



TECHNICAL MEMORANDUM

DATE December 7, 2023

Project No. 31404789.006

TO Jeff Loewe, Environmental Principal
Northern Indiana Public Service Company LLC (NIPSCO)

CC Marc Okin, Joe Kutch

FROM Cody Johnson

EMAIL cody.johnson@wsp.com

**RE: NORTHERN INDIANA PUBLIC SERVICE COMPANY LLC
MICHIGAN CITY GENERATING STATION - PRIMARY SETTLING POND #2
CORRECTIVE MEASURES SELECTION OF REMEDY
SEMI-ANNUAL PROGRESS REPORT #21-06**

On behalf of Northern Indiana Public Service Company LLC (NIPSCO) and in conformance with 40 Code of Federal Regulations (CFR) §257.97(a), WSP USA Inc. (WSP) has prepared this semi-annual progress report for the NIPSCO Michigan City Generating Station located at 101 Wabash Street in Michigan City, La Porte County, Indiana (MCGS or Site). The purpose of this memo is to summarize progress towards selection of a corrective measures remedy for the Primary Settling Pond #2 (Primary 2). This is the sixth semi-annual report since filing the Assessment of Corrective Measures (ACM) Report for Primary 2¹, dated December 7, 2020. The ACM was prepared in conformance with applicable requirements of 40 CFR §257.96, including certification by a qualified Indiana-licensed professional engineer. Subsequently, NIPSCO placed the ACM in the facility operating record, and it was posted to NIPSCO's publicly accessible CCR website. This sixth semi-annual report covers the six-month period from June 8 through December 7, 2023.

Corrective action under the federal CCR Rule is triggered through a two-phase program of groundwater monitoring: detection and assessment. Primary 2 is currently in the Assessment Monitoring phase of the program (40 CFR §257.95). A statistical evaluation of groundwater monitoring data was conducted, and as of June 8, 2020, Primary 2 was required to enter Groundwater Corrective Action (§257.96 through §257.98) based on statistically significant levels (SSLs) above the Groundwater Protection Standards (GWPS) of 0.017 milligrams per liter (mg/L) for arsenic (based on the background concentration developed for Primary 2) and 0.002 mg/L for thallium (based on the Maximum Contaminant Level [MCL]). Arsenic and thallium were then consistently detected at SSLs in one or more wells until March 2022 when thallium was not detected as an SSL in any well. New selenium SSLs were identified in two downgradient wells during the March 2022 event. On August 18, 2022, NIPSCO posted a Notice of SSL indicating that as of July 19, 2022, arsenic and selenium were detected at SSLs above the GWPS in wells downgradient of Primary 2. The selenium GWPS is based on the MCL of 0.050 mg/L. In response to the selenium SSL, WSP prepared Addendum No. 1 to the ACM dated

¹ Wood, 2020. Assessment of Corrective Measures, Primary Settling Pond No. 2, Michigan City Generating Station, Michigan City, Indiana. December 7, 2020.

October 19, 2022². Although selenium was not previously detected at an SSL, it was considered in the evaluation of remedial alternatives in the ACM (Wood, 2020), which concluded that all the alternatives considered would potentially be effective at reducing selenium concentrations. As of December 31, 2022, arsenic, selenium, and thallium had been detected at SSLs.

All discharges to Primary 2 were discontinued in October 2018. Groundwater elevations in the CCR monitoring wells around Primary 2 that are still monitored, including GAMW-12, GAMW-14, GAMW-15, and GAMW-16, declined 2.64 to 4.13 feet in the time between October 2018 and the October 2023 groundwater gauging event. Wells GAMW-15 (downgradient) and GAMW-18 (upgradient) were dry in October 2023. 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 2022-2023 Annual Report for Primary 2 was issued in August 2023³. The arsenic concentrations detected in groundwater from the eight⁴ downgradient wells at Primary 2 for the 21 events from July 2016 to April 2023 ranged from 0.0062 mg/L to 0.060 mg/L. Thallium concentrations for the same 21 events ranged from 0.000089 mg/L (estimated) to 0.0056 mg/L, whereas selenium concentrations ranged from 0.00092 mg/L (estimated) to 0.650 mg/L.

Prior to filing the ACM for Primary 2 in December 2020, a Closure Application⁵ was filed with the Indiana Department of Environmental Management (IDEM) that addressed all five former CCR surface impoundments, including Primary 2, using closure by removal. 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. 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.

NIPSCO completed closure of all five impoundments in July 2023 by removing source materials. Closure of Primary 2 included removal of approximately 46,000 cubic yards of CCR, blast furnace slag, and an additional foot of underlying material which was replaced with native sand backfill. An 18-inch soil cover having a permeability of 1×10^{-5} centimeters per second, or less, was then placed over the backfilled area. A 6-inch layer of topsoil was then placed above the cover soil and vegetated with an IDEM-approved seed mix.

² WSP, 2022. Assessment of Corrective Measures, Primary Settling Pond No. 2, Addendum No. 1, Michigan City Generating Station, Michigan City, IN. October 19, 2022.

³ WSP Golder, 2023. 2022-2023 Annual Groundwater Monitoring and Corrective Action Report – Primary 2, NIPSCO LLC Michigan City Generating Station. August 2023.

⁴ There are now four downgradient wells, as wells GAMW-09 and GAMW-17 were decommissioned in November 2019, and wells GAMW-08 and GAMW-13 were decommissioned in November 2021.

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.

Post-closure monitoring well network installation for all five impoundments was completed in two phases with the deep wells installed first and the shallow wells installed later to allow the shallow groundwater to recover following dewatering associated with impoundment closure activities. The deep monitoring wells (PC-MW-116B, PC-MW-117B, PC-MW-118B, and PC-MW-119) were installed in August 2023⁷. Installation of the shallow wells (PC-MW-103A, PC-MW-105A, PC-MW-116A, PC-MW-117A, and PC-MW-118A) was completed in November 2023.

Removal of source material is the primary objective 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 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). NIPSCO considered these five alternatives to be 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 completed in 2019 focusing primarily on arsenic. That study evaluated technologies to simulate ex-situ treatment of extracted groundwater. WSP collected site groundwater from six wells across the Site, including wells near Primary 2. WSP also performed column studies to simulate a PRB. The treatability and column studies demonstrated effective removal of arsenic from groundwater for either the pump and treat or PRB alternatives. WSP reported their findings in a memorandum⁸ dated February 12, 2020, which was included as Attachment A of the Primary 2 ACM Report.

In May 2023, WSP engineers visited the Site to initiate a constructability evaluation of the potential remedies, focusing on space limitations between the closed impoundments and nearby features (e.g., the Final Pond, sheet pile along Lake Michigan), the potential influence of sheet pile around Secondary 1 and 2, limitations on construction equipment due to overhead transmission lines, the presence of underground utilities (e.g., recirculation lines to the cooling tower that pass beneath the central portion of the Boiler Slag Pond and south along Primary 2), and limitations/requirements to protect transmission tower foundations.

A three-dimensional numerical groundwater flow model for the MCGS has also been developed 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. Additional modeling will be performed to evaluate the effectiveness of each alternative proposed in the ACM for Primary 2, and to assess the estimated times to achieve closure for groundwater.

NIPSCO is performing additional studies of soil and groundwater that are considered imperative to assessing the groundwater following removal of the source of CCR constituents so that the most appropriate corrective

⁷ WSP, 2023. Post-Closure Monitoring Well Completion Report – Phase I Deep Wells Installation, NIPSCO LLC, Michigan City Generating Station, Michigan City, IN. October 31, 2023

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.

measure technology can be selected based on post-closure conditions. The studies include a plume stability analysis based on the results of groundwater samples collected in March 2023, and studies to assess the sorption/desorption of CCR constituents, particularly arsenic, based on the results of soil/water pair samples collected in November 2023 and column studies using EPA Method 1314 to assess the capacity of site soil to sorb dissolved inorganics and the permanence of that sorption. The flow and transport model will be updated with this additional information. An updated report will be prepared semi-annually, in conformance with applicable requirements of 40 CFR §257.97(a), that summarizes NIPSCO's progress towards selection of a remedy for groundwater Corrective Measures at Primary 2.

[https://goldeassociates.sharepoint.com/sites/nipsccocrgwmonitoring/shared documents/mcgs/reports/sor progress reports/mcgs primary 2 semi annual progress report new format 12-2023_raj_cmj.docx](https://goldeassociates.sharepoint.com/sites/nipsccocrgwmonitoring/shared%20documents/mcgs/reports/sor%20progress%20reports/mcgs%20primary%20semi%20annual%20progress%20report%20new%20format%2012-2023_raj_cmj.docx)