TECHNICAL MEMORANDUM

DATE June 6, 2024 **Project No.** 31404789.006

TO Jeff Loewe, Manager, Environmental Remediation
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 #21-07

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, 101 Wabash Street, 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 CCR Rule regulated, now closed Primary Settling Pond #2 (Primary 2). This is the seventh semi-annual report since filing the Assessment of Corrective Measures (ACM) Report for Primary 2[1], 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 seventh semi-annual report covers the six-month period from December 8, 2023, through June 8, 2024.

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 determination of 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, 2022[2]. 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.

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 addressed all five former CCR surface impoundments, including Primary 2, using closure by removal. 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.

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 $1x10^{-5}$ 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. Professional engineer's certification of impoundment closure was completed on October 16, 2023.

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 post-closure monitoring wells for Primary 2 (PC-MW-117B, PC-MW-118B, and PC-MW-119) were installed in August 2023[5]. Installation of the shallow wells (PC-MW-117A, and PC-MW-118A) was completed in November 2023. Further, due to an insufficient water column height, PC-GAMW-14 was decommissioned and replaced with PC-GAMW-14R, which was screened deeper to allow for groundwater collection. With installation of the new wells, the downgradient

[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] 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] 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

post-closure well network for P2 now consists of: PC-GAMW-14R, PC-GAMW-15, PC-GAMW-16, PC-GMMW-01, PC-MW-117A, PC-MW-117B, PC-MW-118A, and PC-MW-118B.

The arsenic concentrations detected in groundwater from the eight[6] downgradient wells at Primary 2 for the 23 events from July 2016 to April 2024 ranged from 0.0062 mg/L to 0.060 mg/L. Thallium concentrations for the same 23 events ranged from 0.000089 mg/L (estimated) to 0.0056 mg/L, whereas selenium concentrations ranged from 0.00092 mg/L (estimated) to 0.800 mg/L.

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 the now-closed 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 memorandum[7] 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. The findings of this assessment will be used in conjunction with future studies as a component of the evaluation of potential corrective measures in the SOR and CMS reports.

A three-dimensional numerical groundwater flow model for the MCGS has also been developed using the USGS finite-difference code MODFLOW-NWT8. The flow model will be used to simulate the groundwater flow system at MCGS in preparation for subsequent transport simulations using the code MT3D9. Additional modeling will be performed as a component of the SOR 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.

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[6] This summary includes data from four downgradient wells that were previously monitored but have been removed: wells GAMW-09 and GAMW-17 were decommissioned in November 2019, and wells GAMW-08 and GAMW-13 were decommissioned in November 2021.

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

[8] 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.

[9] 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.

NIPSCO is also 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 measure technology can be selected based on current post-closure conditions. In November 2023 and January 2024 WSP collected soil and groundwater samples for use in an ongoing fate-and-transport study focused on arsenic, selenium, and thallium. Specifically, the study is intended to further understanding of the relationship between inorganics adsorbed onto the aquifer solids and those in the dissolved-phase plume, which will allow for refined estimates on the time required to achieve the clean-up criteria, allow more efficient placement of potential selected remedy components (i.e. recovery wells and/or PRB(s)), and will provide data necessary to understand how the aquifer geochemistry affects plume behavior and potential ways to manipulate the geochemical environment if feasible to accelerate remediation.

NIPSCO has also initiated a treatability study to evaluate potential treatment media for use in a PRB remedy and/or an ex-situ treatment system associated with a groundwater extraction and treatment remedy. Collection of soil and groundwater for use the treatability study is scheduled to occur in June 2024 with completion of the study anticipated in September/October 2024. The results of this study will help to refine understanding of the potential performance and reliability of proposed remedies and may speed implementation once a remedy has been selected.

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.

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