

2021 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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Table of Contents

1.0	INTRO	DDUCTION	.1
2.0	GROU CURR	INDWATER MONITORING AND CORRECTIVE ACTION PROGRAM OVERVIEW OF ENT STATUS	.1
	2.1	Key Actions Completed - 2021	.2
	2.2	Monitoring System Modification	.3
	2.3	Background Monitoring (2016 to 2017)	.3
	2.4	Detection Monitoring	.3
	2.5	Assessment Monitoring	.3
	2.6	Corrective Action	.5
	2.7	Statistical Evaluation	.6
	2.8	Problems Encountered and Follow-Up Corrective Actions	.6
3.0	KEY A	CTIVITIES PROJECTED FOR 2022	.7
4.0	REFE	RENCES	.7

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 Primary 1 and Primary 2

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 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 2021 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 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. 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 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 PROGRAM OVERVIEW OF CURRENT 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 Detection Monitoring at Primary 1 and Primary 2 (as separate CCR Units) pursuant to the requirements of 40 CFR §257.94. Due to the identification of statistically significant increases (SSIs), NIPSCO established an Assessment Monitoring program in March and April 2018 pursuant to the requirements of 40 CFR §257.95. In 2018, Golder performed the first and second Assessment Monitoring sampling events at Primary 1 and Primary 2. Following the first Assessment Monitoring sampling event, including verification sampling, NIPSCO 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) downgradient of both Primary 1 and Primary 2. Consequently, NIPSCO initiated the assessment of corrective measures (ACM) process for Primary 1 and Primary 2 in December 2018. Golder performed subsequent monitoring events including:

- Third and fourth Assessment Monitoring events in 2019
- Fifth and sixth Assessment Monitoring events in 2020
- Seventh and eighth 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 seventh and eighth Assessment Monitoring events are provided in Table 2. The 2021 analytical results are presented in Table 3. Primary 1 and Primary 2 began and ended the current annual reporting period in Assessment Monitoring pursuant to §257.95. The statistically significant levels (SSLs) of Appendix IV constituents identified in 2021 include thallium at monitoring wells GAMW-07, GAMW-08B, and GAMW-10; arsenic and lithium at monitoring well GAMW-16; and molybdenum at monitoring well GAMW-17. NIPSCO completed the assessment of corrective measures and prepared the ACM Report in May 2019 and is continuing to evaluate the feasibility and design of potential groundwater remedial alternatives in accordance with the provisions of 40 CFR §259.97(a). A remedy has not yet been selected; therefore, no remediation activities were performed in 2021. At least 30 days prior to the selection of remedy, NIPSCO will schedule a public meeting to present the proposed remedial approach for public comment.

2.1 Key Actions Completed - 2021

NIPSCO completed the following key actions relative to CCR Rule groundwater monitoring at Primary 1 and Primary 2 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 sixth Assessment Monitoring event in February 2021 (40 CFR §257.95)
- Notification that constituents in 40 CFR Part 257 Appendix IV exceeded the GWPS in March 2021 (40 CFR §257.95(g))
- Performance of the seventh Assessment Monitoring event in May 2021 (40 CFR §257.95)
- Preparation of the fourth semi-annual Selection of Remedy Progress Report in April 2021 (40 CFR §257.97)
- Evaluation of the results of the seventh Assessment Monitoring event in September 2021 (40 CFR §257.95)
- Notification that constituents in 40 CFR Part 257 Appendix IV exceeded the GWPS in October 2021 (40 CFR §257.95(g))
- Preparation of the fifth semi-annual Selection of Remedy Progress Report in October 2021 (40 CFR §257.97)
- Performance of the eighth Assessment Monitoring event in October 2021 (40 CFR §257.95)

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2.2 Monitoring System Modification

The groundwater monitoring system did not require any modification in 2021 (see Figure 2). Attached 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-01, GAMW-01B	MW-112, GAMW-06, GAMW-07, GAMW-08, GAMW- 08B, GAMW-10, GAMW-11, GAMW-11B, GAMW- 11C, GAMW-16, GAMW-17, GAMW-17B, GAMW-18

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, Golder 2018).

Golder performed a periodic update of background datasets, which includes incorporation of additional background data, to improve 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). Golder incorporated new data into the background dataset, updating the GWPS, in February 2020.

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 SSIs. Due to the identification of SSIs, NIPSCO 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 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 (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. NIPSCO initiated the assessment of corrective measures in December 2018.

Golder performed additional Assessment Monitoring events at Primary 1 and Primary 2 by collecting groundwater samples from each background and downgradient monitoring well per 40 CFR §257.95 including:

Second Assessment Monitoring Event – October 2018: 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 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. The results from the first and second Assessment Monitoring events for both Primary 1 and Primary 2 are included in the 2018 Annual Groundwater Monitoring and Corrective Action Reports, dated January 31, 2019 (2018 Annual Reports, Golder 2019) for each CCR Unit.

- Third Assessment Monitoring Event April 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 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.
- Fourth Assessment Monitoring Event October 2019: The fourth Assessment Monitoring Event was the first Assessment Monitoring event for the combined Primary 1 and Primary 2 CCR Unit. Golder performed the fourth Assessment Monitoring event by collecting groundwater samples for analysis of Appendix III and detected Appendix IV. Golder performed the statistical evaluation of the analytical results of the fourth Assessment Monitoring sampling event in February 2020. The results confirmed the SSLs for thallium at wells GAMW-07 and GAMW-10 and for arsenic and lithium at well GAMW-16. The results from the third and fourth Assessment Monitoring events are included in the 2019 Annual Groundwater Monitoring and Corrective Action Report, dated January 31, 2020 (2019 Annual Report, Golder 2020).
- Fifth Assessment Monitoring Event April 2020: Golder performed the fifth Assessment Monitoring event by collecting groundwater samples for analysis of Appendix III and Appendix IV. Golder performed the statistical evaluation of the analytical results of the fifth Assessment Monitoring event in August 2020. The results confirmed the SSLs for thallium at wells GAMW-07 and GAMW-10 and for arsenic and lithium at well GAMW-16.

Sixth Assessment Monitoring Event - November 2020: Golder performed the sixth 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 sixth Assessment Monitoring sampling event in February 2021. The results confirmed the SSLs for thallium at wells GAMW-07 and GAMW-10 and for arsenic and lithium at well GAMW-16. The results from the fifth and sixth Assessment Monitoring events are included in the 2020 Groundwater Monitoring and Corrective Action Report, dated January 31, 2021 (Golder, 2021).

Seventh Assessment Monitoring Event - May 2021: Golder performed the seventh 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 seventh Assessment Monitoring sampling event in September 2021. The results confirmed the SSLs for thallium at well GAMW-07 and for arsenic and lithium at well GAMW-16. In addition, SSLs were identified for thallium at well GAMW-08B and molybdenum at well GAMW-17. There was no longer an SSL for thallium associated with monitoring well GAMW-10.

Eighth Assessment Monitoring Event - October 2021: Golder performed the eighth Assessment Monitorinb event by collecting groundwater samples 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 eighth Assessment Monitoring sampling event in February 2022.

2.6 Corrective Action

NIPSCO 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 plans to close these CCR Units by removal in accordance with 40 CFR §257.102(c). NIPSCO is currently working with IDEM to finalize the Closure Application.

In 2019, Golder identified changes in the groundwater flow direction because of the shutdown of coal-fired generating activities and consequent modification in operation of the impoundments. As a result, Golder updated the groundwater monitoring network 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 and 2021, Golder continued to sample and evaluate data from the updated monitoring well network consistent with 40 CFR §257.95. The additional data will be presented in an addendum to the ACM in 2022. Additionally, Golder performed the following remedy selection-related activities in 2021:

- Developed a steady state groundwater model to simulate groundwater flow conditions at the Site. The groundwater model was used to estimate particle transport time and to predict changes in groundwater flow conditions after closure and inform elements of the corrective measure alternatives. The modeling results were summarized in a November 2021 technical memorandum.
 - Completed a monitored natural attenuation (MNA) Tier I-III evaluation for the Site. The evaluation included a review of mechanisms, rates, and stability of MNA as a potential corrective measure for groundwater impacts at the Site. The results were summarized in a November 2021 MNA Report.

In 2022, Golder will continue to collect and evaluate additional information relative to the potential Corrective Measures in the ACM, placing emphases on identifying critical data gaps, understanding and responding to newly gathered information on previous assumptions and/or conclusions, identifying and researching applicability of emerging technologies, and monitoring changing conditions and future plans for the Site and their impacts on the remedy process.

2.7 Statistical Evaluation

After 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 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. Golder has not identified any outliers since the 2019 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 GWPS. Golder identified the following 40 CFR Part 257 Appendix IV parameter trends in background monitoring wells:

- Antimony concentrations detected in groundwater samples collected from GAMW-01 show a decreasing trend; all background 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-01 show a decreasing trend; all background results are below the MCL, therefore, the GWPS is equal to the MCL. No detrending routines are required.
- Beryllium concentrations detected in groundwater samples collected from GAMW-01 show a decreasing trend; all background results are below the MCL, therefore, the GWPS is equal to the MCL. No detrending routines are required.
- Cobalt concentrations detected in groundwater samples collected from GAMW-01 show a decreasing trend; all background results are below the health-based standard, therefore, the GWPS is equal to the health-based standard. No detrending routines are required.

2.8 Problems Encountered and Follow-Up Corrective Actions

In spring 2021, field personnel observed that the surface casings and concrete well pads at monitoring wells GAMW-06 and GAMW-07 were slightly damaged (e.g., slight deviance from vertical, cracked or settled concrete pad). Prior to the seventh Assessment Monitoring event (May 2021), Golder subcontracted a licensed Indiana driller to replace the surface casing and well pad at each location and verified that the integrity of the well and dedicated pumping equipment had not been compromised. Groundwater samples were successfully collected from GAMW-06 and GAMW-07 in May 2021; no further corrective action was necessary.

3.0 KEY ACTIVITIES PROJECTED FOR 2022

During calendar year 2022, NIPSCO 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
 - Prepare an Addendum to the Assessment of Corrective Measures Report
 - Inspect and maintain the 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, 2018.
- Golder Associates, "2017 Annual Groundwater Monitoring and Corrective Action Report Primary 2 NIPSCOBailly Generating Station", January 31, 2018.
- Golder Associates, "2018 Annual Groundwater Monitoring and Corrective Action Report- Primary 1 NIPSCO Bailly Generating Station", January 31, 2019.
- Golder Associates, "2018 Annual Groundwater Monitoring and Corrective Action Report- Primary 2 NIPSCO Bailly Generating Station", January 31, 2019.
- Golder Associates, "2019 Annual Groundwater Monitoring and Corrective Action Report- Primary 1 and Primary 2 NIPSCO LLC Bailly Generating Station", January 31, 2020.
- Golder Associates, "2020 Annual Groundwater Monitoring and Corrective Action Report- Primary 1 and Primary 2 NIPSCO LLC Bailly Generating Station", January 31, 2021.
- Golder Associates, "CCR Assessment of Corrective Measures," May 1, 2019.
- Golder Associates, "CCR Groundwater Monitoring Program Implementation Manual," October 2017.
- 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.
- Golder Associates, "NIPSCO Bailly Generating Station, CCR Units Primary 1, Primary 2, and Secondary 1 Corrective Measures Selection of Remedy, Semi-Annual Progress Report #20-01" April 24, 2020.
- Golder Associates, "NIPSCO Bailly Generating Station, CCR Units Primary 1, Primary 2, and Secondary 1 Corrective Measures Selection of Remedy, Semi-Annual Progress Report #20-02" October 21, 2020.
- Golder Associates, "NIPSCO Bailly Generating Station, CCR Units Primary 1, Primary 2, and Secondary 1 Corrective Measures Selection of Remedy, Semi-Annual Progress Report #21-01" April 20, 2021.

Golder Associates, "NIPSCO Bailly Generating Station, CCR Units Primary 1, Primary 2, and Secondary 1 Corrective Measures Selection of Remedy, Semi-Annual Progress Report #21-02" October 20, 2021.

Golder Associates, "Groundwater Flow Model Technical Memorandum Bailly Generating Station" October 2021.

Golder Associates, "Monitored Natural Attenuation Evaluation Bailly Generating Station" October 2021.

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https://golderassociates.sharepoint.com/sites/nipscoccrg wmonitoring/shared documents/bgs/reports/annual report- 2021/p1-p2/draft/draft_2021 annual report-bailly primary 1 & 2.docx



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	
	Background	GAMW-01	6/6/2016	-	Installed for Groundwater Quality Monitoring ⁽¹⁾	
	Monitoring Well	GAMW-01B	9/14/2019	-	Installed to provide additional groundwater quality data	
		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 Orgunductor Quality Manitoring ⁽¹⁾	
		GAMW-07	6/7/2016	-	Installed for Groundwater Quality Monitoring"	
		GAMW-08	6/7/2016	-	Installed for Groundwater Quality Monitoring, considered part of the background	
		0,000	0/7/2010		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)
Primary 1 and		GAMW-10	6/8/2017	Installed for Groundwater Quality Monitoring ⁽¹⁾		
Primary 2		GAMW-11	0/7/0040		Installed for Groundwater Quality Monitoring, considered part of the background	
	wonitoring weil		6/7/2016	-	monitoring well network prior to September 2019 (1,3)	
		GAMW-11B	6/7/2016	-	Installed to observatorize the nature and extent of a notantial release (2)	
		GAMW-11C	9/13/2019	-	Installed to characterize the nature and extent of a potential release.	
		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	-		
		GAMW-17B	9/12/2019	-	Installed to characterize the nature and extent of a potential release $^{(2)}$	
		GAMW-18	9/11/2019	-		
		MW-112	-	-	Installed for Groundwater Quality Monitoring ⁽¹⁾	

1) Per 40 CFR §257.93, 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, monitoring wells GAMW-05, GAMW-09, and GAMW-15 are no longer considered part of the monitoring well network for Primary 1 and Primary 2.



Prepared by: DFSC Checked by: KMC Review ed by: JSP

Table 2:Summary of Sampling EventsCCR Unit Bailly Primary 1 and Primary 2NIPSCO LLC Bailly Generating StationChesterton, Indiana

Well Purpose	Monitoring Well ID	Sample Event #16	Sample Event #17	
Purpose o	of Sample	Annual Assessment Monitoring	Semi-Annual Assessment Monitoring	Total Number of Samples
Sample P	arameters	Appendix III and Appendix IV	Appendix III and Detected Appendix IV	
Background	GAMW-01	5/7/2021	10/19/2021	2
Monitoring Well	GAMW-01B	5/17/2021	10/19/2021	2
	GAMW-06	5/10/2021	10/20/2021	2
	GAMW-07	5/10/2021	10/20/2021	2
	GAMW-08	5/10/2021	10/20/2021	2
	GAMW-08B	5/17/2021	10/20/2021	2
	GAMW-10	5/18/2021	10/22/2021	2
Deverence di evet	GAMW-11	5/18/2021	10/21/2021	2
Downgradient Monitoring Well	GAMW-11B	5/18/2021	10/21/2021	2
Worldoning Weil	GAMW-11C	5/18/2021	10/21/2021	2
	GAMW-16	5/17/2021	10/21/2021	2
	GAMW-17	5/19/2021	10/22/2021	2
	GAMW-17B	5/19/2021	10/22/2021	2
	GAMW-18	5/19/2021	10/21/2021	2
	MW-112	5/18/2021	10/22/2021	2
Total Numbe	r of Samples	15	15	30

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) Semi-annual assessment monitoring parameters did not include radium.

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

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

Chesterton, Indiana

		Location	GAN	IW-01		GAMW-0)1B	GAN	1W-06	GAN	1W-07	GAN	1W-08	GAN	IW-08B	GAN	/W-10
		Sample Date	2021-05-07	2021-10-19	2021	-05-17	2021-10-19	2021-05-10	2021-10-20	2021-05-10	2021-10-20	2021-05-10	2021-10-20	2021-05-17	2021-10-20	2021-05-18	3 2021-10-22
		Sample Type	N	N	FD	Ν	Ν	N	N	N	N	Ν	N	N	N	N	Ν
Chemical Name		Unit															
CCR Appendix III																	
Boron	mg/L		0.17	0.18	0.26	0.26	0.24	0.1 U	0.11	0.1 U	0.1 U	0.11	0.11	0.34	0.25	0.25	0.2
Calcium	mg/L		79.2	72.2	103	102	92.3	72.4	84.1	60.6	70.1	66.8	67.3	87.4	97.6	71.8	72.8
Chloride	mg/L		2.5	2.4	11.6	12.1	13.3	2.1	2.1	1.9	3.2	1.6	2.1	8.9	5.4	1.1	1.3
Fluoride	mg/L		0.12	0.15	2.2	2.1	1.9	1.1	0.94	2.3	2.3	0.9	0.92	0.98	0.63	2.6	2.5
рН	SU		6.36	6.79		8.58	7.16	7.09	7.03	7.12	6.86	7.75	7.61	8.42	6.95	8.62	7.58
Sulfate	mg/L		42.2	42.7	51.7	51.8	38.5	32.4	35.3	38.3	31.8	18.5	18	64.6	36	80.5	65.5
Total Dissolved Solids	mg/L		313	304	396	368	348	233	288	193	232	205	226	386	355	289	238
CCR Appendix IV																	
Antimony	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	0.0011	0.0013	0.001 U	0.001 U	0.001 U	0.001 U
Arsenic	mg/L		0.001 U	0.001 U	0.001	0.001	0.001 U	0.001 U	0.001 U	0.0091	0.0062	0.0056	0.0052	0.0027	0.0024	0.001 U	0.001 U
Barium	mg/L		0.025	0.023	0.022	0.022	0.021	0.019	0.02	0.0086	0.0096	0.02	0.02	0.02	0.02	0.021	0.018
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	0.0002 U	0.0002 U	0.0002 U
Cadmium	mg/L		0.0005	0.00043	0.00068	0.00064	0.00059	0.00035	0.00045	0.00036	0.0005	0.0012	0.0012	0.0032	0.0043	0.00031	0.00029
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	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	0.0013	0.0018	0.001 U	0.001 U	0.0018	0.0021	0.001 U	0.001 U
Fluoride	mg/L		0.12	0.15	2.2	2.1	1.9	1.1	0.94	2.3	2.3	0.9	0.92	0.98	0.63	2.6	2.5
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
Lithium	mg/L		0.008 U	0.008 U	0.008 U	0.008 U	0.0094	0.008 U	0.008 U	0.032	0.037	0.016	0.02	0.013	0.015	0.0089	0.011
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
Molybdenum	mg/L		0.021	0.027	0.029	0.029	0.028	0.024	0.033	0.014	0.013	0.013	0.013	0.075	0.06	0.031	0.033
Radium, Total	pCi/L		1.76 U		1.85 U	1.73 U		1.53 U		0.982 U		1.94 U		1.36 U		1.52 U	
Selenium	mg/L		0.0097	0.0093	0.022	0.024	0.014	0.0065	0.0088	0.0042	0.0033	0.0054	0.0041	0.0059	0.0074	0.012	0.0079
Thallium	mg/L		0.0019	0.002	0.0029	0.003	0.0029	0.0038	0.0042	0.011	0.012	0.0018	0.0021	0.012	0.011	0.0037	0.0036
Field Parameters																	
Dissolved Oxygen	mg/L		3.45	6.94		0.66	0.62	1.44	1.43	1.24	1.88	7.26	6.17	0.47	0.83	6.63	5.68
Oxidation-Reduction Potential	millivolts		158.1	-26.1		220.1	-49.8	196.2	-63.1	73.3	-62.5	142	-61.5	60.3	-88	244.6	-37.9
рН	SU		6.36	6.79		8.58	7.16	7.09	7.03	7.12	6.86	7.75	7.61	8.42	6.95	8.62	7.58
Specific Conductance	uS/cm		585	380		868	457	464.1	423	411.4	400	451.3	340	844	830	633	464
Temperature	deg C		11.5	16.87		13	14.55	11.7	16.55	12.6	17.18	11.6	16.58	13.4	14.16	13.9	15.58
Turbidity	NTU		1.97	1.08		2.54	0.71	1.79	0.96	3.61	4.39	3.35	0.75	2.94	1.29	1.64	0.75

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.



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

Chesterton, Indiana

Location			GAMW-11			GAMW-11B		GAMW-11C		GAMW-16		GAMW-17			GAMW-17B	
	Sample Date	2021	-05-18	2021	-10-21	2021-05-18	2021-10-21	2021-05-18	2021-10-21	2021-05-17	2021-10-21	2021-05-19	2021	-10-22	2021-05-19	2021-10-22
	Sample Type	FD	Ν	FD	Ν	N	N	N	N	N	N	N	FD	Ν	N	N
Chemical Name	Unit															
CCR Appendix III					-				-		-					
Boron	mg/L	0.11	0.11	0.1	0.1	0.66	0.58	0.36	0.29	0.24	0.6	0.96	0.45	0.44	0.98	0.5
Calcium	mg/L	68	68.8	74.3	75.4	124	141	85.7	89	77.7	127	120	110	107	94.4	97.2
Chloride	mg/L	1.6	1.6	1.4	1.4	37.1	44.9	10.5	8.6	1	4.8	6.3	1.6	1.6	14.6	5.2
Fluoride	mg/L	1.9	1.8	1.9	1.9	0.05 U	0.058	0.65	0.63	1.7	1.4	1.6	0.93	0.93	0.71	0.74
рН	SU		8.9		7.54	8.27	7.37	8.49	7.34	9.86	7.69	7.06		7.42	7.21	7.61
Sulfate	mg/L	53.5	52.9	29.2	28.3	83.4	88.5	117	94.7	70.6	157	211	98.8	96.8	232	90
Total Dissolved Solids	mg/L	272	277	242	246	529	530	373	334	303	470	489	392	371	455	363
CCR Appendix IV											•					•
Antimony	mg/L	0.001 U	0.001 U	0.0013	0.0013	0.001 U	0.001 U	0.001 U	0.001 U	0.0012	0.0011	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Arsenic	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	0.013	0.011	0.16	0.19	0.18	0.0016	0.001 U
Barium	mg/L	0.023	0.023	0.023	0.023	0.17	0.18	0.033	0.034	0.0063	0.011	0.068	0.049	0.049	0.03	0.032
Beryllium	mg/L	0.0002 (J 0.0002 U	0.0002 U	0.0002 L	0.0002 U	0.0002 U	0.0002 L	0.0002 U	0.0002 U						
Cadmium	mg/L	0.0002 (J 0.0002 U	0.0002 U	0.0002 L	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.00038	0.0009	0.0002 U	0.0002 U	0.0002 L	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	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	0.001 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
Fluoride	mg/L	1.9	1.8	1.9	1.9	0.05 U	0.058	0.65	0.63	1.7	1.4	1.6	0.93	0.93	0.71	0.74
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
Lithium	mg/L	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U	0.008 U	0.083	0.1	0.018	0.024	0.02	0.017	0.022
Mercury	mg/L	0.0002 (J 0.0002 U	0.0002 U	0.0002 L	0.0002 U	0.0002 U	0.0002 L	0.0002 U	0.0002 U						
Molybdenum	mg/L	0.024	0.024	0.024	0.024	0.013	0.011	0.017	0.015	0.03	0.066	1	0.61	0.61	0.048	0.014
Radium, Total	pCi/L	2.01 U	1.86 U			2.38 U		1.9 U		1.72 U		1.31 U			1.55 U	
Selenium	mg/L	0.016	0.015	0.0082	0.0076	0.001 U	0.001 U	0.0082	0.0086	0.0059	0.019	0.03	0.013	0.014	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	0.0015	0.0021	0.0018	0.0013	0.0013	0.001 U	0.001 U
Field Parameters	•										•					
Dissolved Oxygen	mg/L		7.49		6.99	0.61	0.48	0.88	0.65	4.01	3.23	0.71		0.28	0.83	0.1
Oxidation-Reduction Potential	millivolts		184.3		-11.7	-95.4	-91.7	179.5	-23.6	205	-24.2	-30.9		-83.3	-91.2	-111.3
рН	SU		8.9		7.54	8.27	7.37	8.49	7.34	9.86	7.69	7.06		7.42	7.21	7.61
Specific Conductance	uS/cm		631		497	1179	970	816	619	644	699	693		668	646	672
Temperature	deg C	1	13		14.34	13.8	13.58	14.2	13.51	14	14.6	12.9		13.97	13.3	13.39
Turbidity	NTU		1.69		0.74	1.69	0.51	1.89	0.45	2.02	3.59	4.2		1.99	3.06	3.14

Note:

mg/L = milligrams per liter

uS/cm = micro Siemens per centimeterdeg C = degrees CelsiusNTU = Nephelometric Turbidity UnitspCi/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.



Table 3: Analytical DataCCR Unit Bailly Primary 1 and Primary 2NIPSCO LLC Bailly Generating Station

Chesterton, Indiana

	GAN	1W-18	MW-112		
	Sample Date	2021-05-19	2021-10-21	2021-05-18	2021-10-22
	Sample Type	N	N	N	N
Chemical Name	Unit				
CCR Appendix III			•		
Boron	mg/L	0.16	0.16	0.11	0.15
Calcium	mg/L	76.3	84.1	91.1	114
Chloride	mg/L	1.8	2.4	24.1	13.4
Fluoride	mg/L	1.9	1.7	0.9	1
рН	SU	7.3	7.49	8.19	7.26
Sulfate	mg/L	30.4	31.6	35.2	54.5
Total Dissolved Solids	mg/L	285	279	374	389
CCR Appendix IV					
Antimony	mg/L	0.0014	0.0014	0.001 U	0.001 U
Arsenic	mg/L	0.001 U	0.0011	0.0021	0.0018
Barium	mg/L	0.032	0.032	0.035	0.035
Beryllium	mg/L	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
Chromium	mg/L	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
Fluoride	mg/L	1.9	1.7	0.9	1
Lead	mg/L	0.001 U	0.001 U	0.001 U	0.001 U
Lithium	mg/L	0.014	0.0089	0.012	0.012
Mercury	mg/L	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Molybdenum	mg/L	0.019	0.022	0.034	0.058
Radium, Total	pCi/L	1.26 U		1.29 U	
Selenium	mg/L	0.011	0.012	0.039	0.015
Thallium	mg/L	0.0027	0.0029	0.001 U	0.001 U
Field Parameters					
Dissolved Oxygen	mg/L	5.34	4.67	0.8	0.18
Oxidation-Reduction Potential	millivolts	281.5	-25.5	232.4	-47.4
рН	SU	7.3	7.49	8.19	7.26
Specific Conductance	uS/cm	458.7	526	840	711
Temperature	deg C	12.5	13.7	14.1	15.08
Turbidity	NTU	2.03	1.13	2.6	0.72

Note:

mg/L = milligrams per liter

uS/cm = micro Siemens per centimeterdeg C = degrees CelsiusNTU = Nephelometric Turbidity UnitspCi/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.

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



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) ⁽²⁾	GWPS (mg/L) ⁽³⁾
Antimony	0.006	0.006	0.006
Arsenic	0.01	0.01	0.01
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	0.04	0.04
Mercury	0.002	0.002	0.002
Molybdenum ⁽¹⁾	0.1	0.1	0.1
Radium 226+228	5	5	5
Selenium	0.05	0.05	0.05
Thallium	0.002	0.0039	0.0043

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 in September 2018.

3) GWPS calculated in February 2020.

Prepared by:	DFSC
Checked by:	KMC
Review ed by:	MAH



FIGURES



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REFERENCE(5) 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







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

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PROJECT BAILLY GENERATING STATION CHESTERTON, INDIANA

TITLE WELL LOCATION MAP PRIMARY 1 AND PRIMARY 2

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