GOLDER
MEMBER OF WSP

REPORT

INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN per CCR Rule 257.82

NIPSCO, Michigan City Generating Station CCR Unit, Michigan City, Indiana

Submitted to:

Northern Indiana Public Service Company

2755 Raystone Drive
Valparaiso, Indiana 46383

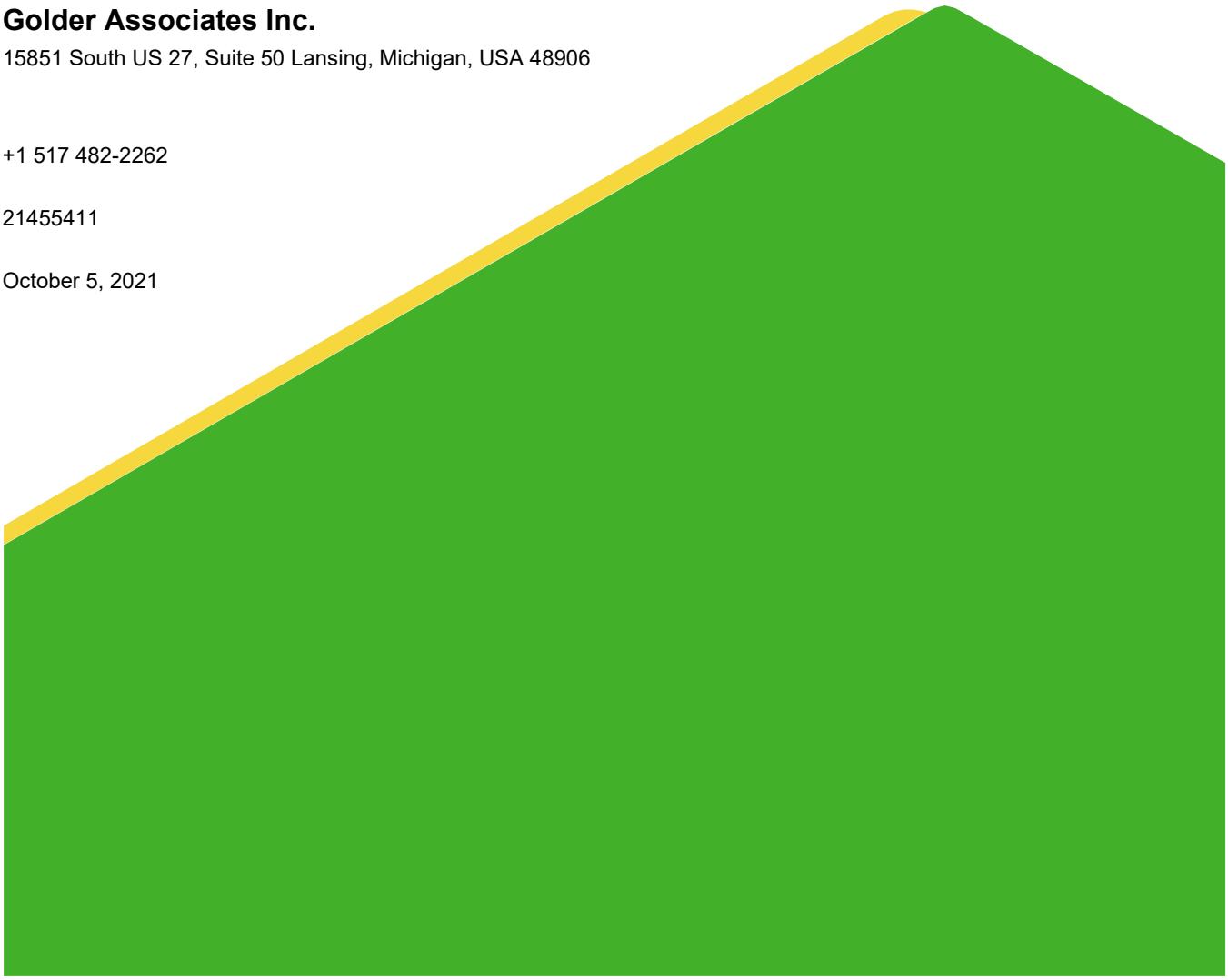
Submitted by:

Golder Associates Inc.
15851 South US 27, Suite 50 Lansing, Michigan, USA 48906

+1 517 482-2262

21455411

October 5, 2021

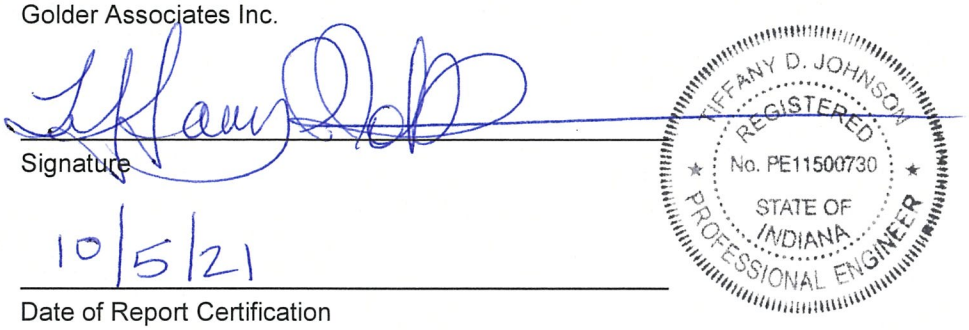


Certification

Professional Engineer Certification Statement [40 CFR 257.82(c)(5)]

I hereby certify that, having reviewed the attached documentation and being familiar with the provisions of Title 40 of the Code of Federal Regulations Section 257.82 (40 CFR Part 257.82), I attest that this Inflow Design Flood Control System Plan is accurate and has been prepared in accordance with good engineering practices, including the consideration of applicable industry standards, and with the requirements of 40 CFR Part 257.82.

Golder Associates Inc.



Signature

10/5/21

Date of Report Certification

Tiffany D. Johnson, P.E.

Name

PE 11500730

Professional Engineer License Number

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TABLES

FIGURES

1.0 INTRODUCTION

1.1 Background

The Northern Indiana Public Service Company (NIPSCO) Michigan City Generating Station (MCGS) is an operating coal-fired electric generating plant located at 101 Wabash Street in Michigan City, LaPorte County, Indiana. MCGS occupies 131 acres in a mixed industrial, commercial, and residential area along the southern shoreline of Lake Michigan. The facility includes power generation and transmission facilities; buildings and associated infrastructure; coal storage and handling operations; pollution control equipment; and various active, inactive, and closed surface impoundments.

1.2 CCR Surface Impoundments

NIPSCO has determined that MCGS has two coal combustion residuals (CCR) surface impoundments that are subject to the requirements of the CCR Final Rule, even though they are undergoing closure, including:

- Boiler Slag Pond (BSP) – approximate two-acre unlined impoundment
- Primary 2 – approximate three-acre unlined surface impoundment roughly 435 feet long, ranging from about 230 to 290 feet wide

1.2.1 Boiler Slag Pond

The BSP was designed by Sargent and Lundy Engineers (S&L) of Chicago, Illinois in 1972 and is an approximate five-foot-deep, two-acre, unlined, incised pond that is currently undergoing closure. The BSP shares an embankment with the Final Settling Pond (FSP) along the northwest side, is adjacent to the closed Secondary No. 2 to the south, adjacent to the site access road to the east, and abuts a repurposed portion of the BSP to the northeast. Based on discussions with NIPSCO and site reconnaissance by Golder Associates Inc. (Golder) personnel, an approximate one acre area located in the northeastern third of the BSP has been repurposed and is hydraulically separated from the remaining portion of the BSP by a median berm. The remaining portion of the BSP that is currently undergoing closure is approximately two acres. This two-acre area is shown on the attached Figure 2 and is subject to the CCR Final Rule.

Prior to closure activities, the BSP accepted primarily bottom ash sluice from the station and surface water runoff from adjacent operational areas. The BSP slopes toward the northwest from ground surface to the common embankment that is shared with the FSP. Several culverts between the BSP and the FSP are identified in the S&L design package from 1972. It is believed that most of these culverts are either removed or non-functional. As shown on Figure 2, only one operational culvert remains within the BSP area outlet between the BSP and FSP and this culvert will be abandoned as part of closure.

1.2.2 Primary Settling Pond No. 2 (Primary 2)

Primary 2 was designed by Sargent and Lundy Engineers (S&L) of Chicago, Illinois in 1972; and as shown on Figure 2, is an approximate three-acre structure located in the southwestern portion of the site. Primary 2 is enclosed by an earth fill embankment, the top of which serves as an access road. Primary 2 was constructed in the early 1970s and is approximately 435 feet long, ranging from approximately 230 to 290 feet wide, with a maximum theoretical capacity of approximately 70,000 cubic yards (cy). The embankment that forms Primary 2 is approximately 14 feet high on the outside slope and approximately 19 feet high on the inside slope. Both the interior and exterior slopes are 2.5H:1V. The crest of the embankment is approximately 15 to 21 feet wide and is at approximate elevation 609 mean sea level (msl); normal high water level is not evident on the construction

drawings. The surrounding ground elevation varies from approximately 596 feet to 602 feet msl. The northwest portion of this embankment separates Primary 2 from Lake Michigan and incorporates two rows of sheet piling and riprap lined slopes. The closed Secondary Settling Ponds 1 and 2 are located southwest and northeast of Primary 2, respectively. The MCGS coal storage area is located east of Primary 2.

Primary 2 historically received fly ash, economizer ash, recirculated water from the ash sluice system, boiler blow down, and wastewater from the boiler drains sluiced directly from the generating station. Primary 2 was formerly operated on an alternating basis with Primary Settling Pond 1 (Primary 1), now closed. Primary 2 discharged water to Secondary 2, also now closed. Currently, Primary 2 is undergoing closure, but contained both CCR and liquids. Primary 2 received air heater wash and boiler room sump water and is currently not accepting CCR materials from the generating station. Water was pumped from the generating station via aboveground steel pipelines that discharge into Primary 2. There is one discharge structure in Primary 2. The discharge structure is concrete and utilizes stop logs to control water elevation and currently discharges to the Final Settling Pond during closure as needed. Water levels, if any, within Primary 2 continue to be manually controlled by MCGS operations personnel during closure operations.

1.3 Purpose

The purpose of this Plan is to provide a basis for the certification required by 40 CFR 257.82 Hydrologic and Hydraulic Capacity Requirements for CCR Surface Impoundments. 40 CFR 257.82(a) requires the owner or operator of a CCR surface impoundment to design, construct, operate, and maintain an inflow flood control system as follows:

- Adequately manage the flow into the CCR unit during and following the peak discharge of the inflow design flood as specified in 40 CFR 257.82(a)(3)
- Adequately manage the flow from the CCR unit to collect and control the peak discharge resulting from the inflow design flood as specified in 40 CFR 257.82(a)(3)
- Handle discharge from the CCR unit in accordance with the surface water requirements under 40 CFR 257.3-3

Since the BSP is determined to be an incised impoundment, the flood control system must provide protection to the CCR unit during a 25-year flood event per 40 CFR 257.82(a)(3)(iv).

Primary 2 is determined to be a significant hazard potential classification assessment, the flood control system must provide protection to the CCR unit during a 1,000-year flood event per 40 CFR 257.82(a)(3)(ii).

2.0 FLOOD CONTROL SYSTEM

To satisfy the requirements of 40 CFR 257.82(a), the flood control system must provide flood protection to the CCR unit during the inflow design flood for two cases: 1) floodwater from outside the unit, and 2) controlling internal water levels within the unit. The sections below describe the run-on control systems in place at the CCR unit, describe the analysis performed to evaluate the adequacy of the existing structure, and list any operational limitations required to maintain adequate flood control measures as required by 40 CFR 257.82(a).

2.1 BSP Analysis

The BSP is an incised CCR surface impoundment, which requires that the flood control system must provide protection to the CCR unit during a 25-year flood event. To evaluate the ability of the BSP to adequately manage

the flow during and following the peak discharge of the design storm event, a hydrologic and hydraulic (H&H) analysis was performed. As discussed above, the BSP is an unlined surface impoundment that currently is undergoing closure and receives only stormwater runoff from the adjacent upland area. The analysis assumed that, during large storm events, the inflow into the BSP during storm events is from direct precipitation and surface water runoff only. Also as discussed above, the analysis assumed outflow to the FSP is through one culvert in the north embankment of the BSP. A HydroCAD version 9.00 analysis was performed for the BSP and incorporated the following:

- A SCS Type II 25-year, 24-hour storm event of 5.26 inches.
- A hydrological model to simulate the collection and conveyance of surface water within the BSP and upland areas during the storm event.
- Hydrologic model of the impoundment to simulate the water storage and the variation in water levels during and following the design storm event based on the geometries included in the construction drawings, information provided by NIPSCO, and satellite imagery. The model assumed a bottom elevation of 9.58 feet plant datum (pd) and crest elevation of 14 feet pd.

2.1.1 BSP Conclusions and Recommendations

Results of the H&H analysis of the BSP are summarized below.

Table 1: BSP Hydrology and Hydraulics Analysis Results

Analysis Item	Result
Depth of Precipitation (in)	5.26
Initial Water Surface Elevation (ft pd)	9.58
Crest Elevation (ft pd)	14.0
Maximum Rate of Inflow from Runoff and Direct Precipitation (cfs)	18.10
Total Inflow (acre-feet)	0.825
Maximum Volume of Water Storage (acre-feet)1	1.7
Design Water Surface Elevation (ft pd)	12.2
Net Freeboard during Design Storm Event (ft)	1.8
Maximum Operational Water Surface Elevation (ft pd)	13.0

Notes:

[1]Includes water stored prior to beginning of design storm event minus the outlet flow through the culvert.

The current configuration of the BSP is compliant with 40 CFR 257.82(a). This conclusion is based on the assumptions presented herein and the following operational conditions:

- The BSP must be operated at or below the maximum operational water surface elevations presented in the table above.

- The BSP must be operated such that the CCR stored in the impoundment does not accumulate above elevation 12.2 feet pd.
- MCGS operations have discontinued the inflow of bottom ash sluice to the BSP.

2.2 Primary 2 Analysis

Primary 2 is determined to be a significant hazard potential classification assessment, and the flood control system must provide protection to the CCR unit during a 1,000-year flood event. To evaluate the ability of Primary 2 to adequately manage the flow during and following the peak discharge of the design storm event, a hydrologic and hydraulic (H&H) analysis was performed.

Primary 2 surface impoundment does not currently receive CCR materials from the generating station and is undergoing closure. As such, the analysis assumed during the design storm event that the only inflow to the impoundment is from hydro-meteorological sources (direct precipitation and surface water runoff). There is a concrete outflow structure in the north end of Primary 2 that discharges water to the Final Settling Pond. The standing water level has been conservatively assumed to be three feet below the top of the embankment crest based on the 2017 Resource Conservation and Recovery Act (RCRA) Inspection performed by Golder Associates Inc. (Golder) in 2017. The catchment area includes the Primary 2 area and the immediately adjacent upland areas around the unit. It was conservatively assumed that all runoff is reported immediately to Primary 2 during storm events.

A HydroCAD version 9.00 analysis was performed for Primary 2 and incorporated the following:

- A SCS Type II 1,000-year, 24-hour storm event of 10.4 inches.
- A hydrological model to simulate the collection and conveyance of surface water within Primary 2 and upland areas during the storm event. The model conservatively assumed that Primary 2 and the upland catchment area (the perimeter embankment) reporting to Primary 2 is impervious to infiltration.
- Hydrologic model of the impoundments to simulate the water storage and the variation in water levels during and following the design storm event based on the geometries included in the construction drawings, information provided by NIPSCO, and satellite imagery. The model assumed a bottom elevation of 15.46 feet pd, an initial water surface of 15.46 feet pd. The model conservatively assumed that no outflow through the outlet structure will occur from Primary 2 during the design storm event.

2.2.1 Primary 2 Conclusions and Recommendations

Results of the H&H analysis of Primary 2 are summarized below.

Table 2: Primary 2 Hydrology and Hydraulics Analysis Results

Analysis Item	Result
Depth of Precipitation (in)	10.4
Initial Water Surface Elevation (ft pd)	15.46
Crest Elevation (ft pd)	30.0
Maximum Rate of Inflow from Runoff and Direct Precipitation (cfs)	54.10
Total Inflow (acre-feet)	2.74

Analysis Item	Result
Maximum Volume of Water Storage (acre-feet)1	23.0
Maximum Water Surface Elevation (ft pd)	18.99
Net Freeboard during Design Storm Event (ft)	11.01
Maximum Allowable Operational Water Surface Elevation (ft amsl)	27.0

The current configuration of Primary 2 is compliant with 40 CFR 257.82(a). This conclusion is based on the assumptions presented herein and the following operational conditions.

- Primary 2 must be operated at or below the maximum operational water surface elevations presented in the table above.

3.0 PLAN REVISION AND RECORDKEEPING

Per 40 CFR 257.82(c)(2): “The owner or operator of the CCR unit may amend the inflow design flood control system plan at any time provided the revised plan is placed in the facility's operating record as required by Section 257.105(g)(3). The owner or operator must amend the written inflow design flood control system plan whenever there is a change in conditions that would substantially affect the written plan in effect.”

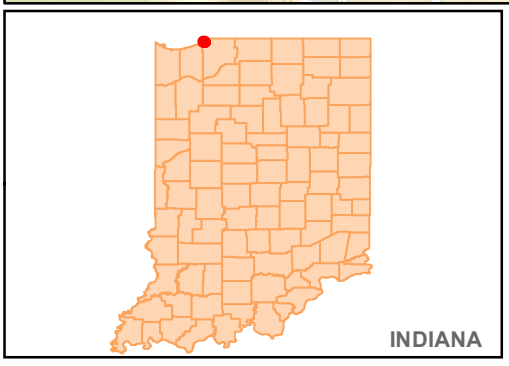
Per 40 CFR 257.81(c)(4): “The owner or operator must prepare periodic inflow design flood control system plans required by paragraph (c)(1) of this section every five years. The date of completing the initial plan is the basis for establishing the deadline to complete the first subsequent plan. The owner or operator may complete any required plan prior to the required deadline provided the owner or operator places the completed plan into the facility's operating record within a reasonable amount of time. In all cases, the deadline for completing a subsequent plan is based on the date of completing the previous plan. For purposes of this paragraph (c)(4), the owner or operator has completed a periodic inflow design flood control system plan when the plan has been placed in the facility's operating record as required by Section 257.105(g)(3).”

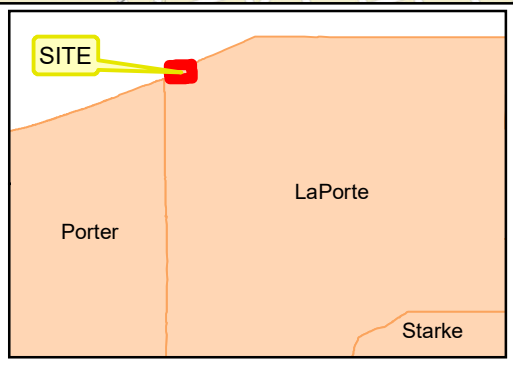
Per 40 CFR 257.82(d): “The owner or operator of the CCR unit must comply with the recordkeeping requirements specified in Section 257.105(g), the notification requirements specified in Section 257.106(g), and the internet requirements specified in Section 257.107(g).”

4.0 REFERENCES

USEPA (US Environmental Protection Agency). 2015. Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule. 40 CFR Part 257. Effective Date October 19, 2015.

Figures





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

CLIENT
NORTHERN INDIANA PUBLIC SERVICE COMPANY

CONSULTANT
GOLDER
MEMBER OF WSP

YYYY-MM-DD	2021-09-16
DESIGNED	JH
PREPARED	DJC
REVIEWED	TDJ
APPROVED	TDJ

PROJECT
CCR SURFACE IMPOUNDMENT
INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN
MICHIGAN CITY GENERATING STATION, MICHIGAN CITY, INDIANA

TITLE
SITE LOCATION MAP

PROJECT NO.	CONTROL	REV.	FIGURE
21455411	21455411B003-GIS.MXD	0	1

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LEGEND

- Existing Sheet Piles
- Approximate Property Line
- CCR Units

NARRATIVE

This figure shows the approximate boundaries of the CCR units submitted as part of this inflow design control system plan for compliance with the final rule, 40 CFR, Part 257.82.

REFERENCES

Ortho Imagery from Indiana University Indiana Spatial Data Portal

0 100 200 400 Feet

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PROJECT
CCR SURFACE IMPOUNDMENT
INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN
MICHIGAN CITY GENERATING STATION, MICHIGAN CITY,

TITLE
EXISTING CONDITIONS

CONSULTANT
GOLDER
MEMBER OF WSP

YYYY-MM-DD	2021-09-16
PREPARED	DJC
DESIGN	JH
REVIEW	TDJ
APPROVED	TDJ

PROJECT No.	CONTROL	Rev.	FIGURE
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