



2019-2020 Annual Groundwater Monitoring and Corrective Action Report - Primary 2 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

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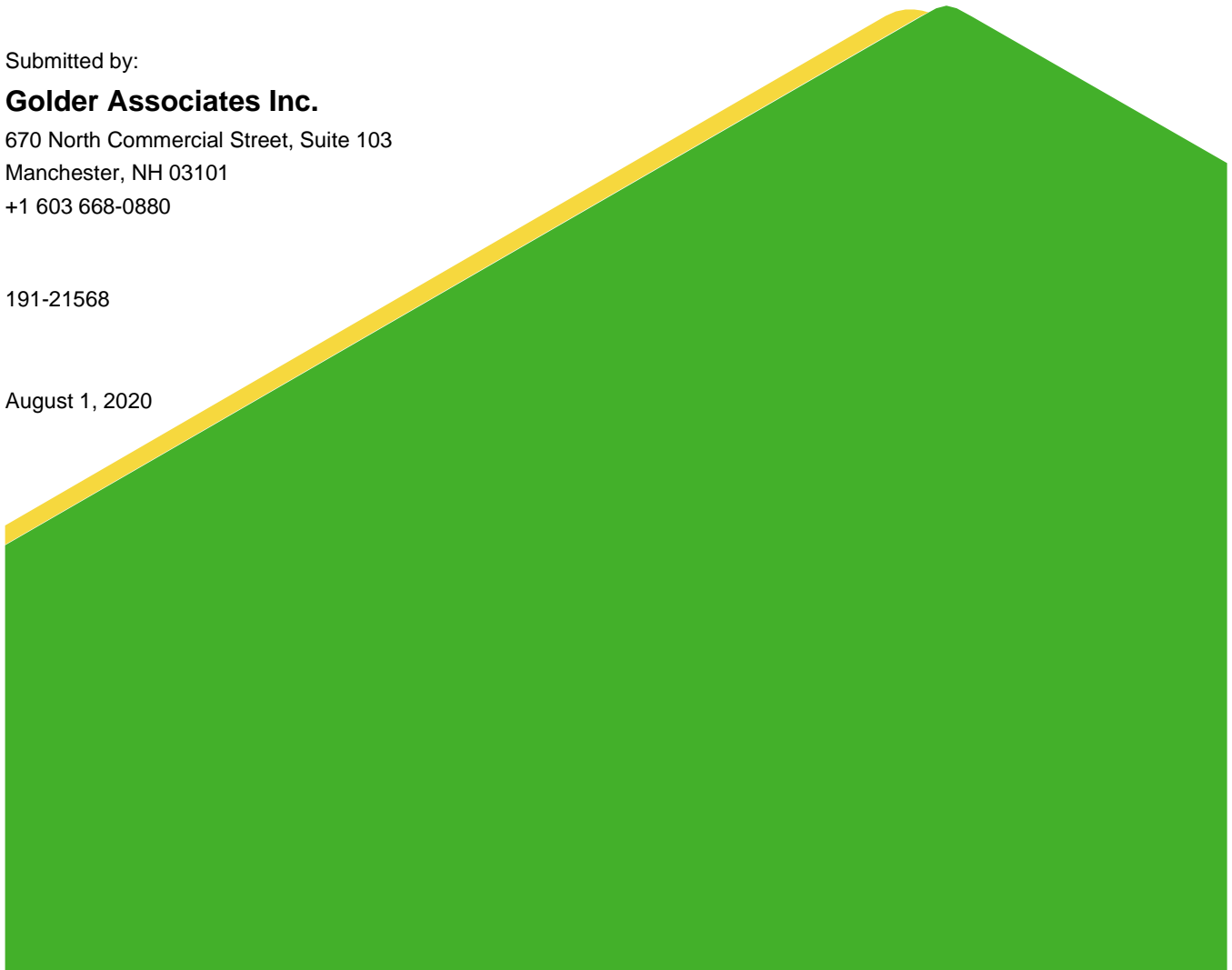


Table of Contents

1.0 INTRODUCTION..... 1

2.0 GROUNDWATER MONITORING AND CORRECTIVE ACTION PROGRAM STATUS..... 1

 2.1 Key Actions Completed – July 2019 - July 2020..... 2

 2.2 Monitoring System Modification 2

 2.3 Background Monitoring (2016 to 2018)..... 2

 2.4 Detection Monitoring 3

 2.5 Assessment Monitoring 3

 2.6 Corrective Measures 4

 2.7 Statistical Evaluation 4

 2.8 Problems Encountered and Follow-Up Corrective Actions..... 5

3.0 KEY ACTIVITIES PROJECTED FOR 2020-2021 5

TABLES

Table 1 Monitoring Well Network

Table 2 Summary of Sampling Events

Table 3 Analytical Data

Table 4 Groundwater Protection Standards

FIGURES

Figure 1 Site Location Map

Figure 2 Well Location Map

1.0 INTRODUCTION

On behalf of Northern Indiana Public Service Company LLC (NIPSCO LLC), Golder Associates Inc. (Golder) prepared this 2019-2020 CCR Annual Groundwater Monitoring and Corrective Action Report (2019-2020 Annual Report) for the surface impoundment referred to as Primary Settling Pond 2 or Primary 2 (P2, the CCR Unit) located at the Michigan City Generating Station (MCGS), 101 Wabash Street, Michigan City, La Porte County, Indiana (Latitude 41° 43' 15" N and Longitude 86° 54' 30" W, see Figure 1). P2 is an approximately 2.7-acre unlined impoundment, as shown in Figure 2.

Golder prepared the 2019-2020 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. P2 is subject to the October 4, 2016 extended compliance deadline of 547 days. Consequently, Golder submitted the first annual groundwater monitoring and corrective action report on August 1, 2019. Each subsequent report will be submitted annually by August 1st.

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 measurement of field parameters and laboratory analysis.

In conformance with the applicable requirements of 40 CFR §257.90(e)(1) through (5) and corresponding State of Indiana requirements, the 2019-2020 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 groundwater activities completed between July 2019 and July 2020
- Includes CCR groundwater monitoring data obtained between July 2019 and July 2020
- 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 PROGRAM STATUS

Starting in 2016, following the installation of a groundwater monitoring system, and throughout calendar years 2017 and 2018, Golder collected background groundwater samples pursuant to the requirements of 40 CFR §257.94 and corresponding State of Indiana requirements. In April 2019, Golder performed the first Detection Monitoring sampling event and in October 2019, Golder performed the first Assessment Monitoring sampling event. Following the first Assessment Monitoring event, including verification sampling in February 2020, NIPSCO LLC posted a notification to the publicly-accessible website that there were detections of Appendix IV parameters downgradient of Primary 2 above applicable groundwater protection standards (GWPS). Consequently, NIPSCO LLC will initiate the assessment of corrective measures process in 2020.

2.1 Key Actions Completed – July 2019 - July 2020

NIPSCO LLC completed the following CCR groundwater monitoring-related activities for P2 between July 2019 and July 2020:

- Preparation of the 2019 Groundwater Monitoring and Corrective Action Annual Report in August 2019 (2018-2019 Annual Report, 40 CFR §257.90(e))
- Performance of the first Assessment Monitoring event in October 2019 (40 CFR §257.94)
- Notification that an Assessment Monitoring Program has been established in November 2019 (40 CFR §257.94(e))
- Performance of the first Assessment Monitoring verification sampling event in February 2020 (40 CFR §257.95)
- Performance of the second Assessment Monitoring event in April 2020 (40 CFR §257.94)
- Evaluation of the results of the first Assessment Monitoring event in June 2020 (40 CFR §257.94)
- Notification that constituents in 40 CFR Part 257 Appendix IV exceeded the GWPS in July 2020 (40 CFR §257.95(g))
- Evaluation of the results of the second Assessment Monitoring event in July 2020 (40 CFR §257.94)

2.2 Monitoring System Modification

In November 2019, to prepare for construction activities related to planned closure of both MCGS CCR Units, NIPSCO LLC decommissioned monitoring wells GAMW-09 and GAMW-17. Based on groundwater flow direction and groundwater quality data collected to date, the remaining six downgradient monitoring wells surrounding P2 are adequate to monitor groundwater downgradient of this CCR Unit. Table 1 provides a summary of the well rationale/purpose and date of installation. An overview of the groundwater monitoring network is provided below.

CCR Unit	Background Monitoring Wells	Downgradient Monitoring Wells
Primary 2	GAMW-05, GAMW-12, GAMW-18	GAMW-08, GAMW-09*, GAMW-13, GAMW-14, GAMW-15, GAMW-16, GAMW-17*, GMMW-1

*Decommissioned in November 2019

2.3 Background Monitoring (2016 to 2018)

Per the requirements of 40 CFR §257.94, Golder collected eleven independent background groundwater samples from each background and downgradient well between July 2016 and October 2018. The background samples were collected at intervals of at least 49 days to account for both seasonal and spatial variability in groundwater quality. 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 standard 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 2018-2019 CCR Annual Groundwater Monitoring and Corrective Action Report, dated August 1, 2019 (2018-2019 Annual Report).

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 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). Since October 2018, four new samples have been collected from each of the background wells, allowing Golder to evaluate the newer data relative to the historical data and to update the GWPS. Prior to incorporating the new data into the background dataset, Golder performed 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 April 2019, followed by a statistical evaluation and data analysis in July 2019. Golder collected groundwater samples from the P2 background and downgradient monitoring wells for analysis of Appendix III constituents per 40 CFR §257.94 and included the results in the 2018-2019 Annual Report. Following receipt and validation of laboratory results, Golder evaluated the results of the first Detection Monitoring sampling event to compare the concentrations of Appendix III constituents relative to facility background concentrations. Using Sanitas™ software, Golder pooled the background data to calculate prediction limits and compared the April 2019 results to the calculated prediction limits to determine statistically significant increases (SSIs). Based on the SSIs identified in the first Detection Monitoring event, NIPSCO LLC established an Assessment Monitoring Program in October 2019.

2.5 Assessment Monitoring

Golder performed the first Assessment Monitoring event (i.e., Assessment and Verification sampling) in October 2019 (Assessment) and February 2020 (Verification). 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 October 2019. In February 2020, Golder collected groundwater samples from each background and downgradient monitoring well for analysis of Appendix III and detected Appendix IV constituents per 40 CFR §257.95. Golder developed GWPS to use as a comparison against the Assessment Monitoring Results in June 2019. Following receipt and validation of laboratory results, Golder evaluated the Appendix IV constituent results relative to the CCR Unit-specific GWPS (see Table 4). At the time of statistical evaluation, the GWPS was the highest value of the Maximum Contaminant Level (MCL), other health-based standard as identified in the CCR Rule Phase 1 Part 1 amendment, or the CCR Unit-specific background concentration for each analyte based on the 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 exceeded the GWPS, there was statistical evidence of a statistically significant level (SSL). Golder determined that SSLs existed for arsenic at all downgradient monitoring wells and for thallium in monitoring wells GAMW-14 and GMMW-1.

Golder performed the second Assessment Monitoring event in April 2020 by collecting groundwater samples from each background and downgradient monitoring well for analysis of Appendix III and Appendix IV constituents per 40 CFR §257.95. Golder performed the statistical evaluation of the analytical results on the second Assessment Monitoring event in July 2020 using the updated GWPS based on the additional background values (see Section 2.3). The results confirmed the SSLs identified after the first Assessment Monitoring event.

The sampling dates, number of groundwater samples collected from each background and downgradient well, and the purpose of sampling are provided in Table 2. The analytical results are presented in Table 3.

2.6 Corrective Measures

NIPSCO LLC is evaluating the feasibility and design of potential groundwater remedial alternatives. The evaluation will be presented in the Assessment of Corrective Measure (ACM) report that will be completed in 2021.

2.7 Statistical Evaluation

Subsequent to 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 as a result 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. 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.

Golder identified outliers in the background monitoring wells in the 2018-2019 Annual Report. In addition to these outliers, Golder identified the following outliers in downgradient monitoring wells:

Golder identified the August 2017 sulfate result from downgradient monitoring well GAMW-09 as an outlier and removed this datum from the dataset for the following reasons:

- Trend charts indicated that the sulfate result was inconsistent with other sulfate concentrations detected in this well.

Golder identified the November 2017 arsenic results from downgradient monitoring well GAMW-13 as an outlier and removed this datum from the background data set for the following reasons:

- Trend charts indicated that the arsenic result was inconsistent with other arsenic concentrations detected in this well.

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

- Fluoride concentrations detected in groundwater samples collected from well GAMW-12 show a decreasing trend; however, all results are below the MCL, therefore, the GWPS is equal to the MCL. No detrending routines are required.

- Lithium concentrations detected in groundwater samples collected from well GAMW-05 show a decreasing trend with the 95% lower confidence band below the health-based standard. 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 health-based standard. No detrending routines are required.

2.8 Problems Encountered and Follow-Up Corrective Actions

In the first Assessment Monitoring event (October 2019), Golder collected a groundwater sample from GAMW-09 at a turbidity level of approximately 8.11 nephelometric turbidity units (NTUs). According to the GMPIM, groundwater samples are to be collected once a well has achieved a turbidity level below 5 NTUs. Due to time constraints in the field, the well was purged for a minimum of two hours and sampled when turbidity appeared to stabilize (e.g., no downward or upward trend over three consecutive readings five minutes apart). Evaluation of the analytical results from this well suggests that the slightly elevated turbidity levels had no significant effect on the representativeness of the samples of groundwater quality.

3.0 KEY ACTIVITIES PROJECTED FOR 2020-2021

From August 2020 to July 2021, NIPSCO LLC anticipates conducting the following key CCR groundwater monitoring activities for P2:

- Prepare and submit the appropriate notifications according to the CCR Rule;
- Complete semi-annual groundwater sampling per CCR requirements;
- Complete the assessment of corrective measures; and
- Inspect and maintain the monitoring system including wells, pumps, and equipment.

Tables

**Table 1: Monitoring Well Network
 CCR Unit Primary 2
 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
Primary 2	Background Monitoring Well	GAMW-05	-	-	Installed for Groundwater Quality Monitoring*
		GAMW-12	6/14/2016	-	
		GAMW-18	6/14/2016	-	
	Downgradient Monitoring Well	GAMW-08	-	-	
		GAMW-09	-	11/21/2019	
		GAMW-13	6/13/2016	-	
		GAMW-14	6/13/2016	-	
		GAMW-15	6/13/2016	-	
		GAMW-16	6/13/2016	-	
		GAMW-17	6/10/2016	11/21/2019	
		GMMW-1	-	-	

* Per the CCR Rule requirements, Golder collected eight rounds of background data prior to April 17, 2019.

Prepared by: DFSC
 Checked by: KMC
 Reviewed by: SCP

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

Well Purpose	Monitoring Well ID	Sample Event #14	Sample Event #15	Sample Event #16	Total Number of Samples
Purpose of Sample		Assessment Monitoring	Verification Sampling	Assessment Monitoring	
Sample Parameters		Appendix III and Appendix IV	Appendix III and Detected Appendix IV	Appendix III and Appendix IV	
Background Monitoring Well	GAMW-05	10/22/2019	-	4/3/2020	2
	GAMW-12	10/23/2019	-	4/2/2020	2
	GAMW-18	10/18/2019	-	4/2/2020	2
Downgradient Monitoring Well	GAMW-08	10/23/2019	2/25/2020	4/1/2020	3
	GAMW-09	10/23/2019	(1)	(1)	1
	GAMW-13	10/22/2019	2/25/2020	4/1/2020	3
	GAMW-14	10/22/2019	2/25/2020	4/1/2020	3
	GAMW-15	10/18/2019	2/25/2020	3/31/2020	3
	GAMW-16	10/23/2019	2/26/2020	3/31/2020	3
	GAMW-17	10/23/2019	(1)	(1)	1
	GMMW-1	10/15/2019	2/26/2020	3/31/2020	3
Total Number of Samples		11	6	9	26

Notes:

Sample counts do not include QC/QA samples.

(1) GAMW-09 and GAMW-17 were decommissioned in November 2019

Prepared by: DFSC
 Checked by: KMC
 Reviewed by: SCP

Table 3: Analytical Data
CCR Unit Primary 2
NIPSCO LLC Michigan City Generating Station
Michigan City, Indiana

Analyte	Unit	GAMW-05			GAMW-08			GAMW-09	
		2019-10-22 FD	2019-10-22 N	2020-04-03 N	2019-10-23 N	2020-02-25 N	2020-04-01 N	2019-10-23 FD	2019-10-23 N
CCR Appendix III									
Boron	mg/L	0.53	0.54	0.53	2.8	2.4	2.2	2.5	2.5
Calcium	mg/L	200	200	169	110	74.2	69	110	110
Chloride	mg/L	270	270	269	48	24.5	28.5	29	29
Fluoride	mg/L	1.5	1.5	1.1	1.3	0.91	1.2	0.89	0.87
pH	SU		7.42	7.3	9.68	9.67	9.36		9.9
Sulfate	mg/L	530	540	638	250	187	207	220	230
Total Dissolved Solids	mg/L	1300	1200	1370	610	394	391	320	310
CCR Appendix IV									
Antimony	mg/L	0.002 U	0.002 U	0.001 U	0.0034	0.0046	0.004	0.0039	0.004
Arsenic	mg/L	0.005 U	0.005 U	0.0017	0.042	0.044	0.039	0.016	0.017
Barium	mg/L	0.031	0.032	0.032	0.031	0.02	0.017	0.04	0.041
Beryllium	mg/L	0.001 U	0.001 U	0.0002 U	0.001 U	0.0002 U	0.0002 U	0.001 U	0.001 U
Cadmium	mg/L	0.001 U	0.001 U	0.0002 U	0.001 U	0.0002 U	0.0002 U	0.001 U	0.001 U
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
Cobalt	mg/L	0.001 U	0.001 U	0.0011	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Fluoride	mg/L	1.5	1.5	1.1	1.3	0.91	1.2	0.89	0.87
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
Lithium	mg/L	0.017	0.018	0.025	0.012	0.011	0.011	0.018	0.018
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
Molybdenum	mg/L	0.01 U	0.01 U	0.0012	0.099	0.089	0.092	0.13	0.13
Radium, Total	pci/L	0.632	0.514	1.74 U	0.289		1.84 U	0.12	-0.104
Selenium	mg/L	0.005 U	0.005 U	0.001 U	0.062	0.05	0.028	0.018	0.018
Thallium	mg/L	0.001 U	0.001 U	0.001 U	0.0032	0.0011	0.0011	0.0016	0.0016
Sample Parameters									
DO	mg/L	-	0.59	0.06	1.31	1.01	0.24	-	0.11
ORP	millivolts	-	-107.9	-108.2	78.8	94.3	52.6	-	-181.3
pH	SU	-	7.42	7.3	9.68	9.67	9.36	-	9.9
SC	uS/cm	-	1958	2307	848	633	541	-	401
TEMP	deg C	-	16.96	12.2	17.16	14	14.51	-	17.3
TURB	NTU	-	0.32	3.08	0.57	3.5	0.24	-	8.11

Note:

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 was estimated.

"J-" = Indicates the result was estimated and may be biased low.

Table 3: Analytical Data
CCR Unit Primary 2
NIPSCO LLC Michigan City Generating Station
Michigan City, Indiana

Analyte	Unit	GAMW-12		GAMW-13			GAMW-14			
		2019-10-23 N	2020-04-02 N	2019-10-22 N	2020-02-25 N	2020-04-01 N	2019-10-22 N	2020-02-25 N	2020-04-01 FD	2020-04-01 N
CCR Appendix III										
Boron	mg/L	0.68	0.6	0.81	0.82	0.72	1.3	1	1.1	1
Calcium	mg/L	300	234	120	126	125	98	85.4	98.5	95
Chloride	mg/L	160	114	14	6.3	10.9	55	11.4	30.6	30.8
Fluoride	mg/L	0.4	0.48	1.3	0.95	1.2	1.2	1.1	1.4	1.4
pH	SU	6.04	7.19	8.02	7.62	7.93	7.71	7.71		8.15
Sulfate	mg/L	2500	1710 J-	170	147	142	170	132	158	157
Total Dissolved Solids	mg/L	3100	2520	530	535	536	620	432	477	461
CCR Appendix IV										
Antimony	mg/L	0.002 U	0.001 U	0.0018 J	0.0012	0.0012	0.0017 J	0.0021	0.002	0.002
Arsenic	mg/L	0.01	0.0089	0.038	0.03	0.026	0.033	0.032	0.03	0.03
Barium	mg/L	0.035	0.021	0.027	0.028	0.027	0.037	0.026	0.029	0.029
Beryllium	mg/L	0.001 U	0.0002 U	0.001 U	0.0002 U	0.0002 U	0.001 U	0.0002 U	0.0002 U	0.0002 U
Cadmium	mg/L	0.0015	0.0004	0.001 U	0.0002 U	0.0002 U	0.001 U	0.0002 U	0.0002 U	0.0002 U
Chromium	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.0011 J	0.002 U	0.002 U	0.002 U
Cobalt	mg/L	0.056	0.038	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Fluoride	mg/L	0.4	0.48	1.3	0.95	1.2	1.2	1.1	1.4	1.4
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
Lithium	mg/L	0.076	0.072	0.056	0.06	0.056	0.03	0.029	0.031	0.029
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
Molybdenum	mg/L	0.016	0.024	0.15	0.12	0.093	0.035	0.024	0.035	0.035
Radium, Total	pci/L	0.43	1.74 U	0.507		1.24 U	-0.112		1.63 U	1.44 U
Selenium	mg/L	0.001 J	0.001 U	0.005	0.015	0.0051	0.086	0.064	0.082	0.084
Thallium	mg/L	0.00025 J	0.001 U	0.00021 J	0.001 U	0.0013	0.0041	0.0021	0.0022	0.0021
Sample Parameters										
DO	mg/L	0.23	0.25	0.96	2.04	0.58	2.35	2.71	-	4.24
ORP	millivolts	49.1	9.9	-262.8	76.7	79.2	-215.8	220.3	-	111.4
pH	SU	6.04	7.19	8.02	7.62	7.93	7.71	7.71	-	8.15
SC	uS/cm	3543	2376	608	624	643	663	499	-	575
TEMP	deg C	15.42	11.65	14.6	9.87	11.74	14	10.03	-	11.97
TURB	NTU	0.25	0.91	1.05	0.13	0.19	1.08	0.06	-	0.01

Note:

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 was estimated.

"J-" = Indicates the result was estimated and may be biased low.

Table 3: Analytical Data
CCR Unit Primary 2
NIPSCO LLC Michigan City Generating Station
Michigan City, Indiana

Analyte	Unit	GAMW-15			GAMW-16			
		2019-10-18 N	2020-02-25 N	2020-03-31 N	2019-10-23 N	2020-02-26 FD	2020-02-26 N	2020-03-31 N
CCR Appendix III								
Boron	mg/L	2.8	2.8	2.4	1.8	1.3	1.2	1.1
Calcium	mg/L	62	108	115	58	72.3	72.9	80.8
Chloride	mg/L	85	86.9	78.4	13	15.2	14.7	11.4
Fluoride	mg/L	1.5	1	1.2	1.2	0.58	0.58	0.57
pH	SU	9.66	9.07	9.07	9.65		9.08	8.7
Sulfate	mg/L	150	236	277	92	108	105	120
Total Dissolved Solids	mg/L	470	620	643	260	265	254	322
CCR Appendix IV								
Antimony	mg/L	0.0015 J	0.0021	0.0022	0.0038	0.0034	0.0034	0.0035
Arsenic	mg/L	0.044	0.033	0.028	0.044	0.03	0.029	0.024
Barium	mg/L	0.014	0.015	0.016	0.0065	0.0087	0.0085	0.0095
Beryllium	mg/L	0.001 U	0.0002 U	0.0002 U	0.001 U	0.0002 U	0.0002 U	0.0002 U
Cadmium	mg/L	0.001 U	0.0002 U	0.0002 U	0.001 U	0.0002 U	0.0002 U	0.0002 U
Chromium	mg/L	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	0.001 U
Fluoride	mg/L	1.5	1	1.2	1.2	0.58	0.58	0.57
Lead	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Lithium	mg/L	0.022	0.029	0.028	0.016	0.022	0.023	0.025
Mercury	mg/L	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Molybdenum	mg/L	0.035	0.036	0.041	0.015	0.019	0.018	0.018
Radium, Total	pci/L	0.493 U		1.47 U	-0.0636			1.08 U
Selenium	mg/L	0.024	0.056	0.081	0.017	0.029	0.03	0.044
Thallium	mg/L	0.0028	0.0022	0.0024	0.0013	0.001 U	0.001	0.0012
Sample Parameters								
DO	mg/L	1.11	2.08	0.84	0.25	-	2.39	0.95
ORP	millivolts	-242.2	183.1	59.2	71.8	-	-7.7	68.8
pH	SU	9.66	9.07	9.07	9.65	-	9.08	8.7
SC	uS/cm	555	737	798	373	-	397	423
TEMP	deg C	15.2	10.22	12.68	17.1	-	13.57	13.04
TURB	NTU	1.02	0.65	0.03	0.02	-	0.77	0.76

Note:

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 was estimated.

"J-" = Indicates the result was estimated and may be biased low.

Table 3: Analytical Data
CCR Unit Primary 2
NIPSCO LLC Michigan City Generating Station
Michigan City, Indiana

Analyte	Unit	GAMW-17	GAMW-18		GMMW-01		
		2019-10-23 N	2019-10-18 N	2020-04-02 N	2019-10-15 N	2020-02-26 N	2020-03-31 N
CCR Appendix III							
Boron	mg/L	2	3.2	3.3	2.7	2.1	1.9
Calcium	mg/L	79	180	188	68	77.5	77
Chloride	mg/L	12	96	122	43	12.7	12.3
Fluoride	mg/L	1.3	0.77	0.87	1.8	0.82	0.95
pH	SU	8.7	7.07	7.06	9.48	8.32	8.29
Sulfate	mg/L	120	880	1030 J-	140	133	146
Total Dissolved Solids	mg/L	390	1600	1780	430	364	391
CCR Appendix IV							
Antimony	mg/L	0.0034	0.002 U	0.001 U	0.0029	0.0032	0.0029
Arsenic	mg/L	0.06	0.0035 J	0.0027	0.022	0.023	0.023
Barium	mg/L	0.07	0.1	0.12	0.042	0.048	0.049
Beryllium	mg/L	0.001 U	0.001 U	0.0002 U	0.001 U	0.0002 U	0.0002 U
Cadmium	mg/L	0.001 U	0.001 U	0.0002 U	0.001 U	0.0002 U	0.0002 U
Chromium	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002	0.0032
Cobalt	mg/L	0.001 U	0.00082 J	0.0019	0.001 U	0.001 U	0.001 U
Fluoride	mg/L	1.3	0.77	0.87	1.8	0.82	0.95
Lead	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Lithium	mg/L	0.028	0.077	0.099	0.021	0.024	0.027
Mercury	mg/L	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Molybdenum	mg/L	0.015	0.057	0.019	0.025	0.023	0.022
Radium, Total	pci/L	-0.269	1.55	1.68 U	0.444 U		1.76 U
Selenium	mg/L	0.043	0.0041 J	0.004	0.13	0.32	0.34
Thallium	mg/L	0.0016	0.001 U	0.001 U	0.0029	0.0024	0.0024
Sample Parameters							
DO	mg/L	0.21	0.65	0.45	1.16	2.09	1.88
ORP	millivolts	-139.8	-184.1	119.1	-68.9	159.9	98.3
pH	SU	8.7	7.07	7.06	9.48	8.32	8.29
SC	uS/cm	450	1651	1889	562	458	493
TEMP	deg C	18.7	17.8	12.49	17.9	8.33	11.21
TURB	NTU	0.9	1.1	0.11	1.38	0.63	0.08

Note:
 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 was estimated.

"J-" = Indicates the result was estimated and may be biased low.

Prepared by: DFSC
 Checked by: KMC
 Reviewed by: SCP

**Table 4: Groundwater Protection Standards
CCR Unit Primary 2
NIPSCO LLC Michigan City Generating Station
Michigan City, Indiana**

Analyte	MCL (mg/L)	May 2019 GWPS (mg/L)	July 2020 GWPS (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	0.095	0.100
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, calculated in May 2019 and July 2020

mg/L= milligrams per liter

1) As of August 29, 2018, these four constituents have health-based standards (not MCLs) that can be used when calculating the GWPS.

Prepared by: DFSC

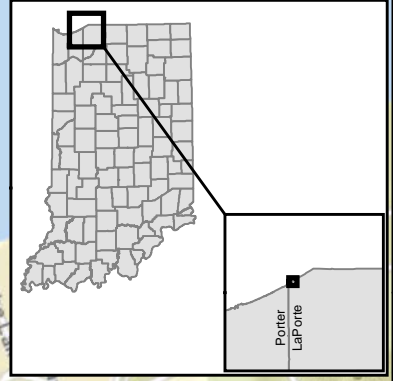
Checked by: KMC

Reviewed by: SCP

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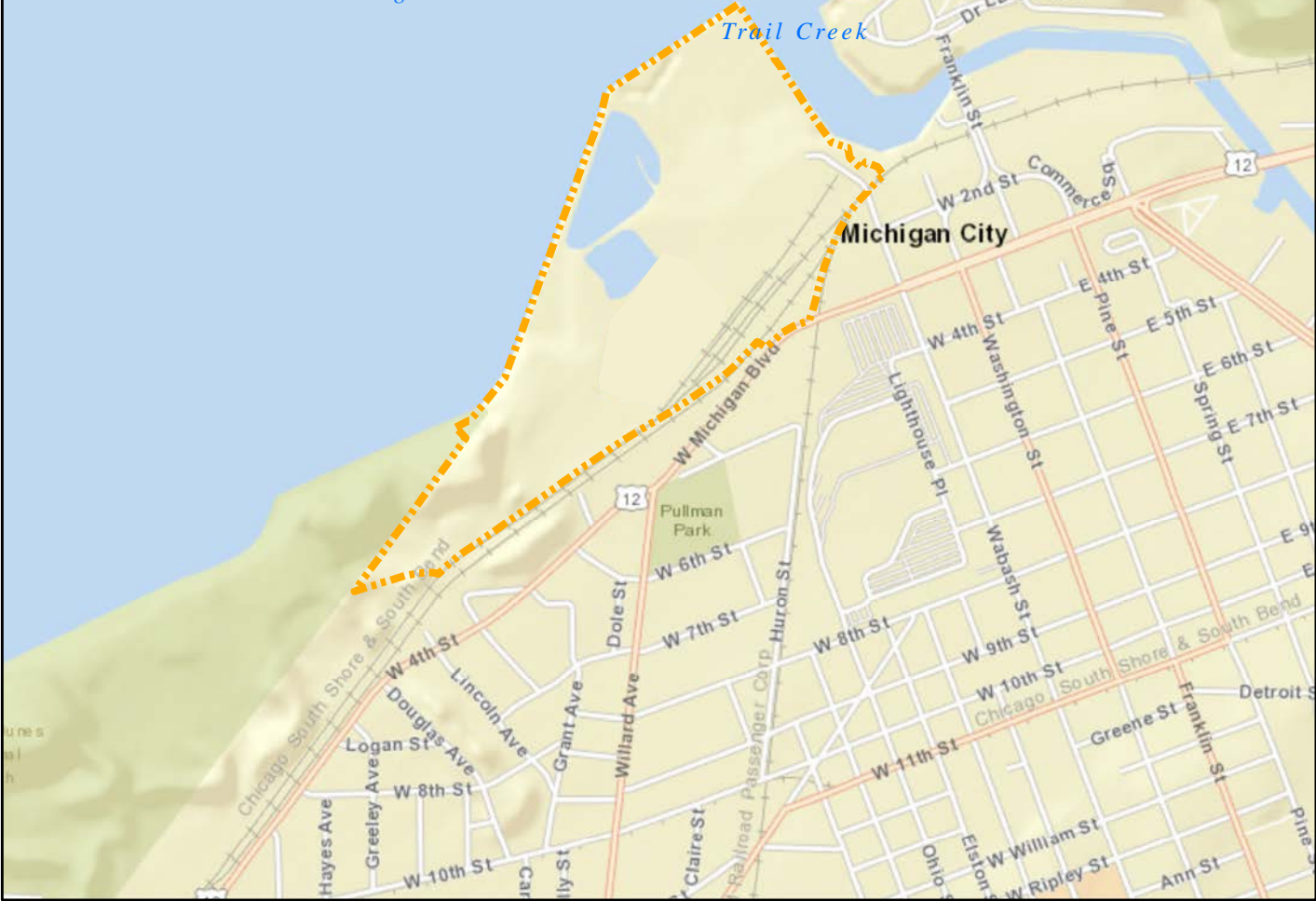
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Lake Michigan


Trail Creek

Michigan City



3000000

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, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY

CLIENT

NORTHERN INDIANA PUBLIC SERVICE COMPANY

PROJECT

NORTHERN INDIANA PUBLIC SERVICE COMPANY
MICHIGAN CITY GENERATING STATION
MICHIGAN CITY, INDIANA

TITLE

SITE LOCATION MAP

CONSULTANT



YYYY-MM-DD	7/22/2019
DESIGNED	DFS
PREPARED	SHL
REVIEWED	JSP
APPROVED	MAH

PROJECT NO.
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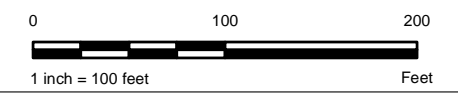
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Lake Michigan

Primary 2

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




NOTE(S)

REFERENCE(S)
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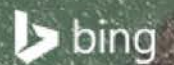
CLIENT
 NORTHERN INDIANA PUBLIC SERVICE COMPANY LLC

PROJECT
 MICHIGAN CITY GENERATING STATION
 MICHIGAN CITY, INDIANA

TITLE
 WELL LOCATION MAP
 PRIMARY 2

CONSULTANT	YYYY-MM-DD	7/13/2020
	DESIGNED	MAH
	PREPARED	SHL
	REVIEWED	JSP
	APPROVED	MAH

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