Semiannual Progress Report Selection of Remedy – Burlington Generating Station

Burlington Generating Station
Burlington, Iowa

Prepared for:

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1.0 INTRODUCTION AND PURPOSE

The Semiannual Progress Report for remedy selection at the Interstate Power and Light Company (IPL) Burlington Generating Station (BGS) was prepared to comply with U.S. Environmental Protection Agency (U. S. EPA) regulations regarding the Disposal of Coal Combustion Residuals (CCR) from Electric Utilities [40 CFR 257.50-107], or the "CCR Rule" (Rule). Specifically, the selection of remedy process was initiated to fulfill the requirements of 40 CFR 257.97.

1.1 BACKGROUND

The Assessment of Corrective Measures (ACM) for the four BGS CCR units was completed on September 12, 2019. The ACM was completed in response to the detection of lithium and molybdenum at statistically significant levels (SSLs) above the Groundwater Protection Standard (GPS) in groundwater samples from downgradient monitoring wells. Lithium concentrations exceeded the GPS at the following downgradient compliance monitoring wells: MW-302, MW-303, MW-307, and MW-308. Molybdenum concentrations exceeded the GPS at the following downgradient compliance monitoring wells: MW-302, MW-307, and MW-308. An ACM Addendum was completed on November 24, 2020.

This Semiannual Progress Report summarizes data collected and remedy evaluation progress made since the November 2020 ACM Addendum No. 1, and outlines planned future activities to complete the remedy selection process. This semiannual progress report covers the 6-month period of September 2022 through February 2023.

1.2 SITE INFORMATION AND MAPS

BGS is located along the west bank of the Mississippi River, about 5 miles south of the city of Burlington, in Des Moines County, Iowa (**Figure 1**). The address of the plant is 4282 Sullivan Slough Road, Burlington, Iowa. In addition to the generating station, which after December 31, 2021, uses natural gas instead of coal to fuel electrical generating operations, the property also contains a former coal yard, natural gas-fired combustion turbines, four CCR surface impoundments (Upper Ash Pond, Economizer Pond, Main Ash Pond, and Ash Seal Pond), and one non-CCR surface impoundment (Lower Pond). Coal and the coal-handling equipment in the former coal yard have been removed.

The groundwater monitoring system at BGS is a multi-unit system. BGS includes four CCR units:

- BGS Ash Seal Pond (existing CCR surface impoundment)
- BGS Main Ash Pond (existing CCR surface impoundment)
- BGS Economizer Ash Pond (existing CCR surface impoundment)
- BGS Upper Ash Pond (existing CCR surface impoundment)

The closure of the BGS impoundments was discussed in the most recent amendment to the written closure plan (SCS Engineers [SCS], 2022). A map showing the CCR units and all background (or upgradient) and downgradient monitoring wells with identification numbers for the CCR groundwater monitoring program is provided as **Figure 2**.

Groundwater flow at the site is generally to the south-southeast, and the groundwater flow direction and water levels fluctuate seasonally due to the proximity to the river. Depth to groundwater as measured in the site monitoring wells varies from less than 1 to 15 feet below ground surface due to topographic variations across the facility and seasonal variations in water levels.

2.0 SUMMARY OF WORK COMPLETED

Groundwater related work completed to support remedy selection for the BGS CCR units is summarized in Table 1A. Work related to the impoundment closure is summarized in Table 1B. Activities completed within the 6-month period of September 2022 through February 2023 covered by this semiannual report are discussed in more detail below.

2.1 MONITORING NETWORK CHANGES

There were no changes to the BGS monitoring well network between September 2022 and February 2023. The monitoring well locations are shown on Figure 2.

2.2 GROUNDWATER MONITORING

Since the September 2022 semiannual update, groundwater samples were collected during October 2022.

- The October 2022 monitoring event was part of the routine semiannual assessment monitoring program.

- None of the of the nine background and compliance wells could be sampled during the October 2022 monitoring event. These wells were dry due to the ongoing dewatering work associated with the impoundment closure activities. Dewatering continued through the end of this reporting period, therefore samples from wells that were dry in October 2022 could not be collected at a later date in the reporting period. Dewatering activities are anticipated to end in 2023.

Wells that are screened deeper within the alluvial aquifer or located further from the dewatering wells did contain sufficient water for sample collection in October 2022. The sampled monitoring wells were delineation wells MW-302A, MW-307A, MW-307B, MW-313, MW-313A, MW-313B, and supplemental background wells MW-310A and MW-314. A summary of groundwater samples collected since the initial ACM was issued in September 2019 is provided in Table 2.

2.3 STATISTICAL EVALUATION

Statistical evaluation of sampling results during the period will be covered in the 2023 Annual Groundwater Monitoring and Corrective Action Report due on January 31, 2024.

Statistical evaluation of groundwater quality data during the period covered by this update included a comparison of Appendix IV parameter results to GPSs. In accordance with the Unified Guidance for Statistical Analysis of Groundwater Monitoring Data at Resource Conservation and Recovery Act (RCRA) Facilities (U. S. EPA, 2009), the evaluation of whether a parameter has been detected at an SSL exceeding the GPS is based on a comparison of the lower confidence limit (LCL) for the mean, calculated from the assessment monitoring results, to the GPS. For the wells that were sampled in the October 2022 monitoring event, SSLs above the molybdenum GPS were identified based on monitoring results to date for delineation wells MW-307A and MW-312.

2.4 ASH POND CLOSURES

Closing the ash ponds is one part of a holistic groundwater remedy at BGS. IPL continues to make significant progress on the engineering, permitting, and construction required to close the ash ponds. Engineering and permitting for the ash pond closures is substantially complete as of this

semiannual update. Construction to prepare the ash ponds for closure has been nearly continuous throughout the reporting period.

Key activities completed during the reporting period included:

- Groundwater dewatering permitting was completed and groundwater dewatering at the Ash Seal Pond and Upper Ash Pond were initiated. Dewatering will continue into the next reporting period.

- Coal residual removal from the coal yard was completed.

- IPL completed and submitted an application for the state sanitary disposal project closure permit for the ash ponds. Iowa Department of Natural Resources (IDNR) issued the permit on February 9, 2023.

A summary of the ash pond closure activities completed during the current reporting period is provided in Table 1B.

2.5 EVALUATION OF CORRECTIVE MEASURE ALTERNATIVES

A qualitative assessment of potential Corrective Measure Alternatives using the selection criteria in 40 CFR 257.97(b) and (c) was provided in the September 2019 ACM and revised in the November 2020 ACM Addendum No. 1.

A multi-phase groundwater treatability study that concluded late in the previous reporting period did not identify a suitable media that could feasibly be used as a chemical amendment or as a permeable reactive barrier. Corrective measure evaluation efforts in the current reporting period focused on non-reactive perimeter barriers and groundwater collection as possible augmentations of the CCR unit closures and included the following:

- An evaluation of the physical and operational constraints to a non-reactive perimeter barrier was completed. The evaluation indicated that the installation of a continuous barrier at the limits of the CCR units would be significantly constrained by existing electrical generating and transmission infrastructure, including current operational fuel and water supplies. A continuous barrier of adequate depth may not be feasible.

- Additional groundwater parameters have been and continue to be collected and analyzed for the purpose of providing additional information that may be needed for the development and evaluation of any groundwater treatment components of the corrective action. These additional parameters include carbonate and bicarbonate alkalinity, and total and dissolved metals (lithium, iron, magnesium, manganese, molybdenum, and sodium).

An updated assessment of the potential Corrective Measure Alternatives using the selection criteria in 40 CFR 257.97(b) and (c) will be provided in the forthcoming Selection of Remedy Report. The updated ACM and Selection of Remedy report will address the holistic groundwater remedy in greater details, including selected actions to supplement the groundwater quality benefits that are anticipated following the pond closures.

3.0 PLANNED ACTIVITIES

Planned activities related to the remedy selection process include the following:

- Continue semiannual assessment monitoring for the existing monitoring well network.
- Update conceptual site model based on additional findings of nature and extent investigation.
- Continue evaluation of remedial options and design.
- Continue dewatering, CCR removal, and CCR consolidation activities to advance the pond closures.
- Continue development of MODFLOW numerical model using site specific geometry, geology, steady-state boundary conditions, and material properties.
- Calibrate the MODFLOW model using water level logger data after dewatering pumps are shut down, single-well pump tests, historical observations of water table elevations, and current water level history matching.
- Collect additional CCR samples to characterize the CCR and water in contact with CCR. Perform Synthetic Precipitation Leaching Procedure (SPLP) tests and leach tests on the CCR samples to identify leachable fractions and expected molybdenum and lithium concentrations in groundwater.
- Hold an additional public meeting.
- Draft the Selection of Remedy Report.

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