2019 Annual Groundwater Monitoring and Corrective Action Report - Primary 1 and Primary 2

NIPSCO LLC Bailly 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
Bailly Generating Station
Chesterton, Indiana

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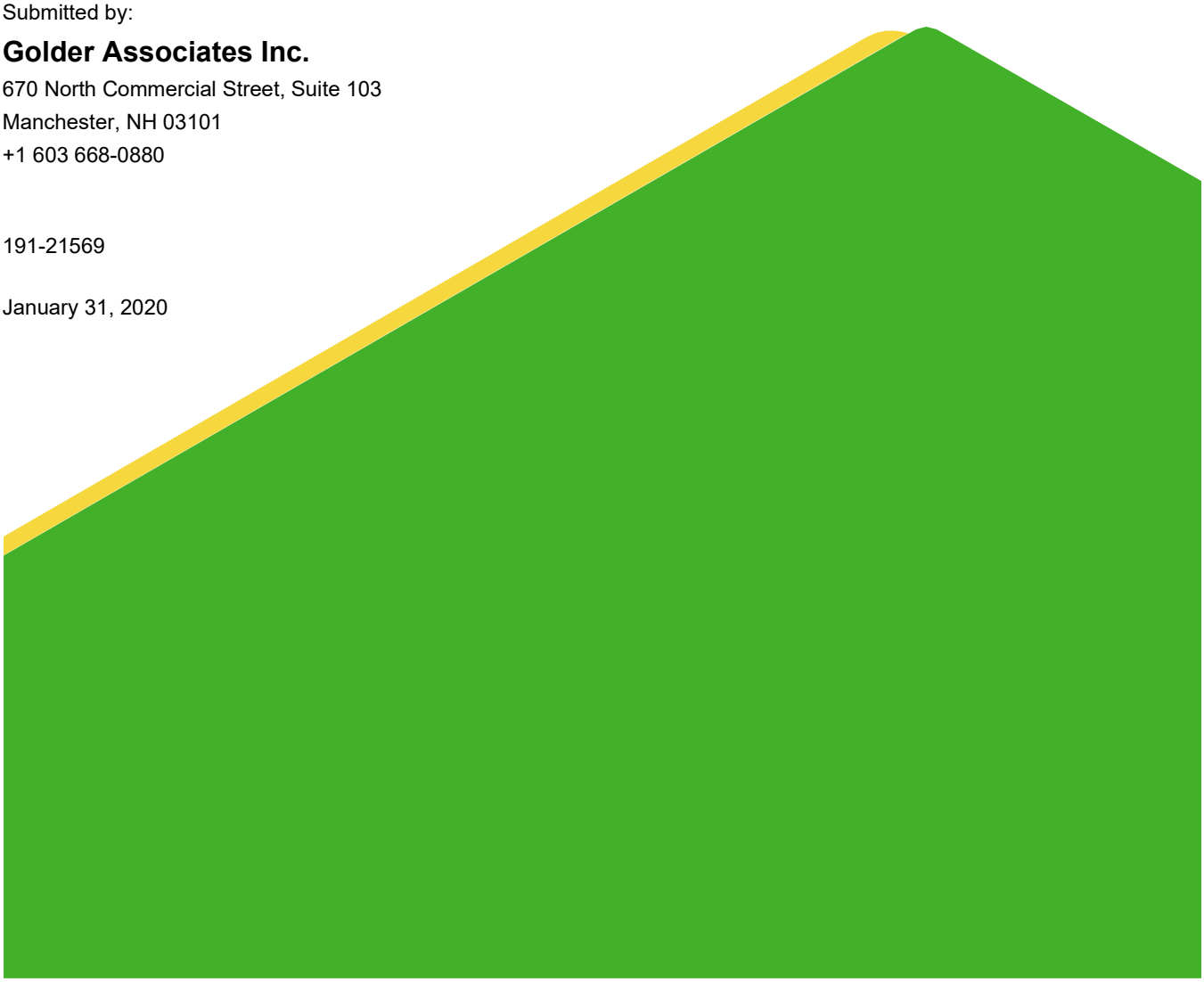

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1.0 INTRODUCTION

On behalf of Northern Indiana Public Service Company LLC (NIPSCO LLC), Golder Associates Inc. (Golder) prepared this 2019 Annual Groundwater Monitoring and Corrective Action Report (2019 Annual Report) for the Bailly Generating Station (BGS, Bailly) Primary 1 and Primary 2 (together, the CCR Unit) located at 246 Bailly Station Road in Chesterton, Porter County, Indiana (Latitude 41° 38' 40" N and Longitude 87° 05' 20" W, see Figure 1). Primary 1 is an approximately six-acre impoundment and Primary 2 is an approximately eight-acre impoundment. Both are incised surface impoundments which are lined with a chlorosulfonated polyethylene "Hypalon" membrane. Primary 1 and Primary 2 are separated by a narrow berm, located adjacent to one another as shown in Figure 2. Golder prepared the 2019 Annual Report for the CCR Unit 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.

In 2017 and 2018, Golder prepared Annual Reports for BGS Primary 1 and Primary 2 as separate CCR Units. In 2019, NIPSCO LLC and Golder decided to monitor Primary 1 and Primary 2 as one CCR Unit due to the proximity of the impoundments to one another and observed changes in the general groundwater flow direction as compared to historical flow patterns. 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 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 2019 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 2019
- Includes CCR Rule groundwater monitoring data obtained in calendar year 2019
- 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 MEASURES PROGRAM STATUS

Starting in 2016 following the installation of a groundwater monitoring system and throughout calendar year 2017, Golder collected background groundwater samples and performed Detection Monitoring at Primary 1 and Primary 2 (as separate CCR Units) pursuant to the requirements of 40 CFR §257.94. In 2018, Golder performed the first and second Assessment Monitoring sampling events at Primary 1 and Primary 2 pursuant to the requirements of 40 CFR §257.95. Following the first Assessment Monitoring sampling event, including verification sampling, NIPSCO LLC posted a notification in the publicly-accessible website that there were detections of 40 CFR Part 257 Appendix IV parameters at concentrations above groundwater protection standards (GWPS) at both Primary 1 and Primary 2. Consequently, NIPSCO LLC initiated the assessment of corrective measures process for both CCR Units. In 2019, Golder completed the third and fourth Assessment Monitoring events. NIPSCO LLC has

completed the Assessment of Corrective Measures Report and is continuing to evaluate the feasibility and design of potential groundwater remedial alternatives in accordance with the provisions of 40 CFR §259.97.

2.1 Key Actions Completed - 2019

NIPSCO LLC completed the following key actions relative to CCR Rule groundwater monitoring at Primary 1 and Primary 2 during calendar year 2019:

- Preparation of the 2018 Groundwater Monitoring and Corrective Action Annual Reports in January 2019 (2018 Annual Report, 40 CFR §257.90(e))
- Evaluation of the results of the second Assessment Monitoring event in January 2019 (40 CFR §257.95)
- Completion and certification of the demonstration that an additional 60 days was needed to complete the Assessment of Corrective Measures in February 2019 (40 CFR §257.96(a), Appendix A).
- Notification that constituents in 40 CFR Part 257 Appendix IV exceeded the GWPS in February 2019 (40 CFR §257.95(g))
- Performance of the third Assessment Monitoring event in April 2019 (40 CFR §257.95)
- Completion of the Assessment of Corrective Measures Report in May 2019 (40 CFR §257.96)
- Evaluation of the results of the third Assessment Monitoring event in August 2019 (40 CFR §257.95)
- Notification that constituents in 40 CFR Part 257 Appendix IV exceeded the GWPS in September 2019 (40 CFR §257.95(g))
- Preparation of the first semi-annual Assessment of Corrective Measures Progress Report in October 2019 (40 CFR §257.97)
- Performance of the fourth Assessment Monitoring event in October 2019 (40 CFR §257.95)

2.2 Monitoring System Modification

Consistent with the requirements of 40 CFR §257.90 and 257.91, NIPSCO LLC modified the groundwater monitoring well network to reflect the observed groundwater flow regime indicated by groundwater elevations collected in 2019. The new flow regime reflects the cessation of BGS generating activities and the consequent modifications in the operation of the CCR Units. The groundwater monitoring system was modified in September 2019 to reflect the change in overall observed groundwater flow to a southerly (versus former northerly) direction in the area of Primary 1 and Primary 2. Former background wells GAMW-08 and GAMW-11 (see Figure 2) may no longer represent upgradient conditions as they could potentially be impacted by groundwater flow beneath the CCR Units. Based on the interpretation of groundwater flow direction from water levels collected to date, GAMW-01 is representative of background conditions at all the CCR Units. New monitoring well GAMW-01B was installed adjacent to GAMW-01 in September 2019 to monitor background groundwater quality immediately above the confining clay layer (Figure 3). Given the observed generally flat gradients beneath Primary 1 and Primary 2 and groundwater flow direction in a more southerly direction, NIPSCO LLC added four newly-installed monitoring wells (and the two formerly background monitoring wells GAMW-08 and GAMW-11) to the downgradient monitoring network and combined Primary 1 and Primary 2 into one unit (i.e., the CCR Unit) for the purposes of groundwater monitoring. Because of the change in monitoring approach and addition of new wells to the network, existing

wells located between Primary 1 and Primary 2 (i.e., GAMW-05, GAMW-09, and GAMW-15) were removed from the monitoring system.

The 2019 monitoring well network contains downgradient monitoring wells located both to the north and to the south of Primary 1 and Primary 2. The groundwater flow direction in this area is flat and variable; consequently, wells both to the north and to the south are either now, or historically were, downgradient of this CCR Unit. Additionally, NIPSCO LLC converted piezometer GAMW-11B to an assessment monitoring well to further characterize the nature and extent in the area of Primary 1 and Primary 2. GAMW-11B will be used to assess the vertical extent of groundwater impacts in this area, if any. An overview of the groundwater monitoring network is provided in the embedded table below.

Background Monitoring Wells	Downgradient Monitoring Wells
GAMW-01, GAMW-01B*, GAMW-08**, GAMW-11**	MW-112, GAMW-05**, GAMW-06, GAMW-07, GAMW-08, GAMW-08B*, GAMW-09**, GAMW-10, GAMW-11, GAMW-11B*, GAMW-11C*, GAMW-15**, GAMW-16, GAMW-17*, GAMW-17B*, GAMW-18*

*Well was added to the monitoring well network in 2019
**Monitoring well was removed from the monitoring well network in September 2019

Attached Table 1 provides a summary of the well rationale/purpose and date of installation. Golder installed, developed, and surveyed the wells in accordance with the CCR Groundwater Monitoring Program Implementation Manual prepared by Golder in October 2017.

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 at Primary 1 and Primary 2 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 sets for Primary 1 and Primary 2 are included in the 2017 CCR Annual Groundwater Monitoring and Corrective Action Reports, dated January 31, 2018 (2017 Annual Reports).

2.4 Detection Monitoring

Golder performed the first Detection Monitoring events at both Primary 1 and Primary 2 in October 2017, followed by a statistical evaluation and data analysis in January 2018. Golder collected groundwater samples from Primary 1 and Primary 2 background and downgradient monitoring wells for analysis of Appendix III constituents per 40 CFR §257.94 and included the results in the 2017 Annual Reports. Following receipt and validation of laboratory results, Golder evaluated the results of the first Detection Monitoring sampling events to compare the concentration of 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 statistically significant increases (SSIs). Due to the identification of SSIs, NIPSCO LLC established an Assessment Monitoring program in April 2018 at both Primary 1 and Primary 2.

2.5 Assessment Monitoring

Golder performed the first Assessment Monitoring events (i.e., Assessment and Verification sampling) at Primary 1 and Primary 2 in March and April 2018, followed by a statistical evaluation and data analysis in August 2018. In March 2018, groundwater samples were collected at all background and downgradient monitoring well locations and analyzed for Appendix IV constituents per 40 CFR §257.95. In April 2018, groundwater samples were collected at the downgradient monitoring well locations and analyzed for Appendix III and detected Appendix IV constituents per 40 CFR §257.95. In September 2018, Golder developed GWPS to use as a comparison against the Assessment Monitoring results. Following receipt and validation of laboratory results, Golder evaluated the Appendix IV constituent results relative to CCR Unit-specific GWPS (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 calculated using a tolerance/prediction limit procedure in accordance with 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 40 CFR Part 257 Appendix IV analyte at each well. If the LCL exceeds the GWPS, there is statistical evidence of an SSL. Golder identified an SSL for thallium at well GAMW-10 for Primary 1 and SSLs for arsenic and lithium in well GAMW-16 and thallium in well GAMW-07 for Primary 2. The SSLs were identified in September 2018 and NIPSCO LLC initiated the assessment of corrective measures in December 2018.

Golder performed the second Assessment Monitoring events at Primary 1 and Primary 2 in October 2018 by collecting 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 performed the statistical evaluation of the analytical results of the second Assessment Monitoring sampling events in January 2019. The results confirmed the SSL for thallium in well GAMW-10 and identified an SSL for thallium in well GAMW-09 for Primary 1. The results confirmed the SSLs for arsenic and lithium at well GAMW-16 and for thallium at GAMW-07 for Primary 2.

Golder performed the third Assessment Monitoring events at Primary 1 and Primary 2 in April 2019 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 of the third Assessment Monitoring sampling events in August 2019. The results confirmed the SSL for thallium at well GAMW-10 for Primary 1. The results confirmed the SSLs for arsenic and lithium at well GAMW-16 and for thallium at GAMW-07 for Primary 2.

Golder performed the fourth Assessment Monitoring event in October 2019 (the first Assessment Monitoring event for the combined Primary 1 and Primary 2 CCR Unit) by collecting 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 will perform the statistical evaluation of the analytical results of the fourth Assessment Monitoring sampling event in February 2020.

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 the potential groundwater remedial alternatives presented in the Assessment of Corrective Measures (ACM) report (Golder, 2019). As discussed in the ACM, NIPSCO LLC plans to close these CCR Units by removal in accordance with 40 CFR §257.102(c). As described in Section 2.2, Golder has identified changes in the groundwater flow direction as result of the shutdown of coal-fired generating

activities and consequent modification in operation of the impoundments. As a result, the groundwater monitoring network has been updated to adequately monitor groundwater quality immediately downgradient of Primary 1 and Primary 2 and to allow for the collection and evaluation of additional information essential to the evaluation of the potential Corrective Measures alternatives.

In 2020, Golder will evaluate the analytical data collected during the September 2019 drilling and new well installation event, re-evaluate the groundwater flow direction based on water levels from the updated monitoring well network, and sample and evaluate groundwater analytical data collected from the updated monitoring well network. Additionally, Golder will continue to perform an engineering review of the five potential Corrective Measures presented in the ACM, by placing an emphasis on monitoring on-Site plume stability, identifying critical data gaps, understanding and reacting to impacts of newly gathered information on previous assumptions and/or conclusions, identifying and researching applicability of emerging technologies, and monitoring changing groundwater and operational conditions, if any, and future plans for the Site and their impacts on the remedy process.

2.7 Statistical Evaluation

Subsequent to each monitoring event, Golder assessed the analytical data for outliers, anomalies, and trends that might 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 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. Golder has not identified any additional outliers since the 2018 Annual Report.

Golder evaluated the background data set for trends using Sanitas™ software. Golder will continue to monitor trends and apply detrending routines, if applicable, before using these data to calculate GWPSs. 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-11 show an increasing trend, however, all results are below the MCL, therefore, the GWPS is equal to the MCL. No detrending routines are required.
- Arsenic concentrations detected in groundwater samples collected from GAMW-08 show an increasing trend, however, all results are below the MCL, therefore, the GWPS is equal to the MCL. No detrending routines are required.
- Mercury concentrations detected in groundwater samples collected from GAMW-01, GAMW-08 and GAMW-11 show an increasing trend, however, mercury has never been detected above the laboratory reporting limit in these wells. No detrending routines are required.

2.8 Problems Encountered and Follow-Up Corrective Actions

No problems were encountered in 2019.

3.0 KEY ACTIVITIES PROJECTED FOR 2020

During calendar year 2020, NIPSCO LLC anticipates conducting the following key CCR groundwater monitoring activities for Primary 1 and Primary 2:

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

4.0 REFERENCES

Golder Associates, “2017 Annual Groundwater Monitoring and Corrective Action Report- Primary 1 NIPSCO Bailly Generating Station”, January 31, 2017.

Golder Associates, “2017 Annual Groundwater Monitoring and Corrective Action Report- Primary 2 NIPSCO Bailly Generating Station”, January 31, 2017.

Golder Associates, “2018 Annual Groundwater Monitoring and Corrective Action Report- Primary 1 NIPSCO Bailly Generating Station”, January 31, 2018.

Golder Associates, “2018 Annual Groundwater Monitoring and Corrective Action Report- Primary 2 NIPSCO Bailly Generating Station”, January 31, 2018.

Golder Associates, “CCR Assessment of Corrective Measures,” May 1, 2019.

Golder Associates, “NIPSCO Bailly Generating Station, CCR Units Primary 1, Primary 2, and Secondary 1 Corrective Measures Selection of Remedy, Semi-Annual Progress Report #19-01” October 28, 2019.

Tables

Table 1 Monitoring Well Network
CCR Unit Bailly Primary 1 and Primary 2
NIPSCO LLC Bailly Generating Station
Chesterton, Indiana

CCR Unit	Well Purpose	Monitoring Well ID	Installation Date (If Applicable)	Decommission Date (If Applicable)	Basis For Action
Primary 1 and Primary 2	Background Monitoring Well	GAMW-01	6/6/2016	-	Installed for Groundwater Quality Monitoring[1]
		GAMW-01B	9/14/2019	-	Installed to provide additional groundwater quality data
	Downgradient Monitoring Well	GAMW-05	6/6/2016	-	Installed for Groundwater Quality Monitoring, removed from the monitoring well network in September 2019 [1,4]
		GAMW-06	6/6/2016	-	Installed for Groundwater Quality Monitoring[1]
		GAMW-07	6/7/2016	-	
		GAMW-08	6/7/2016	-	Installed for Groundwater Quality Monitoring, considered part of the background monitoring well network prior to September 2019 [1,3]
		GAMW-08B	9/9/2019	-	Installed to characterize the nature and extent of a potential release[2]
		GAMW-09	6/13/2016	-	Installed for Groundwater Quality Monitoring, removed from the monitoring well network in September 2019 [1,4]
		GAMW-10	6/8/2017	-	Installed for Groundwater Quality Monitoring[1]
		GAMW-11	6/7/2016	-	Installed for Groundwater Quality Monitoring, considered part of the background monitoring well network prior to September 2019 [1,3]
		GAMW-11B	6/7/2016	-	Installed to characterize the nature and extent of a potential release[2]
		GAMW-11C	9/13/2019	-	
		GAMW-15	2/2/2017	-	Installed for Groundwater Quality Monitoring, removed from the monitoring well network in September 2019 [1,4]
		GAMW-16	2/2/2017	-	Installed for Groundwater Quality Monitoring[1]
		GAMW-17	9/12/2019	-	Installed to characterize the nature and extent of a potential release[2]
		GAMW-17B	9/12/2019	-	
		GAMW-18	9/11/2019	-	
		MW-112	-	-	Installed for Groundwater Quality Monitoring[1]

1) Per the CCR Rule requirements, Golder collected eight rounds of background data prior to October 17, 2017.

2) Per 40 CFR §257.95(g)(1)(i) Rule requirements, Golder collected additional data to further characterize the nature and extent of potential groundwater impacts.

3) Prior to September 2019, monitoring wells GAMW-08 and GAMW-11 were considered part of the background monitoring well network. Due to changes in groundwater flow direction, GAMW-08 and GAMW-11 are now considered part of the downgradient monitoring well network.

4) Due to changes in groundwater flow direction, wells GAMW-05, GAMW-09, and GAMW-15 were sampled in October 2019, but are no longer considered part of the monitoring well network for Primary 1 and Primary 2.

Prepared by: AMH
Checked by: DFS
Reviewed by: MAH

Table 2: Summary of Sampling Events
CCR Unit Bailly Primary 1 and Primary 2
NIPSCO LLC Bailly Generating Station
Chesterton, Indiana

Well Purpose	Monitoring Well ID	Sample Event #12	Sample Event #13	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-01	4/9/2019	10/24/2019	2
	GAMW-01B	NI	10/24/2019	1
Downgradient Monitoring Well	GAMW-05	4/10/2019	10/25/2019	2
	GAMW-06	4/12/2019	10/28/2019	2
	GAMW-07	4/15/2019	10/28/2019	2
	GAMW-08	4/9/2019	10/28/2019	2
	GAMW-08B	NI	10/29/2019	1
	GAMW-09	4/12/2019	10/30/2019	2
	GAMW-10	4/12/2019	10/29/2019	2
	GAMW-11	4/9/2019	10/29/2019	2
	GAMW-11B	NS	10/25/2019	1
	GAMW-11C	NI	10/29/2019	1
	GAMW-15	4/12/2019	10/30/2019	2
	GAMW-16	4/15/2019	10/30/2019	2
	GAMW-17	NI	10/30/2019	1
	GAMW-17B	NI	10/30/2019	1
	GAMW-18	NI	10/30/2019	1
	MW-112	4/12/2019	10/25/2019	2
Total Number of Samples		11	18	29

Notes:

Sample counts do not include QA/QC samples.

(1) Sample events #1-#11 were completed prior to 2019. The purpose, sample parameters, and sample dates are included in the 2017 Annual Report and the 2018 Annual Report.

(2) Location was not part of the monitoring well network during this sample event.

(3) Semi-annual assessment monitoring parameters did not include radium

NI= not installed

NS= not sampled

Prepared by: DFS
Checked by: AMH
Reviewed by: MAH

Table 3: Analytical Data
CCR Unit Bailly Primary 1 and Primary 2
NIPSCO LLC Bailly Generating Station
Chesterton, Indiana

Analyte	Unit	GAMW-01			GAMW-01B	GAMW-05		GAMW-06		GAMW-07			GAMW-08		GAMW-08B	GAMW-09	
		2019-04-09	2019-10-24	2019-10-24	2019-10-24	2019-04-10	2019-10-25	2019-04-12	2019-10-28	2019-04-15	2019-10-28		2019-04-09	2019-10-28	2019-10-29	2019-04-12	2019-10-30
		N	FD	N	N	N	N	N	N	N	FD	N	N	N	N	N	N
CCR Appendix III																	
Boron	mg/L	0.2	0.16	0.16	0.26	0.094 J	0.076 J	0.11	0.12	0.11	0.17	0.17	0.12	0.094 J	0.56	0.22	0.12
Calcium	mg/L	85	76	73	100	41	49	70	81	62	66	66	68	60	94	64	60
Chloride	mg/L	3.3	4.6	5.8	17	1.4	2.3	1.9	1.4 J	2.8	0.94 J	0.96 J	5.7	2.8	14	2.1	1.6
Fluoride	mg/L	0.26	2 U	2 U	2.3	0.45	0.72 J	1.1	2 U	2.4	3	3	1.2	1.3	0.76 J	0.89	1.8
pH	pH units		6.73	7.02		5.68	6.96	6.46	7.26	5.9		7.44	6.59	7.8	7.41	7.29	7.45
Sulfate	mg/L	56	34	33	45	20	17	48	41	44	69	70	44	24	180	49	27
Total Dissolved Solids	mg/L	370 J	300	320	340	170	170	270	330	260	240 J+	260	250 J	210 J+	480	270	240
CCR Appendix IV																	
Antimony	mg/L	0.00073 J	0.00081 J	0.00083 J	0.00076 J	0.002 U	0.002 U	0.00092 J	0.0014 J	0.0011 J	0.00068 J	0.00062 J	0.0012 J	0.0013 J	0.00076 J	0.00072 J	0.00081 J
Arsenic	mg/L	0.005 U	0.0011 J	0.0013 J	0.0014 J	0.0066	0.0043 J	0.00093 J	0.0015 J	0.0076	0.025	0.024	0.0053	0.0049 J	0.0073	0.0013 J	0.0013 J
Barium	mg/L	0.027	0.023	0.023	0.023	0.013	0.016	0.024	0.024	0.01	0.011	0.011	0.022	0.019	0.028	0.024	0.019
Beryllium	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.00042 J	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.00047 J	0.001 U	0.001 U
Cadmium	mg/L	0.00044 J	0.00025 J	0.00023 J	0.00065 J	0.001 U	0.001 U	0.00032 J	0.00049 J	0.001	0.00065 J	0.00062 J	0.0013	0.0014	0.00079 J	0.00039 J	0.001 U
Chromium	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.0011 J	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.0012 J	0.002 U	0.002 U	0.002 U	0.002 U
Cobalt	mg/L	0.001 U	0.001 U	0.001 U	0.00053 J	0.00041 J	0.00031 J	0.001 U	0.00019 J	0.00096 J	0.00087 J	0.00089 J	0.001 U	0.001 U	0.001	0.001 U	0.001 U
Fluoride	mg/L	0.26	2 U	2 U	2.3	0.45	0.72 J	1.1	2 U	2.4	3	3	1.2	1.3	0.76 J	0.89	1.8
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	0.001 U	0.001 U	0.001 U	0.001 U
Lithium	mg/L	0.002 J	0.0031 J	0.0035 J	0.0056 J	0.008 U	0.008 U	0.008 U	0.002 J	0.027	0.029	0.029	0.0097	0.013	0.012	0.01	0.0085
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	0.0002	0.0002 U	0.0002 U	0.0002 U
Molybdenum	mg/L	0.02	0.023	0.021	0.032	0.012	0.015	0.021	0.02	0.018	0.013	0.013	0.014	0.012	0.15	0.02	0.02
Radium, Total	pci/l	0.485				0.389 U		0.691 U		0.591 U			0.432 U			0.636 U	
Radium-226	pci/l	0.115 U				0.1 U		0.426 U		0.152 U			0.0976 U			0.475 U	
Radium-228	pci/l	0.429				0.389 U		0.691 U		0.591 U			0.432 U			0.636 U	
Selenium	mg/L	0.011	0.016	0.015	0.017	0.0014 J	0.0018 J	0.0062	0.0074	0.0058	0.0023 J	0.0023 J	0.0069	0.005	0.0041 J	0.0097	0.0092
Thallium	mg/L	0.002	0.0025	0.0024	0.0035	0.001 U	0.001 U	0.0048	0.0047	0.013	0.013	0.013	0.0017	0.0019	0.0099	0.0035	0.0031
Sample Parameters																	
Dissolved Oxygen	mg/L	4.1		4.76	0.51	0.24	0.56	1.29	2.35	0.99		1.79	5.98	7.39	0.6	1.48	4.9
Oxidation-Reduction Potential	millivolts	250.6		267.9	219.8	96.4	104.5	207.7	226.8	197.7		129	207.7	131.1	19.5	148.1	-156.6
pH	SU	5.51		6.73	7.02	5.68	6.96	6.46	7.26	5.9		7.44	6.59	7.8	7.41	7.29	7.45
Specific Conductivity	uS/cm	522		400	457	226	196	438	357	373		300	379	260	501	370	279
Temperature	deg c	10.93		15.71	14.15	10.83	13.72	11.85	15.07	11.8		15.2	12.35	14.99	13.4	14.6	13.7
Turbidity	ntu	0.68		0.26	0.63	3.91	6.02	0.33	0.24	0.3		3.8	0.05	0.23	0.97	0.48	2.2

Note:

mg/L = milligrams per liter

uS/cm = micro Siemens per centimeter
deg C = degrees Celsius

NTU = Nephelometric Turbidity Units

pCi/L = picocuries per liter
SU = Standard Units

"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.

"J+" = Indicates the result is estimated may be biased high.

Table 3: Analytical Data
CCR Unit Bailly Primary 1 and Primary 2
NIPSCO LLC Bailly Generating Station
Chesterton, Indiana

Analyte	Unit	GAMW-10		GAMW-11		GAMW-11B	GAMW-11C	GAMW-15		GAMW-16		GAMW-17	GAMW-17B	GAMW-18	MW-112		
		2019-04-12	2019-10-29	2019-04-09	2019-10-29	2019-10-25	2019-10-29	2019-04-12	2019-10-30	2019-04-15	2019-10-30	2019-10-30	2019-10-30	2019-10-30	2019-04-12		2019-10-25
		N	N	N	N	N	N	N	N	N	N	N	N	N	FD	N	N
CCR Appendix III																	
Boron	mg/L	0.71	0.27	0.14	0.12	0.65	0.67	0.16	0.1 U	0.2	0.19	1.3	0.5	0.16	0.22	0.22	0.076 J
Calcium	mg/L	48	57	66	74	110	81	52	57	74	69	100	91	65	90	91	75
Chloride	mg/L	6.4	1.6 J	5.3	2	19	18	3.7	2.1	1.2	2.1	15	19	11	39	33	58
Fluoride	mg/L	1.2	1.8 J	1.6	2.4	0.14 J	0.77 J	1	1.4	1.4	1.9	2.1	0.77 J	2.1	1.3	1.2	1.2 J
pH	pH units	7.06	7.78	6.38	7.74	4.8	7.33	7.45	7.51	7.79	8.42	8.21	7.68		6.87	7.44	5.51
Sulfate	mg/L	120	94	79	36	100	96	43	35	94	55	250	160	46	52	52	45
Total Dissolved Solids	mg/L	300	340	310 J	1100	440	420	250	210	310	280	470	400	260	370	380	420
CCR Appendix IV																	
Antimony	mg/L	0.002 U	0.002 U	0.002 U	0.00063 J	0.002 U	0.002 U	0.00064 J	0.00073 J	0.0011 J	0.0012 J	0.002 U	0.002 U	0.0016 J	0.002 U	0.002 U	0.002 U
Arsenic	mg/L	0.005 U	0.00075 J	0.005 U	0.005 U	0.0012 J	0.003 J	0.005 U	0.005 U	0.012	0.015	0.083	0.0021 J	0.005 U	0.0014 J	0.0017 J	0.0011 J
Barium	mg/L	0.066	0.041	0.03	0.028	0.14	0.048	0.019	0.018	0.0081	0.0079	0.061	0.039	0.029	0.031	0.03	0.032
Beryllium	mg/L	0.001 U	0.001 U	0.001 U	0.00034 J	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
Cadmium	mg/L	0.00036 J	0.00027 J	0.001 U	0.00022 J	0.001 U	0.001 U	0.00026 J	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
Chromium	mg/L	0.002 U	0.0018 J	0.002 U	0.002 U	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	0.002 U	0.002 U	0.002 U
Cobalt	mg/L	0.001 U	0.001 U	0.001 U	0.00033 J	0.001 U	0.0011	0.001 U	0.001 U	0.001 U	0.001 U	0.00028 J	0.001 U	0.001 U	0.0003 J	0.00045 J	0.00023 J
Fluoride	mg/L	1.2	1.8 J	1.6	2.4	0.14 J	0.77 J	1	1.4	1.4	1.9	2.1	0.77 J	2.1	1.3	1.2	1.2 J
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	0.001 U	0.001 U	0.001 U	0.001 U
Lithium	mg/L	0.0076 J	0.0069 J	0.008 U	0.008 U	0.005 J	0.0066 J	0.0017 J	0.008 U	0.055	0.061	0.015	0.007 J	0.008	0.011	0.011	0.01
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	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Molybdenum	mg/L	0.2	0.044	0.036	0.024	0.016	0.015	0.028	0.026	0.026	0.055	0.63	0.018	0.036	0.053	0.052	0.032
Radium, Total	pci/l	0.513		0.515				0.539 U		0.501 U					0.517 U	0.713	
Radium-226	pci/l	0.35 U		0.114 U				0.474 U		0.208 U					0.506 U	0.152 U	
Radium-228	pci/l	0.458 U		0.539				0.539 U		0.501 U					0.517 U	0.643	
Selenium	mg/L	0.0065	0.0083	0.0064	0.0098	0.005 U	0.005 U	0.0073	0.0085	0.0099	0.0069	0.008	0.005 U	0.0063	0.022	0.025	0.017
Thallium	mg/L	0.013	0.0078	0.001 U	0.001 U	0.001 U	0.001 U	0.002	0.0016	0.0017	0.0022	0.001 U	0.001 U	0.0021	0.001 U	0.001 U	0.001 U
Sample Parameters																	
Dissolved Oxygen	mg/L	7.53	8.53	4.42	8.16	1.86	0.73	6.56	9.48	5.4	4.97	1.08	0.74	4.19		1.32	5.3
Oxidation-Reduction Potential	millivolts	175.2	101.1	198.5	110	-228	35.1	162.8	245.9	163.7	-150	2	-117	-157.8		207.5	-149.2
pH	SU	7.06	7.78	6.38	7.74	7.83	4.8	7.33	7.45	7.51	7.79	8.42	8.21	7.68		6.87	7.44
Specific Conductivity	uS/cm	379	324	451	363	392	418	302	278	450	312	496	458	313		584	470
Temperature	deg c	13.9	14.2	13.78	13.36	13.6	12.95	14.7	13.5	13.3	13.9	13.8	12.9	13.7		14.01	15
Turbidity	ntu	1.57	0.28	0.58	1.5	2.22	1.89	1.08	0.12	0.11	1.08	0.1	0.18	1.61		0.08	1.86

Note:

mg/L = milligrams per liter

uS/cm = micro Siemens per centimeter
deg C = degrees Celsius

NTU = Nephelometric Turbidity Units

pCi/L = picocuries per liter
SU = Standard Units

"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.

"J+" = Indicates the result is estimated may be biased high.

Prepared by: AMH
Checked by: DFS
Reviewed by: MAH

Table 4: Groundwater Protection Standards
CCR Unit Bailly Primary 1 and Primary 2
NIPSCO LLC Bailly Generating Station
Chesterton, Indiana

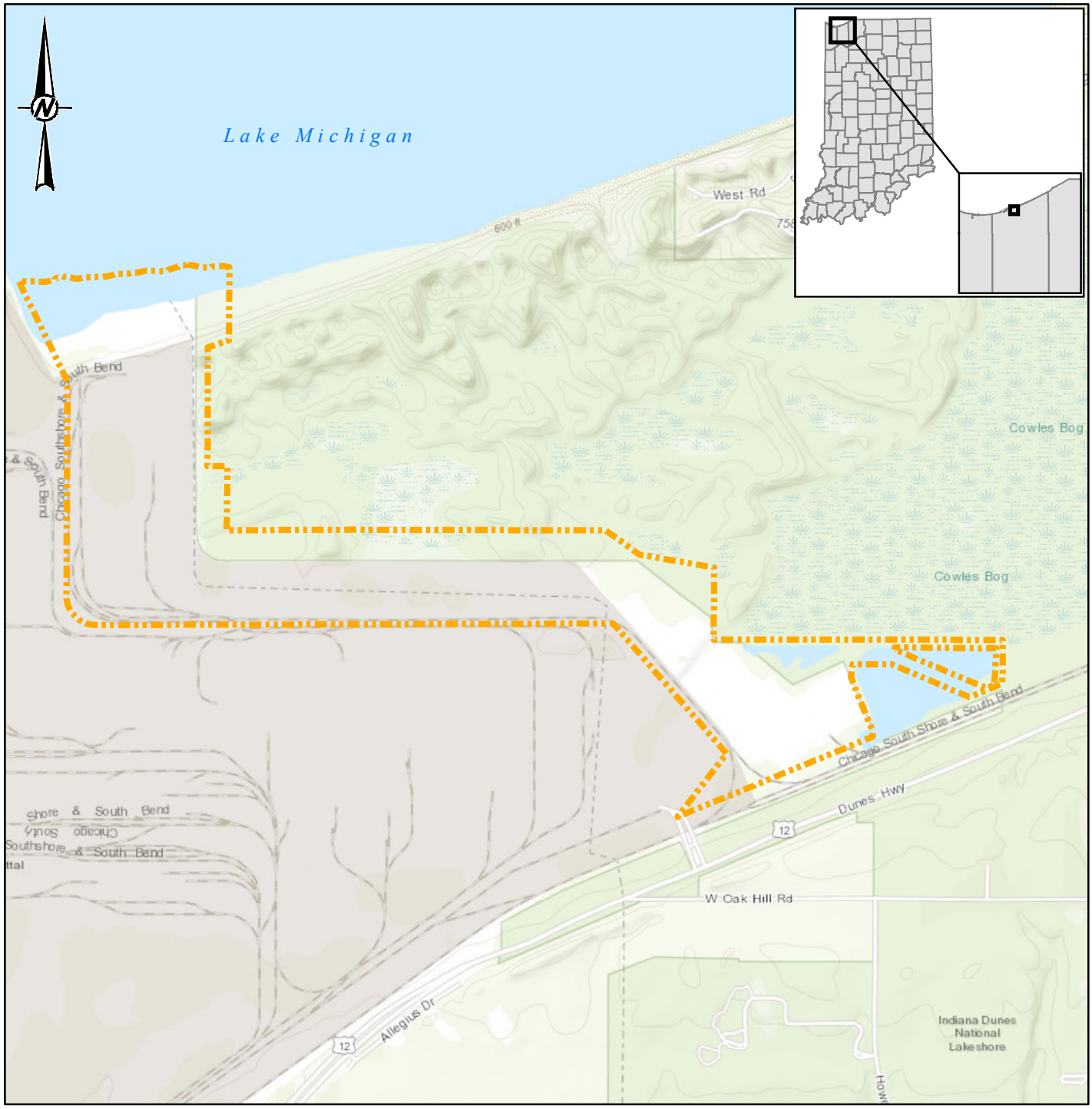
Analyte	MCL (mg/L)	GWPS (mg/L)
Antimony	0.006	0.006
Arsenic	0.01	0.01
Barium	2	2
Beryllium	0.004	0.004
Cadmium	0.005	0.005
Chromium	0.1	0.1
Cobalt(1)	0.006	0.006
Fluoride	4	4
Lead(1)	0.015	0.015
Lithium(1)	0.04	0.04
Mercury	0.002	0.002
Molybdenum(1)	0.1	0.1
Radium 226+228	5	5
Selenium	0.05	0.05
Thallium	0.002	0.0039

Notes:
MCL= Environmental Protection Agency Maximum Contaminant Level
GWPS= Groundwater Protection Standard, calculated in September 2018
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.

Prepared by:	KMC
Checked by:	DFS
Reviewed by:	MAH

Figures



LEGEND

Approximate Property Line

0 1,500 3,000

1 " = 1,500 feet Feet

REFERENCE(S)

SERVICE LAYER CREDITS: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), (C) OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY

CLIENT

NORTHERN INDIANA PUBLIC SERVICE COMPANY LLC

PROJECT

BAILLY GENERATING STATION
CHESTERTON, INDIANA

TITLE

SITE LOCATION MAP

CONSULTANT

GOLDER

YYYY-MM-DD	12/31/2019
DESIGNED	DFS
PREPARED	SHL
REVIEWED	JSP
APPROVED	MAH

PROJECT NO.	CONTROL	REV.	FIGURE
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LEGEND

- Background Well Location
- Downgradient Well Location
- CCR Unit
- Approximate Property Line
- Pre-Plant Closure Generalized Flow Direction

0 300 600

1 " = 300 feet

Feet

NOTE(S)

REFERENCE(S)

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CLIENT

NORTHERN INDIANA PUBLIC SERVICE COMPANY LLC

PROJECT

BAILLY GENERATING STATION
CHESTERTON, INDIANA

TITLE

2016 - SEPTEMBER 2019 WELL LOCATION MAP
PRIMARY 1

CONSULTANT

GOLDER

YYYY-MM-DD	1/22/2020
DESIGNED	JSP
PREPARED	SHL
REVIEWED	JSP
APPROVED	MAH

PROJECT NO.	CONTROL	REV.	FIGURE
19121569	A	0	2

LEGEND

- Background Well Location
- Downgradient Well Location
- CCR Unit
- Approximate Property Line
- Pre-Plant Closure Generalized Flow Direction

0 300 600

1 " = 300 feet

Feet

NOTE(S)

REFERENCE(S)

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CLIENT

NORTHERN INDIANA PUBLIC SERVICE COMPANY LLC

PROJECT

BAILLY GENERATING STATION
CHESTERTON, INDIANA

TITLE

2016 - SEPTEMBER 2019 WELL LOCATION MAP
PRIMARY 2

CONSULTANT

GOLDER

YYYY-MM-DD	1/24/2020
DESIGNED	JSP
PREPARED	SHL
REVIEWED	JSP
APPROVED	MAH

PROJECT NO.	CONTROL	REV.	FIGURE
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1in
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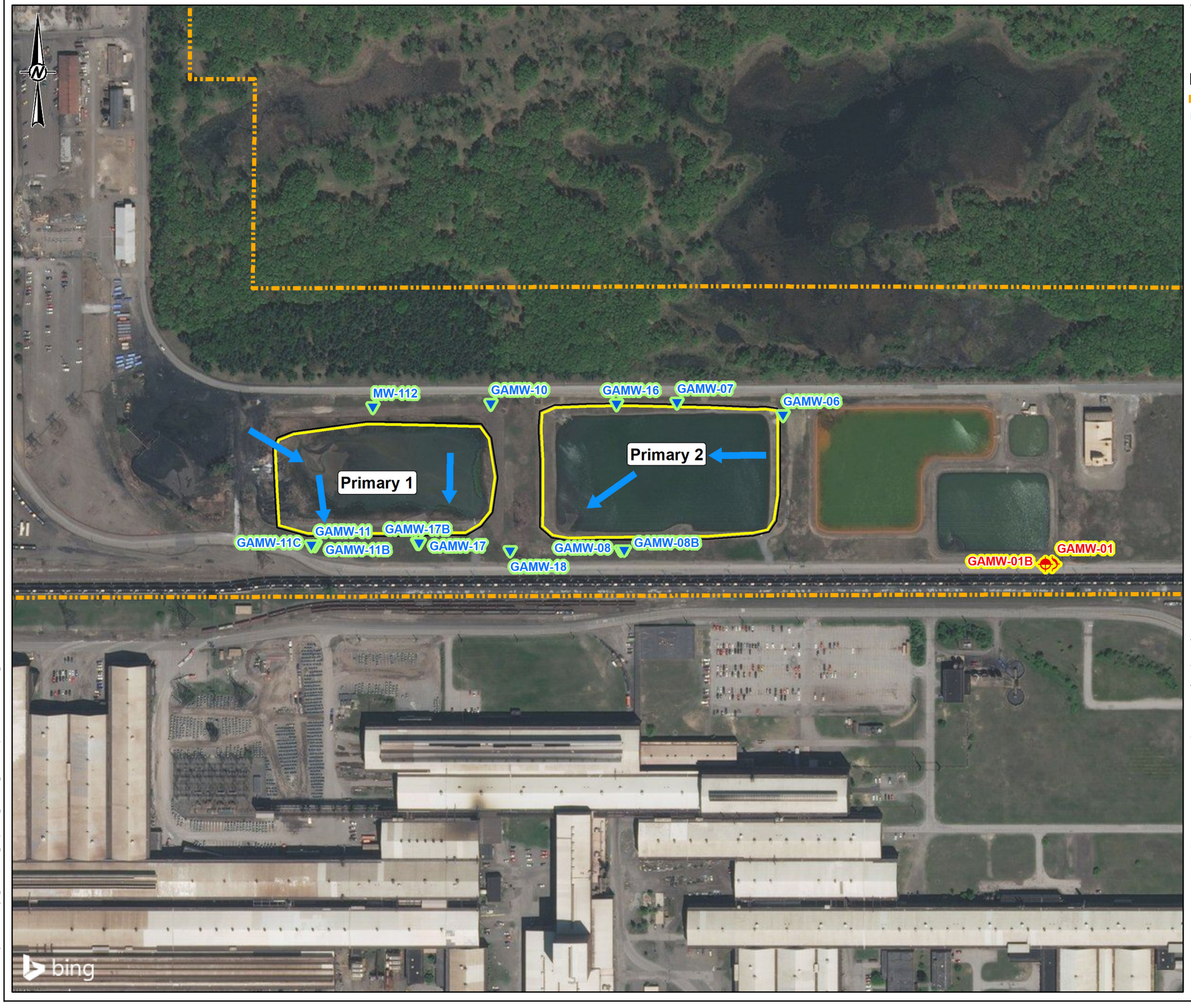

LEGEND

- Background Well Location
- Downgradient Well Location
- CCR Unit
- Approximate Property Line
- Current Post-Plant Closure Generalized Flow Direction

0 300 600

1 " = 300 feet

Feet

NOTE(S)

1. FLOW DIRECTION ON SITE IS VARIABLE AND FLAT. DOWNGRADIENT MONITORING WELLS ARE EITHER HISTORICALLY OR CURRENTLY DOWNGRADIENT OF THE CCR UNIT.

REFERENCE(S)

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CLIENT

NORTHERN INDIANA PUBLIC SERVICE COMPANY LLC

PROJECT

BAILLY GENERATING STATION
CHESTERTON, INDIANA

TITLE

POST SEPTEMBER 2019 WELL LOCATION MAP
PRIMARY 1 AND PRIMARY 2

CONSULTANT

GOLDER

YYYY-MM-DD	1/24/2020
DESIGNED	JSP
PREPARED	SHL
REVIEWED	JSP
APPROVED	MAH

PROJECT NO.	CONTROL	REV.	FIGURE
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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

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APPENDIX A

Extension of 60 Days to Complete Assessment of Corrective Measures

REPORT

BAILLY GENERATING STATION
Chesterton, Indiana

EXTENSION OF 60 DAYS TO COMPLETE ASSESSMENT OF CORRECTIVE MEASURES FOR CCR SURFACE IMPOUNDMENTS REFERRED TO AS PRIMARY 1, PRIMARY 2, AND SECONDARY 1

Pursuant to 40 CFR 257.96(a)

Submitted to:

Northern Indiana Public Service Company
2755 Raystone Drive
Valparaiso, IN 46383

Submitted by:

Golder Associates Inc.
670 North Commercial Street, Suite 103
Manchester, NH 03101
+1 603 668-0880

164817101

February 2019

Table of Contents

ATTACHMENTS

1.0 INTRODUCTION

1.1 Background

The Northern Indiana Public Service Company (NIPSCO) Bailly Generating Station (BGS or Site) manages coal combustion residuals (CCR) in four Hypalon-lined[1] surface impoundments (see Figure 1). Monitoring of groundwater downgradient impoundments referred to as Primary 1, Primary 2, and Secondary 1 per 40 CFR §257.95(g) indicates releases in exceedance of the groundwater protection standard (GWPS), requiring assessment of corrective measures and closure.

1.2 Purpose

Within 90 days of the detection of an Appendix IV constituent at a statistically significant level above the GWPS defined in 40 CFR §257.95(h), 40 CFR §257.96 requires NIPSCO to initiate and 90 days to complete an assessment of corrective measures to prevent further releases, remediate any releases, and restore affected areas to original conditions. However, the regulations allow NIPSCO to demonstrate the need for additional time, not to exceed 60 days, to complete the assessment due to site-specific conditions or circumstances. The purpose of this document is to demonstrate the requirement for the 60-day extension of the initial 90-day corrective measures assessment deadline.

2.0 ASSESSMENT OF CORRECTIVE MEASURES

2.1 Approach

NIPSCO determined the identification and screening of potential corrective measures required CCR Management Unit- and Site-specific data beyond that available from Detection and Assessment Monitoring programs only. Supplemental data needs included the characterization of source materials and the abilities of Site conditions to support various corrective measures alternatives.

2.2 Work-to-Date Encountering Site-Specific Conditions

Prior to the confirmation of exceedances of groundwater protection standards (GWPS), NIPSCO engaged in the design and installation of supplemental source material, soil, pore water, and groundwater sampling programs. Steps in this linear supplemental assessment process included:

- investigation program design/scoping;
- subcontractor driller procurement and scheduling;
- access to and clearance of potential drilling locations within a generating station buffer area downgradient of the surface impoundments;
- sample collection, laboratory turnaround, and data validation; and
- preliminary evaluation of analytical data.

By necessity, due to the various stages inherent in the supplemental data collection program, a substantial portion of the initial 90-day assessment period was consumed by data collection and preliminary analysis, leaving insufficient time to complete the assessment of corrective measures within the initial performance period.

[1] Does not meet the 40 CFR Part 257.71 Liner design criteria for existing CCR surface impoundments

2.3 Work-to-Date Encountering Site-Specific Circumstances

NIPSCO is engaged in other ongoing activities for BGS which directly support the Assessment of Corrective Measures process including:

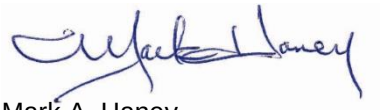
- Upon Indiana Department of Environmental Management (IDEM) approval, NIPSCO intends to close the CCR surface impoundments by removal of source materials, with said source removal being an integral component of its overall Corrective Measures strategy for groundwater. NIPSCO has been working diligently to meet a May 1, 2019 target date for preparation and submittal to IDEM of a Closure Application for these three units plus a fourth impoundment, the Boiler Slag Pond, which has not exhibited a GWPS exceedance but is being closed along with the other impoundments as part of the station decommissioning; and
- Related to supplemental groundwater investigation work discussed in Section 2.2 and as one of several options, NIPSCO is performing a preliminary evaluation of the feasibility of in-situ as well as ex-situ processes as potential remedial alternatives to be considered in the Corrective Measures alternatives screening process.

Similar to work being conducted as discussed in Section 2.2, activities as described herein are ongoing but could not be completed within the initial 90-day performance period due to inherent complexity, the necessity to understand and respond to requirements of state regulators, or lack of a clear outcome based on results to date.

3.0 CONCLUSION

Due to an exceedance of a GWPS downgradient of CCR surface impoundments at BGS, NIPSCO must within 90 days complete an assessment of corrective measures unless a demonstration for an additional 60-day extension of time is made and certification from a qualified professional engineer attests to the accuracy of the demonstration. This document demonstrates that NIPSCO has initiated the assessment of corrective measures process, is taking reasonable steps to complete the process in a timely manner and provides the basis for the qualified professional engineer's attestation for an additional 60-day extension. Pursuant to 40 CFR §257.96(a), a statement of Certification is appended to this plan and located in Exhibit A.

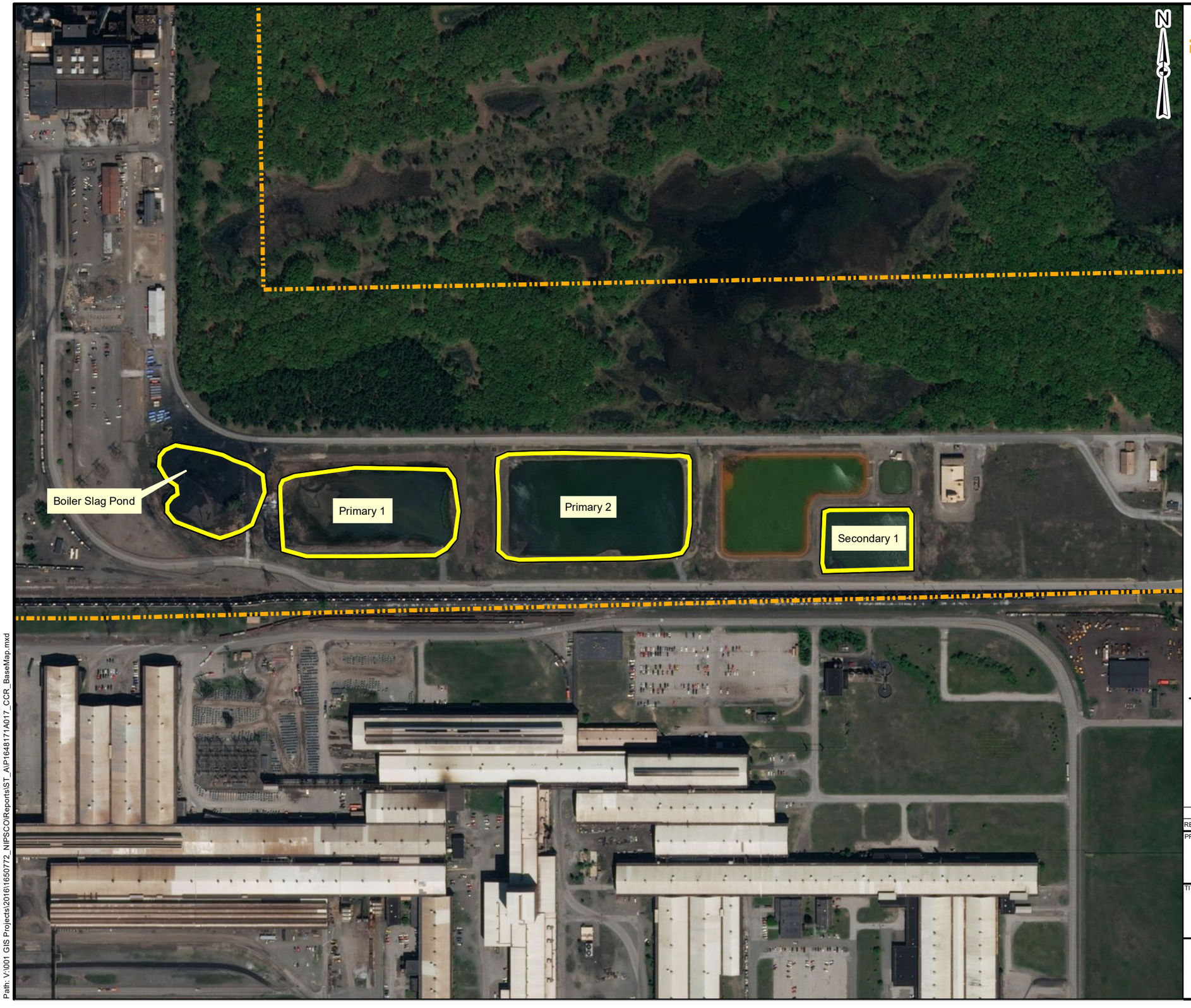
Golder Associates Inc.



Mark A. Haney
Program Leader and Principal

MAH/drb

p:\projects\2016\1648171 nipsco ccr\01 extender\bailly- phase 01\reports and deliverables\60-day cm extension\bgs multi-unit 60 day corrective measures extension request 02-25-19_final.docx



LEGEND

- Approximate Property Line
- CCR Units

REFERENCES

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Elevations are in North American Vertical Datum 88

360 180 0 360 Feet

REV.	DATE	DES	REVISION DESCRIPTION	GIS	CHK	RVW

PROJECT

NORTHERN INDIANA PUBLIC SERVICE COMPANY
BAILLY GENERATING STATION
CHESTERTON, INDIANA

TITLE

BOILER SLAG POND, PRIMARY 1, PRIMARY 2, SECONDARY 1 LOCATION MAP

GOLDER

PROJECT No.		152-6086	FILE No.	048171A017_CCR_BaseMap
DESIGN	DFS	2017-12-07	SCALE: AS SHOWN	REV. 0
GIS	SHL	2019-02-22		
CHECK	JSP	2019-02-22		
REVIEW	MAH	2019-02-22		

FIGURE 1

Path: V:\001 GIS Projects\2016\16507\72_NIPSCO\Reports\ST_AIP1648171A017_CCR_BaseMap.mxd

GOLDER

EXHIBIT A

February 2019

Northern Indiana Public Service Company (NIPSCO) Bailly Generating Station (BGS)
Chesterton, Porter County, Indiana
CCR Surface Impoundments Primary 1, Primary 2, and Secondary 1

STATEMENT OF CERTIFICATION

NIPSCO BGS CCR SURFACE IMPOUNDMENTS PRIMARY 1, PRIMARY 2, AND SECONDARY 1

ASSESSMENT OF CORRECTIVE MEASURES

40 Code of Federal Regulations (CFR), Part 257.96(a)

I, Richard Wesenberg, certify that I have personally examined and am familiar with the provisions of Title 40 of the Code of Federal Regulations Part 257.96 and with the information submitted in the NIPSCO Extension of 60 Days to Complete Assessment of Corrective Measures for CCR Surface Impoundments Referred to as Primary 1, Primary 2, and Secondary 1 documentation, prepared by Golder Associates Inc., dated February 2019. I believe that the information contained therein is true, accurate and has been prepared in accordance with good engineering practices and that the documentation provided in accordance with 257.96(a) demonstrates the need for additional time to complete the assessment of corrective measures due to site-specific conditions and circumstances.

2-25-2019

Richard A. Wesenberg, PE
Program Leader and Principal
Registered Professional Engineer
State of Indiana No.: PE11500584

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T: +1 603 668-0880 +1 603 668-1199

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