2021 Annual Groundwater Monitoring and Corrective Action Report - Boiler Slag Pond

NIPSCO LLC Michigan City Generating Station

Prepared Pursuant to 40 CFR §257.90(e) and Corresponding Regulations under 329 Indiana Administrative Code 10-9-1

Submitted to:

Northern Indiana Public Service Company LLC

Michigan City Generating Station
Michigan City, Indiana

Submitted by:

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January 31, 2022

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1.0 INTRODUCTION

On behalf of Northern Indiana Public Service Company LLC (NIPSCO), Golder Associates USA Inc., *a member of WSP* (Golder), prepared this 2021 Annual Groundwater Monitoring and Corrective Action Report (2021 Annual Report) for the Michigan City Generating Station (MCGS) Boiler Slag Pond (BSP, the CCR Unit) located at 101 Wabash Street, Michigan City, LaPorte County, Indiana (Latitude 41° 43' 15" N and Longitude 86° 54' 30" W, see Figure 1). The BSP is an approximately 2.5-acre unlined impoundment/materials dewatering area, as shown in Figure 2. Golder prepared the 2021 Annual Report in accordance with 40 Code of Federal Regulations (CFR) Parts 257 and 261, "Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals From Electric Utilities; Final Rule" (CCR Rule), as amended, and corresponding regulations under 329 Indiana Administrative Code (IAC) 10-9-1.

The CCR Unit is currently in Assessment Monitoring pursuant to 40 CFR §257.95. Routine monitoring activities performed during the reporting period include inspection of wells for integrity and security, measurement of groundwater levels prior to sample collection to assess groundwater flow direction, and collection of groundwater samples for laboratory analysis.

In conformance with the applicable requirements of 40 CFR §257.90(e)(1) through (5) and corresponding State of Indiana requirements, the 2021 Annual Report:

- Documents the status of the groundwater monitoring and corrective action program
- Provides figures showing the CCR Unit and monitoring well locations
- Summarizes key CCR Rule groundwater activities completed during calendar year 2021
- Includes CCR Rule groundwater monitoring data obtained in calendar year 2021
- Describes any problems encountered during the monitoring activities
- Discusses actions taken to resolve the problems, if applicable
- Projects key activities for the upcoming year

2.0 GROUNDWATER MONITORING AND CORRECTIVE ACTION OVERVIEW OF CURRENT PROGRAM STATUS

Starting in 2016 following the installation of a groundwater monitoring system (Table 1) and throughout calendar year 2017, Golder collected background groundwater samples and performed the first Detection Monitoring event at the CCR Unit pursuant to the requirements of 40 CFR §257.94. In April 2018, Golder performed the second Detection Monitoring sampling event. Due to the identification of statistically significant increases (SSIs), NIPSCO established an Assessment Monitoring program in August 2018, pursuant to the requirements of 40 CFR §257.95. In October 2018, Golder performed the first Assessment Monitoring sampling event. Following the first Assessment Monitoring event, including verification sampling in February 2019, NIPSCO posted a notification to the publicly-accessible website that there were detections of Appendix IV parameters downgradient of the BSP above applicable groundwater protection standards (GWPS). Consequently, NIPSCO initiated the assessment of corrective measures process in August 2019. Golder performed subsequent monitoring events including:

- Second and third Assessment Monitoring events in 2019
- Fourth and fifth Assessment Monitoring events in 2020

- Sixth and seventh Assessment Monitoring events in 2021

The sampling dates, number of groundwater samples collected from each background and downgradient well, and the purpose of sampling associated with the sixth and seventh Assessment Monitoring events are provided in Table 2. The 2021 analytical results are presented in Table 3. The BSP began and ended the current annual reporting period in Assessment Monitoring. NIPSCO completed the Assessment of Corrective Measures Report in January 2020 based on an SSL for arsenic identified at monitoring well GAMW-10 in 2019 and 2020. No statistically significant levels (SSLs) were identified in 2021.

2.1 Key Actions Completed - 2021

NIPSCO completed the following key actions relative to CCR Rule groundwater monitoring at the BSP during calendar year 2021:

- Preparation of the 2020 Groundwater Monitoring and Corrective Action Annual Report in January 2021 (2020 Annual Report, 40 CFR §257.90(e))
- Evaluation of the results of the fifth Assessment Monitoring event in January 2021 (40 CFR §257.95)
- Preparation of the second semi-annual Selection of Remedy Progress Report in January 2021 (40 CFR §257.97)
- Performance of the sixth Assessment Monitoring event in May 2021 (40 CFR §257.95)
- Preparation of the third semi-annual Selection of Remedy Progress Report in June 2021 (40 CFR §257.97)
- Evaluation of the results of the sixth Assessment Monitoring event in September 2021 (40 CFR §257.95)
- Performance of the seventh Assessment Monitoring event in October 2021 (40 CFR §257.95)

2.2 Monitoring System Modification

To prepare for construction activities related to closure of the CCR Units, Golder decommissioned monitoring well GAMW-11 in November 2021 (after the completion of the both the sixth and seventh Assessment Monitoring events). Following the decommissioning of GAMW-11, the BSP monitoring well network contains two downgradient Assessment Monitoring wells. Dewatering activities performed as a component of the BSP impoundment closure activities scheduled to begin in spring 2022 are likely to affect groundwater flow direction(s). As such, groundwater data collected during the closure dewatering and construction activities will not be representative of natural conditions nor necessarily a release from the BSP. Following closure of the impoundment, which is scheduled for completion by late 2022, implementation of the Corrective Action monitoring program will include installation of at least one new downgradient monitoring well. The current monitoring well network is shown in Figure 2. Table 1 provides a summary of the well rationale/purpose and date of installation. An overview of the groundwater monitoring network is provided in the embedded table below.

Background Monitoring Wells	Downgradient Monitoring Wells
GAMW-05, GAMW-12, GAMW-18	GAMW-10, GAMW-11*, GMMW-2

*Decommissioned in November 2021

2.3 Background Monitoring (2016 to 2017)

Per the requirements of 40 CFR §257.94, Golder collected eight independent background groundwater samples from each background and downgradient well between July 2016 and August 2017. Golder used the results of the background monitoring phase to develop appropriate, statistically valid background values for each constituent/monitoring well. Golder submitted the samples to a contract laboratory, in accordance with chain of custody and quality assurance/quality control procedures, for analysis of 40 CFR Part 257 Appendix III and Appendix IV constituents. In addition, Golder personnel measured field water quality parameters including specific conductance, temperature, dissolved oxygen, turbidity, oxidation-reduction potential, and pH. The background data set is included in the 2017 CCR Annual Groundwater Monitoring and Corrective Action Report, dated January 31, 2018 (2017 Annual Report, Golder 2018).

The periodic update of background datasets, during which additional data are incorporated into the background, improves statistical power and accuracy by providing a more conservative estimate of the true background populations. The CCR Rule Groundwater Monitoring Program Implementation Manual (GMPIM, Golder 2017) allows for the statistical limits to be updated after four to eight new measurements are available (i.e., every two to four years of semi-annual monitoring). Prior to incorporating the new data into the background dataset, Golder preformed a Mann-Whitney test and prepared time series graphs to assess if the new data are from the same statistical population as the existing background data. Based on the results of this evaluation, the new data from background monitoring well GAMW-12 are quantitatively different from the data collected prior to October 2018 (e.g., the lithium results from samples collected between July 2016 and October 2018 ranged from 0.03 to 0.048 mg/L while the lithium results from samples collected between April 2019 and April 2020 ranged from 0.072 to 0.17 mg/L).Therefore, the data collected after October 2018 from GAMW-12 were excluded prior to recalculating the GWPS. Golder calculated the updated GWPS (Table 4) using data collected between July 2016 and April 2020 from monitoring wells GAMW-05 and GAMW-18 and the data collected between July 2016 and October 2018 from monitoring well GAMW-12.

2.4 Detection Monitoring

Golder performed the first Detection Monitoring event in October 2017, followed by a statistical evaluation and data analysis in January 2018. Golder collected groundwater samples from the BSP background and downgradient monitoring wells for analysis of Appendix III constituents per 40 CFR §257.94 and included the results in the 2017 Annual Report. Following receipt and validation of laboratory results, Golder evaluated the results of the first Detection Monitoring sampling event to compare the concentration of 40 CFR Part 257 Appendix III constituents relative to facility background concentrations. Using Sanitas™ software, Golder pooled the background data to calculate prediction limits and compared the October 2017 results to the calculated prediction limits to determine SSIs. There were no SSIs identified from the October 2017 sampling event.

Golder performed the second Detection Monitoring event in April 2018 and follow-up pH verification sampling in May, June, and July 2018. Golder performed a statistical evaluation and data analysis in July 2018. Based on SSIs identified in the second Detection Monitoring event, NIPSCO established an Assessment Monitoring program in August 2018. The results from the second Detection Monitoring event are included in the 2018 Annual Groundwater Monitoring and Corrective Action Report, dated January 31, 2019 (2018 Annual Report, Golder 2019).

2.5 Assessment Monitoring

Golder performed the first Assessment Monitoring event (i.e., Assessment and Verification sampling) in October 2018 (Assessment) and February 2019 (Verification). In October 2018, Golder collected groundwater samples from each background and downgradient monitoring well for analysis of Appendix III and Appendix IV constituents per 40 CFR §257.95. In February 2019, Golder collected samples for analysis of detected Appendix IV constituents per 40 CFR §257.95. In May 2019, Golder developed GWPS against which to compare the Assessment Monitoring results. Following receipt and validation of laboratory results, Golder evaluated the Appendix IV constituent results relative to CCR Unit-specific GWPS (see Table 4). At the time of the statistical evaluation the GWPS was the higher value of either the Maximum Contaminant Level (MCL) or the CCR Unit-specific background concentration for each analyte based on a tolerance/prediction limit procedure under 40 CFR §257.95(h)(2). Results from the downgradient monitoring wells were evaluated by comparing the lower confidence limit (LCL) to the CCR Unit-specific GWPS for each Appendix IV analyte at each well. If the LCL exceeds the GWPS, there is statistical evidence of an SSL. Golder determined that an SSL existed for arsenic at well GAMW-10 in May 2019 and NIPSCO initiated the assessment of corrective measures in August 2019. The results from the first Assessment Monitoring event are included in the 2018 Annual Report. The results from the Verification sampling event are included in the 2019 Annual Groundwater Monitoring and Corrective Action Report, dated January 31, 2020 (2019 Annual Report, Golder 2020).

Golder performed additional Assessment Monitoring events by collecting groundwater samples from each background and downgradient monitoring well per 40 CFR §257.95 including:

- Second Assessment Monitoring Event – April 2019: Golder performed the second Assessment monitoring event by collecting groundwater samples for analysis of Appendix III and detected Appendix IV constituents. Golder performed the statistical evaluation of the analytical results of the second Assessment Monitoring sampling event in July 2019. The results confirmed the SSL for arsenic at well GAMW-10.

- Third Assessment Monitoring Event – October 2019: Golder performed the third Assessment Monitoring event by collecting groundwater samples for analysis of Appendix III and Appendix IV constituents. Golder performed the statistical evaluation of the analytical results of the third Assessment Monitoring sampling event in March 2020. The results confirmed the SSL for arsenic at well GAMW-10. The results from the second and third Assessment Monitoring events are included in the 2019 Annual Report.

- Fourth Assessment Monitoring Event – April 2020: Golder performed the fourth Assessment Monitoring event by collecting groundwater samples for analysis of Appendix III and Appendix IV constituents. Golder performed the statistical evaluation of the analytical results of the fourth Assessment Monitoring sampling event in July 2020. No SSLs were identified from this sampling round.

- Fifth Assessment Monitoring Event – October 2020: Golder performed the fifth Assessment Monitoring event by collecting groundwater samples for analysis of Appendix III and Appendix IV constituents. Golder performed the statistical evaluation of the analytical results from the fifth Assessment Monitoring event in January 2021. No SSLs were identified from this sampling round. The results from the fourth and fifth Assessment Monitoring events are included in the 2020 Groundwater Monitoring and Corrective Action Report, dated January 31, 2021 (Golder, 2021).

- Sixth Assessment Monitoring Event – May 2021: Golder performed the sixth Assessment Monitoring event by collecting groundwater samples for analysis of Appendix III and Appendix IV constituents. Golder

performed the statistical evaluation of the analytical results of the sixth Assessment Monitoring event in September 2021. No SSLs were identified from this sampling round.

- Seventh Assessment Monitoring Event – October 2021: Golder performed the seventh Assessment Monitoring event by collecting groundwater samples for analysis of Appendix III and Appendix IV constituents. Golder will perform the statistical evaluation of the analytical results of the seventh Assessment Monitoring event in January 2022.

2.6 Corrective Action

NIPSCO is evaluating the feasibility and design of potential groundwater remedial alternatives presented in the Assessment of Corrective Measures (ACM) report (Wood 2020a). As discussed in the ACM, NIPSCO plans to close this CCR Unit by removal in accordance with 40 CFR §257.102(c). NIPSCO submitted a closure application to IDEM in December 2018 (Wood 2018) with an addendum in February 2019 (Wood 2019). Virtual public meetings were held on April 22 and October 6, 2020 to present the proposed BSP closure approach. IDEM approved the final closure application on March 10, 2021. Construction activities, including source removal as a component of the overall Site groundwater remedy, is scheduled to begin in spring 2022.

The ACM identified groundwater extraction and treatment, a permeable reactive barrier, and monitored natural attenuation as potential groundwater corrective measures. Since the submittal of the ACM, Wood has developed a three-dimensional numerical groundwater flow model using United States Geological Survey finite difference code MODLOW-NWT. Wood will use the model to simulate the groundwater flow system post-closure, evaluate the effectiveness of the potential groundwater remedial alternatives, and assess the estimated times to achieve corrective action objectives for groundwater (Wood, 2021).

In 2022, NIPSCO anticipates performing additional studies of soil and groundwater to assess the sorption/desorption of CCR constituents. Wood will continue to prepare a detailed evaluation/comparison of the groundwater corrective measure alternatives, including conceptual designs and engineering cost estimates, that will provide NIPSCO with sufficient information to select a remedy that effectively meets the requirements of 40 CFR §257.97 including protection of public health and the environment. This detailed evaluation/comparison of corrective measures will be documented in a future Selection of Remedy Report for the CCR Unit.

2.7 Statistical Evaluation

After each monitoring event, Golder assessed the analytical data for outliers, anomalies, and trends that may be an indication of a sampling or analytical error. Outliers and anomalies are generally defined as inconsistently large or small values that can occur because of sampling, laboratory, transportation, or transcription errors, or even by chance alone. Significant trends may indicate natural geochemical variability, a source of systematic error, influence of an upgradient/off-site source, or an actual occurrence of CCR Unit influence upon groundwater quality. Appropriate statistical methods are used to remove outliers from the database and manage trends with detrending routines, prior to the calculation of statistical limits. To assess the data for outliers, anomalies, and trends, Golder assessed the data using time vs. concentration graphs, and statistical routines included in the Sanitas™ statistical analysis software package.

In addition to the outliers identified in the 2020 Annual Report, Golder identified the October 2020 and May 2021 cobalt results from background monitoring well GAMW-12 as outliers and removed these data from the data set for the following reasons:

- Trend charts indicated that these results were inconsistent with other concentrations for cobalt detected in this monitoring well.
- The results are significantly higher than previous data points and, if included in the dataset, would raise the GWPS. Golder removed these data points to provide more conservative GWPS.

Golder evaluated the background data for trends using Sanitas™ software. Golder will continue to monitor trends and will perform detrending routines before using this data to calculate GWPS. Golder identified the following 40 CFR Part 257 Appendix IV parameter trends in background monitoring wells:

- Barium and fluoride concentrations detected in groundwater samples collected from GAMW-12 show a decreasing trend. Neither barium nor fluoride have ever been detected at concentrations above the MCL in the background wells, therefore, the GWPS is equal to the MCL. No detrending routines are required.
- Cobalt concentrations detected in groundwater samples collected from GAMW-18 show an increasing trend. Cobalt has not been detected at concentrations above the health-based standard in groundwater samples collect from this well. No detrending routines are required.
- Lithium concentrations detected in groundwater samples collected from well GAMW-05 show a slight decreasing trend, but the noted trend does not alter the background GWPS for lithium. No detrending routines are required.
- Molybdenum concentrations detected in groundwater samples collected from well GAMW-12 show a decreasing trend with the 95% lower confidence band below the MCL. No detrending routines are required.
- Thallium concentrations detected in groundwater samples collected from GAMW-18 show a decreasing trend, have not been detected above the laboratory reporting limit in this well, and all upgradient thallium results are below the MCL, therefore, the GWPS is equal to the MCL. No detrending routines are required.

2.8 Problems Encountered and Follow-Up Corrective Actions

During the seventh Assessment Monitoring event (October 2021), Golder was unable to collect a sample from background monitoring well GAMW-18. The water column in the well at the time of sampling was below the intake of the dedicated sample pump, and field personnel were unable to reposition the pump or introduce new tubing into the casing below the pump. Prior to the first round of sampling in 2022, Golder will measure the water level and evaluate the usability of GAMW-18.

3.0 KEY ACTIVITIES PROJECTED FOR 2022

During calendar year 2022, NIPSCO anticipates conducting the following key CCR Rule groundwater monitoring activities for the BSP:

- Prepare and submit the appropriate notifications according to the CCR Rule;
- Continue semi-annual Assessment Monitoring groundwater sampling per CCR Rule requirements;
- Begin closure construction activities;
- Continue to evaluate potential remedial alternatives and prepare semi-annual reports describing the progress in selecting and designing the remedy; and
- Inspect and maintain the monitoring system including wells, pumps, and equipment.

4.0 REFERENCES

Golder Associates, “2017 Annual Groundwater Monitoring and Corrective Action Report- Boiler Slag Pond NIPSCO Michigan City Generating Station”, January 31, 2018.

Golder Associates, “2018 Annual Groundwater Monitoring and Corrective Action Report- Boiler Slag Pond NIPSCO Michigan City Generating Station”, January 31, 2019.

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

Golder Associates, “CCR Groundwater Program Implementation Manual,” October 2017.

(Wood 2020a) Wood Environmental & Infrastructure Solutions, Inc, “Assessment of Corrective Measures Boiler Slag Pond Michigan City Generating Station”, January 8, 2020.

(Wood 2020b) Wood Environmental & Infrastructure Solutions, Inc. “Assessment of Corrective Measures, Primary Settling Pond No. 2, Michigan City, Indiana”, December 7, 2020.

Wood Environmental & Infrastructure Solutions, Inc. “Northern Indiana Public Service Company LLC Michigan City Generating Station – Boiler Slag Pond Corrective Measures Selection of Remedy Semi-Annual Progress report #21-01” January 6, 2021.

Wood Environmental & Infrastructure Solutions, Inc. “Northern Indiana Public Service Company LLC Michigan City Generating Station – Boiler Slag Pond Corrective Measures Selection of Remedy Semi-Annual Progress report #21-02” June 30, 2021.

Wood Environmental & Infrastructure Solutions, Inc, “Supplemental Addendum, Monitoring Well Network, Surface Impoundment Closures (CCR Final Rule and RCRA Regulated) Closure Application, Michigan City Generating Station, Northern Indianan Public Service Company, Merrillville, Indiana” February 28, 2019.

Wood Environmental & Infrastructure Solutions, Inc, “Surface Impoundment Closures (CCR Final Rule and RCRA Regulated) Closure Application, Volume 1- Closure Plan and Drawings, Michigan City Generating Station, Northern Indiana Public Service Company, Merrillville, Indiana” December 20, 2018.

TABLES

Table 1: Monitoring Well Network
CCR Unit Michigan City Boiler Slag Pond
NIPSCO LLC Michigan City Generating Station
Michigan City, Indiana

CCR Unit	Well Purpose	Monitoring Well ID	Installation Date (If Applicable)	Decommission Date (If Applicable)	Basis For Action
Boiler Slag Pond	Background Monitoring Well	GAMW-05	-	-	Installed for Groundwater Quality Monitoring(1)
		GAMW-12	6/14/2016	-	
		GAMW-18	6/14/2016	-	
	Downgradient Monitoring Well	GAMW-10	6/14/2016	-	
		GAMW-11	6/14/2016	11/4/2021	Decommissioned to prepare for closure construction activities.
		GMMW-2	-	-	Installed for Groundwater Quality Monitoring(1)

1) Per 40 CFR §257.93, Golder collected eight rounds of background data prior to October 17, 2017.

Prepared by: KMC
Checked by: DFSC
Reviewed by: JSP

Table 2: Summary of Sampling Events
CCR Unit Michigan City Boiler Slag Pond
NIPSCO LLC Michigan City Generating Station
Michigan City, Indiana

Well Purpose	Monitoring Well ID	Sample Event #16	Sample Event #17	Total Number of Samples
Purpose of Sample		Annual Assessment Monitoring	Semi-Annual Assessment Monitoring	
Sample Parameters		Appendix III and Appendix IV	Appendix III and Appendix IV	
Background Monitoring Well	GAMW-05	5/11/2021	10/11/2021	2
	GAMW-12	5/5/2021	10/11/2021	2
	GAMW-18	5/5/2021	(3)	1
Downgradient Monitoring Well	GAMW-10	5/3/2021	10/11/2021	2
	GAMW-11	5/11/2021	10/12/2021	2
	GMMW-2	5/11/2021	10/11/2021	2
Total Number of Samples		6	6	11

Notes:

Sample counts do not include QA/QC samples.

(1) Sample events #1-15 were completed prior to 2021. The purpose, sample parameters, and sample dates are included in the 2017, 2018, 2019, and 2020 Annual Reports.

(2) Sample events #16 and 17 correspond to the sixth and seventh Assessment Monitoring events, respectively.

(3) Groundwater sample was not collected due to low water level and presumed damage to well casing, which prevented adjustment of the dedicated pump.

Prepared by: KMC
Checked by:
Reviewed by: JSP

Table 3: Analytical Data
CCR Unit Michigan City Boiler Slag Pond
NIPSCO LLC Michigan City Generating Station
Michigan City, Indiana

Location		GAMW-05		GAMW-10		GAMW-11		GAMW-12		GAMW-18		GMMW-02		
Sample Date		2021-05-11	2021-10-11	2021-05-03	2021-10-11	2021-05-11	2021-10-12	2021-05-05	2021-10-11	2021-05-05	2021-10-11	2021-05-11	2021-10-11	
Sample Type		N	N	N	N	N	N	N	N	N	N	N	FD	N
Chemical Name	Unit													
CCR Appendix III														
Boron	mg/L	0.5	0.48	0.56	0.69	0.17	0.25	0.55	0.73	2		1.7	1.7	1.8
Calcium	mg/L	166	169	258	250	76.8	75.8	289	286	219		105	116	118
Chloride	mg/L	116	220	200	216	90.8	71.2	61.9	129	69.4		90.6	64.3	65.2
Fluoride	mg/L	0.58	0.77	0.42	0.47	0.44	0.69	0.47	0.61	0.85		0.44	0.39	0.39
pH	SU	7.57	7.28	7.46	7.46	7.49	7.39	5.73	6.44	6.35		8.86		8.31
Sulfate	mg/L	112	441	804	717	195	94.6	1350	1530	1030		194	197	200
Total Dissolved Solids	mg/L	1230	1290	1670	1680	532	435	2130	2530	1800		637	658	660
CCR Appendix IV														
Antimony	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.0015	0.001 U	0.001 U	0.001 U		0.001 U	0.001 U	0.001 U
Arsenic	mg/L	0.016	0.012	0.018	0.025	0.0019	0.0055	0.01	0.013	0.0028		0.017	0.016	0.017
Barium	mg/L	0.024	0.033	0.12	0.12	0.05	0.043	0.015	0.022	0.067		0.088	0.13	0.14
Beryllium	mg/L	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U		0.0002 U	0.0002 U	0.0002 U
Cadmium	mg/L	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.00085	0.0003	0.0002 U		0.0014	0.0014	0.0013
Chromium	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U		0.002 U	0.002 U	0.002 U
Cobalt	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.04 O	0.03 O	0.0014	Not	0.001 U	0.001 U	0.001 U
Fluoride	mg/L	0.58	0.77	0.42	0.47	0.44	0.69	0.47	0.61	0.85	Sampled	0.44	0.39	0.39
Lead	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U		0.001 U	0.001 U	0.001 U
Lithium	mg/L	0.0097	0.022	0.078	0.08	0.011	0.02	0.078	0.076	0.056		0.0088	0.022	0.024
Mercury	mg/L	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U		0.0002 U	0.0002 U	0.0002 U
Molybdenum	mg/L	0.0011	0.0013	0.0054	0.0048	0.0041	0.0042	0.036	0.026	0.035		0.033	0.024	0.024
Radium, Total	pci/l	0.698 U	0.78 U	0.89 U	1.73 J+	0.886 U	0.909 U	1.01 U	0.778 U	1.07		0.0576 U	1.05 U	1.11 U
Selenium	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.0015	0.001 U	0.001 U	0.0036		0.001 U	0.001 U	0.001 U
Thallium	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U		0.001 U	0.001 U	0.001 U
Field Parameters														
Dissolved Oxygen	mg/L	0.53	0.35	0.14	0.31	1.48	0.71	0.18	0.32	0.76		0.72		0.37
Oxidation-Reduction Potential	millivolts	-136.3	-220	-159.2	-264.1	-47.4	-179.5	-66.3	-142	3.3		114.6		-243.3
pH	SU	7.57	7.28	7.46	7.46	7.49	7.39	5.73	6.44	6.35		8.86		8.31
Specific Conductance	uS/cm	2326	199.1	2142	239.7	1104	746	2131	302.9	2179		1232		998
Temperature	deg c	12.7	17.9	13.56	20	10.5	20.3	12.5	18.1	13.85		13.4		20.6
Turbidity	ntu	4.45	1.15	4.83	3.96	2.3	1.22	3.42	3.13	0.77		1.05		0.39

Notes:
mg/L = milligrams per liter
uS/cm = micro Siemens per centimeter
deg C = degrees Celsius
NTU = Nephelometric Turbidity Units
SU = Standard Units
pCi/L = picocuries per liter
"U" = Indicates the result was not detected above the method detection limit (MDL) for the sample; the quantitation limit (RL) is provided.
"J+" = Indicates the result is estimated, biased high
"O" = Indicates the result is an outlier.
Golder did not collect a groundwater sample from GAMW-18 due to low water level and presumed damage to well casing, which prevented adjustment of the dedicated pump.

Prepared by: SLG
Checked by: DFSC
Reviewed by: JSP

GOLDER
MEMBER OF WSP

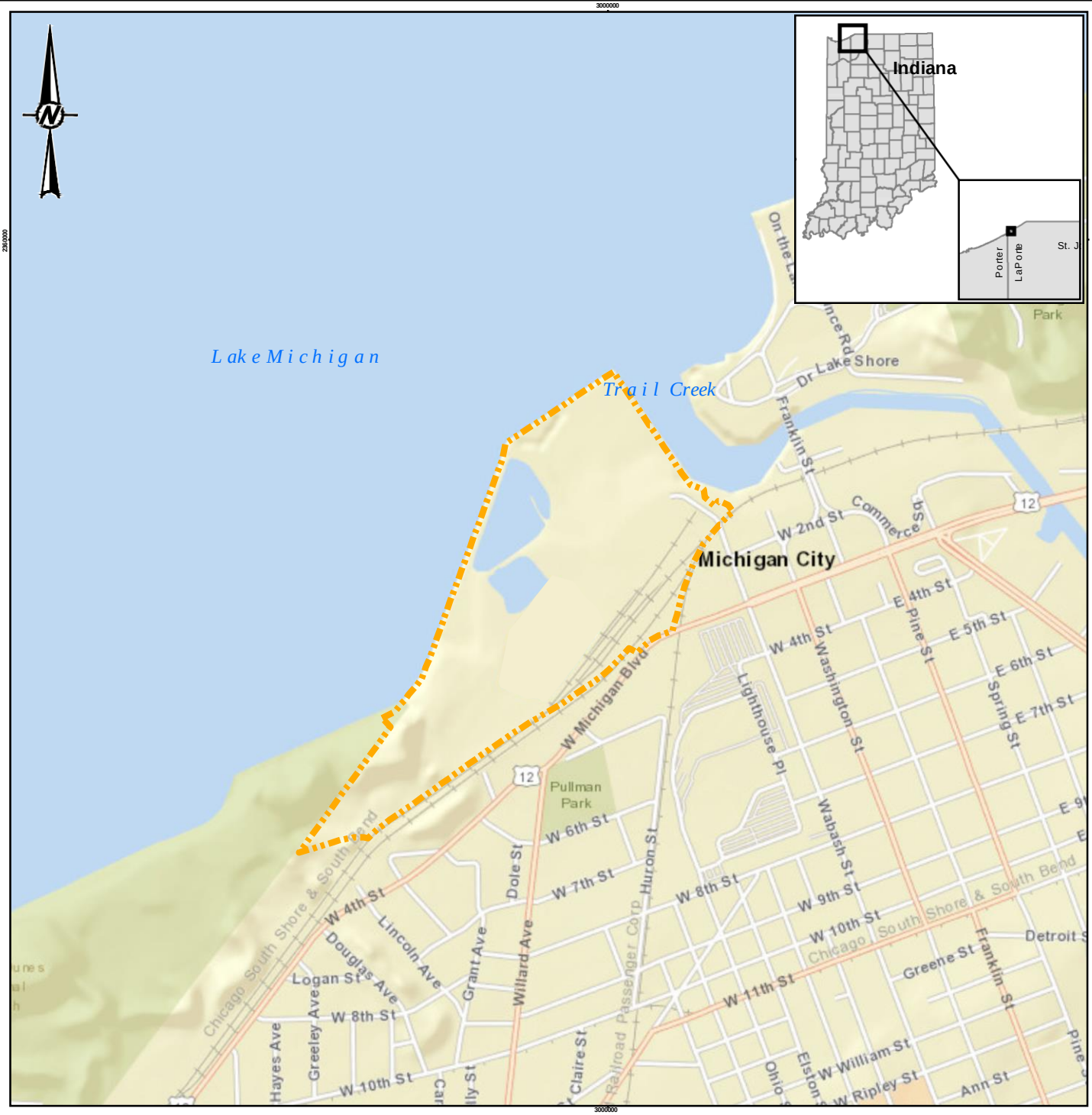
Table 4: Groundwater Protection Standards
CCR Unit Michigan City Boiler Slag Pond
NIPSCO LLC Michigan City Generating Station
Michigan City, Indiana

Analyte	MCL (mg/L)	GWPS[2] (mg/L)	GWPS[3] (mg/L)
Antimony	0.006	0.006	0.006
Arsenic	0.01	0.014	0.017
Barium	2	2	2
Beryllium	0.004	0.004	0.004
Cadmium	0.005	0.005	0.005
Chromium	0.1	0.1	0.1
Cobalt[1]	0.006	0.006	0.006
Fluoride	4	4	4
Lead[1]	0.015	0.015	0.015
Lithium[1]	0.04	0.098	0.10
Mercury	0.002	0.002	0.002
Molybdenum[1]	0.1	0.15	0.15
Radium 226+228	5	5	5
Selenium	0.05	0.05	0.05
Thallium	0.002	0.002	0.002

Notes:
MCL= Environmental Protection Agency Maximum Contaminant Level
GWPS= Groundwater Protection Standard
mg/L= milligrams per liter
1) As of August 29, 2018, these four constituents have health-based standards that can be used when calculating the GWPS, these health-based standards are not MCLs but are provided in the MCL column.
2) GWPS calculated May 2019.
3) GWPS calculated July 2020.

Prepared by: DFSC
Checked by: KMC
Reviewed by:

FIGURES



LEGEND

Approximate Property Line

REFERENCE(S)

SERVICE LAYER CREDITS: SOURCES: ESRI, HERE, GARMIN, USGS, INTERMAP, INCREMENT P, NRCAN, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), ESRI KOREA, ESRI (THAILAND), NGCC, (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY

CLIENT

NORTHERN INDIANA PUBLIC SERVICE COMPANY LLC

PROJECT

MICHIGAN CITY GENERATING STATION
MICHIGAN CITY, INDIANA

TITLE

SITE LOCATION MAP

CONSULTANT

GOLDER
MEMBER OF WSP

YYYY-MM-DD	11/15/2019
DESIGNED	DFS
PREPARED	SHL
REVIEWED	JSP
APPROVED	MAH

PROJECT NO.	CONTROL	REV.	FIGURE
164817101	A	0	1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

LEGEND

- Background Groundwater Monitoring Well
- Downgradient Groundwater Monitoring Well
- Generalized Groundwater Flow Direction
- Existing Sheet Piles
- Approximate Property Line
- CCR Unit

0 100 200

1 " = 100 feet Feet

NOTE(S)

REFERENCE(S)

1. MARBACH, BRADY AND WEAVER, INC. SURVEYED THE BORING LOCATIONS JUNE, 2016
2. SERVICE LAYER CREDITS: © 2021 MICROSOFT CORPORATION © 2021 MAXAR ©CNES (2021) DISTRIBUTION AIRBUS DS

CLIENT

NORTHERN INDIANA PUBLIC SERVICE COMPANY LLC

PROJECT

MICHIGAN CITY GENERATING STATION
MICHIGAN CITY, INDIANA

TITLE

WELL LOCATION MAP
BOILER SLAG POND

CONSULTANT

GOLDER

YYYY-MM-DD	12/28/2021
DESIGNED	DFS
PREPARED	SHL
REVIEWED	JSP
APPROVED	MAH

PROJECT NO.	CONTROL	REV.	FIGURE
19121568	A	0	2

golder.com