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Memo

To:	Jeff Loewe / NIPSCO, LLC	**Reviewer:**	John Storm / Wood
From:	Russell Johnson / Wood	**Wood File No.:**	7382193341.0012
cc:	Marc Okin / NIPSCO, LLC Joe Kutch / NIPSCO, LLC		
Date	June 8, 2021		
Re:	Northern Indiana Public Service Company LLC Michigan City Generating Station – Primary Settling Pond #2 Corrective Measures Selection of Remedy, Semi-annual Progress Report #21-01		

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 Primary Settling Pond #2 (Primary 2). This semi-annual report covers the 6-month period since filing the Assessment of Corrective Measures (ACM) Report for Primary 2[1], dated December 7, 2020. 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.

All discharges to Primary 2 were discontinued in October 2018. Water-level data from September 23, 2020 indicate a decline in the water table elevations in wells surrounding Primary 2, ranging from 1.85 to 3.50 feet, which reflects the cessation of discharge to this pond. Although there has been a notable decline in water levels (and the associated hydraulic gradient), the general pattern of groundwater flow is similar to the pattern when this impoundment was operating – radially away from Primary 2 to the northeast and southwest.

The 2019-2020 Annual Report for Primary 2 was issued in August 2020[2]. The range of arsenic concentrations detected in groundwater from the eight downgradient wells at Primary 2 for the 14 events from July 2016 to April 2020 ranged from 6.2 micrograms per liter (µg/L) to 60 µg/L. Thallium concentrations for the same 14 events ranged from 0.089 µg/L (estimated) to 5.6 µg/L. On August 26, 2020, NIPSCO, LLC reported that as of July 27, 2020, arsenic and thallium had been detected at statistically significant levels (SSLs) above the Groundwater Protection Standards (GWPS) of 17 µg/L based on the background concentration developed for Primary 2, and 2 µg/L based on the Maximum Contaminant Level (MCL), respectively.

[1] Wood, 2020. Assessment of Corrective Measures, Primary Settling Pond No. 2, Michigan City Generating Station, Michigan City, Indiana. December 7, 2020.
[2] Golder, 2020. 2019-2020 Annual Groundwater Monitoring and Corrective Action Report – Primary 2, NIPSCO LLC Michigan City Generating Station. August 1, 2020.

Prior to filing the ACM for Primary 2 in December 2020, a Closure Application[3] was filed with the Indiana Department of Environmental Management (IDEM) that addresses all five former CCR surface impoundments using closure by removal, including Primary 2. A supplemental addendum to the Closure Application[4] 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. 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 Primary 2 by removing source materials pursuant to 40 CFR §257.102(c) as the first step in the corrective measure for Primary 2. Therefore, the ACM focused on residuals in groundwater upon closure of Primary 2 and identified five potential groundwater corrective measure alternatives for possible implementation. The five alternatives include groundwater extraction for treatment with three options for discharge (surface water, publicly owned treatment works, and groundwater reinjection), a permeable reactive barrier (PRB), and monitored natural attenuation (MNA). 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.

Treatability and column studies were conducted in 2019 focusing primarily on arsenic. That study evaluated technologies to simulate ex-situ treatment of extracted groundwater. Site groundwater was collected from six wells across the Site, including wells near 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 pump and treat or PRB alternatives. Findings were reported in a memorandum[5] 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-NWT[6]. The flow model will be used to simulate the groundwater flow system at MCGS in preparation for subsequent transport simulations using the code MT3D[7]. Modeling will be performed to evaluate the effectiveness of each alternative evaluated in the ACM for Primary 2, and to assess the estimated times to achieve closure for groundwater. The model will be modified as new information is gathered.

NIPSCO anticipates performing additional studies of soil and groundwater in Q3/Q4 2021 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 Primary 2.

[3] 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.
[4] 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.
[5] Final Test Report – NIPSCO Pump and Treat Test and Column Study REV 1. February 12, 2020. Attachment A to the ACM for Primary 2
[6] 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.
[7] 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.