Surface Impoundment Closures (CCR Final Rule)

Revised Closure Application

Bailly Generating Station

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List of acronyms

3H:1V	3 horizontal to 1 vertical
AMSL	above mean sea level
ASTM	American Society for Testing and Materials
bgs	below ground surface
BGS	Bailly Generating Station
CCR	coal combustion residuals
CFR	Code of Federal Regulations
cm/sec	centimeters per second
GWPS	groundwater protection standards
HDPE	high-density polyethylene
IAC	Indiana Administrative Code
IDEM	Indiana Department of Environmental Management
IDNP	Indiana Dunes National Park
IDNR	Indiana Department of Natural Resources
LCL	lower confidence limit
LKD	lime kiln dust
LPL	lower prediction limit
MCGS	Michigan City Generating Station
MCL	maximum contaminant level
NC	non-compliance
NGVD29	National Geodetic Vertical Datum of 1929
NIPSCO LLC	Northern Indiana Public Service Company LLC
NPDES	National Pollutant Discharge Elimination System
PVC	polyvinyl chloride
QAPP	quality assurance project plan
RCRA	Resource Conservation and Recovery Act
RMSGS	R.M. Schahfer Generating Station
SAP	sampling and analysis plan
SSI	statistically significant increase
SSL	statistically significant level
SWMU	solid waste management unit
UCL	upper confidence limit
UPL	upper prediction limit
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey

1.0 Introduction

The Bailly Generating Station (BGS), owned by the Northern Indiana Public Service Company LLC (NIPSCO LLC), generated electricity using coal-fired boilers from 1962 until 2018. The coal-fired electricity generating process produced coal combustion residuals (CCR) in the form of boiler slag and fly ash. The CCR materials were sluiced into on-site surface impoundments located southeast of the generating station.

The United States Environmental Protection Agency (USEPA) published the Disposal of Coal Combustion Residuals from Electric Utilities Final Rule (CCR Rule) in the Federal Register on 17 April 2015 requiring closure of CCR surface impoundments not meeting the CCR Rule requirements. The State of Indiana Environmental Rules Board adopted an emergency rule incorporating the USEPA CCR Final Rule requirements for CCR surface impoundments into 329 Indiana Administrative Code (IAC) 10. The amendments in the emergency rule went through a full rule writing process and became permanent 10 December 2016. The Indiana Department of Environmental Management (IDEM) adopted an amendment to update Indiana's regulations for regulating CCR disposal facilities to standards equivalent to the USEPA Rule.

A closure application for CCR impoundments at BGS was submitted to IDEM on February 3, 2021. This document presented the plan and objectives to close these regulated surface impoundments to meet federal and state requirements. This revised closure application addresses modifications to the previous plan to include post closure stormwater management utilizing an infiltration gallery system as outlined in Section 8 of this document. The permit drawings (Appendix A), Surface Water Calculations (Appendix C), Construction Quality Assurance Plan (Appendix D, and IDEM Opinion of Probable Closure and Post Closure Cost (Appendix H) have been revised to reflect this closure modification.

1.1 BGS surface impoundments

The BGS has six surface impoundments located southeast of the generating station. Four of the surface impoundments are CCR Rule regulated. Secondary Settling Pond No. 2 and the Forebay did not manage CCR and are not CCR Rule regulated.

BGS Surface impoundments	
CCR surface impoundments	**Non-CCR impoundments**
Boiler Slag Pond	Secondary Settling Pond No. 2
Primary Settling Pond No. 1	Forebay
Primary Settling Pond No. 2	
Secondary Settling Pond No. 1	

1.2 Closure application objectives

The closure application objectives are to:

- Comply with state and federal regulatory requirements
- Present rationale for proposed closure by removal

- Provide engineering drawings depicting limits and methods to achieve closure by removal
- Describe anticipated post-closure care monitoring and maintenance activities
- Present the post-closure care groundwater monitoring plan
- Develop a schedule for closure and post-closure care activities
- Develop closure and post-closure care opinion of probable costs

2.0 Facility overview

2.1 Location and setting

The BGS is located on the southern shore of Lake Michigan on approximately 350 acres near Chesterton, Indiana. (See Figure 1 - Site Location Map). The street address is 246 Bailly Station Road, Chesterton, Indiana 46304 at latitude 41° 38′ 18″ North, and 87° 07′ 02″ West. The Township is 37N, Range 6W, and Section 21. The BGS and surrounding area are shown on United States Geological Survey (USGS) Quadrangle Map Dune Acres (see Figure 2 - Site Vicinity Map).

The BGS is bounded on the north by Lake Michigan, the east by the Indiana Dunes National Park (IDNP), and on the west and south by ArcelorMittal Steel (formerly Mittal Steel, formerly International Steel Group, and before that, Bethlehem Steel), and partially on the south by US Route 12 and freight and commuter rail lines.

2.2 Facility development

The BGS initiated construction in 1959 with a single coal fired unit (Unit 7) and began commercial operation in 1962. Beginning in 1966, a major expansion project was undertaken to allow construction of a second coal-fired generating unit, Unit 8, which became operational in 1968.

The BGS ceased the coal-fired boilers operation 30 April 2018. A third generator (Unit No. 10), which burned natural gas was retired on 15 July 2020.

2.3 Surface impoundments

Four CCR surface impoundments are located southeast of the BGS generating station. An aerial photograph of the BGS, along with the surface impoundment locations, is presented in Figure 3 - Aerial Photograph of Surface Impoundments. The surface impoundments are primarily incised, constructed below ground surface, with interior side slopes to the pond bottoms. Sargent and Lundy Engineers designed the current configuration of the surface impoundments that began operation in 1981. The surface impoundments were constructed with a liner system consisting of one foot of natural clay and a geomembrane component, with a sand cushion layer and steel furnace slag surface protection. The area and estimated volume of CCR material within each of the surface impoundments is presented in Table 1.

Table 1: Surface Impoundment Closure Information
Surface Impoundments Closure Application, Bailly Generating Station

Surface impoundment	Impoundment type	Impoundment **size (acres)**	Current Estimated CCR volume (cubic yards)
Boiler Slag Pond	Partially incised	1.2	1,000(1)
Primary Settling Pond No. 1	Incised	5.6	28,000(2)

Surface impoundment	Impoundment type	Impoundment **size (acres)**	Current Estimated CCR volume (cubic yards)
Primary Settling Pond No. 2	Incised	7.2	20,000[3]
Secondary Settling Pond No. 1	Incised	2.5	6,000[2]

Note 1: The Closure Plan prepared by Haley and Aldrich dated 7 February 2019 indicated 11,000 cubic yards (CY) of boiler slag. In 2020, Harsco Recycling Co. removed usable boiler slag from the impoundment for beneficial use. It is estimated that 90% of the boiler slag was removed and current remaining volume is on the order of 1,000 CY.
Note 2: CCR volume based on Closure Plan prepared by Haley and Aldrich dated 7 February 2019.
Note 3: Volume based on Closure Plan prepared by Golder dated January 2019

Note that the current impoundment configuration is located within the footprint of a previous set of surface impoundments. It is believed that the original boiler slag pond, primary settling ponds, and secondary ponds were first used when the facility operations began in 1962. Reconstruction of these impoundments took place when the original ponds were reconfigured with construction completed in 1981.

2.4 Previous site investigations

Previous site investigations have been performed at the BGS. The following are relevant to the surface impoundments:

- AMEC Earth & Environmental, Inc. (AMEC), 2005. RCRA Current Conditions Report, NIPSCO Bailly Generating Station Chesterton, Indiana, prepared for Northern Indiana Public Service Company, April 13, 2005.
- AMEC, 2007b. RCRA Facility Investigation Report. NIPSCO Bailly Generating Station, Chesterton, Indiana. August 30, 2007.
- Amec, 2008, *2008 Michigan City Generating Station Subsurface Investigation Summary*, Michigan City, Indiana.
- AMEC, 2010. RCRA Facility Investigation Report for Area B. NIPSCO Bailly Generating Station, Chesterton, Indiana. August 16, 2010.
- USGS Water Resources Investigation 81-16 (USGS, 1981). Data from this 1981 USGS water resources investigation titled, "Effects of Coal Fly Ash Disposal on Water Quality in and around the Indiana Dunes National Lakeshore."
- Water Resources Report 85-4340 (USGS, 1986). This 1986 USGS water resources investigation titled, "Shallow Ground-Water Flow, Water Levels, and Quality of Water 1980-84, Cowles Unit, Indiana Dunes National Lakeshore."
- Final Round 10 - Dam Assessment Report - Bailly Generating Station Coal Ash Impoundments. Prepared by GZA, Inc. dated 17 August 2012.RCRA Facility Investigation (RFI) Report submitted on August 30, 2007 (AMEC, 2007),

3.0 Geology and hydrogeology information

3.1 Physiography

The BGS is located within the Calumet Lacustrine Plain, a physiographic province characterized by three post-glacial dune-beach complexes and bordered on the north by Lake Michigan and on the

south by the Valparaiso Morainal Area (Shedlock et al., 1994). The dune-beach complexes parallel the BGS and the current lakeshore boundary. Local geomorphology from the lakeshore to the south consists of the Holocene and Tolleston dune-beach complex, the western portion of the Great Marsh (an interdunal lowland), and the Calumet and Glenwood dune-beach complex; however, the landscape has been modified to support the BGS facility activities and consists primarily of cut and fill materials (Cohen and Shedlock, 1986). The area northeast of the BGS is preserved largely in its natural state as part of the IDNL and consists of the Great Marsh and landforms of the Holocene and Tolleston dune-beach complex. Part of the Great Marsh northeast of the BGS is designated as the Cowles Bog National Natural Landmark (Cowles Bog).

The land surface elevation ranges from approximately 578 feet above mean sea level (AMSL) along the shore of Lake Michigan to approximately 627 feet AMSL within the BGS. The elevation ranges from approximately 619 feet to 627 feet AMSL. The locations of Geologic Cross Section A-A', and Geologic Cross Section B-B', are shown on Figure 1 and Figure 2, respectively in Appendix B.

3.2 Geology

The geology along the Lake Michigan southern shore represents a complex glacial and post-glacial history consisting of shallow-water coastal lake, wetland, and dune sedimentation that began during, and continued after, the final stages of glacial retreat in the Great Lakes area.

3.2.1 Bedrock geology

Unconsolidated deposits in the BGS vicinity are underlain by the Antrium Shale (Upper Devonian) and carbonate rock (Muscatatuck Group) of Devonian Age. Bedrock in the BGS vicinity ranges from 430 feet to 450 feet AMSL. The Antrium Shale consists of brown to black non-calcareous shale and para conformably (strata are parallel, and the contact is a simple bedding plane) overlies the Muscatatuck Group rocks in the BGS area. The Muscatatuck Group consists of rocks that are predominately limestone and dolomite.

A 1977 USGS boring near the eastern portion of the BGS encountered bedrock (Antrium Shale) at 175 feet below ground surface (bgs). A second USGS boring on the western portion of the BGS encountered shale (Antrium Shale) at 182 feet bgs.

3.2.2 Unconsolidated deposits

Indiana Dunes region subsurface unconsolidated deposits are comprised of three distinct sedimentary units: the basal, middle (till), and surface units. These three sedimentary units can be seen in Geologic Cross Section A-A' presented in Figure 1 in Appendix B.

The basal unit consists of randomly interbedded clay, sand and gravel, and till, and rests on the irregular Paleozoic bedrock surface. The thickness of this lowermost lithologic unit in the area of the BGS is highly variable because of the underlying bedrock's relief and sediments erosion.

The middle unit (till) consists of an assemblage of interbedded, till, glacial/lake clay, sand, and gravel. This unit outcrops in the region as the Lake Border Moraine, about 0.5 miles south of the BGS. The middle unit thickness ranges from 0 feet to 80 feet. The glacial/lake deposits are well developed northward within the unit, where the unit extends under Lake Michigan. The till deposit at the BGS is thickest to the north bordering Lake Michigan, and is thinnest southwest of the BGS, where the till may be discontinuous (Meyer and Tucci, 1979).

The surface unit, an outcropping along the Lake Michigan southern shore, consists of coastal sand with minor gravel, clay, calcareous mud, and peat. This series of dune complexes began forming in response to changes in lake level and changes in the amount of sediment supplied to the coastline.

The Holocene and Tolleston dune-beach deposits underlying the BGS and extending northeast along the shore are composed of up to 50 feet of fine-grained, well-sorted eolian sand with lesser lacustrine beach sand and gravel (Hardy, 1981).

Historical USGS investigations indicate the unconsolidated deposits' upper 50 feet are composed of gray to tan fine sand with some zones of medium sand and gravel. The lower 130 feet are comprised of silty lake clay with interspersed thin beds of silty sands.

3.2.3 Soils

Soils in the BGS vicinity are composed primarily of five types: Oakville fine sand, Houghton muck, Adrian muck, Maumee loamy fine sand, and dune sand.

Soils (surficial deposits) in the BGS area are mainly dune deposits that contain sand and some fine gravel. In addition to the dune deposits, the IDNP intradunal wetlands contain paludal deposits (peat, muck, some marl, and mixtures of peat and sand). The largest portion of land used for industrial purposes is classified as cut and fill.

3.3 Hydrogeology

3.3.1 Bedrock aquifers

The occurrence of bedrock aquifers in the Lake Michigan region depends on the original composition of the rocks and post-depositional changes, which can influence hydraulic properties. The Antrium Shale is a poorly productive shale that overlies the fairly productive carbonates of the Muscatatuck Group. In general, bedrock aquifers are not utilized in the area because of the unproductive shale at the bedrock surface and availability of water from the overlying glacial deposits (Indiana Department of Natural Resources [IDNR], 1994).

3.3.2 Surficial aquifers

Surficial aquifers under the BGS consist of glacially derived sediments associated directly or indirectly with Lake Michigan ice lobe advance and retreat during the Wisconsinan glaciation. There are three major aquifers within the unconsolidated sediments surrounding the BGS: basal, subtill, and surficial. The basal sand aquifer appears to be thicker east of the BGS, although the aquifer extent is not well defined.

The most extensive confined aquifer in the area is the subtill aquifer, which consists primarily of sand with interbedded lenses of clay. The subtill aquifer is part of the geologic middle unit and underlies the entire area of the Lake Border Moraine, which originates in the upland areas south of the BGS and extends beneath the easternmost portion of the BGS based on multiple borings advanced by Wood during the Resource Conservation and Recovery Act (RCRA) Corrective Action program. The subtill aquifer does not appear to extend westward below the CCR Units.

The most extensive aquifer in the BGS area is the surficial aquifer, which consists primarily of unconfined lacustrine and eolian sands. The surficial aquifer under the BGS is approximately 50 feet thick, and groundwater flow in the surficial aquifer is primarily horizontal toward Lake Michigan. The surficial aquifer is sometimes separated into an upper and lower sand unit by a calcareous clay of variable thickness and continuity. This clay unit was encountered in some of the borings advanced near the CCR units during the RCRA Corrective Action and CCR programs. Near the CCR units the saturated thickness of the uppermost sand aquifer ranges from 15 feet to 30 feet depending on the height of the fluctuating water table. Regional estimates of aquifer transmissivity (unconsolidated deposits) in the vicinity range from 10,000 to 50,000 gallons per day per foot (IDNR, 1994). No water

supply wells exist within the BGS and, according to information provided by the IDNR, no potable water supply wells exist within the portion of IDNL located hydraulically downgradient of the BGS.

A line of extraction wells was installed in an east-west alignment approximately 600 feet south of the BGS surface impoundments on the ArcelorMittal Steel property that were once used to dewater foundations at several buildings. Online records available from the Indiana Department of Natural Resources (IDNR) show that the test capacities of these wells ranged from 300 to 1000 gallons per minute (gpm) at the time of installation. None of these wells are registered with the IDNR as Significant Withdraw Wells.

Additional wells were installed on the ArcelorMittal Steel property further south of the above referenced well alignment, including one Significant Withdraw Well. IDNR records indicate that this well has an average annual pumping rate of approximately 200 gpm. The following was stated in a letter by EPA provided to NiSource Environmental Remediation, dated January 21, 2021, "According to ArcelorMittal, of the 35 dewatering wells that were installed many years ago, only one is still in use…The only dewatering well that is currently in use is pumping groundwater at 15 gallons per minute." This information corroborates Woods understanding of the current pumping well south of the impoundments on the Arcelor Mittal property with the exception of the pumping rate.

3.3.3 Surface water

Lake Michigan is located immediately north of the BGS. Industrial consumers and public utilities use Lake Michigan for multiple purposes. The Little Calumet River is located approximately 0.5 miles south of the BGS, and discharges to Lake Michigan through Burns Ditch about 5 stream miles west of the BGS, as shown in Figure 3 - Aerial Photograph of Surface Impoundments.

Surface water features at the BGS include the Boiler Slag Pond, Primary Settling Pond No. 1, Primary Settling Pond No. 2, Secondary Settling Pond No. 1, Secondary Settling Pond No. 2, and the Forebay as shown in Figure 4. Surface water runoff predominately from the coal pile area is managed in the Coal Handling Maintenance Surface Impoundment and the Coal Pile Runoff Absorption Area. Permanent surface water bodies known as the Southeast Ponds are present abutting the far eastern portion of the BGS and wetlands that contain surface water depending on precipitation and groundwater elevations, including Central Blag Slough, Little Lake, and the Eastern Wetlands are present in the IDNP north and northwest of the CCR Units.

4.0 Regulatory framework

Federal regulations contain primary closure requirements for CCR surface impoundments at the BGS. The Federal CCR Rule (40 CFR 257), hereinafter referred to as "the CCR Final Rule," lists rules and requirements to be implemented to close the surface impoundments cited in this closure application.

Prior to the CCR Final Rule, the State of Indiana developed regulatory guidance for closing surface impoundments as outlined in 329 IAC 10. The State of Indiana has incorporated the CCR Final Rule by reference.

This closure application has been prepared to address the CCR Final Rule and applicable IDEM regulations as related to specific closure requirements and post-closure care and cost opinions.

4.1 Federal CCR Rule

The CCR Final Rule was published in the Federal Register 17 April 2015 and became effective 19 October 2015. Written closure plan and post-closure care requirements are set forth in 40 CFR § 257.102 (b)(1) and 40 CFR § 257.104, respectively, and are discussed more fully within this closure application. CCR Final Rule closure requirements applicable to the surface impoundments include:

- General Provisions in 257.50 through 257.53
- Ground water monitoring and corrective action standards in 257.90 through 257.98
- Closure and post-closure care standards in 257.100 through 257.104
- Recordkeeping, notification, and posting of information to the Internet in 257.105 through 257.107.

5.0 Surface impoundment description

Sargent & Lundy Engineers designed the surface impoundments beginning in 1978 with construction completed in 1981. The impoundments are incised, excavated below the surrounding ground surface. A perimeter slope was excavated downward to the relatively flat impoundment bottom. Each surface impoundment was constructed with a liner system consisting of the following components presented in descending order from top to bottom:

- One-foot of coarse-graded crushed steel furnace slag
- Six inches of sand
- A geomembrane
- Six inches of sand
- One foot of clay soil material.

One exception to this bottom liner system configuration is the Boiler Slag Pond has two feet of steel furnace slag as the top component.

Overhead power lines span all four of the surface impoundments in the east / west direction. Overhead power lines including transmission line support towers are present along the southern and northern impoundment limits. The support towers are located as follows:

- East of the Boiler Slag Pond and at the southwest corner of Primary Settling Pond No. 1
- At the southeast corner of Primary Settling Pond No. 1 and the southwest corner of Primary Settling Pond No. 2
- At the southeast corner of Primary Settling Pond No. 2 and the southwest corner of Secondary Settling Pond No. 2
- East of Secondary Settling Pond No. 1.

The support towers are located on unexcavated areas that exist between the impoundments. The overhead transmission lines and support towers were in place prior to construction of the currently configured surface impoundments.

A piping system was constructed to transfer operational water through the surface impoundment system. Boiler slag was sluiced from the generating station to the impoundment. Fly ash was sluiced to Primary Settling Pond No. 1 and Primary Settling Pond No. 2. Sluiced water was transferred from the Boiler Slag Pond to Primary Settling Pond No. 1. Operational waters were subsequently transferred from Primary Settling Pond No. 1 through the existing piping system and subsequently into the Forebay for discharge.

5.1 Boiler Slag Pond

The Boiler Slag Pond has an irregular shape, approximately 335 feet long by 160 feet wide and encompasses approximately 1.2 acres. Based on the Closure Plan prepared by Haley and Aldrich

dated 7 February 2019, the impoundment contained as much as 11,000 CY of CCR material. In 2020, Harsco Recycling Co. (Harsco), removed usable boiler slag from the impoundment for beneficial use. It is estimated that approximately 90% of the boiler slag was removed and remaining CCR is estimated to be on the order of 1,000 CY.

The Boiler Slag Pond was designed as a lined surface impoundment with an approximate depth ranging from 8 to 9 feet. This depth corresponds to a bottom of impoundment elevation (top of liner) of approximately 618.5 to 619.5 feet NAVD88 (North American Vertical Datum of 1988) sloping toward Primary Settling Pond No. 1.

The impoundment interior slopes were designed at 3 horizontal to 1 vertical (3H:1V); however, excavation for slag removal and erosion have occurred, allowing steepened interior slopes with light vegetation near the ground surface. The exterior slopes are at 3H:1V, sparsely vegetated with grass, with some signs of erosion.

5.2 Primary Settling Pond No. 1

Primary Settling Pond No. 1 measures approximately 750 feet long by 350 feet wide and encompasses approximately 5.6 acres. The surface impoundment is incised with an approximately 120-foot-wide flat area between Primary Settling Pond No. 1 and Primary Settling Pond No. 2. The interior slopes are constructed at 3H:1V. Primary Settling Pond No. 1 contains approximately 28,000 cubic yards of CCR material, based on the Closure Plan prepare by Haley and Aldrich dated 7 February 2019. Primary Settling Pond No. 1 is a lined surface impoundment with an approximate depth ranging from 8 to 10 feet. The bottom elevation is approximately 611.5 feet to 613.5 NAVD88.

5.3 Primary Settling Pond No. 2

Primary Settling Pond No. 2 measures approximately 750 feet long by 400 feet wide and encompasses approximately 7.2 acres. Primary Settling Pond No. 2 is an incised pond with an approximately 100-foot-wide flat area present between Primary Settling Pond No. 2 and Secondary Settling Pond No. 2 located to the east. The interior slopes are constructed at 3H:1V.

Primary Settling Pond No. 2 is a lined surface impoundment with an approximate depth below ground surface ranging from 20 feet to 14 feet from west to east. It has a bottom elevation (top of liner elevation) of approximately 612.5 feet to 610.5 feet, sloping from west to east. The top of the impoundment is at approximately 625 feet on the north and east sides, approximately 620 feet along the south side, and approximately 635 feet on the west side. Primary Settling Pond No. 2 stores approximately 20,000 cubic yards of CCR material, based on the Closure Plan-Rev 2 prepared by Golder dated January 2019.

5.4 Secondary Settling Pond No. 1

Secondary Settling Pond No. 1 measures approximately 385 feet long by 275 feet wide and encompasses approximately 2.5 acres. It is an incised pond with interior slopes constructed at 3H:1V. Secondary Settling Pond No. contains approximately 6,000 cubic yards of CCR material, based on the Closure Plan prepared by Haley and Aldrich dated 7 February 2019.

Secondary Settling Pond No. 1 is a lined surface impoundment with a bottom elevation (top of liner elevation) of approximately 609.5 feet to 608.5 feet NAVD88, sloping from west to east. The top of the impoundment is at approximately 620 feet to 623 feet NAVD88 with an approximate depth ranging from 10 to 14 feet.

6.0 Closure approach

The following sections discuss the surface impoundments closure approach.

6.1 General approach

Removing the surface impoundment contents (CCR) is the proposed closure method. CCR material will be excavated and transported to the NIPSCO LLC R.M. Schahfer Generating Station (RMSGS) onsite landfill for disposal (or possibly sold for beneficial use). The CCR materials from each surface impoundment will be excavated, placed in highway dump trucks, and transported over a pre-determined route to the RMSGS.

Closure by removal will include removing contents to the impoundments limits as determined from the Sargent and Lundy construction documents. The surface impoundment closure will consider requirements to preserve the overhead powerlines, including poles and high transmission metal towers running along the surface impoundment's northern and southern boundaries.

The surface impoundments liner components will be removed for disposal in the NIPSCO LLC RMSGS onsite landfill. The geomembrane material will be separated from the slag/sand/clay soil material for disposal at the RMSGS CCR Landfill or in an off-site facility permitted to accept the geomembrane material. The impoundment slopes associated with unexcavated areas between the impoundments were lined to extend up the perimeter slope beyond the CCR/ free water level. The liner will be removed from the perimeter slopes and verification procedures performed as described in this closure application.

As indicated, the impoundments were constructed by excavating below the ground surface, therefore berms were not constructed with the exception of the partial berm at the Boiler Slag Pond. The berm material at this location will be excavated and disposed at the RMSGS on-site CCR landfill.

Removal verification procedures will be conducted at the bottom of the surface impoundments upon excavation completion for the surface impoundment CCR and liner system. Verification will include visual observations for the presence of CCR and topographical survey of the CCR limits, liner system limits, and excavation bottom. Photographs will be taken to document the CCR removal conditions.

Grading and placing off-site soil/topsoil material to a minimum depth of 2 feet (18 inches of soil material and 6 inches of topsoil) will create a final cover and promote storm water runoff. Post closure storm water runoff will be managed by gravity drainage or by using the existing piping system and Forebay pumping station.

6.2 Closure performance standard

The CCR Rule as well as IDEM regulations establish requirements for the CCR surface impoundment closures. The closure performance standards are listed in Table 2.

Table 2: Closure Performance Standards

Surface Impoundment Closure Application, Bailly Generating Station

Regulation	Citation	Closure performance standard
40 CFR 257	102(c)	An owner or operator may elect to close a CCR unit by removing and decontaminating all areas affected by releases from the CCR unit.

Regulation	Citation	Closure performance standard
		CCR removal and decontamination of the CCR unit are complete when constituent concentrations throughout the CCR unit and any areas affected by releases from the CCR unit have been removed and groundwater monitoring concentrations do not exceed the groundwater protection standard established pursuant to §257.95(h) for constituents listed in Appendix IV to this part.
40CFR 257	102(d)	Control post closure infiltration of liquids through the former unit. Permeability of soil cover layer is not less than 1 x 10^{-5} centimeters per second (cm/sec). Preclude the probability of future impoundment of water, sediment, or slurry. Provide for major slope stability to prevent sloughing or movement. Minimize need for maintenance Timely completion of closure
329 IAC	10-30-1	Owner or operators of Type I and Type II restricted waste sites and non-municipal solid waste landfills shall close the facilities in such a manner that: • Minimizes the need for further maintenance • Controls post-closure escape of waste, waste constituents, leachate, contaminated precipitation, or waste decomposition products to the ground or surface waters or the atmosphere • At a minimum, is in compliance with applicable closure provisions and conditions imposed in the facility permit.

7.0 Closure design

Closure will be conducted by removing surface impoundment contents (CCR materials). The following sections of this closure application provide closure methodology discussions and details. Removing impounded water, dewatering interstitial water, and moisture conditioning of the CCR will be conducted as necessary to complete the surface impoundment closures. The impoundment liner system (as described previously) will be removed and disposed. Backfill soil to achieve subgrade and a two-foot soil cover will be placed over the former surface impoundment areas following excavation to provide:

1. Grading to manage surface water runoff
2. Final cover as a separation layer and to limit infiltration.

Overhead electrical transmission lines including poles and high transmission metal towers are present along the surface impoundments' northern and southern boundaries. The support structures (towers) and below grade foundations are located adjacent to the surface impoundments. The transmission

lines will remain in operation and final closure design must consider the towers' integrity with respect to CCR excavation and removal near them.

7.1 Demolition

The inflow pipelines associated with CCR and non-CCR discharge will be removed or capped at the impoundment limit and grouted with a minimum length of 10 feet of flowable fill. Piping that is left in place will be cleaned of CCR prior to grouting.

The removed system piping will be cut for placement in roll-off boxes for off-site disposal in a disposal facility permitted to accept the pipe materials. Concrete structures associated with the piping system will be demolished with the reinforcing materials removed for recycling, if appropriate, and the concrete debris placed in roll-off boxes for off-site disposal in a disposal facility permitted to accept the demolished concrete materials. The Boiler Slag Pond has a concrete retaining wall that will be demolished and properly disposed during closure.

7.2 Dewatering considerations

Water management will be required during surface impoundments closure activities. Requirements include free water removal, CCR interstitial water removal, storm water control during closure implementation, and potential groundwater inflow. Water management will be conducted using trenches and sumps, mechanical pumps, well point systems, or removal wells. Dewatering operations and associated discharges during closure will be managed to meet IDEM guidelines, federal discharge limits, and NPDES requirements, as appropriate. NIPSCO LLC will coordinate with IDEM's Office of Water Quality to develop allowable discharge conditions and constituent limits.

The groundwater level around the surface impoundments is typically located near the bottom on the ponds, depending on the varying bottom elevations. Levels have fluctuated since the BGS ceased operation of the coal-fired boiler operations. Groundwater levels dropped significantly at the Boiler Slag Pond to levels that are currently 6 feet or more below the deepest liner bottom elevation of 614.5 ft NAVD88. The water level decline at Primary Settling Pond 1 was less pronounced compared to the Boiler Slag Pond. Current groundwater elevations at Primary Settling Pond 1 are a foot or more below the deepest liner base elevation of 608.5 ft NAVD88. Water level declines after the plant shutdown were not evident at Primary Settling Pond 2 or Secondary Settling Pond 1. Groundwater levels at Primary Settling Pond 2 occasionally rise above the deepest liner base elevation of 607.5 ft NAVD88, whereas groundwater levels at Secondary Settling Pond 1 routinely rise above the highest liner base elevation of 606.5 ft NAVD, and since 2016 have always been above the lowest liner base elevation of 605.5 ft NAVD88.

Expected water management activities are discussed as follows:

- Free water removal - The surface impoundments at the BGS contain approximately 22 million gallons of free water (based on closure plans previously referenced). Free water removal will be performed by gravity flow and, where necessary, mechanical pumping, discharging to the permitted NPDES discharge. Shallow trenches or sumps excavated prior to commencing grading activities, and pumps installed, if necessary, can lower the surface impoundment water level to allow excavation activities to begin.

- CCR interstitial water removal - Water draining from the CCR materials during excavation will be managed during closure activities. This water will be collected in sumps for appropriate discharge and or disposal.
- Storm water control - Storm water from rainfall events will be managed based on the stage of closure for each of the surface impoundments. Rainfall occurring during the excavation activity will be diverted, as needed, using perimeter ditches, diversion berms, and/or swales to direct surface run on around/away from the surface impoundments. Rainfall within the excavation areas will be managed with ditches to direct the water to sumps. Storm water will be evaluated for appropriate discharge or disposal.
- Potential groundwater inflow -Closure activities are likely to encounter groundwater depending on the seasonal conditions and fluctuating groundwater elevations. Consideration will be given to performing excavation work during the summer construction season. Accumulated groundwater, if encountered, will be collected in sumps, by well points and/or rim ditches.

7.3 CCR excavation

CCR materials in the surface impoundments will be excavated following completion of the free water removal activity and transported for disposal in the RMSGS onsite landfill. The excavation sequence is expected to begin with the Boiler Slag Pond and move west to east to Primary Settling Pond No. 1, Primary Settling Pond No. 2, and finish with Secondary Settling Pond No. 1. The actual excavation sequence will be a collaborative decision of NIPSCO LLC and the selected closure contractor.

7.3.1 Excavation

CCR material will be excavated using appropriate equipment, e.g., track-mounted hydraulic excavators, bulldozers, on-road dump trucks, etc. The CCR materials will be excavated, drained of excess water, conditioned as necessary, and placed in over-the-road (highway) dump trucks for transport to the NIPSCO LLC RMSGS onsite landfill for disposal. Liner materials will be excavated using similar equipment and methods as the CCR material excavation. The blast furnace slag and geomembrane liner material will be separated from the sand and clay soil material for disposal at the RMSGS CCR Landfill or in an off-site disposal facility permitted to accept the blast furnace slag and geomembrane material. The sand and clay soil material will be loaded and transported for disposal in the NIPSCO LLC RMSGS onsite landfill. Material excavation information and estimated excavation volumes are presented in Table 3.

The CCR material will be excavated to the depth of the design bottom of each of the surface impoundments, plus removal of the bottom liner system. Visual verification of CCR removal will be performed upon completion of the surface impoundment excavation. The excavation limits i.e. bottom and side slopes, will be field surveyed to provide a record of the depth of the CCR materials, bottom liner system, and final excavation depth.

Table 3: Preliminary Surface Impoundment Excavation Information
Surface Impoundment Closure Application, Bailly Generating Station

CCR impoundment name	Bottom of impoundment/CCR elevation (feet)	Removal excavation elevation (feet)	Current Estimated CCR Volume CY	Estimated Liner Volume CY	Estimated excavation volume (cubic yards) [1]
Boiler Slag Pond	619	615	1,000	12,000	13,000
Primary Settling Pond No. 1	612	609	28,000	29,000	57,000
Primary Settling Pond No. 2	611	608	20,000	31,000	51,000
Secondary Settling Pond No. 1	609	606	6,000	10,000	16,000
Total	-	-	55,000	82,000	137,000

7.3.2 CCR conditioning

Based on the moisture level after dewatering, excavated CCR materials may require conditioning prior to loading and transporting the CCR materials for disposal. Conditioning may include draining by gravity, mixing with available drier material, and, if required, adding stabilization/ solidification materials such as quicklime, cement kiln dust (CKD), lime kiln dust (LKD), or Portland cement. The requirement for conditioning will be field determined based on site specific conditions and the result of paint filter testing. Further discussion regarding CCR conditioning has been provided in the Response to Request for Additional Information (RAI) dated June 21, 2021 and is inserted as follows.

> *"During closure activities, NIPSCO LLC will take appropriate measures to stabilize the CCR at a moisture level such that CCR is not displaced during the transportation process. Considerations for construction/transportation methods will include conditioning the CCR.*
>
> *CCR conditioning during the closure process will include physical, mechanical, and, if needed, chemical additive methods. The level of conditioning necessary will vary based on site-specific conditions, including type of CCR, initial moisture level when excavated, and tendency of CCR to release water naturally. Initially, free water will be removed from the impoundments as well as dewatering of the CCR prior to excavation. This activity will drain much of the interstitial water prior to the removal process. CCR will then be excavated and placed onto a bench within the CCR impoundment footprint and allowed to naturally drain. As a second step, if appropriate, the CCR may be spread or windrowed to allow further drying. The construction contractor may also*

blend dry CCR with wetter CCR to achieve a moisture content that is stable for transport. It is anticipated that under most conditions, these activities will be sufficient to lower the moisture level and allow transportation of the CCR.

As a further step, if the above CCR conditioning methods do not sufficiently lower the moisture content, chemical stabilization may be considered to reach required levels for transport. Lime kiln dust (LKD), quick lime, Portland cement, or cement kiln dust (CKD) will be mixed to lower the moisture to appropriate levels. Mixing ratios generally vary from three to eight percent; however, ratios vary depending on the CCR and chemical additive. General requirements for excavation, loading and transportation of CCR, as previously described, will be identified in the project contract documents. Means and methods are typically established by the contractor based on the technical specifications.

During the Michigan City Generating Station (MCGS) Closure Application approval process, NIPSCO LLC successfully demonstrated that chemical additives would be acceptable for mixing with CCR materials and meet the NIPSCO LLC Rollin M. Schahfer Generating Station CCR-compliant landfill permit requirements. The commercially available additives are not expected to change and therefore, should have the same chemical compositions for both closure projects (i.e., MCGS and BGS). Since the chemical additives and CCR materials are consistent between generating stations, NIPSCO LLC proposes to use the previously submitted and IDEM-approved analytical results for the BGS project. NIPSCO LLC will provide the chemical additive results to IDEM under separate cover."

7.3.3 Dust Control

Construction dust will be carefully controlled and monitored throughout the closure project duration to comply with all local, state and national requirements. Per 40 CFR 257.80, NIPSCO has prepared a CCR Fugitive Dust Control Plan (Plan) for the Bailly Generating Station . While this Plan more directly addresses facility operations activities, the dust control measures are appropriate and will be applied/enforced during the closure construction activities. The contractor will be required to control and manage dust throughout every phase of the project. The contractor will be required to meet BGS's Air Quality Permit conditions. A project-specific dust control plan will be one of the contractor's required submittals for performing excavation, transport, and backfilling activities. A dust control narrative was provided in the Response to Request for Additional Information dated June 21, 2021, and is included in this closure application as follows.

General

Construction dust will be carefully controlled and monitored throughout the closure project duration to comply with all local, state, and national requirements. Per 40 CFR 257.80, NIPSCO LLC has prepared a CCR Fugitive Dust Control Plan (Plan) for the Bailly Generating Station (BGS). While this Plan more directly addresses facility operations activities, the dust control measures are appropriate and will be applied/enforced during the closure construction activities.

The closure contractor will be directly responsible for dust control during closure and will prepare a site-specific Dust Control Work Plan applicable to his work methods. NIPSCO LLC will review and approve the Contractor's Dust Control Work Plan. Other involved parties associated with the

closure, (Owner's Engineer and Construction Quality Assurance (CQA) representative) will regularly observe site conditions for adequacy of dust control measures.

Project Approach

The Dust Control Work Plan incorporates measures to minimize CCR from becoming airborne during closure activities. Primary dust control will be addressed by applying water to haul roads, open excavation areas, and stockpiles. Appropriate measures will be taken to properly condition site surface areas. Conditioning generally refers to wetting the CCR with water to prevent wind dispersal. Water is applied to site surface areas using water trucks, equipped all-terrain vehicles and manual spray nozzles to maintain appropriate moisture conditions during construction. Dust control equipment will generally operate continuously during active construction hours unless site conditions are such that dust control is not necessary. Conditioning can also be accomplished with a commercially available dust control product. Stockpiles may be covered with tarps or plastic sheeting to prevent dust dispersal.

Contractor Requirements

The closure contractor will be required to submit a detailed site-specific Dust Control Work Plan to control dust for all the aspects of the Project; excavation, staging, conditioning, loading, and hauling of the CCR materials and staging, placing, grading, and compaction of the subgrade fill, soil cover and aggregate/topsoil materials. Dust control related to the interior haul/access roads at BGS will be required throughout the performance of the Work. The Contractor will detail how the dust is controlled for material stockpiles; both excavated CCR materials and, if performed, stockpiles of subgrade fill, soil cover, topsoil, and aggregate materials.

1. *The Contractor's Dust Control Work Plan will be reviewed regularly for compliance and adequacy. If needed, the Contractor's Dust Control Work Plan will be revised, and operations adjusted accordingly.*

2. *Develop the Dust Control Work Plan considering one (1) or a combination of the three (3) methods as follows:*

    a. *Water Application.*

    b. *Chemical Application.*

    c. *Cover Material.*

3. *The Contractor, as part of the Work, will provide sufficient water trucks for dust suppression at the Project Site and the Laydown Area. The Owner shall have the right to direct the Contractor to halt construction activities in the event of a dust suppression deficiency until the Contractor addresses such deficiency. Water used for dust control shall be from an Owner-approved source.*

7.3.4 CCR transport and disposal

Transportation and disposal of the excavated CCR will be to the NIPSCO LLC RMSGS onsite, CCR-compliant landfill. The excavated CCR/ liner materials will be loaded in highway-compatible trucks equipped with tarpaulins/covers and be transported using a pre-determined route to the NIPSCO LLC RMSGS onsite landfill. The CCR/liner materials will be disposed at the RMSGS onsite landfill as directed by the RMSGS onsite landfill operator. The required permits and/or authorizations for CCR/liner material transportation and disposal will be obtained in accordance with local, municipal, state, and federal rules and regulations. NIPSCO LLC, if required, will coordinate with IDEM any RMSGS onsite landfill permit amendments related to disposing of the CCR/liner materials, including possible CCR/liner conditioning materials such as LKD, Portland cement, or other amendments, from the surface impoundments. Off-site transportation and disposal of blast furnace slag and geomembrane liner materials will follow the same procedures as the CCR/liner materials off-site transportation and disposal.

Transport and disposal of the CCR and liner materials will be documented during closure activities. The volume, method of disposal, and final location of the CCR/liner materials will be documented.

Measures will be employed to prevent trucks transporting the CCR/liner material for off-site disposal from carrying CCR/ liner material outside the impoundment closure footprint. One of the following methods or a combination thereof will be used:

- Construction of an aggregate construction entrance where the trucks leave the CCR impoundment footprint.
- Construction of a temporary wheel/undercarriage wash located where the vehicles leave the excavation areas and before the vehicles exit the BGS property.

7.3.5 Closure removal verification

Visual observations will be conducted to evaluate removal of physical CCR materials upon completion of the excavation of the CCR material and bottom liner materials. A topographic survey will be conducted to determine the final excavation limit and be documented with photographs.

An appropriately spaced grid system will be established in the field for each of the former surface impoundment areas. Verification will occur at the approximate center of each grid.

7.4 Closure certification

Closure certification for the surface impoundments will include:

- A certification statement signed by NIPSCO LLC and a qualified Indiana professional engineer stating the surface impoundments have been closed in accordance with the approved closure application.
  - A notification of former surface impoundments closure completion will be placed in the BGS's operating record
  - The notification of completion will be submitted within 60 days of completing the former surface impoundments closure.
- Verification NIPSCO LLC has recorded a notation on the deed to the property, which will, in perpetuity, notify any potential purchaser of the property the land was formerly used as CCR material surface impoundment. At a minimum, the recorded notation will contain:

- The general types and locations of where the former CCR materials resided
- The former CCR materials depth
- A plot plan, with surface contours at intervals of 2 feet, indicating:
  - Final land surface water run-off direction(s)
  - Surface water control structures after closure completion
  - Final grading
- A statement prohibiting construction; installation of wells, pipes, conduits, or septic systems; or any other excavation on the property without approval by the IDEM commissioner.

Certification will require documentation that the surface impoundments closure meets the requirements contained in the drawings and technical specifications for closure by removal. This closure application includes a construction quality assurance plan (see Appendix D) used to document implementation of the surface impoundments closure including CCR material excavation and disposal, structural fill installation, topsoil installation, and final surface area vegetation.

8.0 Post closure grading/soil cover

A 2-foot soil cover will be required over the excavated areas to meet the closure performance standard as defined in the CCR Rule. The former surface impoundment areas will be backfilled with off-site soil material to the elevations and grades shown on Drawing B-1071 - Final Grading Plan provided in Appendix A. The contour elevations shown on the final grading plan represent the top of the placed surface cover. The final grades will facilitate flow of surface water to the infiltration collection areas. The volume of final grading/backfill material including topsoil is shown in Table 4.

Table 4: Preliminary Surface Impoundments Soil Cover Information
Closure Application, Bailly Generating Station

Material	Estimated grading/backfill volume (cubic yards)
Soil cover - 18 inches	90,000
Topsoil - 6 inches	15,000
Total	105,000

8.1 Borrow source/soil cover requirements

Two feet of soil cover will include a minimum of 18 inches of soil material and six inches of topsoil material. A borrow source will be determined by the contractor at the time of closure construction to provide necessary final grading and soil cover requirements. Therefore, the borrow location(s) are not currently available. The following soil cover properties will be required and verified when selecting the borrow source:

- A maximum particle size of 3 inches
- A Unified Soil Classification System classification of SC, ML, ML-CL, or CL as determined by American Society for Testing and Materials (ASTM) D2487-11
- Permeability ≤ 1 x 10-05 cm/sec as determined by ASTM D5084-16a.

The topsoil material will be obtained from an off-site source meeting requirement for particle size analysis (ASTM D422-63(2007) e2), organic content (ASTM D2974-14), and pH (ASTM D4972-13).

8.2 Soil cover placement

The soil cover will consist of off-site borrow material placed in successive lifts of loose material not more than 12 inches thick. Each lift will be uniformly spread on the preceding lift that has been moistened or aerated, as necessary, and scarified or otherwise broken up in such a manner that the material bonds with the surface on which it is placed. Off-site borrow material should be placed with the following considerations:

- Slope the surface of each lift as shown on the drawings to promote free draining of water from the lift
- The surface of each lift will be free of loose material and foreign objects
- Remove the soil material in any areas where it becomes soft or yielding, replace with satisfactory soil borrow materials, and compact the soil borrow materials
- Fill and level ruts in the surface of any lift before compacting
- Seal the surface of the last lift placed at the end of each day using a vibratory smooth-drum roller
- Compaction accomplished by pneumatic-tired roller, vibratory compactor, or other equipment suitable to compact the soil material to a Standard Proctor of 95%
- Acceptable criteria for compaction are at an appropriate moisture content determined by the Standard Proctor (ASTM D698-12e2) optimum moisture content to achieve a dry density greater than or equal to 95% of the Standard Proctor (ASTM D698-12e2) maximum dry density
- In-place density testing using a nuclear density gauge to verify acceptance of the compaction effort.

Moisture condition the fill (if necessary) for any areas that fail the compaction requirements and re-compact the area until it meets compaction requirements. Scarify or moisture condition the entire lift before the succeeding lift is placed if large areas of any lift fail the compaction requirements.

The topsoil will be placed and graded using low-ground-pressure track-mounted equipment to minimize consolidation in the topsoil material. The cover area will be seeded following acceptance of the topsoil material placement, to establish vegetative growth to minimize potential erosion and sediment issues. A disc will be used, if required, to break up the top surface of the topsoil to provide an adequate seed bed. The topsoil and seed mix including material characteristics and type will be specified in the technical specifications prepared for contractors to use in installing the topsoil cover and vegetation.

8.3 Post-closure surface water management

The Final CCR Rule 40 CFR §257.81 establishes requirements for surface water run-on and run-off controls. As previously described, the impoundments at the BGS are incised, therefore, post closure stormwater drainage cannot leave the impoundments by gravity flow. Based on our detailed engineering evaluation, stormwater will be managed by constructing infiltration galleries below the impoundments to remove stormwater by transfer and infiltration to the subsurface.

Final grading will direct post-closure storm water to infiltration inlets. The surface water run-off was designed for peak discharges from a 25-year, 24-hour storm event. Refer to Appendix C for stormwater hydraulics and hydrology calculations. Perimeter ditches/swales are included in the

surface impoundments final backfill grading. The final surface water control and infiltration system is shown on the Permit Drawings provided in Appendix A.

The infiltration trenches will extend the length of each impoundment, 8 to 16 feet wide by 4 to 6 feet deep. Refer to Drawing B-1075 for infiltration trench details. Filtration tubes will be installed around the collection perimeter to limit solids from entering the infiltration system and cleanout locations will be provided for future maintenance.

Appropriate erosion protection and sediment controls will be established for the post-closure condition. Erosion protection and sediment control drawings will be included in the closure drawings to provide adequate on-site control and prevent surface materials off-site migration. NIPSCO LLC will prepare a Storm Water Pollution Prevention Plan (SWPPP), based on design and configuration of the erosion protection and sediment controls required throughout surface impoundment closure activities.

9.0 Closure schedule

The BGS surface impoundment closure schedule is provided in Table 5. The closure schedule was developed considering:

- Current estimate of the year in which the surface impoundment closure activities will be completed
- Description of sequential steps to close the surface impoundments:
  - Coordinating and obtaining permit approvals
  - Dewatering and removing the CCR materials
  - Installing the soil cover.

Closure dates other than the completed closure (regulatory) date are considered preliminary for establishing the closure sequence and relative time periods to perform primary activities. These dates may be adjusted in the future.

Table 5: Revised Surface Impoundments Closure Schedule

Surface Impoundments Closure Application, Bailly Generating Station

Closure activity	Scheduled start	Scheduled completion
Revised closure application to IDEM		31 December 2022
Public outreach meeting		To Be Determined
IDEM closure approval period	January, 2023	July 2023
Bid and Award closure contract	September 2023	December 2023
Estimated surface impoundments closure	Q2 2024	Q3 2025

10.0 Post-closure care

The post-closure care plan describes operations, monitoring, and maintenance activities required for the closed surface impoundments throughout the post-closure care period. The post-closure care period duration is mandated to be a minimum of 30 years following IDEM acceptance of the surface impoundment closure certifications and can be extended if any of the subject former surface impoundments are under assessment monitoring in accordance with 40 CFR §257.95. NIPSCO LLC will be responsible for compliance with 40 CFR §257.104 and 329 IAC 10-31 following IDEM acceptance of closure certifications for the surface impoundments, including, but not limited to:

- Maintaining final backfill area integrity and effectiveness
- Repairing the final backfill as necessary to correct effects of settlement, subsidence, erosion, or other issues, and preventing run-on and run-off from eroding or otherwise damaging the final backfill area
- Maintaining the groundwater monitoring system and monitoring groundwater in accordance with 40 CFR §257.90 through §257.98, 329 IAC 10-29 and 10-31, and additional IDEM closure requirements as may be applicable under the approved Closure Application

The items included in the post-closure care plan for the closed surface impoundments are described in the following sections.

10.1 Groundwater monitoring

Post-closure requirements include establishing, operating, and maintaining a groundwater monitoring program that addresses each of the subject closed surface impoundments and meets the applicable standards of 40 CFR §257.90-98, 40 CFR §104, 329 IAC 10-29, and 329 IAC 10-31.

Surface impoundments Primary Settling Pond 1 (Primary 1), Primary Settling Pond 2 (Primary 2), Secondary Settling Pond 1 (Secondary 1), and the Boiler Slag Pond are subject to the self-implementing CCR Rule requirements, including groundwater monitoring to identify whether releases have occurred during operating and post-closure care periods. In addition to the self-implementing Federal CCR Rule requirements, when and where applicable, the IDEM Office of Land Quality has released and previously indicated that NIPSCO LLC will be subject to application of the Surface Impoundment Closure Guidance (SICG) during any Closure Application review process.

10.1.1 Overview of existing groundwater monitoring system

NIPSCO LLC designed the monitoring network described herein to meet the performance standards specified in 40 CFR §257.91, modifying and supplementing the initial system as appropriate to address site conditions. The monitoring network adequately monitors representative background groundwater conditions and the quality of groundwater downgradient of each CCR Unit. In designing and installing the network, NIPSCO LLC identified two existing monitoring wells (MW-105 and MW-112 – installed as part of the BGS RCRA Corrective Action program) that are appropriately located and constructed to serve as CCR Rule-compliant monitoring wells. In 2016, NIPSCO installed additional monitoring wells at each CCR Unit based on knowledge of historical site conditions, a Site Conceptual Model, and interpretation of the CCR Rule requirements.

To complete and update the monitoring well network for the CCR Units (i.e., BSP, combined Primary 1 and 2, and Secondary 1), NIPSCO LLC ultimately installed 21 monitoring wells, including six new wells in 2019 at the locations shown in Drawing BGS-04 in Appendix A. NIPSCO LLC selected monitoring wells GAMW-01 and GAMW-01B (installed in 2019) to serve as background wells for all CCR Units. The downgradient monitoring well networks around the BSP and Secondary 1 remain unchanged since inception of the CCR Rule monitoring program. NIPSCO LLC modified the existing monitoring well network near Primary 1 and Primary 2 (now considered one CCR Unit for the purposes of groundwater monitoring) to account for changed conditions and additional information about the site and area conditions, including the variable groundwater flow directions resulting from the cessation of influent to the CCR Units.

10.1.2 Monitoring program approach

Going forward, until IDEM adopts the Federal CCR regulations at the state level in final form and is authorized to implement Indiana's rules in lieu of the Federal program, NIPSCO LLC is faced with

operating groundwater program(s) to satisfy two separate and at times overlapping requirements. These somewhat similar, although not identical, requirements include monitoring to satisfy the CCR Rule self-implementing requirements, and, ultimately, enacting a post-closure monitoring program referenced in 329 IAC Rule 10-29 and 329 IAC Rule 10-31 as a condition of Closure Application approval.

Satisfying these two programs simultaneously makes design, coordination with, and approval by IDEM and subsequent operation of such monitoring complex. This is due to the possibility that, under the self-implementing CCR Rule regulations, monitoring parameters and frequencies can change because of groundwater monitoring results (e.g., transition from detection monitoring to assessment monitoring or vice-versa, establishment of groundwater protection standards [GWPS], exceedance of one or more GWPS). The current monitoring program, driven by the Federal CCR Rule regulatory requirements in place at this time, does not lend itself to a traditional 329 IAC post-closure monitoring approach.

For these four surface impoundments included in the Closure Application – Primary 1, Primary 2, Secondary 1, and Boiler Slag Pond – NIPSCO LLC proposes a comprehensive post-closure groundwater monitoring program that addresses aspects of and combines appropriate existing elements from each of the applicable Federal and state obligations identified above – namely, the CCR Rule requirements and 329 IAC Rule 10-29 and 329 IAC Rule 10-31 regulations – and considers the findings and implications of the CCR monitoring data. Details of the post-closure program are presented in sections as follows: monitoring well network and basis of design, sampling and analysis plan, sampling frequency, monitoring parameters, data evaluation/statistics, quality assurance project plan, corrective action, data reporting, post-closure monitoring term, and summary and supporting documents.

10.1.3 Monitoring well network and basis of design

NIPSCO LLC is currently monitoring a series of existing background and downgradient wells screened within the uppermost aquifer to satisfy ongoing Federal CCR Rule program requirements.

Site geology in the vicinity of the surface impoundments from ground surface to depth includes:

- Fill: A fill layer is generally present around the CCR Units from ground surface to approximately three to 10 feet below ground surface (ft bgs). The fill material includes a mixture of fly ash, boiler slag, and sand.
- Light Brown/Brown Sand: A loose to compact fine to coarse-grained light brown to brown dune-beach and lacustrine sand with varying quantities of fine gravels and silts underlies the fill material and varies in thickness from approximately 20 to 30 feet.
- Silty Clay (upper clay unit): An approximately two- to four-foot thick interbedded clay with little sand and gravel underlies the light brown to brown sand beneath the CCR Units and is present at an approximate depth of 30 to 40 ft bgs. The silty clay delineates the base of the uppermost aquifer.
- Gray Sand: A loose to compact fine to coarse-grained gray sand underlies the upper silty clay unit. The gray sand varies in thickness and is up to 70 feet thick on the southern side of the CCR Units.
- Basal Clay and Till Unit: A basal clay and silt underlies the gray sand. The basal till and silt are up to 105 feet thick on the northern side of the CCR Units. The thickness of the basal unit is highly variable due to erosion of the sediments and the underlying bedrock's relief.

- Bedrock: A fractured dolomitic limestone was encountered near the eastern portion of the Site at an approximate depth of 145 feet bgs.

Based on geologic information reviewed and consistent with industry interpretations of the definition provided in 40 CFR §257.53, the Site's uppermost aquifer consists of the unconfined fill material, native dune beach sand, and lacustrine light brown to brown sands and gravels that underlie each of the surface impoundments addressed by the Closure Application. The saturated thickness of the aquifer is approximately 15 to 30 feet depending upon seasonal variation of the water table and depth to the uppermost confining layer.

Under natural conditions, general groundwater flow direction and discharge would be expected to be toward Lake Michigan (i.e., toward the north). Except for data from wells located around the perimeter of the Boiler Slag Pond, historical piezometric data also indicated a flat to northerly gradient in the vicinity of the surface impoundments. However, groundwater dewatering activities at the ArcelorMittal property located due south of the Site alters the local Site groundwater flow direction. Golder understands that ArcelorMittal withdraws over 1,000-gallons per minute from wells located to the south of the CCR units to reduce groundwater infiltration into pits/basements of buildings associated with their steel manufacturing operations. Golder has assumed that ArcelorMittal will continue to operate their dewatering wells and that the potentiometric surface will remain constant during the post-closure monitoring.

Based on the historical and recent BGS hydrogeologic information, there is an apparent groundwater mound beneath the Boiler Slag Pond. Therefore, the well network around the Boiler Slag Pond was designed and is being monitored to account for the localized effect of groundwater mounding. This CCR Unit features four downgradient wells. In addition, due to a) the effects of the ArcelorMittal off-Site groundwater extraction system on Site groundwater flow and b) reduced discharge of influent into the CCR Units, NIPSCO LLC has modified its prior CCR Rule-design monitoring network and selected monitoring wells GAMW-01/01B to represent background groundwater quality conditions for all the CCR Units.

The current Primary 1 and Primary 2 combined monitoring well network includes four monitoring wells (MW-112, GAMW-10, GAMW-16, and GAMW-07) located north of these impoundments that historically were consistently downgradient. Presently, these monitoring wells are not hydraulically downgradient of Primary 1 and Primary 2 based on the new data indicating groundwater flow direction to the south. However, for data collection and evaluation purposes, NIPSCO LLC will continue to consider these four wells as part of the downgradient monitoring well network because the hydraulic gradients are generally flat across Primary 1 and 2 and these wells have historically indicated detections of Appendix IV parameters. Monitoring wells that constitute the downgradient monitoring systems for all surface impoundments subject to closure and post-closure (i.e., Boiler Slag Pond, Primary 1, Primary 2, and Secondary 1) are outlined in Table 6.

Based upon site-specific data, average horizontal groundwater flow velocity was calculated at approximately 213 feet/year. The vertical hydraulic gradient calculations indicate a general downward gradient across the Site. The native sand materials appear to be more conducive to vertical flow versus the overlying fill materials.

Consistent with the self-implementing requirements of 40 CFR §257.91, NIPSCO LLC designed a monitoring system for Primary 1, Primary 2, Secondary 1, and the Boiler Slag Pond that was certified by a qualified Indiana-licensed Professional Engineer as meeting the technical requirements under the CCR Rule. This system consists of two background monitoring wells and 19 downgradient monitoring wells. The monitoring well placement accounted for and addressed the aquifer saturated thickness,

horizontal and vertical flow conditions, and release mechanisms as identified by the Site Conceptual Model.

NIPSCO LLC has developed the proposed post-closure monitoring network based on knowledge of current groundwater flow directions and quality; proposed extent of closure excavation, backfill and grading, and surface water drainage plans; presumed post-construction influences on existing groundwater flow conditions; current CCR Rule obligations for the four surface impoundments; and interpretation of 329 IAC Rule 10-29 and 10-31 applicability.

The post-closure groundwater monitoring program will include 21 existing groundwater wells to monitor groundwater quality near the four surface impoundments in accordance with IDEM-approved closure plans. Each monitoring well number and the monitoring well's designated purpose is presented in Table 6. The surface impoundments addressed by the closure plans and background and downgradient monitoring well locations that comprise the post-closure network are depicted on Drawing BGS-04 in Appendix A. Boring logs and construction diagrams for the 21 groundwater wells are provided in Appendix B.

Table 6: Surface Impoundments Groundwater Monitoring Wells

Surface Impoundments Closure Application, Bailly Generating Station

	Monitoring Well Locations	Top of Casing Elevation (ft-msl)	Screen Interval			Well Diameter (inches)
			Top (ft-bgs)		Bottom (ft-bgs)	
Background	PC-GAMW-01	624.53	13		23	2
	PC-GAMW-01B	623.76	27		32	2
Downgradient	PC-GAMW-02	624.20	13		23	2
	PC-GAMW-03	624.35	13		23	2
	PC-GAMW-04	624.12	13		23	2
	PC-GAMW-06	626.97	17		27	2
	PC-GAMW-07	629.04	19		29	2
	PC-GAMW-08	624.35	15		25	2
	PC-GAMW-08B	623.73	30		40	2
	PC-GAMW-10	631.94	21		31	2
	PC-GAMW-11	625.04	14		24	2
	PC-GAMW-11C	625.16	29		34	2
	PC-GAMW-12R	TBD	15		25	2
	PC-GAMW-13	625.34	13		23	2
	PC-GAMW-14	624.32	13		23	2
	PC-GAMW-16	629.92	20		30	2
	PC-GAMW-17	623.96	14.5		24.5	2
	PC-GAMW-17B	624.12	28.5		33.5	2
	PC-GAMW-18	626.87	20		30	2
	PC-MW-105	622.05	8		18	2
	PC-MW-112	628.07	17		27	2

Notes:

Locations surveyed in US State Plane Indiana West Zone NAD 1983, NAVD 1988 (ft)

ft-bgs = feet below ground surface

ft-msl = feet above mean sea level
TBD = to be determined

10.1.4 Sampling and analysis plan (SAP)

NIPSCO LLC will perform post-closure groundwater monitoring in accordance with procedures and protocols consistent with 329 IAC 10-29-2 and outlined in a Site-specific SAP, the complete, stand-alone version of which is provided in Appendix E. The SAP will include the following elements to provide reliable, consistent, and defensible data:

- Groundwater monitoring procedures that provide representative samples that minimize the potential for cross-contamination
- A quality assurance program that provides quantitative detection limits and the degree of error for analysis of each chemical of concern
- Sample preservation and shipment procedures that maintain reliability of the sample collected for analysis
- Chain-of-custody procedures that prevent tampering and maintain samples integrity prior to analysis.
- The SAP will be reviewed periodically as dictated by alterations in site conditions (e.g., initiation of corrective measures/corrective action, changes in groundwater flow direction) or groundwater monitoring program changes (e.g., addition or deletion of monitoring parameters, addition, or deletion of monitoring wells) and, if necessary, NIPSCO LLC will update the document to reflect necessary modifications.

10.1.5 Sampling frequency

NIPSCO LLC is currently collecting semi-annual groundwater samples in accordance with the CCR Rule requirements (i.e., 40 CFR Part 257 Appendix III and IV parameter lists). Prior to closure of the surface impoundments, NIPSCO LLC will have collected the necessary number of data points to perform statistical analyses as described in the Section 10.1.7 - Data Evaluation/Statistics.

NIPSCO LLC will begin post-closure monitoring during the first calendar quarter after completion of the impoundment closure construction activities and submittal of the Closure Certification Report by the certifying engineer. NIPSCO LLC will perform quarterly post-closure monitoring for a minimum of eight consecutive quarters (i.e., two years) to assess 1) changes in groundwater quality and 2) potential changes in groundwater flow direction, both related to conditions associated with closure activities (i.e., source removal, emplacement of a low permeability cover system, surface water [precipitation run-on] diversion). The two-year quarterly monitoring period is necessary to assist NIPSCO LLC with refining the Conceptual Site Model that will be used to assess whether additional groundwater monitoring or management activities are required, if any.

Following the initial two-year quarterly monitoring events, NIPSCO LLC will continue post-closure groundwater monitoring on a semi-annual basis for parameters appropriate to detect/assess changes in groundwater quality because of completed closure activities. NIPSCO LLC will maintain consistency with the ongoing semi-annual CCR Rule monitoring program, for which sampling is currently conducted primarily in April and October. The initial semi-annual event will be scheduled for the earlier of either April or October following the final two-year quarterly monitoring event. NIPSCO LLC will continue semi-annual groundwater monitoring for a minimum of 28 years (30-years total), or a shorter duration and/or frequency if changes in regulations allow. If groundwater concentrations do

not meet the groundwater benchmarks, NIPSCO LLC will continue groundwater monitoring beyond the nominal 30 years.

10.1.6 Monitoring parameters

NIPSCO LLC proposes a monitoring parameter list appropriate to the Site environmental, industrial, and geological background conditions; Site investigation findings; surface impoundment waste management history; and current monitoring provisions of the CCR Rule. From the perspective of evaluating potential post-closure impacts to water quality, the results generated from this approach will be amenable to applying statistical-based (e.g., intra-well or inter-well) or standards-based comparisons. Consistent with the CCR Rule monitoring requirements, the post-closure monitoring parameter list will include:

Field-based water quality parameters	pH, specific conductivity, temperature, turbidity, oxidation-reduction potential
40 CFR, Part 257 Appendix III Detection Monitoring Parameters	Boron, calcium, chloride, fluoride, sulfate, total dissolved solids, pH
40 CFR, Part 257 Appendix IV Assessment Monitoring Parameters	Antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, fluoride, lead, lithium, mercury, molybdenum, selenium, thallium, radium 226 and 228 (combined)

10.1.7 Data evaluation/statistics

Golder developed the selected statistical method for the BGS Closure Application in accordance with 40 CFR Part 257.93 and 329 IAC 10-29, using methodology presented in *Statistical Analysis of Groundwater Data at RCRA Facilities, Unified Guidance, March 2009, EPA 530/R-09-007* (Unified Guidance). For consistency between CCR Rule self-implementing and IDEM Solid Waste closure requirements, the statistical approach proposed herein is the same as the approach currently being used in the monitoring program required under 40 CFR Part 257.93. The full statistical analysis plan is provided as part of the SAP. The statistical methods used for Detection Monitoring under 40 CFR Part 257.93 will be the same as those used to comply with 329 IAC 10-29-6 (also referred to as Phase I), while the statistical methods used for Assessment Monitoring under 40 CFR Part 257.93 will be the same as those used to comply with 329 IAC 10-29-7 (also referred to as Phase II). Corrective Action Monitoring under 40 CFR Part 257.98 will be the same as those used to comply with 329 IAC 10-29-9. The post-closure monitoring program will begin in Corrective Action Monitoring.

The background populations for each monitoring well and constituent, general background statistics have been developed using the baseline data set. These general statistics include: 1) a review of the intra-well data for potential outliers, 2) an analysis for underlying trends, and 3) an examination of data distribution (i.e., data normality). Following general statistical procedures, data will be reviewed periodically, and outliers will be removed (if applicable) and data will be processed as appropriate for the data distribution detected. Parametric testing methods will be used if the data are normally or transform-normally distributed. Non-parametric testing techniques will be used if the data are non-normally distributed.

10.1.7.1 Phase I - Detection monitoring

Under the Detection Monitoring Phase (referenced as Phase I in 329 IAC 10-29-6), the prediction interval method will be used to evaluate groundwater monitoring data for 40 CFR Part 257 Appendix III parameters. An inter-well testing approach will be used – meaning that data from downgradient

wells will be compared to compliance limits derived from background groundwater quality data in hydraulically-upgradient locations. Background data from the upgradient monitoring wells network will be pooled to calculate an upper prediction limit (UPL) (and lower prediction limit [LPL] for pH) for each Appendix III parameter. Results from the final detection monitoring event at the downgradient monitoring wells will be evaluated by comparing individual results to the UPL (and LPL for pH) for each monitoring event. Under this method, an "initial exceedance" occurs when the concentration of any Appendix III constituent in a downgradient monitoring well exceeds the UPL (or is lower than the LPL for pH).

If data from a downgradient monitoring well exceeds the UPL, a 1-of-2 resampling strategy will be used to verify the initial exceedance. One independent resample will be collected and evaluated within 90 days of the initial statistical evaluation to determine whether the initial exceedance is verified. The initial exceedance is considered a spurious result if the resample result does not verify the initial result, and detection monitoring continues for that constituent/well combination. The verified result is considered a statistically significant increase (SSI) if the verification sample result confirms the initial exceedance. Unless an alternate source demonstration (ASD) can be provided to contradict the SSI, the next step will be to enter assessment monitoring (referenced as Phase II in 329 IAC 10-29-7), as described in the following section.

10.1.7.2 Phase II - Assessment monitoring

Under the Assessment Monitoring phase (i.e., Phase II), the statistical method used will be the confidence interval method. As in detection monitoring, an inter-well approach will be used – meaning data from downgradient monitoring wells will be compared to compliance limits derived from background groundwater quality data in hydraulically-upgradient locations. A GWPS will be calculated for each 40 CFR Part 257 Appendix IV constituent. In accordance with 257.95(h), the GWPS will be the maximum contaminant level (MCL)/health-based standard or the background concentration for each analyte as calculated using a tolerance/prediction limit procedure. Results from the downgradient monitoring wells will be evaluated by comparing the calculated intra-well lower confidence limit (LCL) with the GWPS for each Appendix IV constituent. If the LCL exceeds the GWPS, there is statistical evidence of a statistically significant level (SSL), which will trigger additional response activities, including a delineation of the nature and extent of the noted SSLs and, potentially, Corrective Action. If concentrations of all 40 CFR Part 257 Appendix III and Appendix IV constituents are below background values for two consecutive sampling events, the monitoring program can return to Detection Monitoring.

10.1.7.3 Corrective Action Monitoring

During Corrective Action implementation, the groundwater monitoring approach is the same as that described under Assessment Monitoring. In Corrective Action Monitoring, the statistical method used to evaluate the data will also be the inter-well confidence interval method (i.e., the same method used for Assessment Monitoring). However, there is one significant difference between Assessment Monitoring and Corrective Action Monitoring. During Corrective Action Monitoring, results from the downgradient monitoring wells will be evaluated by comparing the calculated intra-well Upper Confidence Limit (UCL) with the GWPS for each Appendix IV constituent. If the UCL exceeds the GWPS, there is statistical evidence of non-compliance (NC), which will result in continued Corrective Action Monitoring and possible additional Corrective Action remedies.

If NC is noted under Corrective Action Monitoring, trend analysis and other data analysis tools will be applied to understand whether the data are stable or trending. If increasing trends are noted for key indicators, additional remedies may be necessary. If trends are stable or decreasing during Corrective Action Monitoring, no additional actions may be necessary and Corrective Action Monitoring will

continue. Once the UCL is below the GWPS for three consecutive years for each Appendix IV constituent in each well, the Corrective Action remedy is considered complete (from the standpoint of groundwater monitoring), and the monitoring program can return to Assessment Monitoring.

10.1.8 Quality assurance project plan (QAPP)

To monitor, control, and enhance data quality so that the data is acceptable for reporting and evaluation purposes, NIPSCO LLC has developed and will follow a QAPP that addresses, at a minimum, quality assurance objectives and controls; field sample collection; sample handling and preservation; chain of custody and transport; field equipment calibration and laboratory analytical methods; internal quality control checks; and performance and system audits. The site-specific QAPP is provided in Appendix F.

The QAPP will be reviewed periodically as dictated by groundwater monitoring program changes (e.g., addition or deletion of monitoring parameters, addition, or deletion of monitoring wells) and, if necessary, NIPSCO LLC will update the document to reflect necessary modifications.

10.1.9 Corrective actions

NIPSCO LLC has developed a conceptual Corrective Action Monitoring program that considers technical, regulatory, and programmatic impacts. Specifically, the Corrective Action Monitoring program allows for the effects of post-closure source removal to be reflected in groundwater quality monitoring results and has been sequenced accordingly. Corrective Action may be indicated for certain groundwater-related events including, but not limited to:

- Exceedances of regulatory benchmarks or guidelines for more than two consecutive sampling periods
- Consistent upward trends (or downward, in the case of pH only) for more than two consecutive sampling periods

Depending upon degree and timing of changes in groundwater quality post-closure, Corrective Actions may include activities ranging from addition of monitoring parameters, increased frequency of monitoring, and/or modification/expansion of the post-closure monitoring network, to monitored natural attenuation (MNA), the installation of passive barriers, or the design and operation of active groundwater recovery and treatment systems. Response action(s) and system(s) of choice will necessarily be based upon numerous factors including demonstrated effectiveness of the source removal closures, location and degree of groundwater impacts, improving or declining groundwater quality trends post-closure, and other time-dependent variables. NIPSCO LLC will notify IDEM within 14 days of receipt of validated sampling results in response to these conditions and provide a proposed course of action consistent with 329 IAC 10-29-9 to address the potential need for Corrective Actions to supplement source removal. Because such an event will be in the mature stages of post-closure monitoring and plume conditions will be expected to have reached stability, NIPSCO LLC anticipates that this response will focus primarily on Corrective Actions. Also, by this time NIPSCO LLC anticipates that alternatives will have been identified and screened such that an evaluation will be straightforward. Within 180 days of receipt of validated sampling results, NIPSCO LLC will present a proposed approach to Corrective Actions (e.g., MNA, groundwater extraction, control, and treatment systems) to IDEM for approval. Should the proposed remedy at this stage also require modification to the existing groundwater monitoring program (other than compliance with self-implementing provisions of the CCR Rule or state-adopted equivalent), NIPSCO LLC will also submit a simultaneous request to IDEM and obtain concurrence before making such change(s) to that aspect of the post-closure program.

If Corrective Actions are required and during Corrective Actions implementation, the groundwater monitoring approach statistical evaluation will be completed as described under Section 10.1.7.3.

10.1.10 Data reporting

NIPSCO LLC will prepare reports including summaries of sampling activities, data tables and interpretations, supporting figures, and planned modifications and response activities, if necessary, and submit them to IDEM within 60 days of receipt of sampling data, data evaluation, and performance of statistical analysis.

10.1.11 Post-closure monitoring term

NIPSCO LLC will maintain and operate the groundwater monitoring system for a post-closure care period of up to 30 years minimum in accordance with the applicable requirements of 40 CFR, Part 257.104 and 329 IAC 10-31-2 and as provided in Section 10.1.5. The post-closure monitoring period may be extended past 30 years until monitoring has returned to the detection phase for a period of three consecutive years, at which point the monitoring term will cease.

10.2 Inspection requirements

Inspections of the closed former surface impoundments will be performed throughout the post-closure care period. Inspections will be performed biannually with an inspection report prepared and submitted to IDEM in accordance with 329 IAC 10-31-2(2). Items inspected include, but are not limited to:

- Final backfill area
  - Settlement/subsidence
  - Accumulated surface water
  - Slope stability issues
  - Erosion issues
  - Vegetation quality - e.g. stressed or missing
  - Vegetation other than grass on the final cover
  - Need for mowing
  - Burrowing animals
- Surface water management system
  - Erosion issues
  - Vegetation quality - e.g. stressed or missing
  - Vegetation other than grass in the ditches, diversions, and/or swales
  - Obstructions blocking water flow - e.g. large rocks, fallen trees/limbs/brush, etc.
  - Burrowing animals
- Groundwater monitoring program
  - Groundwater monitoring wells integrity
  - Protective casing and concrete pads integrity
  - Locks present and in working condition

  - Access to the monitoring locations
- General

    Site benchmarks and other survey control integrity.

An inspection form (example provided in Appendix G) for each of the closed former surface impoundments will be completed for each of the biannual inspections. The inspection forms will be included in an inspection report prepared to provide, but not be limited to:

- Inspection summary
- Discussion of issues observed during the inspection
- Discussion of how identified issues will be handled
- Discussion of how issue(s) identified during past inspections were addressed
- Schedule for addressing the issues
- Inspection forms
- Photographs to document the inspection and any maintenance activities.

The inspection reports will be maintained in the BGS operating record.

10.3 Maintenance requirements

The maintenance activities will depend on the issues observed during the biannual inspections throughout the post-closure care period. The post-closure care plan addresses how the identified issues will be handled in a general sense, with specific remedial efforts determined based on each identified issue's severity. A schedule for addressing identified issues will be included in the inspection report, again, determined based on each identified issue's severity.

The maintenance activity for each issue will be performed as soon as practical. Maintenance activities initiation and length of time required to address each issue will vary depending on issue severity. For example, replacing a missing or broken lock on a groundwater monitoring well protective casing can be performed in a much shorter timeframe than repairing erosion gullies/rills or settlement in the final backfill area. Based on the inspection items provided in Section 10.2, typical maintenance activities can include, but are not limited to:

- Final backfill area
  - Using non-impacted soil to repair settlement/subsidence areas, erosion gullies/rills, slope failure(s), and area(s) where animal burrows are identified
  - Revegetating the area of disturbance to establish a healthy stand of grass
  - Revegetating missing and/or stressed vegetation
  - Removing vegetation other than grass from the final backfill area surface
  - Mowing the grass, a minimum of twice per year - spring and fall
- Surface water management system
  - Using non-impacted soil to repair erosion gullies/rills
  - Revegetating the area of disturbance to establish a healthy stand of grass
  - Revegetating missing and/or stressed vegetation

  - Removing obstructions blocking water flow - e.g. large rocks, fallen trees/limbs/brush, etc.
  - Removing vegetation other than grass from the ditches, diversions, and/or swales
- Groundwater monitoring program
  - Replacing groundwater monitoring wells including abandoning compromised groundwater monitoring wells
  - Replacing compromised protective casing and concrete pads
  - Replacing missing and/or inoperable locks
- General

    Repairing/replacing site benchmarks and other survey control.

A discussion, including photographs, of how the identified issue(s) were addressed will be included in the inspection reports. Changes to the maintenance activity schedule will also be addressed.

10.4 Post-closure care contact

The primary NIPSCO LLC person who can be contacted during the post-closure care period and who is responsible for post-closure care maintenance and monitoring is:

Contact Name:	Jeff Neumeier
Contact Physical Address:	246 Bailly Station Road, Chesterton, Indiana 46304
Contact Telephone Number:	(219) 787-7298 (BGS office)
	(219) 873-7337 (Michigan City Generating Station office)
	(219) 680-7098 (mobile)
Contact E-Mail Address:	JNeumeier@NiSource.com

10.5 Post-closure use of the property

BGS plans no long-term use of the property where the former surface impoundments are located at the time of this closure application submittal. NIPSCO LLC and BGS reserve the right to use this area at a future time, when a use for this area is determined.

A demonstration will be prepared to establish that future use of this area does not compromise the final backfill integrity or monitoring systems function and does not increase the threat to human health or the environment.

10.6 Post-closure certification

NIPSCO LLC will prepare a notification that post-closure care has been completed no later than 60 days following completion of the post-closure care period. The notification will include certification by NIPSCO LLC and a qualified Indiana professional engineer, verifying the post-closure care has been completed in accordance with the post-closure care plan. The notification will be placed in the NIPSCO LLC BGS CCR Operating Record as required by 40 CFR 257.105 (i) (13) for the former surface impoundments.

11.0 Opinion of probable closure and post-closure care cost

An opinion of probable closure and post-closure care cost has been prepared for the former surface impoundments on forms provided by IDEM, and is included in Appendix H.

The closure activities include, but are not limited to:

- Installing erosion and sedimentation controls
- Excavating CCR materials and bottom liner system
- Loading, transporting, and disposing of the CCR materials in the RMSGS onsite landfill
- Loading, transporting, and disposing of the blast furnace slag and geomembrane liner materials in an off-site disposal facility permitted to accept the blast furnace slag and geomembrane materials
- Backfilling the former surface impoundments with off-site soil and topsoil
- Installing surface water control/management features
- Vegetating the final surface.

The opinion of probable closure care cost was prepared for each of the closure activities identified for the former surface impoundments. The closure activities are as presented in Sections 6.0 and 7.0 of the closure application. The total opinion of probable closure cost is $34,340,000.

The post-closure care activities can include, but are not limited to:

- Semi-annual inspections of the final backfill for erosion, surface water ponding, and storm drainage features
- Vegetation mowing
- Repairing areas where erosion has occurred
- Maintaining vegetation to prevent erosion
- Groundwater monitoring.

The opinion of probable post-closure care cost was prepared for each of the monitoring, inspection, and maintenance activities identified for the former surface impoundments. The monitoring, inspection, and maintenance activities are as presented in Sections 10.2 and 10.3 of the post-closure care plan. The total opinion of probable post-closure care cost is $2,084,664 for the 30-year post-closure care period.

The unit costs and/or lump sum costs were obtained from sources including, but not limited to, historical costs for activities of like/similar scope, RS Means Cost Data, contractor/vendor quotes, and other consultant costs.

12.0 Financial assurance

Financial assurance is required for closure and post-closure care of the surface impoundments under 329 IAC 10-39-3. Financial assurance is not required under the CCR Final Rule.

The financial assurance mechanism for the closure and post-closure care activities is:

329 IAC 10-39-3(a)(5) - A financial test

NIPSCO LLC will demonstrate the financial test has been met by submitting to the commissioner the documents required in 329 IAC 10-39-3(a)(5)(C) upon closure application approval and annually within 90 days after the close of each fiscal year.

The opinion of probable post-closure care cost included with this closure application was calculated using the IDEM format. NIPSCO LLC will review the opinion of probable post-closure care cost

annually until the post-closure care of the former surface impoundments certification is deemed adequate and submit to the commissioner no later than 15 June of any given year. The opinion of post-closure care cost will be adjusted for inflation using one of the following methods:

- Recalculating the opinion of post-closure care cost in current dollars
- Using an inflation factor derived from the most recent implicit price deflator for gross national product published by the United States Department of Commerce in its Survey of Current Business.

If the post-closure care plan has changed, NIPSCO LLC. will revise the opinion of post-closure care cost not later than 30 days after the commissioner has approved the changed post-closure care plan. The revised opinion of post-closure care cost will be adjusted for inflation as previously specified.

13.0 Public outreach

NIPSCO LLC intends to provide public information opportunities about closure of the surface impoundments. NIPSCO LLC will prepare a public outreach plan describing the surface impoundment closures and subsequent corrective action activities. Property owners within a one-mile radius of the closure is provided in Appendix I.

NIPSCO LLC regularly publishes and updates documents for the BGS operating record (https://www.nipsco.com/about-us/ccr-rule-compliance in accordance with requirements contained in the Federal CCR Rule (40 CFR 257.105). Documents have been, or will be posted for:

- Location restrictions
- Design criteria
- Operating criteria
- Groundwater monitoring and corrective action
- Closure and post-closure care.

14.0 References

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Figures

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Appendix A

Appendix B

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Appendix G

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Appendix H

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