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December 1, 2021

**Delivered Electronically**

Ms. Laurie Stevenson, Director  
Ohio Environmental Protection Agency  
50 West Town Street, Suite 700  
P.O. Box 1049  
Columbus, OH 43216-1049

Dear Ms. Stevenson:

**Re: Ohio Valley Electric Corporation  
December 2021 Semi-Annual Selection of Remedy Report**

As required by 40 CFR 257.106(h)(9), the Ohio Valley Electric Corporation is providing notification to the Director of the Ohio Environmental Protection Agency that the fourth Semi-Annual Selection of Remedy report has been completed in compliance with 40 CFR 257.97(a) for Kyger Creek Station's Boiler Slag Pond (BSP). The intent of the report is to provide a six-month update on the progress of selecting a remedy for confirmed Appendix IV SSIs above the groundwater protection standard in the groundwater at the BSP. The report has been placed in the facility's operating record in accordance with 40 CFR 257.105(h)(12), as well as, on the company's publicly accessible internet site in accordance with 40 CFR 257.107(h)(9), which can be viewed at <https://www.ovec.com/CCRCCompliance.php>.

If you have any questions, or require any additional information, please call me at (740) 897-7768.

Sincerely,

A handwritten signature in black ink that reads "Tim Fulk". The signature is written in a cursive style with a large, stylized "F" and "L".

Tim Fulk  
Engineer II

TLF:klr

# Semiannual Report on the Progress of Remedy Selection

**40 CFR 257.97(a)**

Boiler Slag Pond

Kyger Creek Station  
Cheshire, Ohio

December 2021

Prepared by: Ohio Valley Electric Corporation

3932 U.S. Route 23

Piketon, OH 45661



# TABLE OF CONTENTS

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1	Introduction .....	3
1.1	Regulatory Background.....	3
1.2	Report Contents.....	4
2	Site Background .....	4
2.1	Unit Specific Geology and Hydrogeology.....	4
2.2	Potential Receptor Review.....	5
3	Groundwater Assessment Monitoring Program.....	5
3.1	Groundwater Monitoring Well Network .....	5
3.2	Groundwater Characterization .....	6
4	Assessment of Corrective Measures.....	6
4.1	Planned Source Control Measures.....	6
4.2	Potential Remedial Technologies.....	7
5	Selection of Remedy: Current Progress .....	8
5.1	Planned Work.....	8

# 1 INTRODUCTION

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In accordance with 40 CFR § 257.97(a), the Ohio Valley Electric Corporation (OVEC) has prepared this Semi-Annual report to document progress toward remedy selection, design and implementation of corrective actions associated with groundwater monitoring exceedances at the Kyger Creek Station's Boiler Slag Pond (BSP). This report summarizes activities during the period of June 1, 2021 through December 1, 2021. Updates to the report will be published semi-annually, until such time a remedy has been selected. Upon selection, a final report will be prepared describing the selected remedy and how it meets the standards specified in the rule.

## 1.1 REGULATORY BACKGROUND

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

In May 2019, OVEC initiated an Assessment of Corrective Measures (ACM) at the Kyger Creek BSP as a result of a confirmed SSL of Appendix IV constituent Arsenic in monitoring well KC-15-07 during September 2018 Assessment Monitoring Activities, as required by 40 CFR § 257.97(a). In accordance with 40 CFR § 257.96(a), OVEC prepared an ACM report for the Kyger Creek BSP. It was placed in the facility's operating record and uploaded to OVEC's CCR Rule Compliance internet site on September 19, 2019. A revised ACM report, which contains supplemental information was placed on OVEC's CCR Rule Compliance internet site, on November 30, 2020. The ACM Reports provide an assessment of the effectiveness of potential corrective measures in achieving the criteria provided in 40 CFR § 257.96(c). Multiple strategies were evaluated to address groundwater exhibiting concentrations of Arsenic above the GWPS, with two technically feasible options identified. Both feasible options require dewatering of the pond, followed by the execution of an engineered cap and closure of the BSP facility. OVEC is currently in the preliminary design and permitting stages of this effort. The options determined to be technically feasible include:

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

Following the completion of the ACM Report, OVEC hosted a public meeting to present the options for remediation on November 6, 2019, in Gallipolis, Ohio. OVEC then observed a 30-day public comment period, per 40 CFR § 257.97(a), prior to beginning the process of selecting a remedy. No comments were received during this time period.

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

## 1.2 REPORT CONTENTS

The fourth semi-annual progress report provides regulatory background, an overview of site characteristics and ACM findings, and summarizes activities supporting the selection and implementation of a remedy during the period of June 1, 2021, through December 1, 2021.

## 2 SITE BACKGROUND

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The Kyger Creek Station, located in Cheshire, Ohio, is a 1.1-gigawatt coal-fired generating station operated by OVEC. The Kyger Creek Station has five (5), 217-megawatt generating units and has been in operation since 1955. CCRs were sluiced to surface impoundments located in the plant site since it began operation. The Kyger Creek BSP is located at the south end of the Kyger Creek Station and is approximately 32 acres in size. The BSP was built to serve as a process and management area for coal combustion waste products generated at the station. Overflow from the BSP is carried into a reinforced concrete intake structure at the south end of the Boiler Slag Complex. Water entering the intake structure is discharged into the Clearwater Pond. Built in 1980, the Clearwater Pond is approximately nine (9) acres in size and is located to the southwest end of BSP. The Clearwater Pond is not a CCR unit and monitoring is not required.

### 2.1 UNIT SPECIFIC GEOLOGY AND HYDROGEOLOGY

Available data show, deposits of silts and clays beneath the base of the BSP range from 15 to over 50 feet thick. The silts and clays transition to a layer of sand and gravel where groundwater is present. Based on previously reported physical properties and yield, the sand and gravel unit was determined to be the uppermost aquifer beneath the BSP and is located more than five (5) feet beneath the bottom of the BSP as required by the CCR Rule. Water level data from the existing wells illustrate groundwater flowing primarily toward the south and southeast.

Regional groundwater flows to the south and southeast towards the Ohio River. Local groundwater flow beneath the BSP generally flows from the northwest to the south and southeast towards the Ohio River. During periods when the water level in the Ohio River rises significantly and flooding occurs, groundwater flow in the uppermost aquifer will temporarily reverse with groundwater flowing toward the north and northwest beneath the BSP. This flow reversal has been observed in multiple groundwater level measurement events. Additional evaluation of the site is needed to gain a better understanding of how this reversal in groundwater flow direction can impact the remedy that is ultimately selected for the SP.

## 2.2 POTENTIAL RECEPTOR REVIEW

OVEC completed an assessment of the proximity of public and private drinking water supplies to the BSP in response to SSLs above the GWPS. It was determined that the closest withdrawal wells designated by the Ohio Department of Natural Resources (ODNR) as drinking water wells are located greater than one mile from the facility, and are not hydraulically connected to the groundwater at the BSP facility.

# 3 GROUNDWATER ASSESSMENT MONITORING PROGRAM

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Groundwater assessment monitoring for the Kyger Creek BSP is conducted in accordance with 40 CFR § 257.95.

## 3.1 GROUNDWATER MONITORING WELL NETWORK

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

- KC-15-01 (Upgradient);
- KC-15-02 (Upgradient);
- KC-15-03 (Upgradient);
- KC-15-04 (Downgradient);
- KC-15-05 (Downgradient);
- KC-15-06 (Downgradient);
- KC-15-07 (Downgradient); and
- KC-15-08 (Downgradient).

Additionally, three (3) monitoring wells that were installed as part of the additional assessment activities for the BSP were added to the CCR groundwater monitoring network for the BSP as follows:

- KC-19-27 (Downgradient);
- KC-19-28 (Downgradient); and
- KC-19-29 (Downgradient).

### 3.2 GROUNDWATER CHARACTERIZATION

Groundwater assessment monitoring was first conducted at the Kyger BSP during September 2018 sampling. Arsenic, an Appendix IV constituent, was detected and confirmed to exceed the GWPS of 10 µg/L at well KC-15-07. This well is centrally located within the Kyger BSP groundwater monitoring network, and it was confirmed that exceedances did not occur at adjacent wells. In response, OVEC was required to characterize the extent of the release, pursuant to 40 CFR § 257.95(g)(1), and installed additional monitoring wells at the property boundary (wells KC-19-27, KC-19-28, KC-19-29). It was determined that Arsenic was not leaving the property at levels higher than the GWPS, and therefore the potential remediation zone was confined to the BSP complex. Semi-annual sampling at the BSP sentinel wells has continued, and has further demonstrated the assessment that Arsenic at levels higher than the GWPS are confined to OVEC property.

## 4 ASSESSMENT OF CORRECTIVE MEASURES

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In accordance with 40 CFR § 257.96(a), OVEC prepared an ACM report for the Kyger Creek BSP and placed it in the facility's operating record. It was uploaded to OVEC's CCR Rule Compliance internet site on September 19, 2019. As noted above, a revised ACM report containing supplemental information was posted to OVEC's CCR Rule Compliance internet site on November 30, 2020. The ACM Report provides an assessment of the effectiveness of potential corrective measures in achieving the criteria provided in 40 CFR § 257.96(c).

### 4.1 PLANNED SOURCE CONTROL MEASURES

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

- (1) Be protective of human health and the environment;*
- (2) Attain the groundwater protection standard as specified pursuant to § 257.95(h);*
- (3) Control the source(s) of releases so as to reduce or eliminate, to the maximum extent feasible, further releases of constituents in Appendix IV to this part into the environment;*
- (4) Remove from the environment as much of the contaminated material that was Released from the CCR unit as is feasible, taking into account factors such as avoiding in appropriate disturbance of sensitive ecosystems;*
- (5) Comply with standards for management of wastes as specified in § 257.98(d).*

During the ACM development process, several in-situ and ex-situ remedial technologies were evaluated to address Arsenic in groundwater at the BSP, and screened against evaluation criteria requirements in 40 CFR § 257.96(c). The two (2) technologies that appear to be most technically feasible, and therefore most likely for selection as a remedy were:

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

Both feasible options require dewatering of the pond, followed by the execution of an engineered cap and closure of the BSP facility. OVEC is committed to continued compliance with the requirements and timeframes of the CCR Rule, and will close the Kyger BSP in accordance with 40 CFR § 257.102 prior to implementation of further groundwater remediation measures. OVEC, with the assistance of its Qualified Professional Engineer, has evaluated its site and available resources, and determined that no alternative capacity is available to receive the boiler slag. OVEC has been working with Qualified Professional Engineers to develop the design for the development of alternative capacity, which will concurrently provide closure for the BSP. This proposed design includes the construction of concrete dewatering tanks and a new lined low volume waste water treatment system in the immediate area of the existing BSP in order to manage Kyger Creek Station's boiler slag waste stream and other non-CCR low volume waste waters, as well as incorporates complex facility water redirects. Once the proposed equipment and management ponds are operational, capping activities will occur for the balance of the BSP footprint.

OVEC has submitted a site-specific alternative to initiation of closure deadline demonstration to U.S. EPA, which includes a proposed schedule by which all of the aforementioned work is proposed to be completed. Prior to initiating these closure activities, OVEC will need to secure the appropriate permits from the Ohio Environmental Protection Agency, as well as the Ohio Department of Natural Resources. OVEC met with each of these agencies in late 2019 and mid-2020 to gain an understanding of their respective expectations, and then again in mid-2021, regarding facility design and permitting. A closure design was developed and submitted to Ohio EPA, with initial closure approval for the BSP being granted on October 19, 2021.

The initial closure methods described above will reduce the potential for releases and migration of CCR constituents. Groundwater assessment monitoring as required by 40 CFR § 257.96(b) will continue until a remedy is selected and implemented. The monitoring will be conducted to track changes in groundwater conditions as a result of these closures and operational changes. These data will also be considered in the selection and design of a remedy in accordance with 40 CFR § 257.97.

#### 4.2 POTENTIAL REMEDIAL TECHNOLOGIES

As a source control measure, the Kyger Creek BSP will be closed in accordance with CFR § 257.102 prior to implementation of further groundwater remediation efforts. In



addition to source control measures, two primary strategies were identified to address groundwater exhibiting concentrations of Arsenic above the GWPS, including:

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

The ACM report titled “Kyger Creek BSP- Assessment of Corrective Measures Report- Rev 1”, which is available on OVEC’s publicly accessible internet site, provides a more detailed description of these corrective measures. The effectiveness of each potential corrective measure was assessed in accordance with 40 CFR § 257.96 (c), and both options listed above are considered technically feasible, and appropriate for groundwater remediation efforts at the BSP.

## 5 SELECTION OF REMEDY: CURRENT PROGRESS

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As noted in the ACM Report, OVEC determined that an effective method for source control would be to leave the CCR material in place and install a CCR compliant cap system to prevent future infiltration of stormwater.

During the period covered by this semi-annual report, a design was developed for the closure of the BSP, and a Permission-to-Install Application submitted to the Ohio Environmental Protection Agency for their review and approval . Final approval from the agency was granted on October 19, 2021, allowing closure activities to commence on October 27, 2021.

In addition, a design package was developed and submitted to the Ohio Department of Natural Resources, who regulates dams and dikes in the State of Ohio, on October 14, 2021, to request permission to alter the existing BSP dam structure to support final closure of the impoundment. Modification of the existing dam structure is necessary to support closure activities. Impacts to groundwater caused by alterations to the BSP dam structure are unknown at this time.

OVEC continues to work with Ohio EPA and Ohio DNR to secure additional permits associated with the closure of the BSP and boiler slag waste stream redirects.

OVEC’s hydrogeologist conducted the semi-annual groundwater sampling and testing during this report period. In addition to sampling the monitoring wells in the CCR groundwater monitoring network, the sentinel wells installed to aid in ACM activities were also sampled. A total of 11 wells (8 Network and 3 Sentinel) were sampled near the BSP and the results will be summarized in the upcoming 2021 Groundwater Monitoring and Corrective Actions Report. Preliminary analyses indicate that concentrations of Arsenic at the sentinel wells continue to be well below the site’s groundwater protection standards. In addition to the semi-annual monitoring, OVEC’s hydrogeologist also collected monthly depth-to-groundwater readings at wells in the

area of the BSP in order to better understand the dynamic nature of groundwater flow at the BSP.

## 5.1 PLANNED WORK

OVEC's consultant or hydrogeologist will sample and test all of the monitoring wells as part of the semi-annual requirement.

OVEC's hydrogeologist will continue to collect monthly depth-to-groundwater readings at wells in the area of the BSP. This will help to better understand the dynamic nature of groundwater flow at the BSP, and ensure the remedy selected is appropriate.

OVEC's hydrogeologist will develop Time-Series evaluations to determine if the concentrations of Arsenic are increasing, decreasing, or are asymptotic. This item is being completed to support a more robust modeling effort, and is meant to aid in the final selection of a remedy process.

OVEC's hydrogeologist will begin development of a site computer model to better understand the potential effectiveness of the remedy options.

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

OVEC will need to seek a modification to its NPDES permit to initiate dewatering activities associated with the BSP closure. OVEC is actively working with its permit writer to progress the issuance of a NPDES permit renewal in support of these activities.

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

OVEC will submit the next progress report by June 1, 2022.

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