

Memo

Date: Tuesday, July 30, 2024

To: Lansing Board of Water & Light

From: HDR Michigan, Inc.

Subject: Erickson Power Station Semiannual Progress Report for Selection of Remedy per 40 CFR §257.97(a)

Erickson Power Station (Erickson or Site) is an electrical power generation facility located at 3725 South Canal Road in Delta Township, Eaton County, Michigan owned and operated by Lansing Board of Water & Light (BWL) (**Figure 1**). Erickson formerly operated a single coal-fired generator capable of producing 165 megawatts of electricity. Erickson has three CCR impoundments that are subject to the U.S. Environmental Protection Agency's (EPA's) Coal Combustion Residuals (CCR) Rule specified in 40 CFR §257: the Forebay, Retention Basin, and Clear Water Pond (CWP) (**Figure 2**). The CCR impoundments triggered assessment of corrective measures and therefore are the subject of this remedy selection semiannual progress report.

In accordance with the CCR Rule, BWL initiated groundwater monitoring in the certified network around the CCR units in 2020. On November 23, 2020, BWL first reported that concentrations of Appendix IV constituents in monitoring wells at the ash impoundments were observed at statistically significant levels (SSLs) above Groundwater Protection Standards (GPS) (HDR, 2020). Subsequently, BWL drilled additional wells, completed additional hydrogeologic investigation, and completed the *Conceptual Site Model and Assessment of Corrective Measures* Report (ACM Report) on November 25, 2021 and posted to BWL's public website (HDR, 2021). Since the ACM Report, a phased program has been implemented to support remedy selection, primarily through plume delineation and aquifer characterization, and progress updates have been made on a semiannual basis.

The purpose of this Memo is to provide an update describing progress in the first half of 2024 toward selecting a remedy for corrective action, as required by 40 CFR §257.97(a) of the CCR Rule.

BWL completed numerous tasks in the first half of 2024 to close the impoundments by performing dewatering and ash removal and further characterize the impact to groundwater to further the assessment of corrective measures. Between January and June 2024, BWL completed the following tasks:

- Continued CCR impoundments dewatering and ash removal;
- Semiannual assessment monitoring sampling and analysis;
- Completion of ACM data collection activities including collection of Monitored Natural Attenuation (MNA) soil samples and installation of a pump test well and subsequent completion of the step-draw down test;
- Approval of a permit required to construct monitoring wells in a wetland area and necessary access road; and
- Development of a No Rise Study Report to demonstrate that the above referenced monitoring wells do not impact the floodplain of Carrier Creek.

Impoundment Closure Status - Source Removal

The CCR Impoundments Closure Work Plan for removal of CCR was completed on January 6, 2023, and approved by EGLE on January 17, 2023, with the intent to later submit an amendment associated with the closure verification objectives or thresholds. Additional ash sampling and analysis was completed, and a Closure Work Plan Amendment was submitted to EGLE on August 1, 2023. The Closure Work Plan Amendment further detailed closure objectives and included the ash analytical data as well as the microscopy verification thresholds. Nine ash samples (three each from the Forebay, Retention Basin, and CWP) were collected and submitted for analysis. The microscopy verification thresholds were determined based on a ratio of CCR to native material that would reduce the expected concentration of the constituent to less than that of the established cleanup criteria.

BWL performed a site-specific background soil study as part of the development of the Closure Work Plan, approved by EGLE on January 17, 2023. Also conditional to this approval was the expansion of the Soil Background Study. BWL performed additional background soil sampling, analysis, and statistics to refine the established-site specific soil background values, and a revised Soil Background Study was submitted to EGLE on April 25, 2023. EGLE returned comments to BWL regarding the Soil Background Study and the Closure Work Plan Amendment on June 28, 2023. These comments were addressed, and a final version of the Soil Background Study and Closure Work Plan Amendment was returned to EGLE for approval on July 21, 2023.

The CCR removal contractor was selected and mobilized to the site in February 2023 to begin dewatering operations from the three impoundments. The water removed from the impoundments was treated on site, monitored, and discharged into nearby Lake Delta in compliance with an NPDES permit. Initial CCR dewatering efforts and ash and liner material removal commenced and was completed in May 2023. Subsequent precipitation dewatering took place intermittently to collect dry verification samples. Solid waste material was disposed of at Granger Wood Street Landfill. Through mid-June 2024, approximately 68,000 cubic yards of material (ash, liner, and CCR impacted riprap) have been removed and disposed of offsite from the three impoundments.

CCR removal verification was performed through visual, photographic, soil sampling, and laboratory analytical testing. Visual verification was completed for all three units in August 2023. Sampling was initially completed for the CWP in July 2023 and the analytical results indicating that the pond had met the necessary statistical closure criteria. Multiple samples were collected for the Forebay and Retention Basin throughout July to December 2023 as analytical results indicated exceedances above established closure criteria. Analytical verification results were

statistically analyzed, and exceedances were found for arsenic and boron for the Retention Basin and boron and molybdenum for the Forebay; however, microscopy results were below 3% CCR (microscopy closure criteria 7% CCR) for the Forebay and Retention Basin.

Efforts to close Erickson Power Station have continued in the first half of 2024. During a meeting with EGLE on February 27, 2024, EGLE instructed BWL that to achieve closure, the BWL would be required to continue with deeper excavation and closure efforts until all sampling locations returned analytical results meeting the closure criteria, regardless of EGLE's previously agreed upon statistical closure criteria, as detailed in their acceptance of the Closure Plan for the Erickson impoundments on September 5, 2023. Therefore, in accordance with the EGLE's new requirements, BWL completed additional excavation of impacted nodes and re-sampling of all three impoundment units starting in March 2024. Final clean closure samples were obtained for the Clear Water Pond and Forebay in May 2024. Final clean closure samples were obtained for the Retention Basin in June 2024. Ash removal verification efforts for the Forebay, Retention Basin, and CWP and the subsequent closure verification report are expected to be finalized by the end of 2024.

Nature and Extent Characterization Progress

In 2020, BWL determined there were statically significant levels of lithium in groundwater over groundwater protection standards (GPS). In response, BWL completed an Assessment of Corrective Measures (ACM) in November 2021. In addition, BWL installed wells in 2021 to evaluate the nature and extent of the GPS exceedances and initiated a groundwater flow and transport model to serve as a predictive evaluation tool and to model corrective measure scenarios for the selection of a remedy. In 2022, BWL installed seven new monitoring wells at the site. Each of the monitoring wells served a specific purpose to further characterize groundwater flow direction in both the glacial and bedrock aquifer, evaluate potential connectivity between the glacial and bedrock aquifers, and evaluate background water quality for both the glacial and bedrock aquifers. These wells also allowed for the expansion of the hydrogeologic conceptual site model to include the bedrock aquifer, and further delineate the GPS exceedances.

BWL has been working with adjacent and nearby landowners requesting agreements to install monitoring wells. This time-consuming effort necessitated multiple points of contact and nearly all landowners would not grant easements for monitoring well installations. Meanwhile BWL has been developing "work-around" alternatives to landowner's parcels to the extent practical, including wells on narrow BWL-owned strips of land. Ten new wells were installed for assessment and characterization of the groundwater plume at Erickson to the north, east, and south of the CCR impoundments. Groundwater data from these wells currently suggest that the plume is contained within the boundaries of these newly installed wells.

The property owner east of Erickson has declined to allow for the installation of a monitoring well on their property. Therefore, BWL is proposing multi-level wells and supporting access paths in the wetland east of the Erickson property boundary. To accommodate the installation of these wells, BWL applied for a permit. The permit to construct these wells within the wetland was submitted to EGLE on April 21, 2023. Review of the permit was completed in May 2023 and comments were sent back to BWL to address prior to resubmission in July 2023. Additional

concerns regarding the constructed access paths and interference with the floodplain after this submission resulted in multiple meetings with BWL, EGLE, and HDR from September 8, 2023, through the end of the year, with the last meeting occurring on December 22, 2023. During the meeting, EGLE requested additional information which BWL provided on February 7, 2024, and the permit (WRP040277v.1) was issued on February 15, 2024, by EGLE, Water Resources Division, under the provisions of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA); specifically, Part 303, Wetland Protection.

The proposed monitoring wells and a portion of the access roads are located within the effective 100-year Special Flood Hazard Area (SFHA) and floodway of Carrier Creek. BWL prepared and submitted a No Rise Study Report to Delta Township, Floodplain regulatory authority of Carrier Creek, to demonstrate that the proposed access road and the proposed monitoring wells will not increase the Corrected Effective Base Flood Elevations (BFEs) nor modify the Corrected Effective floodway widths, and therefore demonstrates the flood carrying capacity is maintained and satisfies Section 13.03 D of the Delta Township Zoning Ordinance. Data from these proposed wells will help further define the groundwater flow directions, as well as refine the understanding of vertical and horizontal plume extent at the property boundary. Currently, eight new wells have been proposed and are anticipated be installed by the end of 2024:

- MW-17A, MW-17B, MW-17C, and MW-17D to be installed to the north of the clustered wells at MW-7 to confirm groundwater flow directions and delineate the northern extents of the plume in the glacial and bedrock aquifers.
- MW-18A, MW-18B, MW-18C, and MW-18D to be installed to the east of the clustered wells at MW-7 to confirm groundwater flow directions and delineate the eastern extents of the plume in the glacial and bedrock aquifers.

Assessment of Corrective Measures Data Collection

An Assessment of Corrective Measures Data Collection Work Plan was developed for the site to support the Assessment of Corrective Measures completed for the site in November 2021. The workplan was finalized on February 15, 2024, and focuses on data collection, site-specific feasibility, and time to achieve compliance for the monitored natural attenuation (MNA) and Groundwater Extraction and Treatment remedial measures.

Groundwater Extraction and Treatment Data Collection

To assess the GWET remedial strategy, a single pump test well was installed at Erickson, screened within the sandy glacial sediments. The wells location was selected due to the proximity of the adjacent multi level well series to obtain information on both the glacial and bedrock aquifers as wells as being within in an area of the contaminant plume where contamination is most concentrated.

The pump test well (PTW) was installed central to MW-7, MW-7B, and MW-7C, with approximately 8-9 foot separations from each MW-7 series well. The pump test well was installed on May 10, 2024, and subsequently developed. To assess an accurate pump rate, a modified step drawdown test starting at 20 gallons per minute (GPM) was completed on May 13, 2024. After the well had recovered, the pumping rate was adjusted to 66.2 GPM based on the results of the step-drawdown test, and the 24-hour constant rate test began on May 14, 2024. There was 1.74 feet of drawdown within the pump test well and approximately 1 foot of

drawdown in the adjacent MW-7 series glacial wells. Slight drawdown of approximately 0.1 foot was observed in the adjacent MW-7B bedrock aquifer well. Glacial wells MW-2 and MW-8 further from the PTW were observed to have drawdown of approximately 0.5 feet.

A groundwater sample from this well was collected on May 15, 2024, after development and the completion of the pump test and delivered under chain of custody to Merit Laboratories in East Lansing, Michigan to be analyzed for the analytes previously present in **Table 2**. The analysis will be completed and a Pump Test Memorandum summarizing the results will be developed in August 2024, with the findings later be incorporated into the remedy selection for the site.

Monitored Natural Attenuation Data Collection

To assess the MNA remedial strategy, borings co-located with Erickson wells with SSLs (MW-2, MW-3, MW-5, MW-6, MW-14, and the newly installed pump test well in the vicinity of MW-7) were installed in May 2024. Soil samples were collected from each boring, including the PTW and analyzed for the following:

- Contaminant concentrations in aquifer solids (COCs include aluminum, antimony, arsenic, boron, cadmium, calcium, chromium, iron, lead, lithium, manganese, mercury, and molybdenum) by Merit Laboratories, Inc.
- Batch attenuation testing for COCs listed above (chemical extractions to determine probable range of K_d partition values to suggest attenuation is taking place) from Resolution Partners, LLC.
- Subsurface mineralogy (clay mineralogy, Fe-Mn-Al oxides, carbonate minerals, sulfides, total organic carbon) from ACZ Laboratories, Inc.

Complete analysis of these samples is still in progress and is anticipated to be complete by the end of July 2024. For Tier I analysis of MNA, specific groundwater parameters from the targeted Erickson wells are required. These additional groundwater monitoring parameters will be collected at the next assessment monitoring event in August 2024. The Tier I MNA evaluation is anticipated to be completed in Q4 2024.

Next Steps Towards Remedy Selection

A significant step in remedy selection is determining the extent of the impact to groundwater to ensure that the remedy implemented will manage the impact, minimize or eliminate risks, and is located in an appropriate location. Therefore, BWL has been coordinating land agreements on the eastern Erickson property boundary to install and monitor wells inside and outside of the Erickson property to evaluate the potential extent of contamination. Recent data from newly installed wells (2023 wells) suggests that the plume is contained within the boundaries of these newly installed wells, and also that the groundwater flow direction for the glacial and Saginaw aquifers has changed from previous understandings. Recent data indicates that the glacial aquifer likely flows north under the wetland on the eastern side of the property boundary, and therefore the proposed wells discussed above (MW-17 and MW-18 multi-level wells) placed on the eastern boundary of the site may help determine the flow direction east of the site. Further, due to the delays surrounding the installation of monitoring wells in the wetland area, BWL has also proposed sampling further north of the proposed wells within a parcel of land owned by the Eaton County Drain Commission. As the sampling process proposed is also within the wetland area but does not include site disturbance, BWL intends to use this data to assess the northern extent of the plume boundary and site additional wells concurrent with the installation of MW-17 and MW-18 to expedite further plume delineation activities. BWL will seek approval from Eaton County Drain Commission and EGLE prior to proceeding with the low impact sampling.

It is anticipated that the remedy selection process for addressing affected groundwater will proceed following the removal of the CCR source materials, estimated to be completed by Q4 2024, and the impact of the source removal on groundwater quality will be evaluated.

Additionally, BWL will continue implementing CCR groundwater compliance schedule in conformance with §257.90 - §257.98, which includes semiannual assessment monitoring in accordance with §257.95 to monitor groundwater conditions and inform the remedy selection. The final remedy will be formally selected per §257.97 once the selected option is reviewed and commented on by EGLE and a public meeting is conducted at least 30-days prior to the final selection as required under §257.96(e).

The following activities are proposed to be performed or initiated in the next 6-month period:

- installation of the wetland wells series at MW-17 and MW-18;
- continued semiannual groundwater assessment monitoring;
- complete analysis of the pump test data and develop Pump Test Report;
- collection of MNA groundwater samples and evaluation of the MNA remedial path; and
- completion of removal of CCR source materials and closure verification of the Erickson CCR impoundments.

References

HDR, 2020. Groundwater Protection Standards and Determination of SSLs per §257.95g [Memorandum]. November 23, 2020.

HDR, 2021. Conceptual Site Model and Assessment of Corrective Measures. November 5, 2021.



Figure 1. Vicinity Map for Erickson Power Station

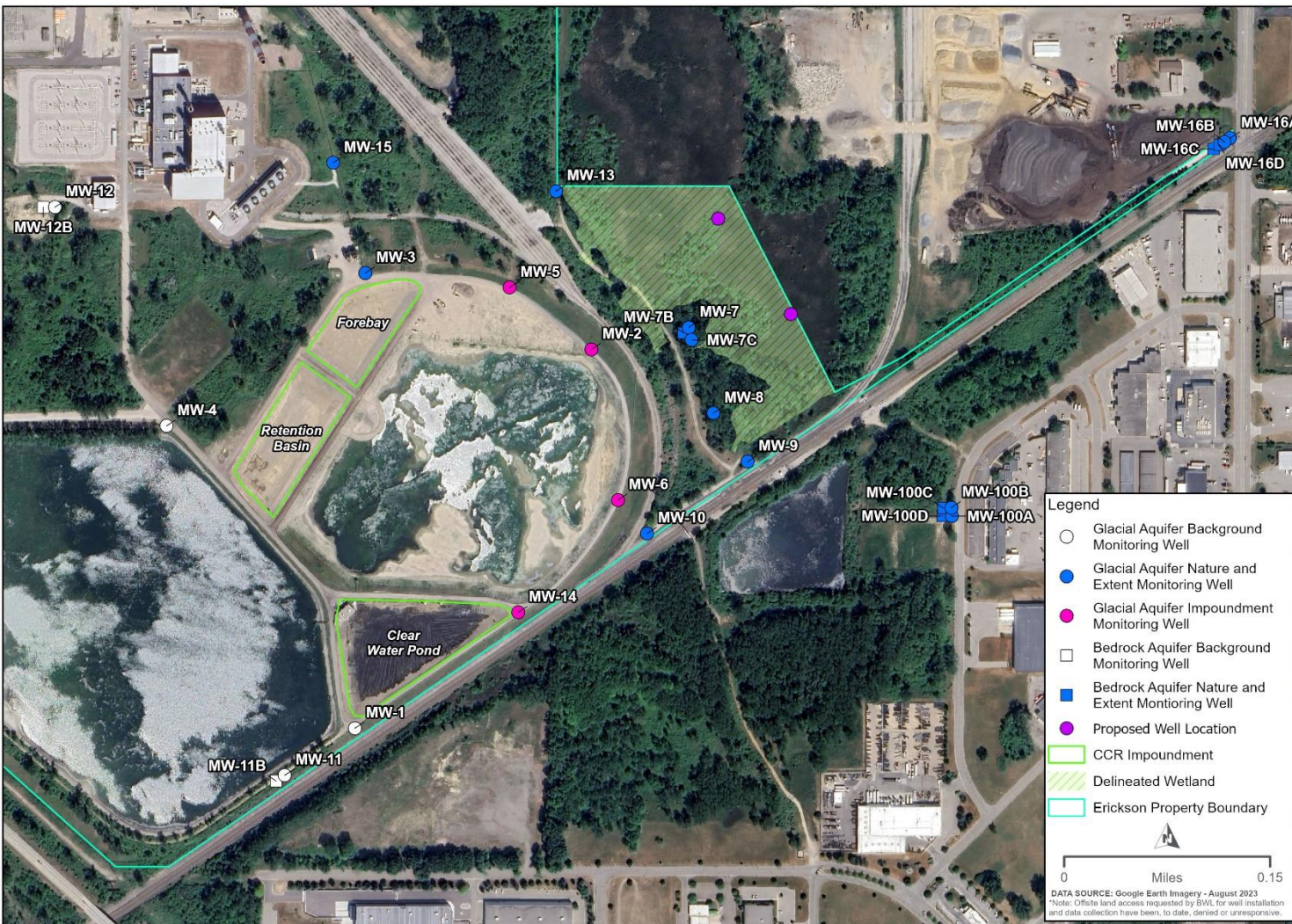


Figure 2. CCR Units and Monitoring Wells