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Memo

To:	Jeff Loewe / NIPSCO, LLC	Reviewer:	John Storm / Wood
From:	Russell Johnson / Wood		
cc:	Marc Okin / NIPSCO, LLC Joe Kutch / NIPSCO, LLC	Wood File No.:	7382193341.0008
Date	January 7, 2022		
Re:	Northern Indiana Public Service Company LLC Michigan City Generating Station – Boiler Slag Pond Corrective Measures Selection of Remedy, Semi-annual Progress Report #21-03		

In conformance with 40 Code of Federal Regulations (CFR) §257.97(a), Wood Environment & Infrastructure Solutions, Inc. (Wood) has prepared this semi-annual progress report for the Northern Indiana Public Service Company LLC (NIPSCO LLC) Michigan City Generating Station located at 101 Wabash Street in Michigan City, La Porte County, Indiana (MCGS or Site). The purpose of this report is to summarize progress towards selection of a Corrective Measures remedy for the Boiler Slag Pond (BSP). This semi-annual report covers the 6-month period since filing the Corrective Measures Selection of Remedy, Semi-annual Progress Report #21-02 for the BSP¹ dated June 30, 2021.

The first Assessment Monitoring event at the BSP was conducted in October 2018 and verified in February 2019. In May 2019 it was determined that arsenic was detected at a statistically significant level (SSL) above its Groundwater Protection Standard (GWPS) based on the site-specific background concentration of 14 ug/L. As a result, NIPSCO initiated an assessment of corrective measures for the BSP in August 2019. The Assessment of Corrective Measures (ACM) Report² for the BSP was prepared to address arsenic, which was the only inorganic identified at a SSL above its GWPS. Wood prepared the ACM in conformance with applicable requirements of 40 CFR §257.96, including certification by a qualified Indiana-licensed professional engineer. Subsequently, NIPSCO LLC placed the ACM in the facility operating record, and it was posted to NIPSCO LLC's publicly accessible CCR website. Since that time, the 2019 and 2020 Annual Groundwater Monitoring and Corrective Action Reports^{3,4} were placed in the operating record and posted to the NIPSCO CCR website. Arsenic detections at wells located downgradient of the BSP in 2019 and 2020 were consistent with the arsenic data through 2018 that were considered in the ACM for the BSP, although a new maximum arsenic detection (27 ug/L) was reported for groundwater collected from well GAMW-10 during the

¹ Wood 2021a. Memo - Northern Indiana Public Service Company LLC, Michigan City Generating Station – Boiler Slag Pond, Corrective Measures Selection of Remedy, Semi-annual Progress Report #21-02. Wood Environment and Infrastructure Solutions, Inc. June 30, 2021.

² Assessment of Corrective Measures Boiler Slag Pond Michigan City Generating Station Michigan City, Indiana. Wood Environment and Infrastructure Solutions, Inc. January 8, 2020.

³ Golder, 2020. 2019 Annual Groundwater Monitoring and Corrective Action Report – Boiler Slag Pond, NIPSCO, LLC Michigan City Generating Station. Golder Associates, Inc. January 31, 2020.

⁴ Golder, 2021. 2020 Annual Groundwater Monitoring and Corrective Action Report – Boiler Slag Pond, NIPSCO, LLC Michigan City Generating Station. Golder Associates, Inc. January 31, 2021.



October 2019 event, above the prior maximum concentration of 23 ug/L. Data from the April and October 2021 groundwater monitoring events will be included in the next annual report for the BSP, which is due in January 2022.

Notifications for arsenic at SSLs downgradient of the BSP were issued in June and August 2019, and April 2020, for the sampling events of October 2018, April 2019, and October 2019, respectively. A new arsenic background value of 0.017 mg/L was established in July 2020 based on the April 2020 event. There have been no arsenic SSL notifications for any well downgradient of the BSP for the April/October 2020 events, or the April 2021 event. No other constituents were detected at SSLs above the GWPS through April 2021. The statistical evaluation of the October 2021 results has not yet been completed.

Prior to filing the ACM for the BSP in January 2020, a Closure Application⁵ was filed with the Indiana Department of Environmental Management (IDEM) that addresses all five former CCR surface impoundments using closure by removal, including the BSP. A supplemental addendum to the Closure Application⁶ was subsequently filed with IDEM in February 2019. The addendum addressed the post-closure groundwater monitoring network for all five CCR surface impoundments, which includes 24 existing wells and 12 new wells. As stated in the ACM Report (Wood, 2020), during development of the post-closure application and in discussions with IDEM a two-year, post-closure monitoring period was proposed to evaluate the effectiveness of source removal and attenuation before implementing a groundwater corrective action. A virtual public hearing was conducted on April 16, 2020, to present the proposed approach for CCR unit closure at MCGS, after which NIPSCO received several comments from interested stakeholders. IDEM approved the Closure Application on March 10, 2021, with initiation of closure activities planned for Q2/Q3 2022.

Currently, NIPSCO LLC intends to close the BSP by removing source materials pursuant to 40 CFR §257.102(c) as the first step in the corrective measure for the BSP. Therefore, the ACM focused on residuals in groundwater upon closure of the BSP and identified five potential groundwater corrective measure alternatives for possible implementation. The five alternatives include monitored natural attenuation (MNA), groundwater extraction for treatment with three options for discharge (surface water, publicly owned treatment works, and groundwater reinjection), and a permeable reactive barrier (PRB). These five alternatives were also considered viable for the other impoundments slated for closure at the MCGS because of similar contaminants and the proximity of impoundments to one another.

An ACM Report⁷ for Primary Settling Pond #2 (Primary 2) was prepared in December 2020. Primary 2 is located immediately adjacent to the BSP and there may be overlapping arsenic plumes potentially reflecting historic groundwater flow patterns when the two units were still receiving process water. All discharges to Primary 2 were discontinued in October 2018, and to the adjacent Boiler Slag Pond on April 15, 2019. Water-level data from October 6, 2021, indicates a decline in the water table elevations in wells surrounding Primary 2, ranging from 2.57 to 5.43 feet lower than August 6, 2018, which reflects the cessation of discharge to this pond.

Treatability and column studies were conducted in 2019 focusing primarily on arsenic. That study looked at technologies to simulate ex-situ treatment of extracted groundwater. Site groundwater was collected from six wells across the Site, including wells near the BSP and Primary 2. Column studies were also performed to simulate a PRB. The treatability and column studies demonstrated very effective removal of arsenic from groundwater for either the

⁵ Wood, 2018. Surface Impoundment Closures (CCR Final Rule and RCRA Regulated) Closure Application, Volume 1 – Closure Plan and Drawings (Appendix A), Michigan City Generating Station, Northern Indiana Public Service Company, Merrillville, Indiana. December 20, 2018.

⁶ Wood, 2019. Supplemental Addendum, Monitoring Well Network, Surface Impoundment Closures (CCR Final Rule and RCRA Regulated) Closure Application, Michigan City Generating Station, Northern Indiana Public Service Company, Merrillville, Indiana. February 28, 2019.

⁷ Wood, 2020b. Assessment of Corrective Measures, Primary Settling Pond No. 2, Michigan City Generating Station, Michigan City, Indiana. December 7, 2020.

pump and treat or PRB alternatives. Findings were reported in a memorandum⁸ prepared by Wood in February 2020, which was included as Attachment A of the Primary 2 ACM Report.

Wood has also developed a three-dimensional numerical groundwater flow model for the MCGS using the USGS finite-difference code MODFLOW-NWT⁹. The flow model will be used to simulate the groundwater flow system at MCGS in preparation for subsequent transport simulations using the code MT3D¹⁰. Modeling will be performed to evaluate the effectiveness of each alternative evaluated in the ACM for the BSP, and to assess the estimated times to achieve closure for groundwater. The model will be continually modified as new information is gathered.

NIPSCO anticipates performing additional studies of soil and groundwater in Q3/Q4 2022 to assess the sorption/desorption of CCR constituents, particularly arsenic. In addition, Wood will continue to provide an updated report semi-annually, in conformance with applicable requirements of 40 CFR §257.97(a), that summarizes NIPSCO LLC's progress towards selection of remedy for groundwater Corrective Measures at the BSP.

⁸ Final Test Report – NIPSCO Pump and Treat Test and Column Study REV 1. February 12, 2020. Attachment A to the ACM for Primary 2

⁹ Niswonger, R.G., Panday, Sorab, and Ibaraki, Motomu, 2011, MODFLOW-NWT, A Newton formulation for MODFLOW-2005: U.S. Geological Survey Techniques and Methods 6-A37, 44 p.

¹⁰ Zheng, Chunmiao, and P. Patrick Wang, 1999, MT3DMS, A modular three-dimensional multi-species transport model for simulation of advection, dispersion and chemical reactions of contaminants in groundwater systems; documentation and users guide, U.S. Army Engineer Research and Development Center Contract Report SERDP-99-1, Vicksburg, MS, 202 p.