.6 | 6.1 |
| **October 2018** | NM | NM | 11.9 | **7.59** |
| **November 2018** | 14.7 | 3.27 | NM | NM |
| **December 2018** | NM | NM | 11.9 | 7.41 |
| **March 2019** | NM | NM | 9.8 | 6.7 |
| **May 2019** | 13.9 | 6.56 | NM | NM |
| **June 2019** | NM | NM | 8.5 | 6.5 |
| **October 2019** | NM | NM | 11.0 | DRY |
| **November 2019** | 17 | DRY | 9.0 | NM |
| **March 2020** | NM | NM | 8.2 | 5.7 |
| **April 2020** | 8.1 | 2.5 | NM | NM |
| **June 2020** | NM | NM | 9.6 | 5.9 |
| **September 2020** | 15 | 7 | 10 | 6.9 |
| **December 2020** | NM | NM | 11 | 6.4 |
| **March 2021** | 9.6 | 2.8 | 11 | 6.0 |
| **June 2021** | NM | NM | 10 | 6.2 |
| **September 2021** | 13 | 5.1 | **13** | DRY |
| **December 2021** | NM | NM | 12 | NM |
| **March 2022** | 9.3 | 6.9 | 12 | 6.2 |
| **June 2022** | NM | NM | 11 | 5.9 |
| **September 2022** | 14 | 4.2 | 10 | 3.8 |
| **December 2022** | NM | NM | **13** | NM |
| **March 2023** | 12 | 4.8 | 12 | 5.1 |
| **June 2023** | NM | NM | 11 | 5.5 |

**TABLE 3**
**HISTORIC BORON CONCENTRATIONS: IDEM WELLS CF-9406 & CF-9407 AND CCR WELLS CF-15-08 & CF-15-09**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

| Boron Concentrations in IDEM and CCR Wells (2016 through 2025) Continued | | | | |
|---|---|---|---|---|
| **Date** | **CF-9406** | **CF-9407** | **CF-15-08** | **CF-15-09** |
| **September 2023** | 15 | 1.0 | 11 | 5.4 |
| **November 2023** | NM | NM | 12 | 7.0 |
| **March 2024** | 13 | NM | 8.5 | 5.7 |
| **June 2024** | NM | NM | 3.9 | 4.7 |
| **September 2024** | 9.8 | 0.52 | 7.6 | 6.0 |
| **December 2024** | NM | NM | 6.5 | 4.9 |
| **March 2025** | 5.0 | 2.1 | 7.1 | **3.0** |
| **June 2025** | NM | NM | 6.3 | **3.0** |

Notes:
1. All concentrations are mg/L.
2. NM = Well was not monitored on this date.
3. DRY = Well was dry and not able to be sampled.
4. Maximum and minimum Boron results for IDEM wells (June 1995 through 2011 only) and CCR wells are shown in **Bold.**

# FIGURES

N

CLIFTY HOLLOW ROAD

CF-15-04

CLIFTY CREEK STATION

BIG CLIFTY CREEK

LIMIT OF WASTE PLACEMENT

TYPE I RESIDUAL WASTE LANDFILL

WBSP-15-02

WEST BOILER SLAG POND

DEVIL'S BACKBONE

WBSP-15-01

INDIANA

KENTUCKY

CF-15-05

CF-15-06

OHIO RIVER

RIVER ROAD

LANDFILL RUNOFF COLLECTION POND

B'

B

CF-15-08

CF-15-07

CF-9407

CF-15-09

CF-07-06D

CF-9406

CF-07-08

CF-9405

CF-07-09

LEGEND:

BACKGROUND CCR PROGRAM MONITORING WELL LOCATION

DOWNGRADIENT CCR PROGRAM MONITORING WELL LOCATION

IDEM PROGRAM MONITORING WELL LOCATION

800' 0' 800' 1600'

SCALE: 1"= 800'

| | |
|---|---|
| DRAWN BY | JM |
| DATE | |
| CHECKED BY | |
| JOB NO. | 2017114-CLI |
| DWG FILE | IKEC_Clifty_ASD_MW Locs_b03.dwg |
| DRAWING SCALE | NOT TO SCALE |

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INDIANA-KENTUCKY ELECTRIC CORPORATION

CLIFTY CREEK STATION
MADISON, INDIANA
TYPE I RESIDUAL WASTE LANDFILL
MONITORING WELL LOCATIONS

DRAWING NAME: FIGURE 1

REV.: 0

Plot: 01/10/2019 13:32 _PROGRAMS-IKEC\Clifty Creek-CCR Program\CAD\ASD GW Sampling\IKEC_Clifty_ASD_MW Locs_b03.dwg\FIG 1

DWG. NO. 16-30500-01-A

TYPE I RESIDUAL WASTE LANDFILL

WEST BOILER SLAG POND

LRCP

A

A'

Proposed Grading Limit

Ohio River

LEGEND:

**A-A'** CROSS SECTION TRANSECT

SOURCE: CLIFTY CREEK PERMIT DRAWINGS (FMSM, NOVEMBER 2006)

| | |
|---|---|
| DRAWN BY | JM |
| DATE | |
| CHECKED BY | |
| JOB NO. | 2017116-CLI |
| DWG FILE | Clifty_ASD_Boring Plan b04.dwg |
| DRAWING SCALE | NOT TO SCALE |

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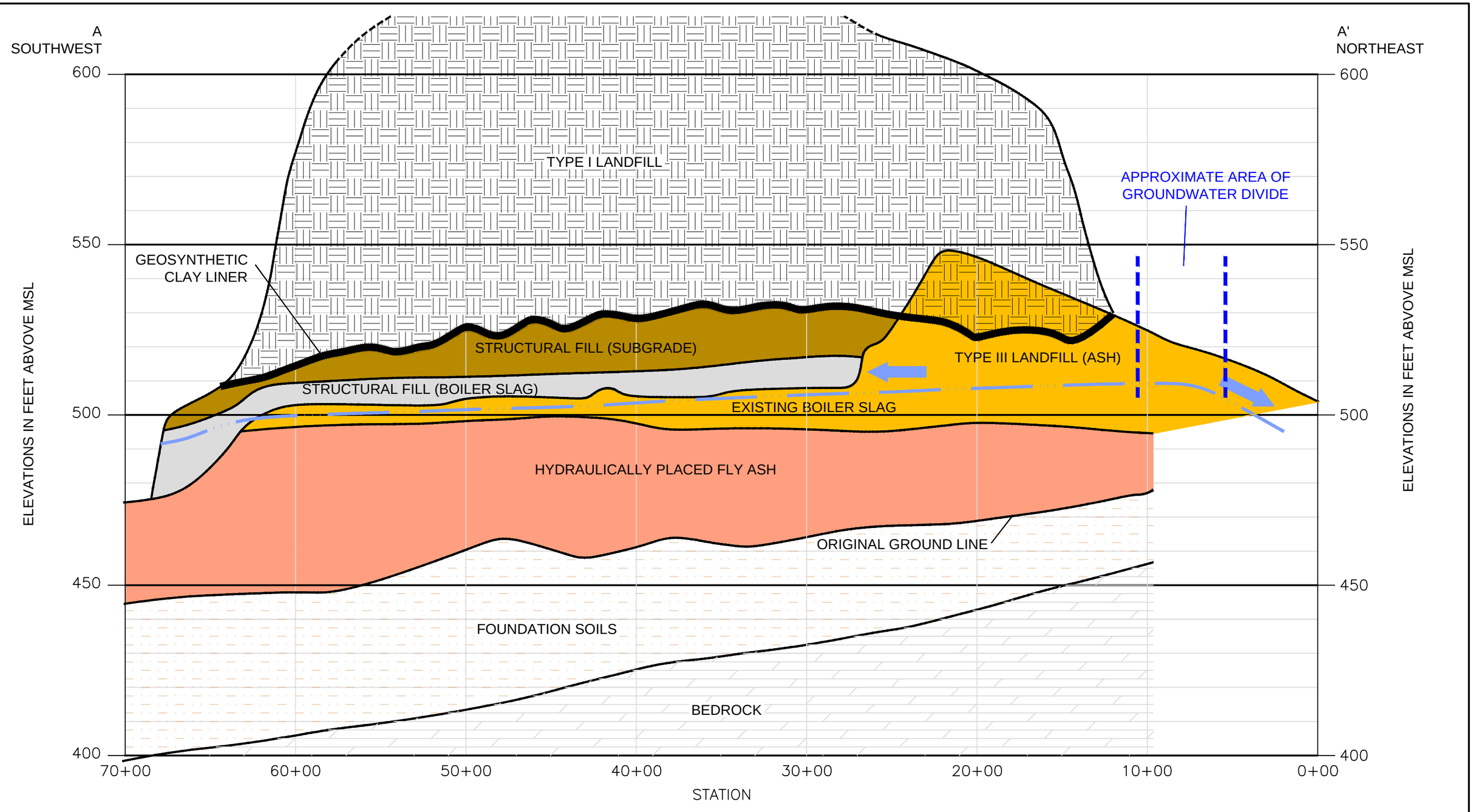
INDIANA-KENTUCKY ELECTRIC CORPORATION

CLIFTY CREEK STATION
MADISON, INDIANA
OVERVIEW OF TYPE I LANDFILL AND LRCP

DRAWING NAME: FIGURE 2

REV. 0

Plot: 12/12/2018 10:47 _PROGRAM-IKEC\Clifty Creek-CCR Program\CAD\ASD GW Sampling\Clifty_ASD_Boring Plan b04.dwg




APPROXIMATE PHREATIC SURFACE

GROUNDWATER FLOW DIRECTION

| | |
|---|---|
| DRAWN BY | JM |
| DATE | |
| CHECKED BY | |
| JOB NO. | 2022008-CLI |
| DWG FILE | 3_Clifty_ASD_Cross Sec b02_RVSD 9-8-22.dwg |
| DRAWING SCALE | NOT TO SCALE |

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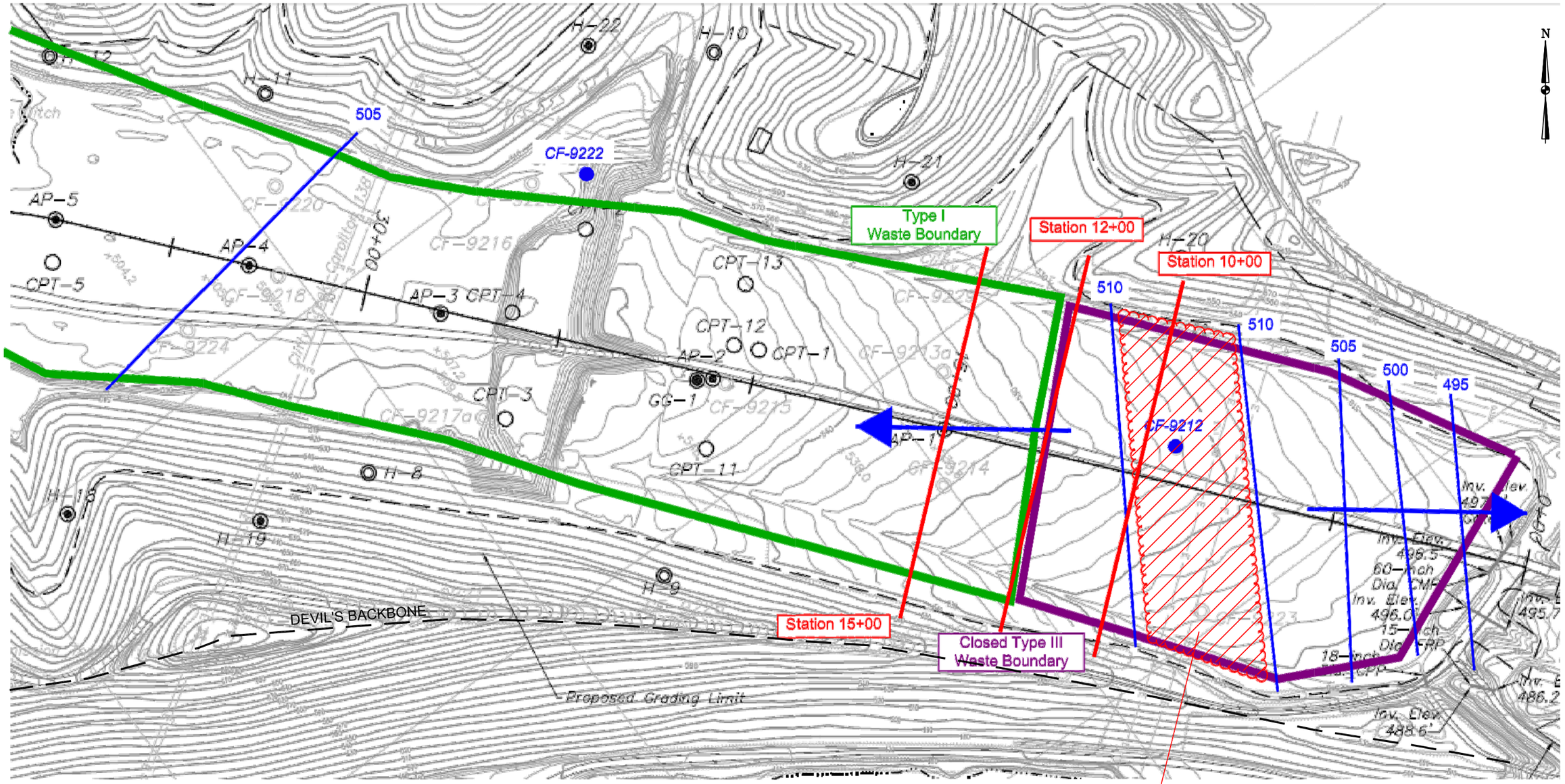
INDIANA-KENTUCKY ELECTRIC CORPORATION

CLIFTY CREEK STATION
MADISON, INDIANA
TYPE I RESIDUAL WASTE LANDFILL
GENERALIZED GEOLOGIC CROSS-SECTION
A-A' (SOUTHWEST-NORTHEAST)

DRAWING NAME: FIGURE 3

REV.: 0

Plot: 09/08/2022 14:19 _PROGRAM-IKEC\Clifty Creek-CCR Program\CAD\ASD 8_LF_MAR 2022\3_Clifty_ASD_Cross Sec b02_RVSD 9-8-22.dwg




505 — January 2006 Groundwater Contour

Groundwater Flow Direction

APPROXIMATE LOCATION OF GROUNDWATER DIVIDE.
BETWEEN STATIONS 7+00 AND 10+00.

| | |
|---|---|
| DRAWN BY | JM |
| DATE | |
| CHECKED BY | |
| JOB NO. | 2017116-CLI |
| DWG FILE | Clifty_GW Divide b01.dwg |
| DRAWING SCALE | NOT TO SCALE |

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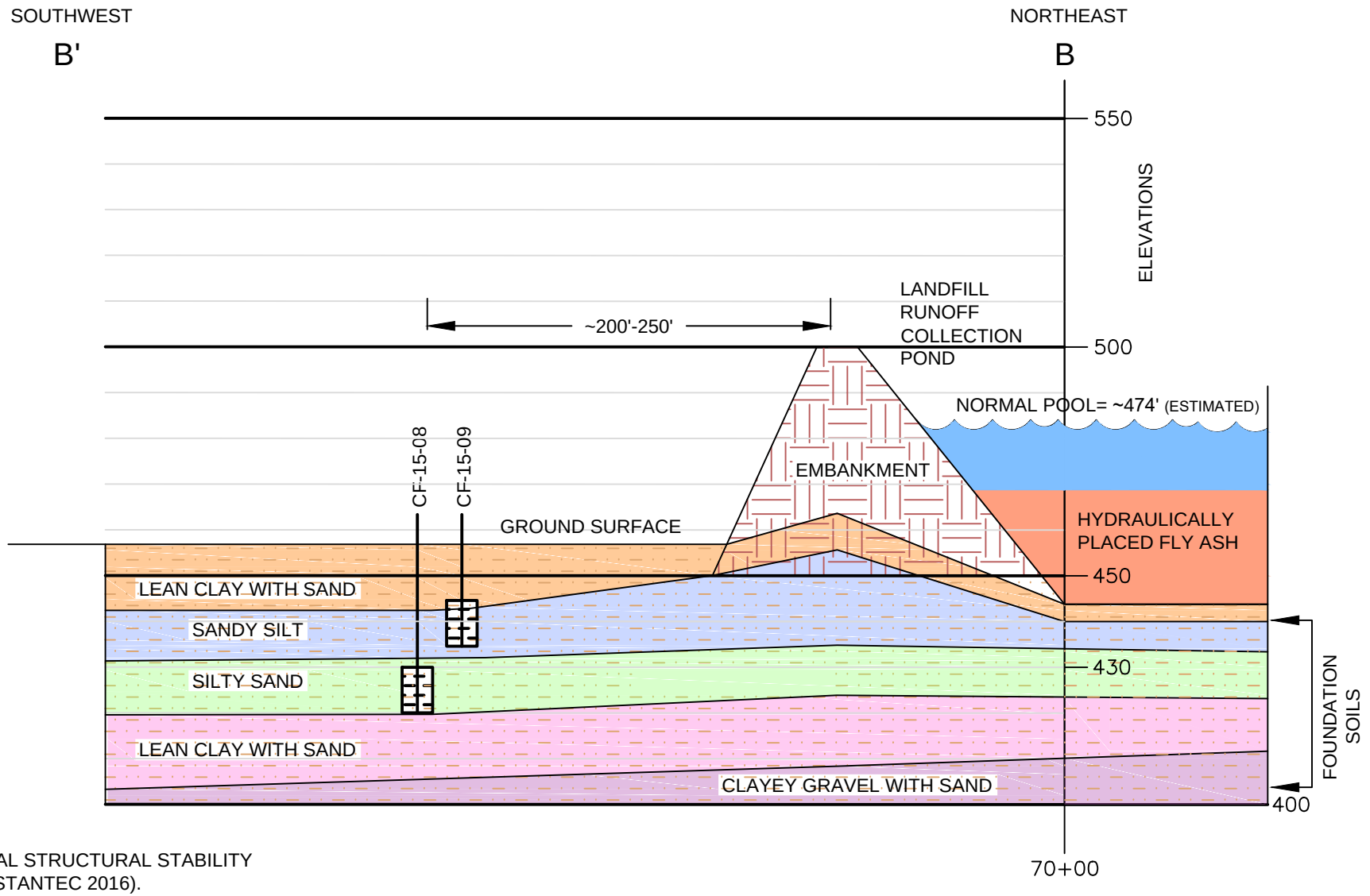
INDIANA-KENTUCKY ELECTRIC CORPORATION

CLIFTY CREEK STATION
MADISON, INDIANA
GROUNDWATER FLOW AT
NORTHEAST END OF BEDROCK CHANNEL

DRAWING NAME: FIGURE 4

REV.: 0

Plot: 12/12/2018 11:46 _PROGRAMS-IKEC\Clifty Creek-CCR Program\CAD\ASD GW Sampling\Clifty_GW Divide b01.dwg




NOTES:
BASED ON INITIAL STRUCTURAL STABILITY ASSESSMENT (STANTEC 2016).

| | |
|---|---|
| DRAWN BY | JM |
| DATE | |
| CHECKED BY | |
| JOB NO. | 2025018-CLI |
| DWG FILE | |
| DRAWING SCALE | NOT TO SCALE |

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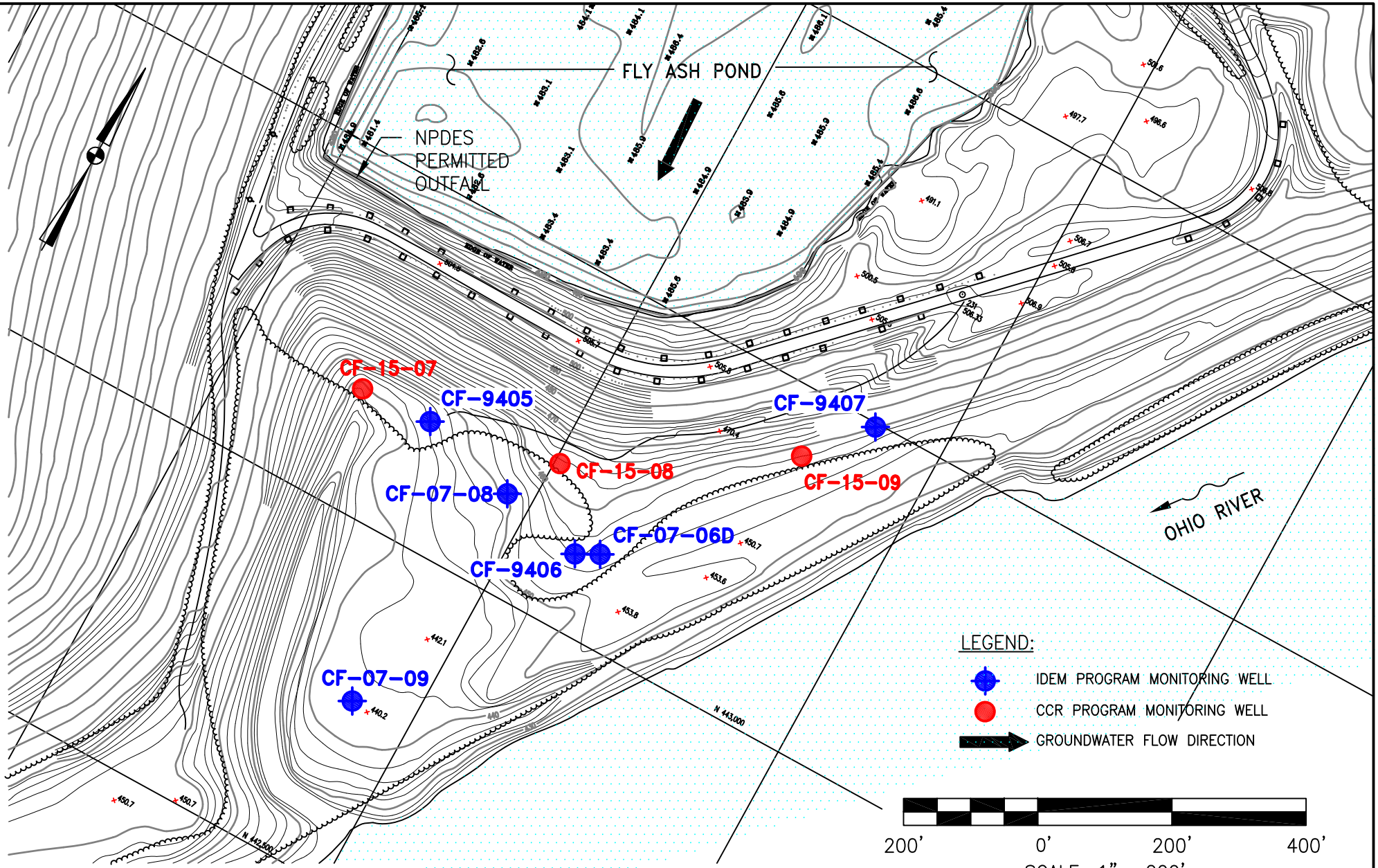
INDIANA-KENTUCKY ELECTRIC CORPORATION
CLIFTY CREEK STATION
MADISON, INDIANA
GENERALIZED CROSS-SECTION
LANDFILL RUNOFF COLLECTION POND TO
CCR MONITORING WELLS

| DRAWING NAME | REV. |
|---|---|
| FIGURE 5 | 0 |

Plot: 01/25/2022 12:15 _PROGRAMS-IKEC\Clifty Creek-CCR Program\CAD\ASD 7_LF_SEPT 2021\5_Clifty_ASD_X-Sec Pond-Wells a06_revised 1-25-22.dwg




| | |
|---|---|
| DRAWN BY | JM |
| DATE | |
| CHECKED BY | |
| JOB NO. | 2017116-CLI |
| DWG FILE | CLIFTY Well Locations a03 R2.dwg |
| DRAWING SCALE | AS SHOWN |

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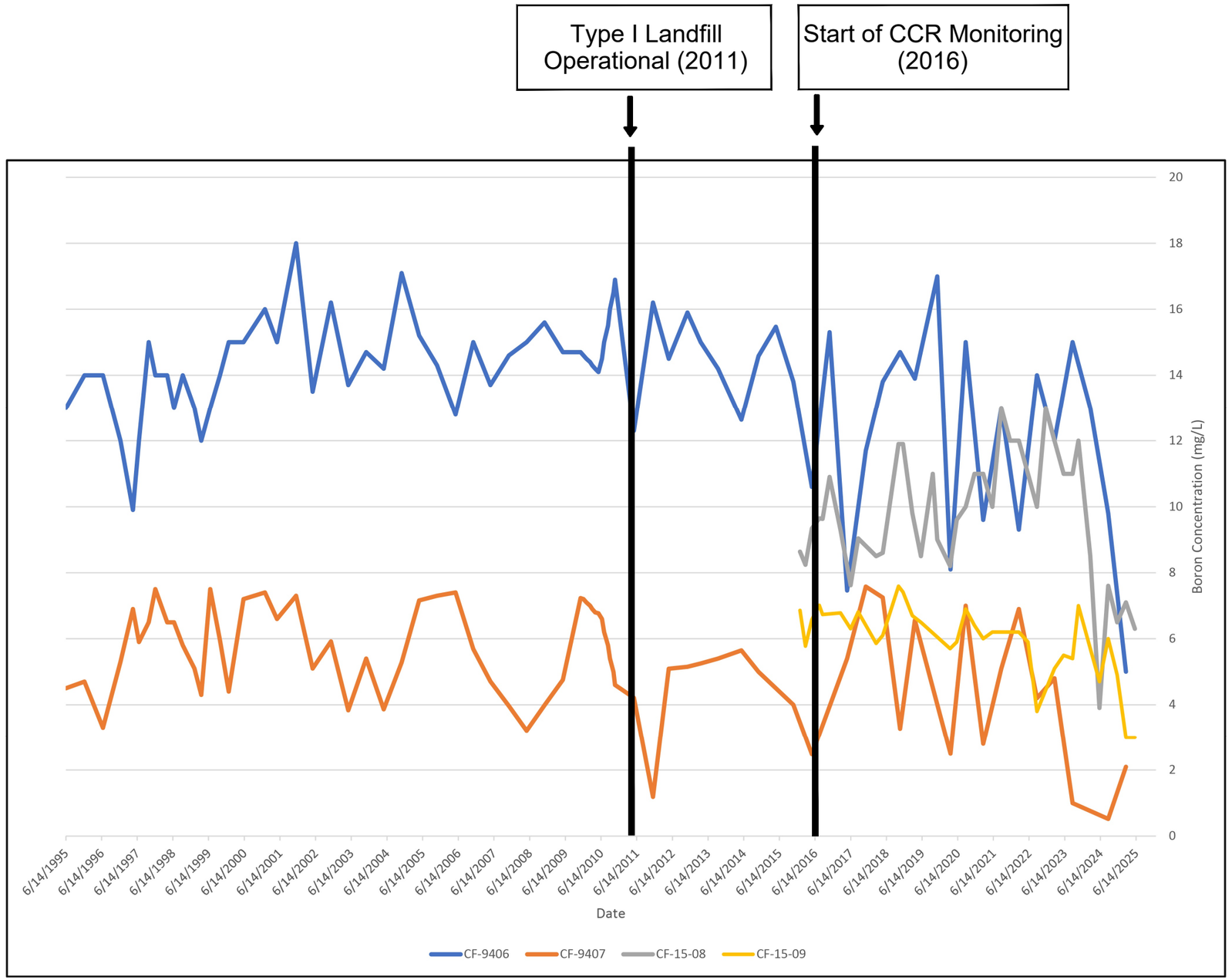
INDIANA-KENTUCKY ELECTRIC CORPORATION

CLIFTY CREEK PLANT
MADISON, INDIANA
CCR PROGRAM AND IDEM PROGRAM
MONITORING WELL LOCATION MAP

| DRAWING NAME | REV. |
|---|---|
| FIGURE 6 | 0 |

Plot: 12/12/2018 12:18 _PROGRAM-IKEC\Clifty Creek-CCR Program\CAD\ASD GW Sampling\CLIFTY Well Locations a03 R2.dwg




| | |
|---|---|
| DRAWN BY | GRM |
| DATE | 8-19-2025 |
| CHECKED BY | |
| JOB NO. | |
| DWG FILE | 2025018_7_IKEC_CLIFTY_ASD 9 LRCP_BORON-TIME GRAPH_2025.DWG |
| DRAWING SCALE | NOT TO SCALE |

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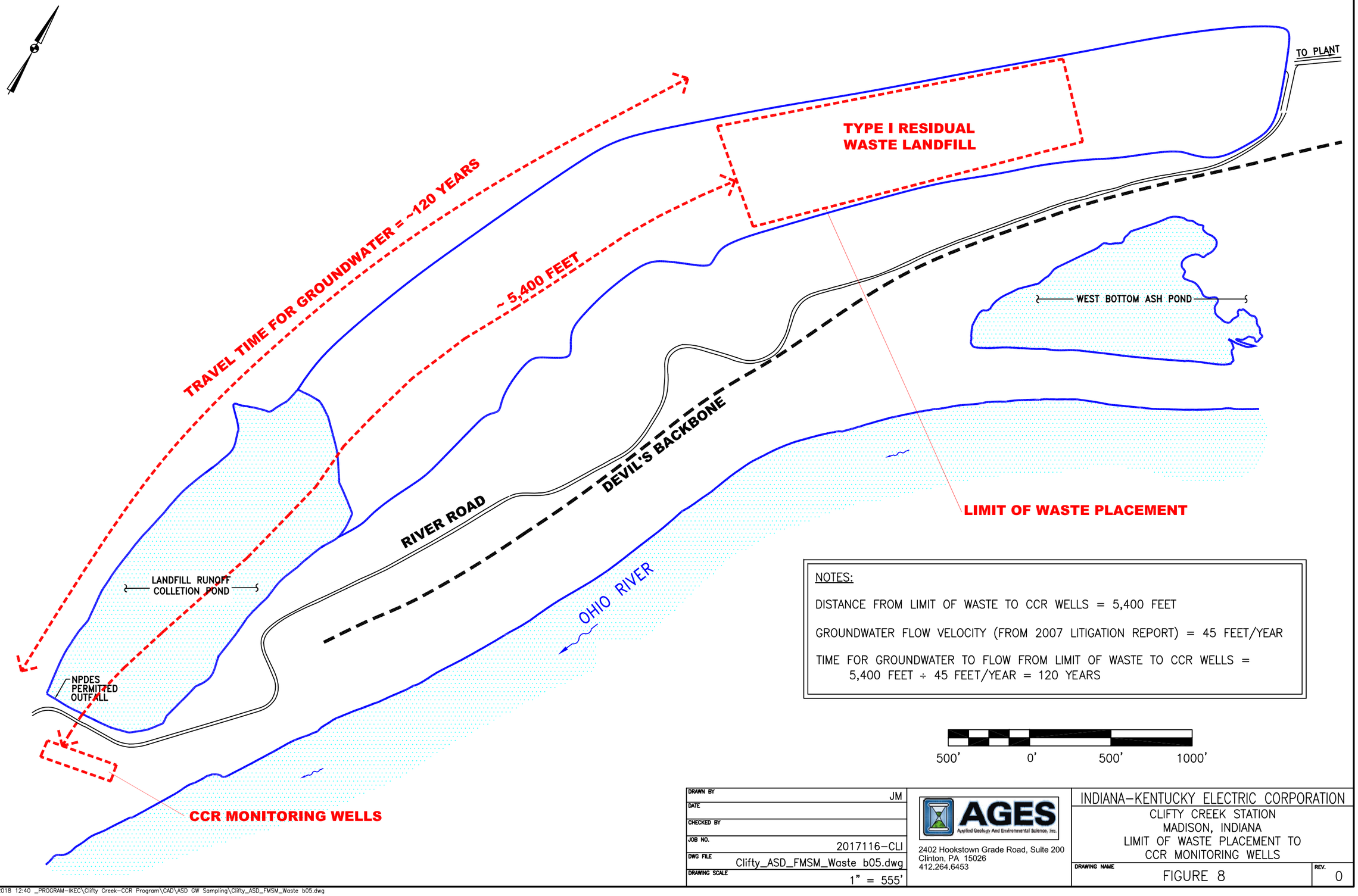
INDIANA-KENTUCKY ELECTRIC CORPORATION

CLIFTY CREEK STATION
MADISON, INDIANA
TIME SERIES DATA FOR BORON (mg/L)
CF-9406, CF-9407, CF-15-08 AND CF-15-09
JUNE 1995-JUNE 2025

| DRAWING NAME | REV. |
|---|---|
| FIGURE 7 | 0 |

PLOTTED: 8/19/2025 X:\SHARED\CLIENT_SHARE\GARYMALARKEY\2024 CLIFTY CREEK\CAD 8-19-2025\DWG FILES\2025018_7_IKEC_CLIFTY_ASD 9 LRCP_BORON-TIME GRAPH_2025.DWG




NOTES:

DISTANCE FROM LIMIT OF WASTE TO CCR WELLS = 5,400 FEET

GROUNDWATER FLOW VELOCITY (FROM 2007 LITIGATION REPORT) = 45 FEET/YEAR

TIME FOR GROUNDWATER TO FLOW FROM LIMIT OF WASTE TO CCR WELLS =
5,400 FEET ÷ 45 FEET/YEAR = 120 YEARS

500' 0' 500' 1000'

| | |
|---|---|
| DRAWN BY | JM |
| DATE | |
| CHECKED BY | |
| JOB NO. | 2017116-CLI |
| DWG FILE | Clifty_ASD_FMSM_Waste b05.dwg |
| DRAWING SCALE | 1" = 555' |

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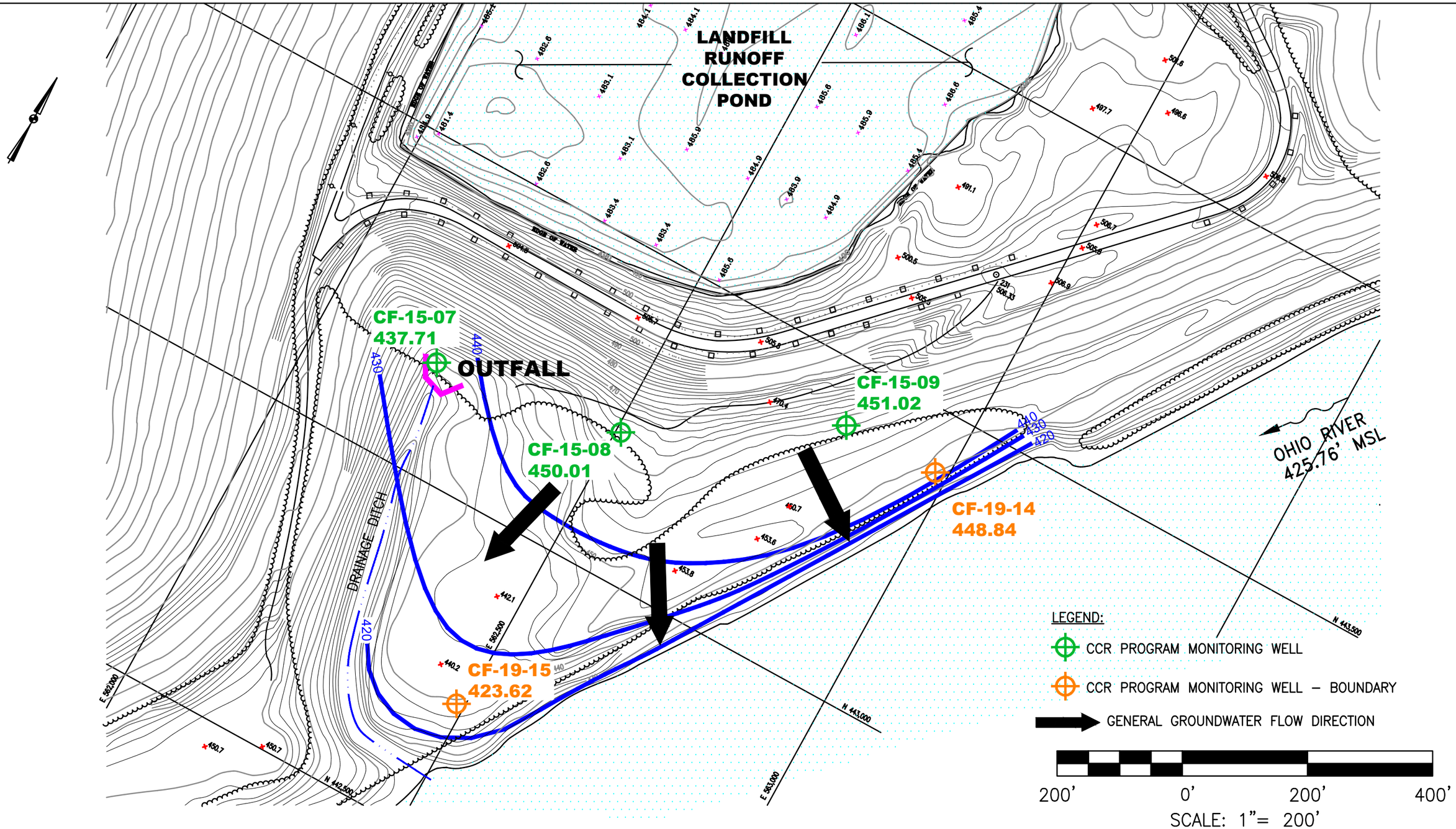
INDIANA-KENTUCKY ELECTRIC CORPORATION
CLIFTY CREEK STATION
MADISON, INDIANA
LIMIT OF WASTE PLACEMENT TO
CCR MONITORING WELLS

DRAWING NAME: FIGURE 8 REV. 0

Plot: 12/12/2018 12:40 _PROGRAM-IKEC\Clifty Creek-CCR Program\CAD\ASD GW Sampling\Clifty_ASD_FMSM_Waste b05.dwg

# APPENDIX A

# GROUNDWATER FLOW MAPS
# (MARCH AND JUNE 2025)




| | |
|---|---|
| DRAWN BY | GRM |
| DATE | 8–19–2025 |
| CHECKED BY | |
| JOB NO. | 2025018 |
| DWG FILE | 2025018_A–1_IKEC_CLIFTY_ASD 9 LRCP_GW FLOW_2025.DWG |
| DRAWING SCALE | AS SHOWN |

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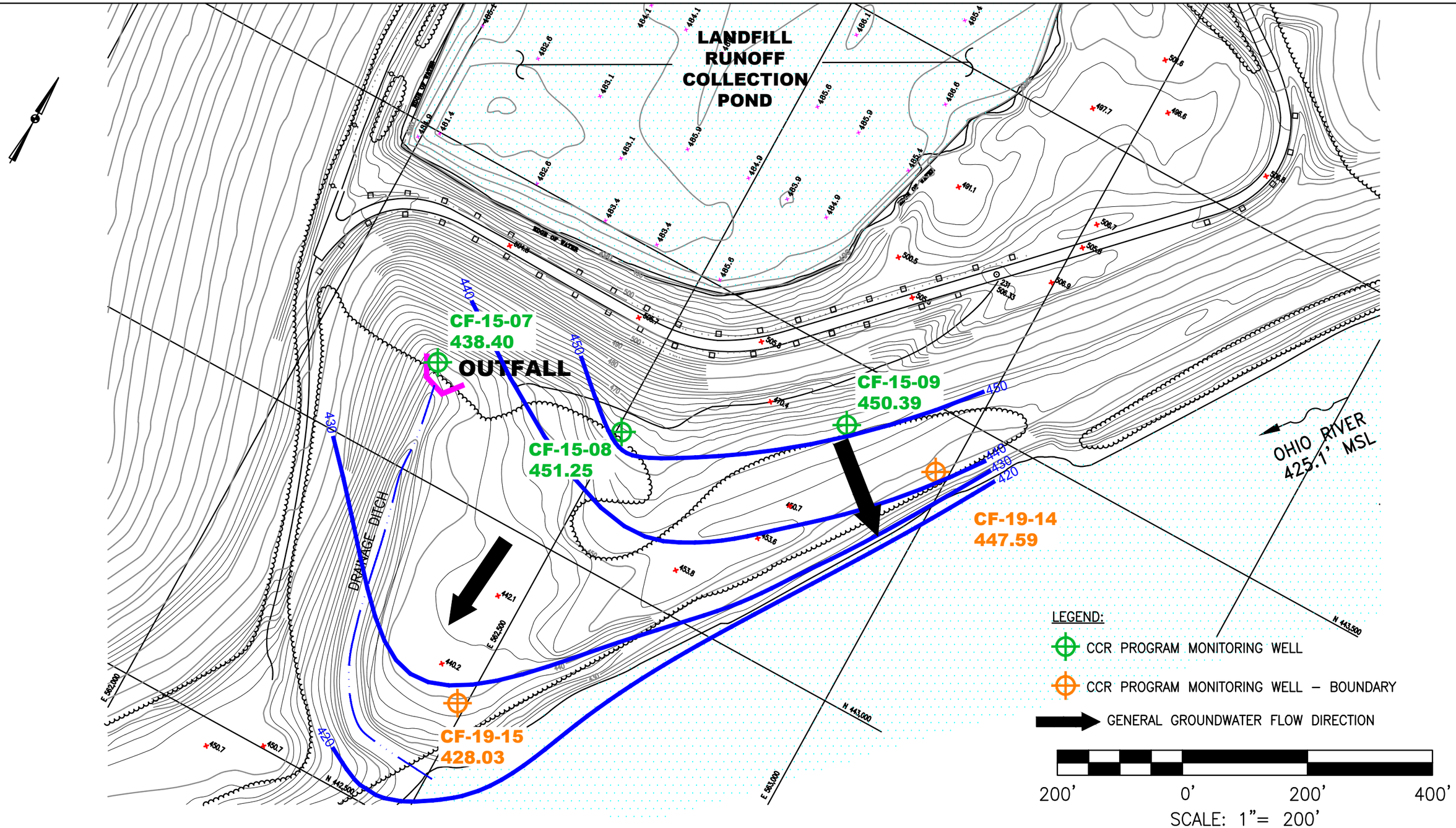
INDIANA–KENTUCKY ELECTRIC CORPORATION
CLIFTY CREEK STATION
MADISON, INDIANA
CCR PROGRAM
TYPE I RESIDUAL WASTE LANDFILL AND
LANDFILL RUNOFF COLLECTION POND
GROUNDWATER FLOW – UPPERMOST AQUIFER
MARCH 2025

| DRAWING NAME | REV. |
|---|---|
| FIGURE A–1 | 0 |

PLOTTED: 8/19/2025 X:\SHARED\CLIENT_SHARE\GARYMALARKEY\2024 CLIFTY CREEK\CAD 8–19–2025\DWG FILES\2025018_A–1_IKEC_CLIFTY_ASD 9 LRCP_GW FLOW_2025.DWG




| | |
|---|---|
| DRAWN BY | GRM |
| DATE | 8–19–2025 |
| CHECKED BY | |
| JOB NO. | 2025018 |
| DWG FILE | 2025_A–2_IKEC_CLIFTY_ASD 9 LRCP_GW FLOW_2025.DWG |
| DRAWING SCALE | AS SHOWN |

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INDIANA–KENTUCKY ELECTRIC CORPORATION

CLIFTY CREEK STATION
MADISON, INDIANA
CCR PROGRAM
TYPE I RESIDUAL WASTE LANDFILL AND
LANDFILL RUNOFF COLLECTION POND
GROUNDWATER FLOW – UPPERMOST AQUIFER
JUNE 2025

| DRAWING NAME | REV. |
|---|---|
| FIGURE A–2 | 0 |

PLOTTED: 8/19/2025 X:\SHARED\CLIENT_SHARE\GARYMALARKEY\2024 CLIFTY CREEK\CAD 8–19–2025\DWG FILES\2025_A–2_IKEC_CLIFTY_ASD 9 LRCP_GW FLOW_2025.DWG

# APPENDIX B

# FIGURE FROM LRCP DAM STABILITY ASSESSMENT REPORT (Stantec 2016)

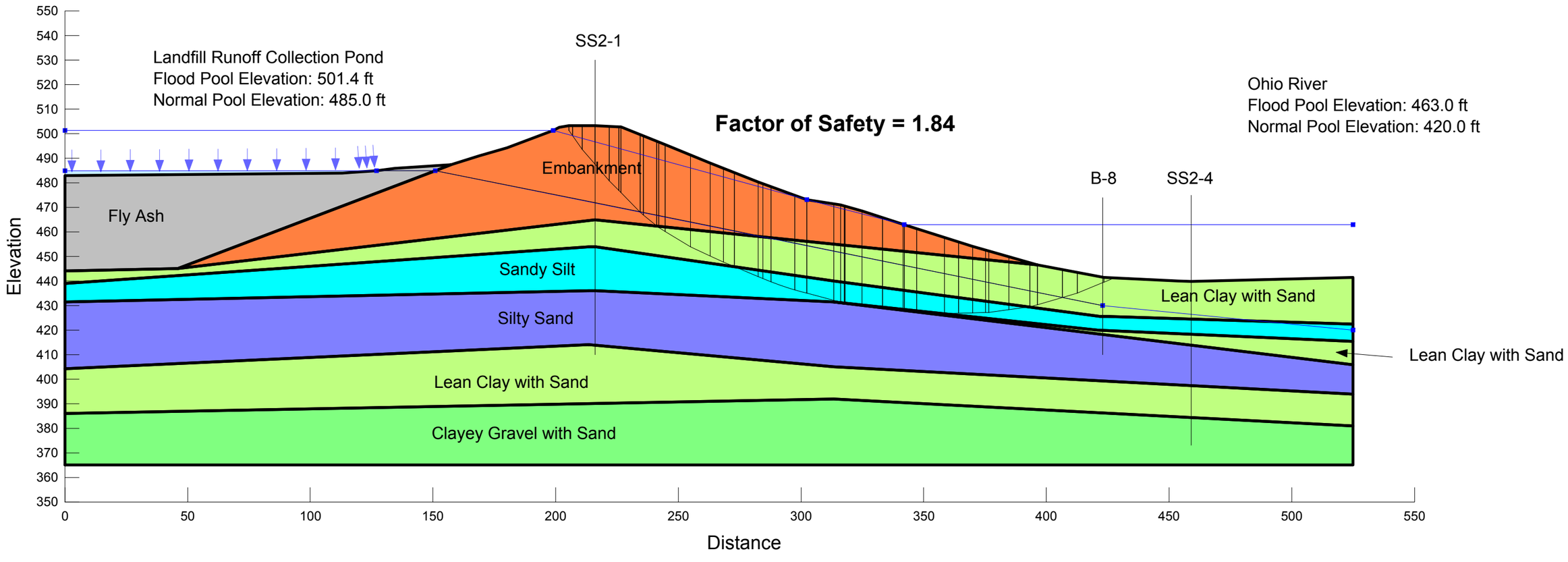
# Indiana-Kentucky Electric Corporation
# Clifty Creek Station
# Landfill Runoff Collection Pond Dam
# Madison, Indiana
# Section D-D'

## Existing Geometry
## Sudden Drawdown
## Undrained, Sudden Drawdown Strengths

Note: The results of the analysis shown here are based on available subsurface information, laboratory test results and approximate soil properties. The drawing depicts approximate subsurface conditions based on historical drawings or specific borings at the time of drilling. No warranties can be made regarding the continuity of subsurface conditions.

## Sudden Drawdown

| Material Type | Unit Weight | Effective - c' | Effective - phi | Total - c | Total - phi |
|---|---|---|---|---|---|
| Embankment (SDD) | 129 pcf | 198 psf | 27.5 ° | 1400 psf | 21 ° |
| Lean Clay with Sand (SDD) | 127 pcf | 206 psf | 28 ° | 1200 psf | 17 ° |
| Sandy Silt (SDD) | 125 pcf | 0 psf | 30 ° | 0 psf | 30 ° |
| Silty Sand (SDD) | 94 pcf | 0 psf | 30 ° | 0 psf | 30 ° |
| Clayey Gravel with Sand (SDD) | 130 pcf | 0 psf | 35 ° | 0 psf | 35 ° |
| Fly Ash (SDD) | 115 pcf | 0 psf | 25 ° | 0 psf | 25 ° |



# APPENDIX C

# PHASE 1, 2 AND 3 EXISTING CONDITIONS TOPOGRAPHIC MAP (Stantec 2024)

LEGEND

- UTILITY POLE
- TRANSMISSION LINE
- TRANSMISSION TOWER
- VEGETATION
- EDGE OF WATER
- PROPERTY LINE
- WASTE BOUNDARY
- GRADING LIMITS

## MAPPING SOURCE NOTE:

TOPOGRAPHIC, BATHYMETRIC, AND PLANIMETRIC SURVEY INFORMATION FOR THE PLANS WERE OBTAINED FROM MAPPING PROVIDED BY INDIANA-KENTUCKY ELECTRIC CORPORATION (IKEC) AND AMERICAN ELECTRIC POWER (AEP). DATE OF MAPPING IS DECEMBER 16, 2023. THE ACTIVE LANDFILL REFLECTS THE QUARTERLY TOPOGRAPHY FROM APRIL 2024 PROVIDED BY IKEC AND ADVANCED DRONE SOLUTIONS. HORIZONTAL DATUM IS NAD27 AND VERTICAL DATUM IS NAVD88.

## NOTES:

1. PHASE 1 PLACEMENT ONGOING. PHASE 2 SUBGRADE UNDER CONSTRUCTION. PHASE 3 SHOWS MINOR LANDFILL MODIFICATION TEMPORARY CONDITIONS.
2. AREAS WITH TEMPORARY SOIL COVER ARE MULCHED AND SEEDED.
3. MINOR LANDFILL PERMIT MODIFICATION TO THE LEACHATE AND STORMWATER MANAGEMENT ARE SHOWN IN THE PHASE 3 RWS TYPE 1 FOOTPRINT AND THE RWS TYPE III FOOTPRINT.

APRIL 2024 SURVEY UPDATE

PHASE 2
(UNDER CONSTRUCTION)

PROJECT BASELINE

SUBPHASES 1C AND 1D
(ACTIVE)

PHASE 3
(TEMPORARY COVER, MINOR LANDFILL MODIFICATION)

APRIL 2024 SURVEY UPDATE

WASTE BOUNDARY

JACQUELINE S. HARRIS
REGISTERED
No. 10911138
STATE OF INDIANA
PROFESSIONAL ENGINEER
6/5/2024

0 50' 100' 200'
1"=100'

Stantec
Stantec
10020 Alliance Road, Suite 300
Cincinnati, Ohio 45242
Tel (513) 842-8200
www.stantec.com



Client/Project
INDIANA-KENTUCKY ELECTRIC CORPORATION

ANNUAL CONTOUR UPDATE AS REQUIRED BY 329 IAC 10-20-24
CLIFTY CREEK COAL ASH LANDFILL (ID 39-04)
MADISON, JEFFERSON COUNTY, INDIANA

Title
PHASES 1, 2, AND 3 EXISTING CONDITIONS
(JUNE 2024)

Permit-Seal

Project Number: 173410747

| File Name: 173747x101-xxxx-2024.dwg | Dsn. | Dwn. | Chkd. | Dept. |
|---|---|---|---|---|
| | JSH | PJS | JSH | 24.05.22 |

Drawing No. 1

| Revision | Sheet |
|---|---|
| - | 1 of 2 |

# APPENDIX F

# ALTERNATE SOURCE DEMONSTRATION SEPTEMBER 2025
# TYPE I LANDFILL

AGES
Applied Geology And Environmental Science, Inc.

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Clinton, PA 15026
www.appliedgeology.net
P 412. 264. 6453
F 412. 264. 6567

# COAL COMBUSTION RESIDUALS REGULATION
# ALTERNATE SOURCE DEMONSTRATION REPORT
# SEPTEMBER 2025 ASSESSMENT MONITORING EVENT
# TYPE I RESIDUAL WASTE LANDFILL
# INDIANA-KENTUCKY ELECTRIC CORPORATION
# CLIFTY CREEK PLANT
# MADISON, JEFFERSON COUNTY, INDIANA

**JANUARY 2026**

**Prepared for:**

**INDIANA-KENTUCKY ELECTRIC CORPORATION (IKEC)**

**Prepared by:**

**APPLIED GEOLOGY AND ENVIRONMENTAL SCIENCE, INC. (AGES)**

# COAL COMBUSTION RESIDUALS REGULATION
# ALTERNATE SOURCE DEMONSTRATION REPORT
# SEPTEMBER 2025 ASSESSMENT MONITORING EVENT
# TYPE I RESIDUAL WASTE LANDFILL
# INDIANA KENTUCKY ELECTRIC CORPORATION
# CLIFTY CREEK PLANT
# MADISON, JEFFERSON COUNTY, INDIANA

**JANUARY 2026**

**Prepared for:**

**INDIANA-KENTUCKY ELECTRIC CORPORATION (IKEC)**

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# COAL COMBUSTION RESIDUALS REGULATION
# ALTERNATE SOURCE DEMONSTRATION REPORT
# SEPTEMBER 2025 ASSESSMENT MONITORING EVENT
# TYPE I RESIDUAL WASTE LANDFILL
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## 1.0 INTRODUCTION

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 the Resource Conservation and Recovery Act (RCRA) and became effective six (6) months from the date of its publication (April 2015) in the Federal Register, referred to as the "CCR Rule."

The Indiana-Kentucky Electric Corporation (IKEC) contracted with Applied Geology and Environmental Science, Inc. (AGES) to administer the CCR Rule groundwater monitoring program at the Clifty Creek Station located in Madison, Jefferson County, Indiana. There are three (3) CCR units at the Clifty Creek Station (Figure 1):

- Type I Residual Waste Landfill (Type I Landfill);
- Landfill Runoff Collection Pond (LRCP); and,
- West Boiler Slag Pond (WBSP).

Under the CCR program, the Type I Landfill and LRCP are being monitored under one (1) multi-unit groundwater monitoring system. During the March 2018 Detection Monitoring event, Boron Statistically Significant Increases (SSIs) were confirmed in two (2) wells located downgradient of the Type I Landfill and LRCP, and these CCR units entered into Assessment Monitoring in September 2018. Based on a successful Alternate Source Demonstration (ASD) (AGES 2019a), IKEC determined that the Type I Landfill was not the source of the Boron. Therefore, the Type I Landfill returned to Detection Monitoring in January 2019. During the March 2019, October 2019, March 2020, September 2020, March 2021, September 2021, March 2022, September 2022, March 2023, and September 2023 Detection Monitoring sampling events, SSIs for Boron were again confirmed in wells located downgradient of the unit. Based on successful ASDs for these nine (9) Detection Monitoring events (AGES 2019b, AGES 2020a, AGES 2020b, AGES 2021a, AGES 2021b, AGES 2022a, AGES 2022b, AGES 2023b, AGES 2023a and AGES 2024b), the Type I Landfill remained in Detection Monitoring. As an alternate source for Boron at the LRCP could not be established, the LRCP remains in Assessment Monitoring.

During the March 2024 Detection Monitoring sampling event, Boron SSIs were not identified; however, a SSI was confirmed in well CF-15-08 for Chloride. The Type I Landfill entered Assessment Monitoring in October 2024.

During the September 2024 and March 2025 Assessment Monitoring Sampling Events, Boron SSIs were confirmed in wells CF-15-08 and CF-15-09 located downgradient of the Type I Landfill. SSIs for Calcium (September 2024 only), Chloride, Sulfate, and Total Dissolved Solids (TDS) (March 2025 only) were also confirmed in well CF-15-08. IKEC prepared a successful ASD for each event to show that the Type I Landfill was not the source of the Boron (AGES 2025a, AGES 2025b).

During the September 2025 Assessment Monitoring Sampling Event, Boron SSIs were confirmed in wells CF-15-08 and CF-15-09 located downgradient of the Type I Landfill; SSIs for Chloride, Sulfate, and Total Dissolved Solids (TDS) were also confirmed in well CF-15-08. IKEC has prepared this ASD to show that the Type I Landfill is not the source of the Boron. Details regarding this evaluation are presented in this report.

## 1.1 Background

In accordance with §257.91(d) of the CCR Rule, as detailed in the Well Installation Report (AGES 2018), because the LRCP is directly adjacent to the southwest (downgradient) of the Type I Landfill, and because of the hydrogeologic conditions of the site, IKEC installed a multi-unit groundwater monitoring system to monitor groundwater quality directly downgradient of the Type I Landfill and LRCP. As described above, the Type I Landfill entered Assessment Monitoring in October 2024. In accordance with §257.95 of the CCR Rule, IKEC completed the groundwater monitoring requirements of the Assessment Monitoring Program at the Type I Landfill as described below.

The 3rd round of Assessment Monitoring groundwater samples was collected between September 19 and October 1, 2025, from monitoring wells at the Type I Landfill (Figure 1). All samples were collected in accordance with the Groundwater Monitoring Program Plan (GMPP) (AGES 2024a) and analyzed for Appendix III and Appendix IV constituents.

Upon receipt, the groundwater monitoring data were statistically evaluated in accordance with §257.93(f) of the CCR Rule and the Clifty Creek Station CCR Statistical Analysis Plan (StAP) (Stantec 2021). The initial statistical evaluation identified potential SSIs for Boron in monitoring wells CF-15-08 and CF-15-09 at the Type I Landfill. The results of the statistical evaluation are summarized in Table 1.

In accordance with the StAP, IKEC resampled the well for Boron on December 3, 2025. Based on the result of the resampling event, the SSIs for Boron were confirmed in monitoring wells CF-15-08 and CF-15-09 (Table 1).

### 1.2 Purpose of This Report

The purpose of this report is to present an ASD and provide sufficient evidence that the SSIs identified for Boron in wells CF-15-08 and CF-15-09 resulted from a source other than the Type I Landfill.

The CCR Rule does not contain specific requirements for an ASD beyond what is stated, as follows, in §257.94(e)(2):

*"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 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."*

In addition to the above requirements of the CCR Rule, this ASD has been conducted and presented using guidance and documentation recommendations included in the U.S. EPA document Solid Waste Disposal Facility Criteria Technical Manual EPA 530-R-93-017 (U.S. EPA 1993).

A detailed discussion of the confirmed SSIs and a technical justification that the exceedance results are from a source other than the Type I Landfill are presented in the following sections of this report.

## 2.0 DESCRIPTION OF THE TYPE I LANDFILL

### 2.1 Unit Description

The Type I Landfill and LRCP occupy an approximately 166-acre area situated within an eroded bedrock channel. The Landfill consists of approximately 109 acres that were approved as a Type I residual waste landfill by the Indiana Department of Environmental Management (IDEM) in 2007. The 57 acres consist of the LRCP located at the southwest end of the Type I Landfill (Figures 1 and 2).

Beginning in 1955, ash products were sluiced to a disposal pond located in the bedrock channel at the plant site. To allow for more disposal capacity, an on-site fly ash pond was developed into a Type III residual landfill in 1988. All required permits for the Type III Residual Waste Landfill (Type III Landfill) were obtained from IDEM. The Type III Landfill was permitted to be constructed and to serve as closure for the historic fly ash pond. The Type III Landfill is located at the northeast end of the bedrock channel and went operational in 1991.

After IDEM approval, IKEC upgraded the Type III Landfill to a Type I residual waste landfill (Type I Landfill). As a result, the Type III Landfill was closed, and the Type I Landfill was designed and constructed to serve as the cap for the closed Type III Landfill. The Type I Landfill, which went operational in 2010, is completely separated from the closed Type III Landfill by a geosynthetic clay liner and an engineered clay liner on top of the Type III Landfill to serve as a cap.

## 2.2 Hydrogeology

Based on information in the Hydrogeologic Study Report (AGES 2007), bedrock beneath the Type I Landfill and the closed Type III Landfill consists of impermeable limestone and shale of the Ordovician Dillsboro formation, which is overlain by approximately 20 to 35 feet of gray clay. The gray clay is directly overlain by fly ash that had been historically hydraulically placed in the area. A generalized cross-section showing the proposed final limits of the Type I Landfill & LRCP, the location and limits of the closed Type III Landfill, and the extent of the historic, hydraulically placed fly ash is presented in Figure 3. A limestone ridge known as the Devil's Backbone runs northeast to southwest along the length of the Type I Landfill & LRCP and the closed Type III Landfill. The Devil's Backbone acts as an impermeable barrier that forces groundwater passing beneath both of the landfills to flow either toward the northeast or toward the southwest. A detailed hydrogeologic study determined that a groundwater flow divide is present near the northeast end of the bedrock channel and that all groundwater beneath the active Type I Landfill flows toward the southwest (AGES 2007) (Figure 4). As detailed in the Monitoring Well Installation Report (AGES 2018), an aquifer does not exist beneath either of the landfills. Therefore, alluvial deposits located southwest of the LRCP are designated as the uppermost aquifer for the Type I Landfill & LRCP.

The Type I Landfill was constructed using a geosynthetic clay liner to prevent water from the Type I Landfill from entering the underlying layers. Water in the Type I Landfill is collected by a leachate system and discharged into the low-volume waste treatment system.

In November and December 2015, groundwater monitoring wells were installed for the CCR groundwater monitoring network at the site. The CCR groundwater monitoring network for the Type I Landfill consists of eight (8) monitoring wells (Figure 1). Three (3) monitoring wells (CF-15-07, CF-15-08, and CF-15-09) were installed in the alluvial deposits (uppermost aquifer) located southwest of the LRCP. Based on exploratory soil borings and historical data, there were no

suitable upgradient locations for the Type I Landfill. Well CF-15-04 was installed northeast of and outside the hydrologic influence of the Type I Landfill and the closed Type III Landfill to serve as a background monitoring well. Wells CF-15-05 and CF-15-06 were also installed in alluvial deposits along the Ohio River to serve as background monitoring wells. Wells WBSP-15-01 and WBSP-15-02 are located southeast of the impermeable Devil's Backbone and are hydraulically separated from groundwater flowing beneath the Type I Landfill. Because these wells are outside the hydraulic influence of the Type I Landfill, these wells were designated as background wells. Table 2 presents construction details for the monitoring wells in the groundwater monitoring network for the Type I Landfill. Two (2) additional wells (CF-19-14 and CF-19-15) were installed southwest of the Type I Landfill during the characterization of the LRCP and are now also part of the monitoring system for the Type I Landfill. Groundwater elevation data from the wells has been used to support the development of flow maps for the area.

Based on groundwater levels collected at the site since 1994, groundwater in the uppermost aquifer southwest (downgradient) of the Type I Landfill typically flows to the southwest toward the Ohio River. Historic groundwater data also indicates that groundwater flow at the southwest end of the property is affected by the elevation of the adjacent Ohio River. Evidence of routine, brief flow reversals (i.e., groundwater flows from the Ohio River back toward the southwest end of the property) and periodic flooding of the southwest end of the property have also been observed.

Groundwater contour maps for the uppermost aquifer southwest of the Type I Landfill in September 2025 (Assessment Monitoring Event) and December 2025 (Resampling Event) are included in Appendix A (Figures A-1 and A-2). Groundwater generally flows to the southwest toward the Ohio River.

## 3.0 ALTERNATE SOURCE DEMONSTRATION

As noted above, Boron was identified as a confirmed SSI in wells CF-15-08 and CF-15-09 downgradient of the Type I Landfill. Based on a review of the current and historic data, AGES/IKEC have determined that the active Type I Landfill is not the source of the Boron SSIs reported in the CCR monitoring wells and that historic fly ash that had been sluiced into the valley beginning in 1955 is the alternate source for the Boron SSIs. As discussed in detail below, this conclusion is based on the following lines of evidence:

- Ash that was historically sluiced into the bedrock valley in the 1950s is a known source of Boron and is hydraulically connected to groundwater downgradient of the Type I Landfill;
- Boron has been detected in groundwater downgradient from the hydraulically-placed ash (and the Type I Landfill) in IDEM program wells CF-9405, CF-9406 and CF-9407 (located near wells CF-15-08 and CF-15-09) since 1994, which is 17 years prior to operation of the Type I Landfill; and
- Given the extremely low groundwater flow velocity at the landfill, the travel time for a release of Boron from the Type I Landfill to reach wells CF-15-08 and CF-15-09 is

estimated at 120 years. As the Type I Landfill has only been in operation for 12 years, the landfill cannot be the source of the Boron.

Details to support these conclusions are presented below.

## 3.1 Alternate Source Demonstration Method

The evaluation of the alternate source for Boron in wells CF-15-08 and CF-15-09 was assessed in general accordance with guidelines presented in the Solid Waste Disposal Facility Criteria Technical Manual (U.S. EPA 1993) using the following methods:

- Identify a potential alternate source;
- Establish that a hydraulic connection exists between the alternate source and the wells with the confirmed SSIs;
- Establish that constituents of concern are present at the alternate source; and
- Establish that the concentrations observed in the compliance wells could not have resulted from the CCR unit given the hydrogeologic conditions at the site.

## 3.2 Alternate Source Identification

The initial groundwater investigation conducted for the former Type III Landfill (beginning in 1994) focused on the fly ash that had been hydraulically placed in the bedrock channel beginning in 1955. The Type III Landfill was permitted to serve as the closure for the hydraulically placed fly ash.

After IDEM approval, IKEC upgraded the Type III Landfill to a Type I Landfill and the Type I Landfill was permitted as the closure for a significant portion of the original Type III landfill footprint. The active Type I Landfill was constructed with a geosynthetic liner and an engineered clay liner on top of the Type III Landfill to serve as a cap. The two (2) liners create an effective hydraulic barrier between the active Type I Landfill and the closed Type III Landfill, which precludes the migration of leachate from the Type I Landfill. The portions of the Type III landfill closed in accordance with the state-approved closure plan are not subject to the 2015 CCR Rule.

Both landfills were constructed on top of the historic, hydraulically placed fly ash which extends the length of the bedrock channel (Figure 3) beneath the LRCP to the embankment at the southwestern end of the LRCP (Figure 5). Although the base of the LRCP contains historic, hydraulically placed fly ash, the LRCP does not receive CCR and the existing historic CCR is not actively managed. Therefore, the LRCP is considered an inactive CCR unit, and is currently undergoing closure.

Due to the age and extent of the historic, hydraulically placed ash, this material was identified as the alternate source for the Boron detected in wells CF-15-08 and CF-15-09.

### 3.3 Establish a Hydraulic Connection

A review of the permit drawings, construction drawings, and a figure from the Initial Structural Stability Assessment Landfill Runoff Collection Pond Report (Stantec 2016) (Appendix B) indicated that material from the closed Type III Landfill and the historic, hydraulically placed fly ash are located beneath the active Type I Landfill & LRCP (Figure 3). The base of the layer of "hydraulically placed fly ash" is located between elevations 445 feet mean sea level (ft msl) and 500 ft msl.

When the fly ash was originally emplaced in the bedrock channel, there were no impermeable liners constructed to separate the fly ash from the underlying "foundation soils." The CCR and IDEM groundwater monitoring wells are screened in these "foundation soils," which consist of alluvial deposits of silt, sand and gravel. These alluvial deposits extend from beneath the LRCP and the hydraulically placed fly ash southwest to the Ohio River and provide a direct hydraulic connection between the historic, hydraulically placed fly ash and the groundwater monitoring wells (Figure 5).

### 3.4 Constituents Are Present at the Alternate Source

Both the closed Type III Landfill and the Type I Landfill are currently being monitored under an IDEM groundwater monitoring program. In 1994, three (3) monitoring wells (CF-9405, CF-9406, and CF-9407) were installed south of the LRCP as a condition of a pH variance for the former Type III Landfill granted by IDEM. From June 1994 through February 1995, 17 biweekly background events were conducted. Since June 1995, routine quarterly and semi-annual monitoring of these wells has been conducted.

In 2009, three (3) additional wells (CF-07-06D, CF-07-08, and CF-07-09) were installed per IDEM to monitor groundwater quality during the year prior to the start of operations of the Type I Landfill in 2011. Wells in the IDEM groundwater monitoring network are located south of the LRCP and screened in the same "foundation soils" as the wells in the CCR monitoring network (Figure 6).

During quarterly and semi-annual sampling events from June 1995 through 2011, Boron was detected in well CF-9406 (adjacent to well CF-15-08) at concentrations ranging from 9.9 milligrams per liter (mg/L) to 18 mg/L and in well CF-9407 (adjacent to well CF-15-09) at concentrations ranging from 1.19 mg/L to 7.5 mg/L (Table 3 and Figure 7). This demonstrates that Boron was present in groundwater downgradient of the eventual location of the Type I Landfill 17 years prior to its operation. Boron concentrations in downgradient CCR wells have ranged from 3.9 mg/L to 13 mg/L in well CF-15-08, and from 3.0 mg/L to 7.59 mg/L in well CF-15-09 (Table 3 and Figure 7). These concentrations are similar to historic Boron concentrations observed in wells CF-9406 and CF-9407 from June 1995 through 2011.

Because Boron concentrations similar to those observed in CCR wells CF-15-08 and CF-15-09 were detected in IDEM wells CF-9406 and CF-9407 prior to construction of the Type I Landfill, the historic, hydraulically placed ash is the source of the detected Boron.

### 3.5 Hydrogeologic Conditions and Groundwater Flow Velocity

As presented in the Evaluation of Potential Risk to Supply Well Fields Report (AGES 2006), a groundwater flow velocity of 45 feet per year (ft/yr) was calculated for alluvial deposits, which are designated as the uppermost aquifer for these CCR units. Based on the most recent topographical survey conducted of the Type I Landfill (Appendix C), the current limit of waste for the active Type I Landfill is located approximately 5,400 feet (more than one [1] mile) northeast of the three (3) CCR groundwater monitoring wells (CF-15-07, CF-15-08, and CF-15-09) (Figure 8). Based on this data, it was calculated that it will take 120 years for groundwater to flow from the current limit of waste in the Type I Landfill to the CCR monitoring wells. Waste placement in the Type I Landfill began in early 2011. Given the two (2) constructed liners, the distance and the flow rate, water from the Type I Landfill should not be able to enter the groundwater, and groundwater has not had enough time to reach the CCR monitoring wells.

Based on the calculations presented above, the active Type I Landfill cannot be the source of Boron detected in the CCR monitoring wells.

## 4.0 CONCLUSIONS AND RECOMMENDATIONS

The ASD has been completed in general accordance with guidelines presented in the Solid Waste Disposal Facility Criteria Technical Manual (U.S. EPA 1993).

Based on a review of the current and historic data, AGES/IKEC have determined that the Type I Landfill is not the source of Boron detected in the CCR monitoring wells CF-15-08 and CF-15-09. This conclusion is supported by the following evidence:

- “Foundation soils” that extend from beneath the LRCP and the hydraulically placed fly ash southwest to the Ohio River provide a direct hydraulic connection between the historic, hydraulically placed fly ash and the CCR groundwater monitoring wells CF-15-08 and CF-15-09.
- Historic data from the IDEM groundwater monitoring program indicate that Boron concentrations similar to those observed in CCR wells CF-15-08 and CF-15-09 were detected in IDEM wells CF-9406 and CF-9407 for 17 years prior to operation of the Type I Landfill, indicating that the Boron is associated with the historic, hydraulically placed fly ash.
- Using the previously calculated groundwater flow velocity of 45 ft/yr, it is estimated that it would take 120 years for groundwater flowing beneath the Type I Landfill to reach the CCR monitoring wells.

Based on the demonstration presented above, the Type I Landfill is not the source of the Boron detected in CCR monitoring wells CF-15-08 and CF-15-09.

# 5.0 REFERENCES

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# TABLES

**TABLE 1**
**SUMMARY OF POTENTIAL AND CONFIRMED APPENDIX III SSIs**
**TYPE I RESIDUAL WASTE LANDFILL**
**CCR GROUNDWATER MONITORING PROGRAM**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

| Well ID | Potential SSI Parameter (Units) | 3rd Assessment Monitoring Sampling Event September 2025 | | 3rd Assessment Monitoring Resampling Event December 2025 | |
|---|---|---|---|---|---|
| | | Potential SSI Result | UTL | Potential SSI Result | Confirmed SSI (Yes/No) |
| CF-15-08 | Boron (mg/L) | 5 | 0.19 | 7.6 | Yes |
| | Chloride (mg/L) | 150 | 66 | 120 | Yes |
| | Sulfate (mg/L) | 830 | 508 | 760 | Yes |
| | TDS (mg/L) | 1700 | 1300 | 1500 | Yes |
| CF-15-09 | Boron (mg/L) | 3.4 | 0.19 | 3.3 | Yes |

Notes:
SSI: Statistically Significant Increase
UTL: Upper Tolerance Limit (Pooled Interwell UTL)
mg/L: Milligrams per liter

**TABLE 2**
**GROUNDWATER MONITORING NETWORK**
**TYPE I LANDFILL**
**CCR GROUNDWATER MONITORING PROGRAM**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

| Monitoring Well ID | Designation | Date of Installation | Coordinates | | Ground Elevation (ft)[2] | Top of Casing Elevation (ft)[2] | Top of Screen Elevation (ft) | Base of Screen Elevation (ft) | Total Depth From Top of Casing (ft) |
|---|---|---|---|---|---|---|---|---|---|
| | | | Northing | Easting | | | | | |
| **CF-15-04** | Background | 12/3/2015 | 451482.81 | 569307.19 | 465.55 | 468.03 | 439.55 | 429.55 | 38.48 |
| **CF-15-05** | Background | 12/1/2015 | 447491.91 | 565533.64 | 439.85 | 442.58 | 422.85 | 412.85 | 29.73 |
| **CF-15-06** | Background | 11/30/2015 | 447026.92 | 565190.31 | 437.49 | 440.40 | 431.49 | 421.49 | 18.91 |
| **CF-15-07** | Downgradient | 11/23/2015 | 443135.08 | 562259.25 | 438.61 | 441.11 | 432.61 | 422.61 | 18.50 |
| **CF-15-08** | Downgradient | 11/19/2015 | 443219.57 | 562537.29 | 460.33 | 462.79 | 430.33 | 420.33 | 42.46 |
| **CF-15-09** | Downgradient | 11/25/2015 | 443445.96 | 562871.69 | 456.73 | 459.45 | 447.73 | 442.73 | 16.72 |
| **WBSP-15-01** | Background | 11/30/2015 | 449072.27 | 566322.12 | 466.93 | 469.36 | 458.93 | 448.93 | 20.43 |
| **WBSP-15-02** | Background | 11/11/2015 | 449803.91 | 566987.30 | 473.83 | 476.76 | 457.83 | 452.83 | 23.93 |
| **CF-19-14** | Downgradient/Boundary | 3/8/2019 | 443401.75 | 562901.93 | 452.29 | 454.88 | 440.05 | 430.05 | 24.83 |
| **CF-19-15** | Downgradient/Boundary | 3/13/2019 | 442704.78 | 562483.02 | 441.10 | 443.61 | 415.19 | 405.19 | 38.42 |

Notes:

1. The Well locations are referenced to the North American Datum (NAD83), east zone coordinate system.
2. Elevations are referenced to the North American Vertical Datum (NAVD) 1988.
3. Boundary Monitoring Wells CF-19-14 and CF-19-15 were added to the Monitoring Network in December 2024

**TABLE 3**
**HISTORIC BORON CONCENTRATIONS: IDEM WELLS CF-9406 & CF-9407 AND CCR WELLS CF-15-08 & CF-15-09**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

| Boron Concentrations in IDEM Wells (1994 through 2015) | | | | | |
|---|---|---|---|---|---|
| **Date** | **CF-9406** | **CF-9407** | **Date** | **CF-9406** | **CF-9407** |
| **6/8/1994** | 10 | 2.9 | **11/19/2002** | 16.2 | 5.92 |
| **6/22/1994** | 9.8 | 4.7 | **5/14/2003** | 13.7 | 3.83 |
| **7/6/1994** | 11 | 6.3 | **11/12/2003** | 14.7 | 5.4 |
| **7/20/1994** | 12 | 8.4 | **5/11/2004** | 14.2 | 3.86 |
| **8/3/1994** | 10 | 6.3 | **11/9/2004** | 17.1 | 5.28 |
| **8/17/1994** | 9 | 6.4 | **5/9/2005** | 15.2 | 7.16 |
| **8/31/1994** | 12 | 7.7 | **11/8/2005** | 14.3 | DRY |
| **9/14/1994** | 9.8 | 6.9 | **5/17/2006** | 12.8 | 7.4 |
| **9/28/1994** | 9.7 | 5.9 | **11/15/2006** | 15 | 5.69 |
| **10/12/1994** | 12 | 7.3 | **5/9/2007** | 13.7 | 4.71 |
| **10/26/1994** | 12 | 6.8 | **11/14/2007** | 14.6 | DRY |
| **11/9/1994** | 11 | 6.7 | **5/13/2008** | 15 | 3.21 |
| **11/30/1994** | 11 | 5 | **11/12/2008** | 15.6 | DRY |
| **12/7/1994** | 10 | 3.6 | **5/19/2009** | 14.7 | 4.75 |
| **12/21/1994** | 11 | 2.5 | **11/16/2009** | 14.7 | 7.23 |
| **1/18/1995** | 11 | 3 | **12/16/2009** | NM | NM |
| **2/22/1995** | 13 | 3.6 | **01/14/2010** | NM | NM |
| **6/14/1995** | 13 | 4.5 | **02/23/2010** | NM | NM |
| **12/21/1995** | 14 | 4.7 | **03/16/2010** | NM | NM |
| **6/26/1996** | 14 | 3.3 | **04/15/2010** | NM | NM |
| **12/23/1996** | 12 | 5.3 | **5/19/2010** | 14.1 | 6.77 |
| **4/30/1997** | **9.9** | 6.9 | **06/23/2010** | NM | NM |
| **6/30/1997** | 12 | 5.9 | **07/15/2010** | NM | NM |
| **10/7/1997** | 15 | DRY | **08/24/2010** | NM | NM |
| **12/16/1997** | 14 | **7.5** | **09/14/2010** | NM | NM |
| **4/16/1998** | 14 | 6.5 | **10/19/2010** | NM | NM |
| **6/24/1998** | 13 | 6.5 | **11/3/2010** | 16.9 | DRY |
| **9/23/1998** | 14 | DRY | **Type I Landfill Operational** | | |
| **1/21/1999** | 13 | 5.1 | **5/17/2011** | 12.3 | 4.21 |
| **3/31/1999** | 12 | 4.3 | **11/28/2011** | 16.2 | **1.19** |
| **6/30/1999** | 13 | 7.5 | **5/7/2012** | 14.5 | 5.09 |
| **10/7/1999** | DRY | DRY | **11/13/2012** | 15.9 | DRY |
| **1/6/2000** | 15 | 4.4 | **3/30/2013** | 15 | 5.25 |
| **6/6/2000** | 15 | 7.2 | **9/23/2013** | 14.2 | DRY |
| **1/10/2001** | 16 | 7.4 | **5/21/2014** | 12.63 | 5.646 |
| **5/15/2001** | 15 | 6.6 | **11/11/2014** | 14.58 | DRY |
| **11/26/2001** | **18** | 7.3 | **5/9/2015** | 15.47 | DRY |
| **5/15/2002** | 13.5 | 5.1 | **11/3/2015** | 13.8 | DRY |

**TABLE 3**
**HISTORIC BORON CONCENTRATIONS: IDEM WELLS CF-9406 & CF-9407 AND CCR WELLS CF-15-08 & CF-15-09**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

| Boron Concentrations in IDEM and CCR Wells (2016 through 2025) | | | | |
|---|---|---|---|---|
| **Date** | **CF-9406** | **CF-9407** | **CF-15-08** | **CF-15-09** |
| **January 2016** | NM | NM | 8.64 | 6.86 |
| **March 2016** | NM | NM | 8.24 | 5.78 |
| **May 2016** | 10.6 | 2.48 | 9.34 | 6.58 |
| **July 2016** | NM | NM | 9.65 | 7.01 |
| **August 2016** | NM | NM | 9.63 | 6.73 |
| **November 2016** | 15.3 | DRY | 10.9 | DRY |
| **March 2017** | NM | NM | 9.29 | 6.78 |
| **May 2017** | 7.46 | 5.4 | NM | NM |
| **June 2017** | NM | NM | **7.62** | 6.3 |
| **August 2017** | NM | NM | 9.04 | 6.81 |
| **November 2017** | 11.7 | 7.58 | NM | NM |
| **March 2018** | NM | NM | 8.5 | 5.86 |
| **May 2018** | 13.8 | 7.25 | 8.6 | 6.1 |
| **October 2018** | NM | NM | 11.9 | **7.59** |
| **November 2018** | 14.7 | 3.27 | NM | NM |
| **December 2018** | NM | NM | 11.9 | 7.41 |
| **March 2019** | NM | NM | 9.8 | 6.7 |
| **May 2019** | 13.9 | 6.56 | NM | NM |
| **June 2019** | NM | NM | 8.5 | 6.5 |
| **October 2019** | NM | NM | 11.0 | DRY |
| **November 2019** | 17 | DRY | 9.0 | NM |
| **March 2020** | NM | NM | 8.2 | 5.7 |
| **April 2020** | 8.1 | 2.5 | NM | NM |
| **June 2020** | NM | NM | 9.6 | 5.9 |
| **September 2020** | 15 | 7 | 10 | 6.9 |
| **December 2020** | NM | NM | 11 | 6.4 |
| **March 2021** | 9.6 | 2.8 | 11 | 6.0 |
| **June 2021** | NM | NM | 10 | 6.2 |
| **September 2021** | 13 | 5.1 | **13** | DRY |
| **December 2021** | NM | NM | 12 | NM |
| **March 2022** | 9.3 | 6.9 | 12 | 6.2 |
| **June 2022** | NM | NM | 11 | 5.9 |
| **September 2022** | 14 | 4.2 | 10 | 3.8 |
| **December 2022** | NM | NM | **13** | NM |
| **March 2023** | 12 | 4.8 | 12 | 5.1 |
| **June 2023** | NM | NM | 11 | 5.5 |

**TABLE 3**
**HISTORIC BORON CONCENTRATIONS: IDEM WELLS CF-9406 & CF-9407 AND CCR WELLS CF-15-08 & CF-15-09**
**CLIFTY CREEK STATION**
**MADISON, INDIANA**

| Boron Concentrations in IDEM and CCR Wells (2016 through 2025) Continued | | | | |
|---|---|---|---|---|
| **Date** | **CF-9406** | **CF-9407** | **CF-15-08** | **CF-15-09** |
| **September 2023** | 15 | 1.0 | 11 | 5.4 |
| **November 2023** | NM | NM | 12 | 7.0 |
| **March 2024** | 13 | NM | 8.5 | 5.7 |
| **June 2024** | NM | NM | 3.9 | 4.7 |
| **September 2024** | 9.8 | 0.52 | 7.6 | 6.0 |
| **December 2024** | NM | NM | 6.5 | 4.9 |
| **March 2025** | 5.0 | 2.1 | 7.1 | **3.0** |
| **June 2025** | NM | NM | 6.3 | **3.0** |
| **September 2025** | 8.3 | DRY | 5.0 | 3.4 |
| **December 2025** | NM | NM | 7.6 | 3.3 |

Notes:
1. All concentrations are mg/L.
2. NM = Well was not monitored on this date.
3. DRY = Well was dry and not able to be sampled.
4. Maximum and minimum Boron results for IDEM wells (June 1995 through 2011 only) and CCR wells are shown in **Bold.**

# FIGURES

N

CLIFTY HOLLOW ROAD

CF-15-04

CLIFTY CREEK STATION

BIG CLIFTY CREEK

LIMIT OF WASTE PLACEMENT

TYPE I RESIDUAL WASTE LANDFILL

WBSP-15-02

WEST BOILER SLAG POND

DEVIL'S BACKBONE

WBSP-15-01

INDIANA

KENTUCKY

CF-15-05

CF-15-06

OHIO RIVER

RIVER ROAD

LANDFILL RUNOFF COLLECTION POND

B'

B

CF-15-08

CF-15-07

CF-9407

CF-15-09

CF-07-06D

CF-9406

CF-07-08

CF-9405

CF-07-09

LEGEND:

BACKGROUND CCR PROGRAM MONITORING WELL LOCATION

DOWNGRADIENT CCR PROGRAM MONITORING WELL LOCATION

IDEM PROGRAM MONITORING WELL LOCATION

800' 0' 800' 1600'

SCALE: 1"= 800'

| | |
|---|---|
| DRAWN BY | JM |
| DATE | |
| CHECKED BY | |
| JOB NO. | 2017114-CLI |
| DWG FILE | IKEC_Clifty_ASD_MW Locs_b03.dwg |
| DRAWING SCALE | NOT TO SCALE |

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INDIANA-KENTUCKY ELECTRIC CORPORATION

CLIFTY CREEK STATION
MADISON, INDIANA
TYPE I RESIDUAL WASTE LANDFILL
MONITORING WELL LOCATIONS

DRAWING NAME: FIGURE 1

REV.: 0

Plot: 01/10/2019 13:32 _PROGRAMS-IKEC\Clifty Creek-CCR Program\CAD\ASD GW Sampling\IKEC_Clifty_ASD_MW Locs_b03.dwg\FIG 1

DWG. NO. 16-30500-01-A

TYPE I RESIDUAL WASTE LANDFILL

WEST BOILER SLAG POND

LRCP

A

A'

Proposed Grading Limit

Ohio River

LEGEND:

**A-A'** CROSS SECTION TRANSECT

SOURCE: CLIFTY CREEK PERMIT DRAWINGS (FMSM, NOVEMBER 2006)

| | |
|---|---|
| DRAWN BY | JM |
| DATE | |
| CHECKED BY | |
| JOB NO. | 2017116-CLI |
| DWG FILE | Clifty_ASD_Boring Plan b04.dwg |
| DRAWING SCALE | NOT TO SCALE |

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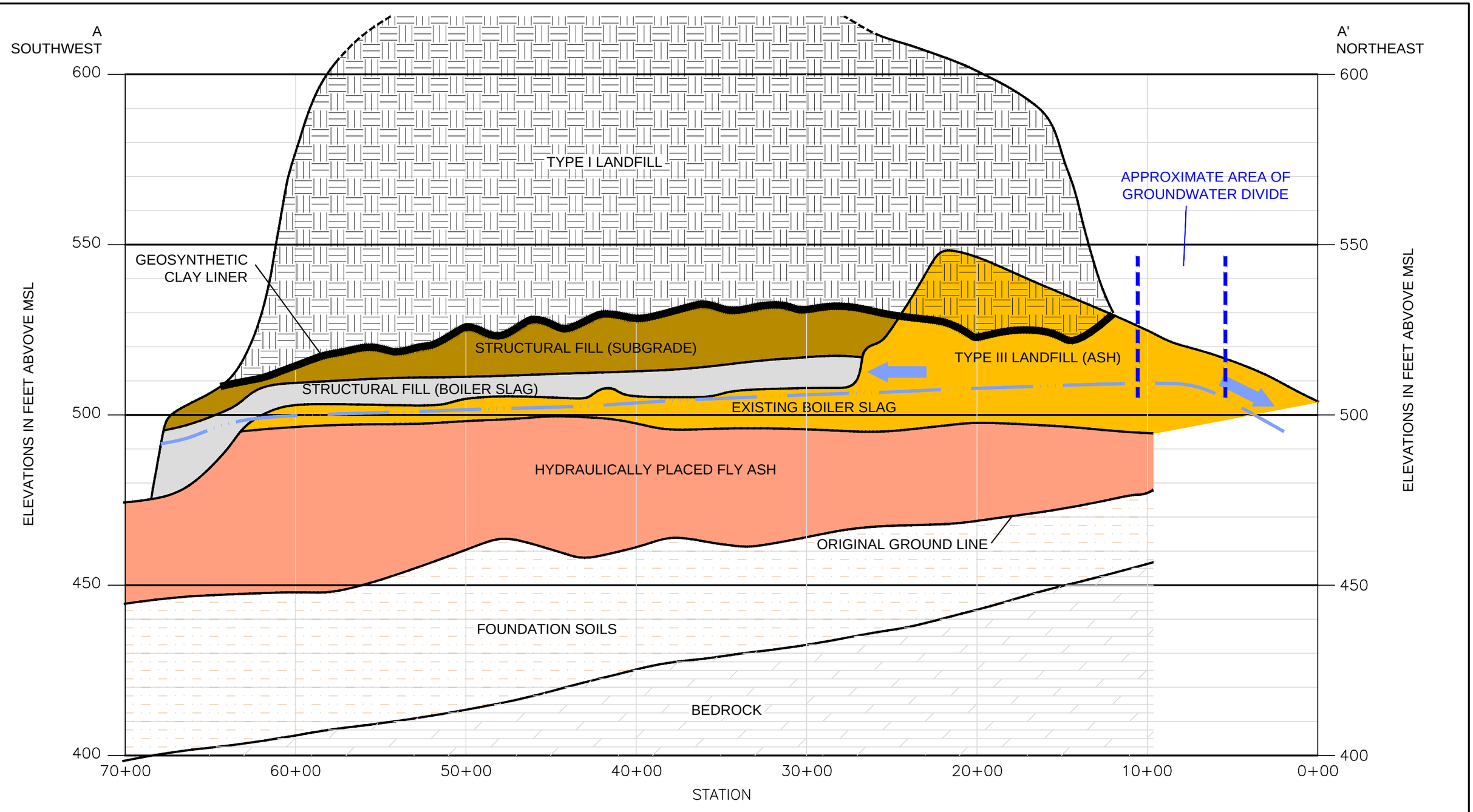
INDIANA-KENTUCKY ELECTRIC CORPORATION

CLIFTY CREEK STATION
MADISON, INDIANA
OVERVIEW OF TYPE I LANDFILL AND LRCP

DRAWING NAME: FIGURE 2

REV. 0

Plot: 12/12/2018 10:47 _PROGRAM-IKEC\Clifty Creek-CCR Program\CAD\ASD GW Sampling\Clifty_ASD_Boring Plan b04.dwg




APPROXIMATE PHREATIC SURFACE

GROUNDWATER FLOW DIRECTION

| | |
|---|---|
| DRAWN BY | JM |
| DATE | |
| CHECKED BY | |
| JOB NO. | 2022008-CLI |
| DWG FILE | 3_Clifty_ASD_Cross Sec b02_RVSD 9-8-22.dwg |
| DRAWING SCALE | NOT TO SCALE |

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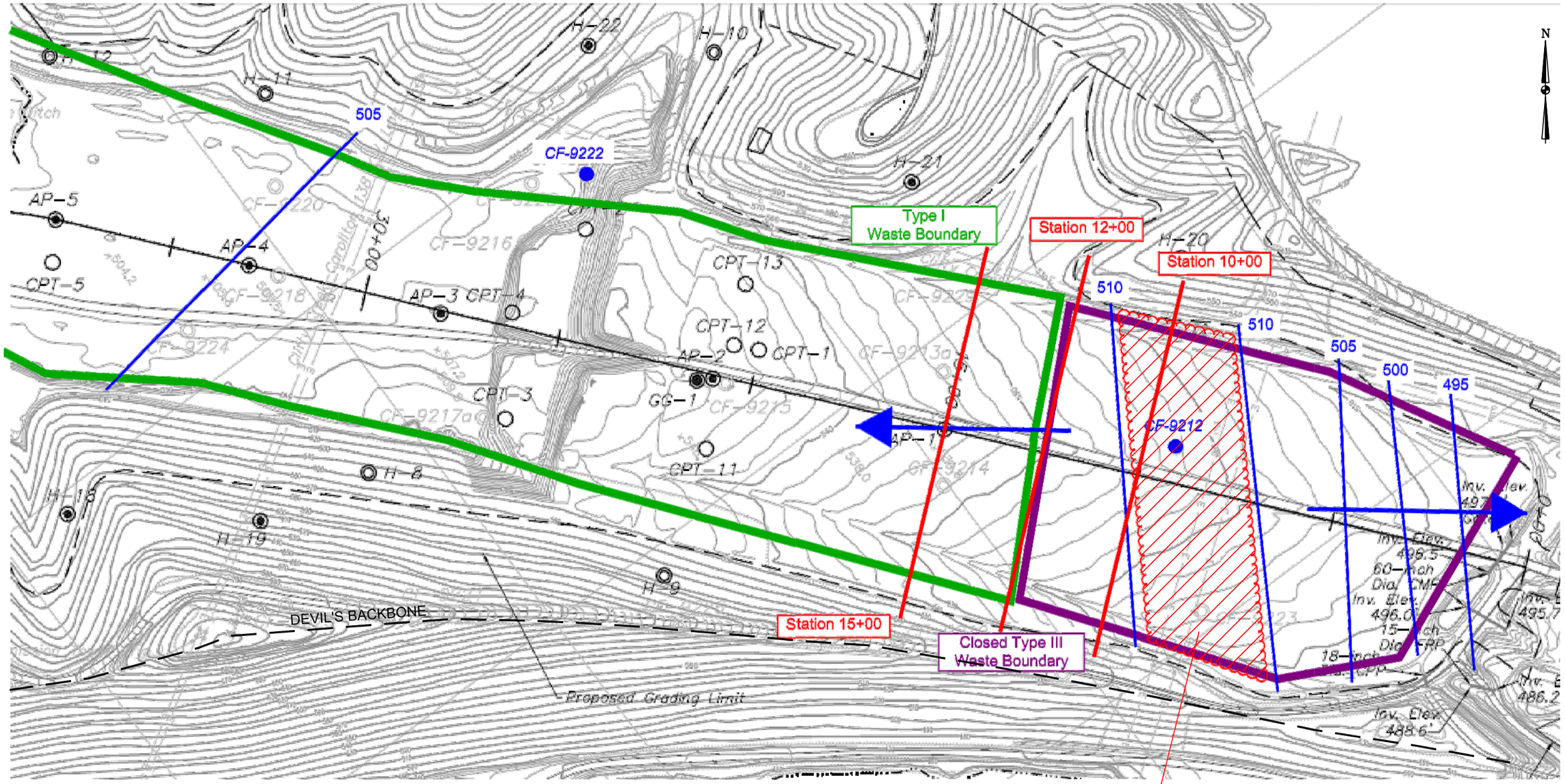
INDIANA-KENTUCKY ELECTRIC CORPORATION

CLIFTY CREEK STATION
MADISON, INDIANA
TYPE I RESIDUAL WASTE LANDFILL
GENERALIZED GEOLOGIC CROSS-SECTION
A-A' (SOUTHWEST-NORTHEAST)

DRAWING NAME: FIGURE 3

REV.: 0

Plot: 09/08/2022 14:19 _PROGRAM-IKEC\Clifty Creek-CCR Program\CAD\ASD 8_LF_MAR 2022\3_Clifty_ASD_Cross Sec b02_RVSD 9-8-22.dwg




505 — January 2006 Groundwater Contour

Groundwater Flow Direction

APPROXIMATE LOCATION OF GROUNDWATER DIVIDE.
BETWEEN STATIONS 7+00 AND 10+00.

| | |
|---|---|
| DRAWN BY | JM |
| DATE | |
| CHECKED BY | |
| JOB NO. | 2017116-CLI |
| DWG FILE | Clifty_GW Divide b01.dwg |
| DRAWING SCALE | NOT TO SCALE |

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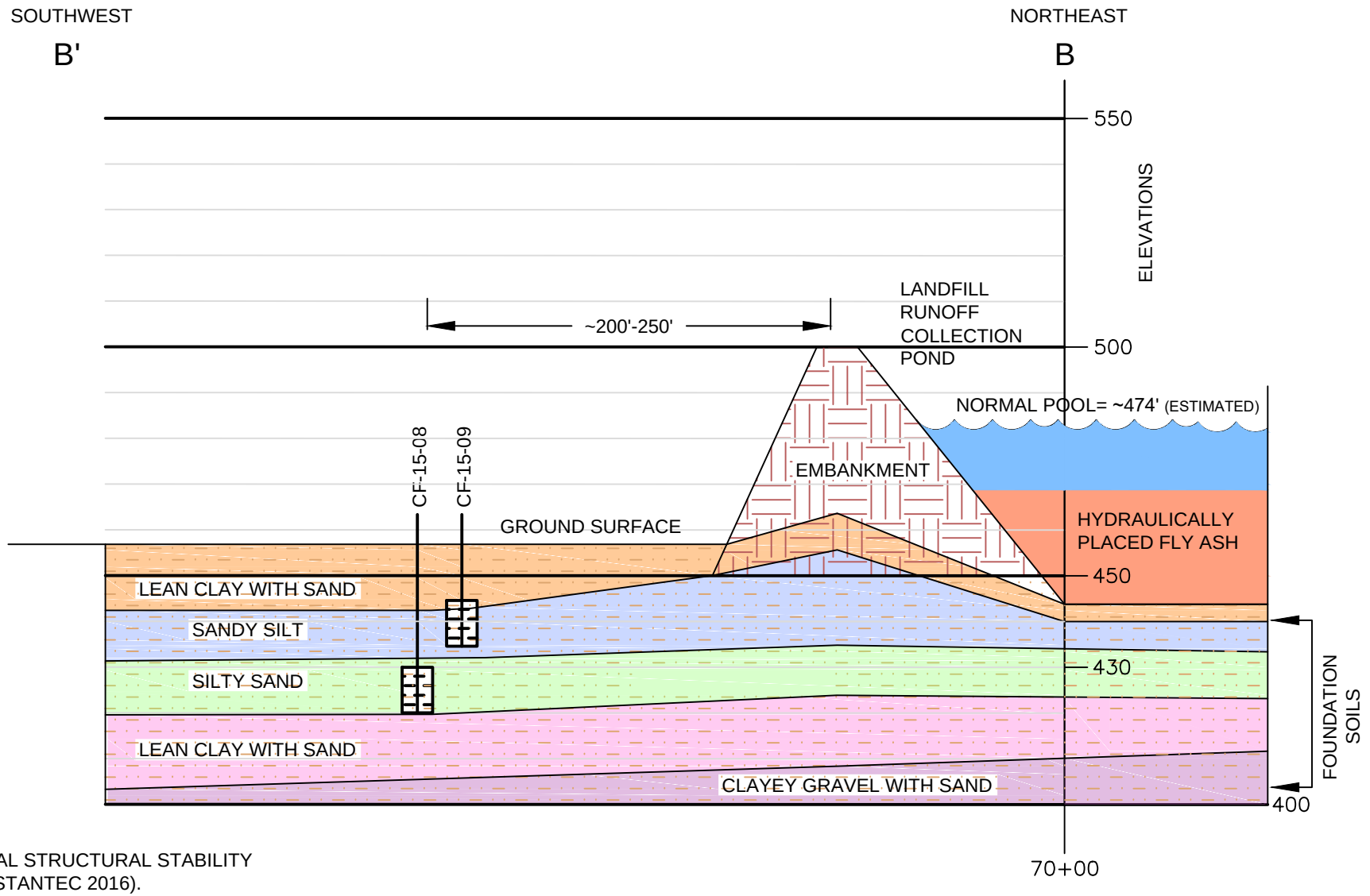
INDIANA-KENTUCKY ELECTRIC CORPORATION

CLIFTY CREEK STATION
MADISON, INDIANA
GROUNDWATER FLOW AT
NORTHEAST END OF BEDROCK CHANNEL

DRAWING NAME: FIGURE 4

REV.: 0

Plot: 12/12/2018 11:46 _PROGRAMS-IKEC\Clifty Creek-CCR Program\CAD\ASD GW Sampling\Clifty_GW Divide b01.dwg




NOTES:
BASED ON INITIAL STRUCTURAL STABILITY ASSESSMENT (STANTEC 2016).

| | |
|---|---|
| DRAWN BY | JM |
| DATE | |
| CHECKED BY | |
| JOB NO. | 2025018-CLI |
| DWG FILE | |
| DRAWING SCALE | NOT TO SCALE |

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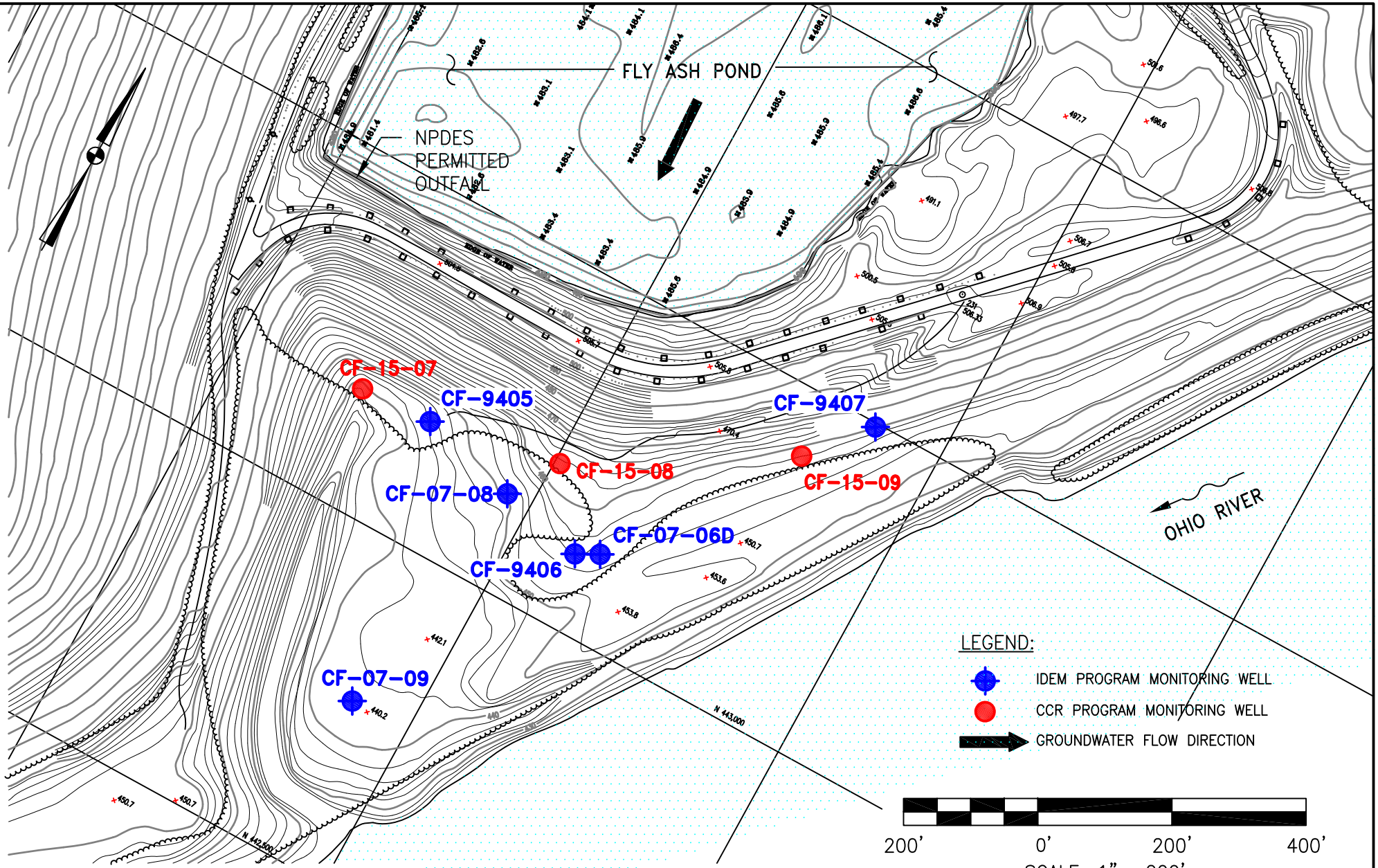
INDIANA-KENTUCKY ELECTRIC CORPORATION
CLIFTY CREEK STATION
MADISON, INDIANA
GENERALIZED CROSS-SECTION
LANDFILL RUNOFF COLLECTION POND TO
CCR MONITORING WELLS

| DRAWING NAME | REV. |
|---|---|
| FIGURE 5 | 0 |

Plot: 01/25/2022 12:15 _PROGRAMS-IKEC\Clifty Creek-CCR Program\CAD\ASD 7_LF_SEPT 2021\5_Clifty_ASD_X-Sec Pond-Wells a06_revised 1-25-22.dwg




| | |
|---|---|
| DRAWN BY | JM |
| DATE | |
| CHECKED BY | |
| JOB NO. | 2017116-CLI |
| DWG FILE | CLIFTY Well Locations a03 R2.dwg |
| DRAWING SCALE | AS SHOWN |

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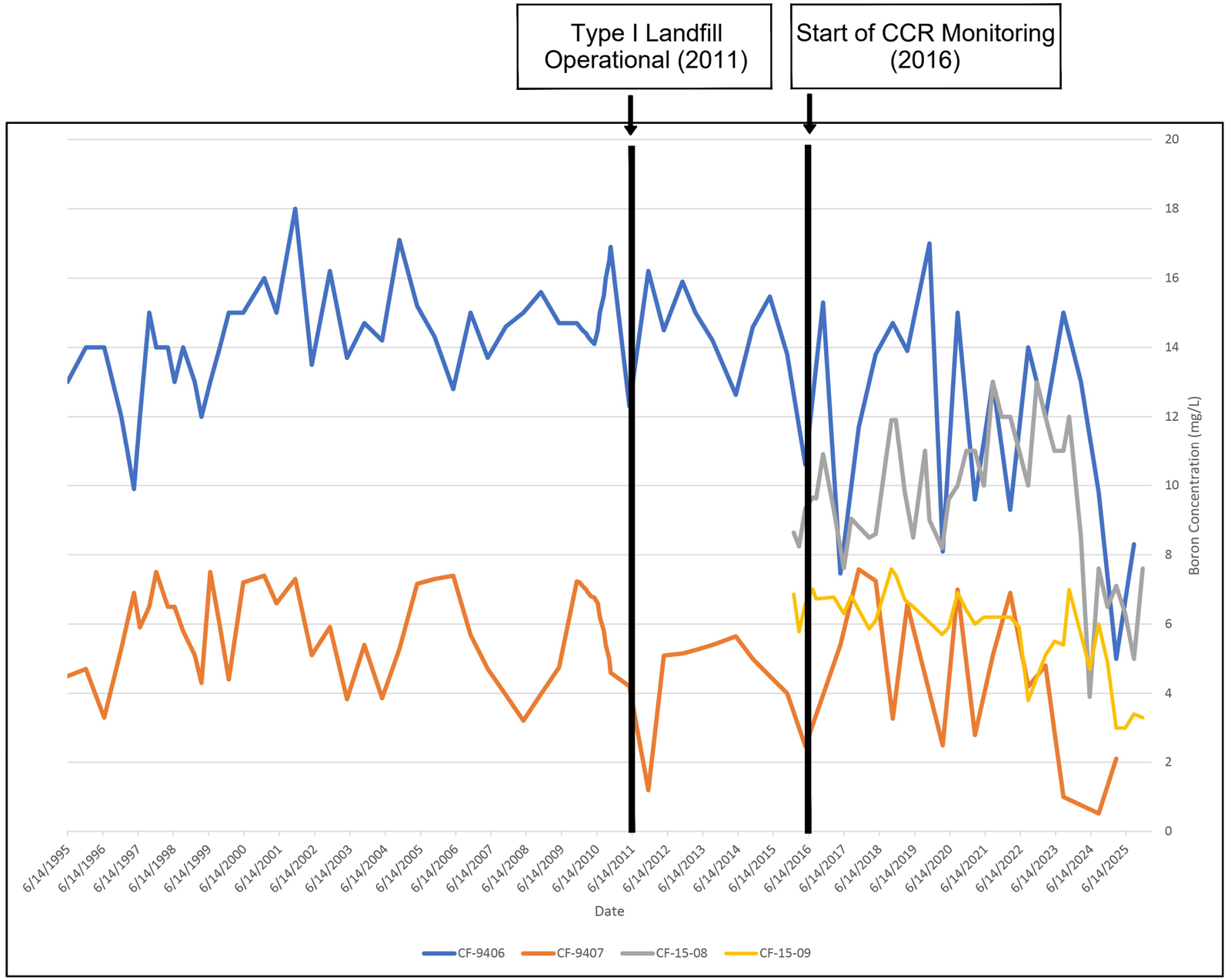
INDIANA-KENTUCKY ELECTRIC CORPORATION

CLIFTY CREEK PLANT
MADISON, INDIANA
CCR PROGRAM AND IDEM PROGRAM
MONITORING WELL LOCATION MAP

| DRAWING NAME | REV. |
|---|---|
| FIGURE 6 | 0 |

Plot: 12/12/2018 12:18 _PROGRAM-IKEC\Clifty Creek-CCR Program\CAD\ASD GW Sampling\CLIFTY Well Locations a03 R2.dwg




| | |
|---|---|
| DRAWN BY | GRM |
| DATE | 12-23-2025 |
| CHECKED BY | |
| JOB NO. | |
| DWG FILE | 2025023_7_IKEC_CLIFTY_ASD 9 LRCP_BORON-TIME GRAPH_2025.DWG |
| DRAWING SCALE | NOT TO SCALE |

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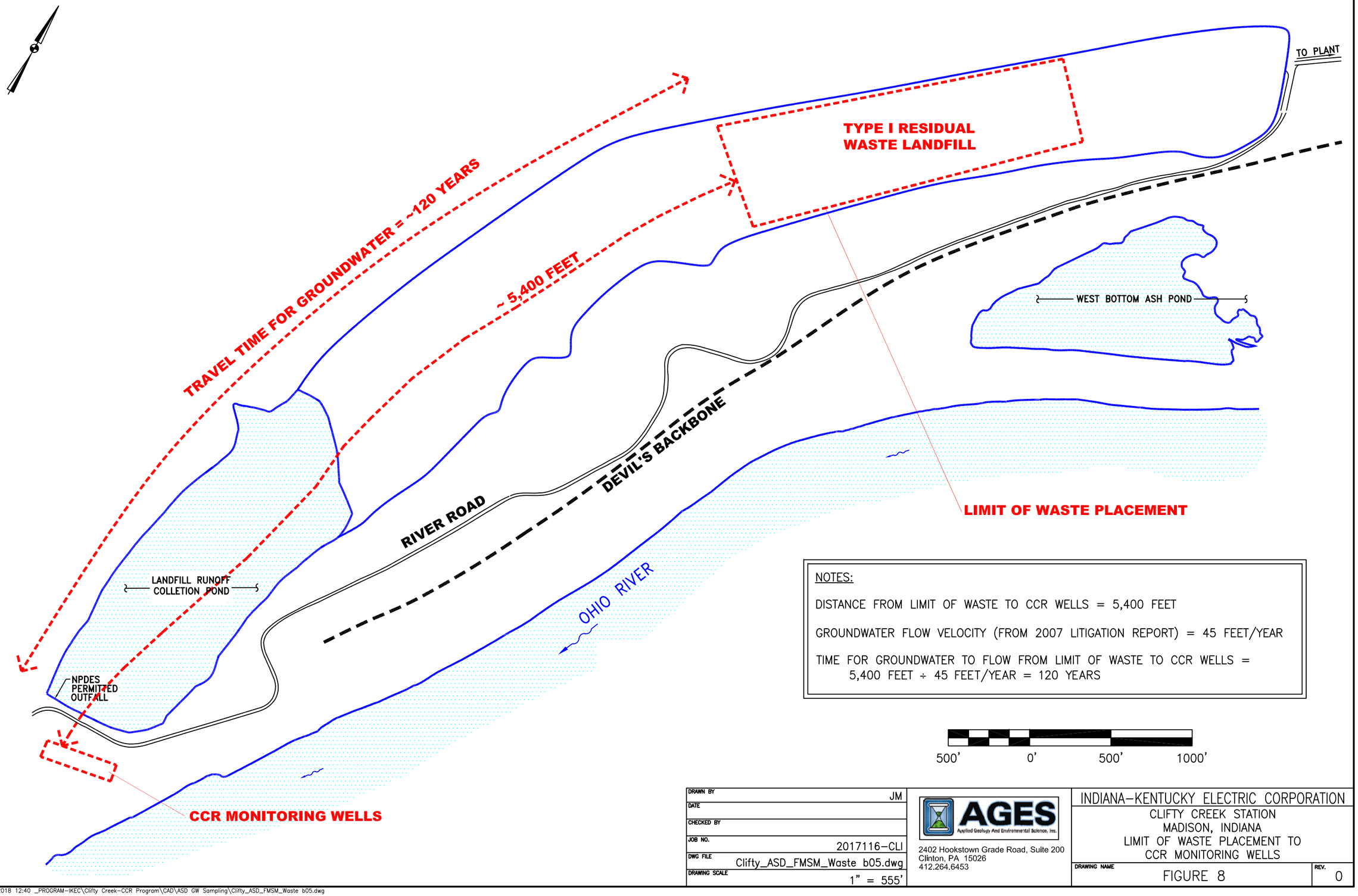
INDIANA-KENTUCKY ELECTRIC CORPORATION
CLIFTY CREEK STATION
MADISON, INDIANA
TIME SERIES DATA FOR BORON (mg/L)
CF-9406, CF-9407, CF-15-08 AND CF-15-09
JUNE 1995-DECEMBER 2025

| DRAWING NAME | REV. |
|---|---|
| FIGURE 7 | 0 |

PLOTTED: 12/23/2025 X:\SHARED\CLIENT_SHARE\GARYMALARKEY\2025023_TASK 0_CLI-TS_12-17-2025\DWGS\2025023_7_IKEC_CLIFTY_ASD 9 LRCP_BORON-TIME GRAPH_2025.DWG




NOTES:

DISTANCE FROM LIMIT OF WASTE TO CCR WELLS = 5,400 FEET

GROUNDWATER FLOW VELOCITY (FROM 2007 LITIGATION REPORT) = 45 FEET/YEAR

TIME FOR GROUNDWATER TO FLOW FROM LIMIT OF WASTE TO CCR WELLS =
5,400 FEET ÷ 45 FEET/YEAR = 120 YEARS

500' 0' 500' 1000'

| | |
|---|---|
| DRAWN BY | JM |
| DATE | |
| CHECKED BY | |
| JOB NO. | 2017116-CLI |
| DWG FILE | Clifty_ASD_FMSM_Waste b05.dwg |
| DRAWING SCALE | 1" = 555' |

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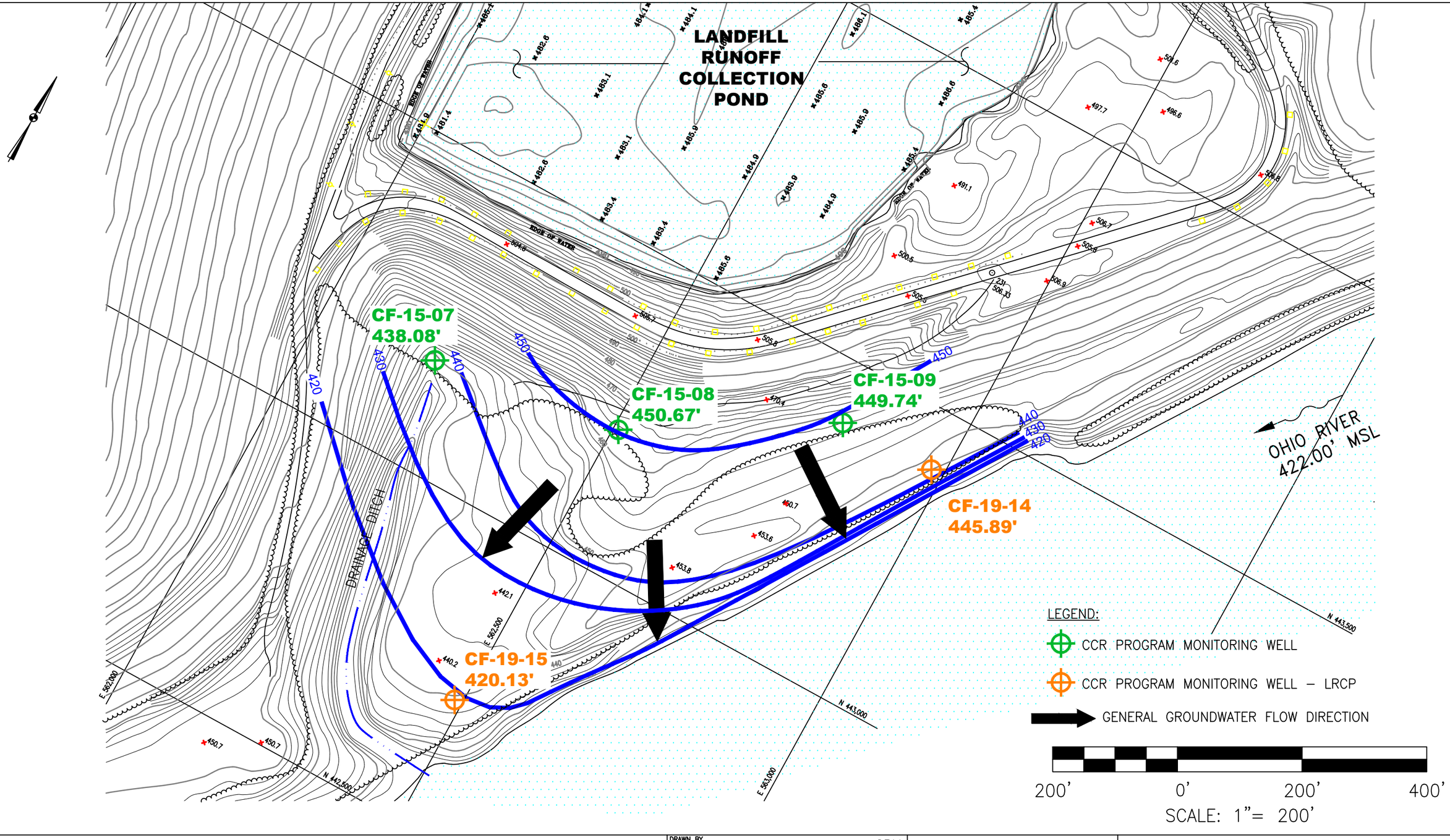
INDIANA-KENTUCKY ELECTRIC CORPORATION
CLIFTY CREEK STATION
MADISON, INDIANA
LIMIT OF WASTE PLACEMENT TO
CCR MONITORING WELLS

DRAWING NAME: FIGURE 8 REV. 0

Plot: 12/12/2018 12:40 _PROGRAM-IKEC\Clifty Creek-CCR Program\CAD\ASD GW Sampling\Clifty_ASD_FMSM_Waste b05.dwg

# APPENDIX A

# GROUNDWATER FLOW MAPS
# (SEPTEMBER AND DECEMBER 2025)




NOTE:
WELLS CF-19-14 AND CF-19-15 WERE INSTALLED IN MARCH 2019 DURING THE CHARACTERIZATION OF THE LRCP.

| | |
|---|---|
| DRAWN BY | GRM |
| DATE | 12-23-2025 |
| CHECKED BY | |
| JOB NO. | 2025023 |
| DWG FILE | 2025023_A-1_IKEC_CLIFTY_ASD 9 LRCP_GW FLOW_2025.DWG |
| DRAWING SCALE | AS SHOWN |

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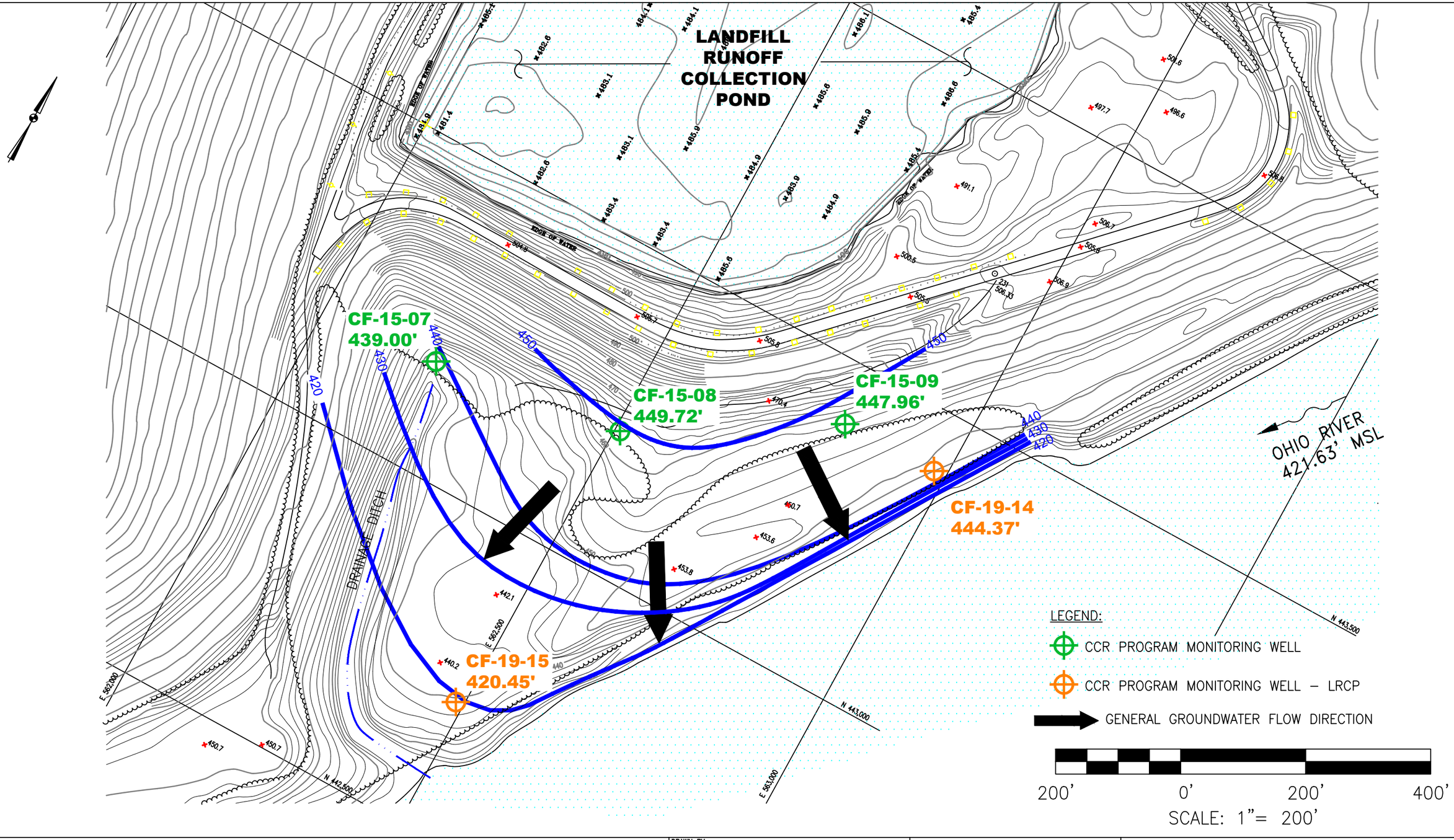
INDIANA-KENTUCKY ELECTRIC CORPORATION
CLIFTY CREEK STATION
MADISON, INDIANA
CCR PROGRAM
TYPE I RESIDUAL WASTE LANDFILL AND
LANDFILL RUNOFF COLLECTION POND
GROUNDWATER FLOW – UPPERMOST AQUIFER
SEPTEMBER 2025

DRAWING NAME: FIGURE A-1
REV.: 0

PLOTTED: 12/23/2025 X:\SHARED\CLIENT_SHARE\GARYMALARKEY\2025023_TASK 0_CLI-TS_12-17-2025\DWGS\2025023_A-1_IKEC_CLIFTY_ASD 9 LRCP_GW FLOW_2025.DWG




NOTE:
WELLS CF-19-14 AND CF-19-15 WERE INSTALLED IN MARCH 2019 DURING THE CHARACTERIZATION OF THE LRCP.

| | |
|---|---|
| DRAWN BY | GRM |
| DATE | 12-23-2025 |
| CHECKED BY | |
| JOB NO. | 2025023 |
| DWG FILE | 2025023_A-2_IKEC_CLIFTY_ASD 9 LRCP_GW FLOW_2025.DWG |
| DRAWING SCALE | AS SHOWN |

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CLIFTY CREEK STATION
MADISON, INDIANA
CCR PROGRAM
TYPE I RESIDUAL WASTE LANDFILL AND
LANDFILL RUNOFF COLLECTION POND
GROUNDWATER FLOW – UPPERMOST AQUIFER
DECEMBER 2025

| DRAWING NAME | REV. |
|---|---|
| FIGURE A-2 | 0 |

PLOTTED: 12/23/2025 X:\SHARED\CLIENT_SHARE\GARYMALARKEY\2025023_TASK 0_CLI-TS_12-17-2025\DWGS\2025023_A-2_IKEC_CLIFTY_ASD 9 LRCP_GW FLOW_2025.DWG

# APPENDIX B

# FIGURE FROM LRCP DAM STABILITY ASSESSMENT REPORT (Stantec 2016)

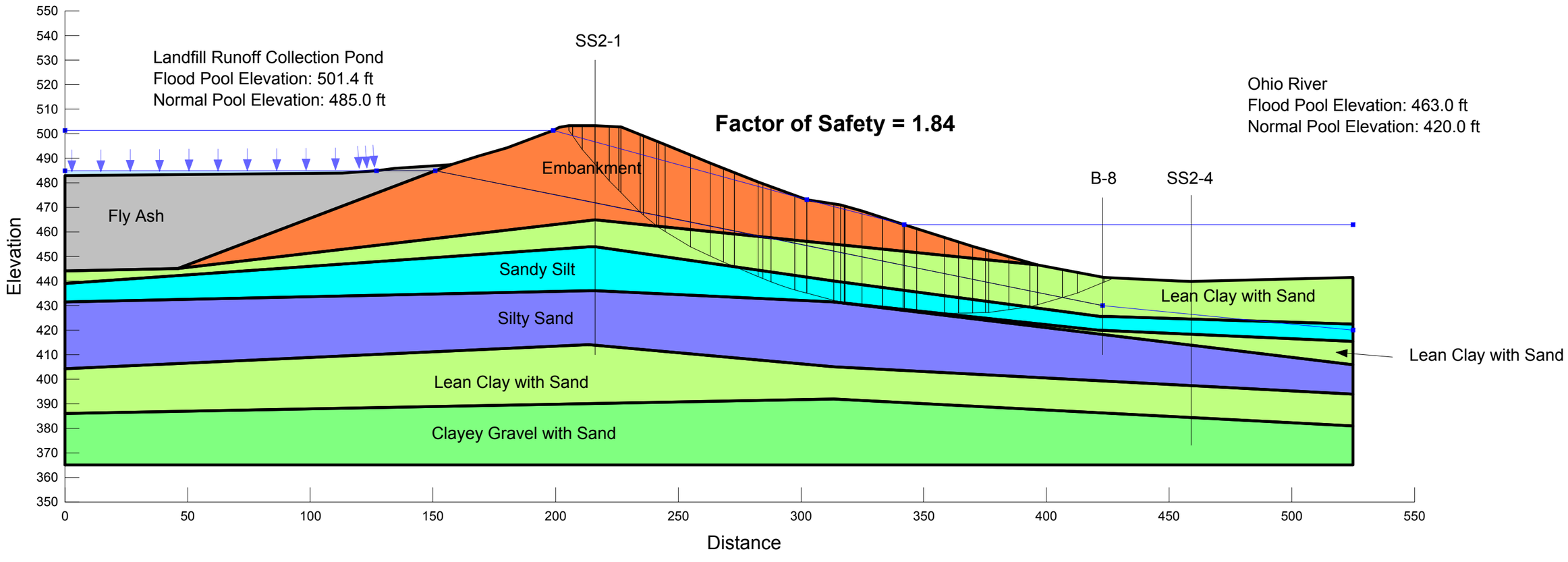
# Indiana-Kentucky Electric Corporation
# Clifty Creek Station
# Landfill Runoff Collection Pond Dam
# Madison, Indiana
# Section D-D'

## Existing Geometry
## Sudden Drawdown
## Undrained, Sudden Drawdown Strengths

Note: The results of the analysis shown here are based on available subsurface information, laboratory test results and approximate soil properties. The drawing depicts approximate subsurface conditions based on historical drawings or specific borings at the time of drilling. No warranties can be made regarding the continuity of subsurface conditions.

## Sudden Drawdown

| Material Type | Unit Weight | Effective - c' | Effective - phi | Total - c | Total - phi |
|---|---|---|---|---|---|
| Embankment (SDD) | 129 pcf | 198 psf | 27.5 ° | 1400 psf | 21 ° |
| Lean Clay with Sand (SDD) | 127 pcf | 206 psf | 28 ° | 1200 psf | 17 ° |
| Sandy Silt (SDD) | 125 pcf | 0 psf | 30 ° | 0 psf | 30 ° |
| Silty Sand (SDD) | 94 pcf | 0 psf | 30 ° | 0 psf | 30 ° |
| Clayey Gravel with Sand (SDD) | 130 pcf | 0 psf | 35 ° | 0 psf | 35 ° |
| Fly Ash (SDD) | 115 pcf | 0 psf | 25 ° | 0 psf | 25 ° |



# APPENDIX C

# PHASE 1, 2 AND 3 EXISTING CONDITIONS TOPOGRAPHIC MAP (Stantec 2024)

LEGEND

- UTILITY POLE
- TRANSMISSION LINE
- TRANSMISSION TOWER
- VEGETATION
- EDGE OF WATER
- PROPERTY LINE
- WASTE BOUNDARY
- GRADING LIMITS

## MAPPING SOURCE NOTE:

TOPOGRAPHIC, BATHYMETRIC, AND PLANIMETRIC SURVEY INFORMATION FOR THE PLANS WERE OBTAINED FROM MAPPING PROVIDED BY INDIANA-KENTUCKY ELECTRIC CORPORATION (IKEC) AND AMERICAN ELECTRIC POWER (AEP). DATE OF MAPPING IS DECEMBER 16, 2023. THE ACTIVE LANDFILL REFLECTS THE QUARTERLY TOPOGRAPHY FROM APRIL 2024 PROVIDED BY IKEC AND ADVANCED DRONE SOLUTIONS. HORIZONTAL DATUM IS NAD27 AND VERTICAL DATUM IS NAVD88.

## NOTES:

1. PHASE 1 PLACEMENT ONGOING. PHASE 2 SUBGRADE UNDER CONSTRUCTION. PHASE 3 SHOWS MINOR LANDFILL MODIFICATION TEMPORARY CONDITIONS.
2. AREAS WITH TEMPORARY SOIL COVER ARE MULCHED AND SEEDED.
3. MINOR LANDFILL PERMIT MODIFICATION TO THE LEACHATE AND STORMWATER MANAGEMENT ARE SHOWN IN THE PHASE 3 RWS TYPE 1 FOOTPRINT AND THE RWS TYPE III FOOTPRINT.

APRIL 2024 SURVEY UPDATE

PHASE 2
(UNDER CONSTRUCTION)

PROJECT BASELINE

SUBPHASES 1C AND 1D
(ACTIVE)

PHASE 3
(TEMPORARY COVER, MINOR LANDFILL MODIFICATION)

APRIL 2024 SURVEY UPDATE

WASTE BOUNDARY

JACQUELINE S. HARRIS
REGISTERED
No. 10911138
STATE OF INDIANA
PROFESSIONAL ENGINEER
6/5/2024

0 50' 100' 200'
1"=100'

Stantec
Stantec
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Client/Project
INDIANA-KENTUCKY ELECTRIC CORPORATION

ANNUAL CONTOUR UPDATE AS REQUIRED BY 329 IAC 10-20-24
CLIFTY CREEK COAL ASH LANDFILL (ID 39-04)
MADISON, JEFFERSON COUNTY, INDIANA

Title
PHASES 1, 2, AND 3 EXISTING CONDITIONS
(JUNE 2024)

Permit-Seal

Project Number: 173410747

| File Name: 173747x101-xxxx-2024.dwg | Dsn. | Dwn. | Chkd. | Dept. |
|---|---|---|---|---|
| | JSH | PJS | JSH | 24.05.22 |

Drawing No. 1

| Revision | Sheet |
|---|---|
| - | 1 of 2 |