DRAFT ROUND 10 DAM ASSESSMENT REPORT
NIPSCO MICHIGAN CITY GENERATING STATION
COAL ASH IMPOUNDMENTS

MARCH 29, 2012

PREPARED FOR:

U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460

PREPARED BY:

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GZA File No. 01.0170142.30

GZA
GeoEnvironmental, Inc.

Engineers and Scientists

March 29, 2012
File No. 01.0170142.30

Mr. Stephen Hoffman
U. S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Re: Round 10 Dam Assessment - Draft Report
EPA Contract No. EP10W001313
NIPSCO – Michigan City Generating Station Coal Ash Impoundments
Michigan City, Indiana

One Edgewater Drive
Norwood, MA 02062
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Dear Mr. Hoffman:

In accordance with our proposal 01.P000177.11, dated March 28, 2011, and U.S. Environmental Protection Agency (EPA) Contract No. EP10W001313, Order No. EP-B11S-00049, GZA GeoEnvironmental, Inc. (GZA) has completed our inspection of the Northern Indiana Public Service Company (NIPSCO) Michigan City Generating Station (Site) Coal Ash Impoundments located in Michigan City, Indiana. The Site visit was conducted on May 23, 2011. The purpose of our efforts was to provide the EPA with a Site-specific evaluation of the impoundments to assist EPA in assessing the structural stability of the impoundments under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act Section 104(e). We are submitting one hard copy and one CD-ROM copy of this Draft Report directly to the EPA.

In GZA's professional opinion, each of the Impoundments appear to be sound and no immediate remedial action appears to be necessary, based upon the information provided and our observations. However, based on EPA's inspection criteria, the overall condition of the Impoundments is judged to be **POOR** because no geotechnical computations were made available to GZA for review. Thus, the stability of the Impoundments could not be independently verified**..** Further discussion of our evaluation and recommended actions are presented in the Round 10 Dam Assessment Report. The report includes: (a) completed Field Assessment Checklists; (b) figures of the impoundments; and (c) selected photographs with captions. Our services and report are subject to the Limitations found in **Appendix A** and the Terms and Conditions of our contract agreement.

We are happy to have been able to assist you with this assessment and appreciate the opportunity to continue to provide you with dam engineering consulting services. Please contact the undersigned if you have any questions or comments regarding the content of this Round 10 Dam Assessment Report.

Sincerely,

GZA GEOENVIRONMENTAL, INC.

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DRAFT REPORT

EXECUTIVE SUMMARY

This Dam Assessment Report presents the results of a visual inspection of the Northern Indiana Public Service Company (NIPSCO, Owner), Michigan City Generating Station (MCGS) located in Michigan City, Indiana. The inspection was performed on May 23, 2011, by representatives of GZA GeoEnvironmental, Inc (GZA), accompanied by representatives of NIPSCO.

MCGS IMPOUNDMENTS

There are six separate impoundments located at the MCGS, consisting of: Primary Settling Pond No. 1 (Primary No. 1), Secondary Settling Pond No. 1 (Secondary No. 1), Primary Settling Pond No. 2 (Primary No. 2), Secondary Settling Pond No. 2 (Secondary No. 2), the Bottom Ash Area (BAA), and the Final Settling Pond (FSP).

In general, wastewater flows through the Impoundments by gravity from southwest to northeast to the FSP where it is either pumped (recycled) back to the MCGS or discharged to Outfall 001 by gravity.

Primary No. 1, Primary No. 2, and Secondary No. 1 consist of an earthfill embankment with a crest length of approximately 3,050 feet and a maximum height (from the lowest elevation of Secondary No. 1 to the top of embankment) of approximately 29 feet. A gravel road along the top of the crest has a width of approximately 20 feet and an elevation of approximately 608.72 feet, National Geodetic Vertical Datum of 1929 (NGVD 29)[1]. The outer and inner slopes of the embankments are approximately 2.5 horizontal to 1 vertical (2.5H:1V). The perimeter of Secondary No. 1 is a sheet pile wall. Crushed stone up to 8-inch diameter was placed on the upper portion of the inner slope from the top of the sheet pile wall up to the crest.

Secondary No. 2 consists of an earthfill embankment with a crest length of approximately 450 feet. Secondary No. 2 shares its southwestern slope with Primary No. 2. The southwestern upstream slope of Secondary No. 2 is the northeastern downstream slope of Primary No. 2. As such, the maximum embankment height of Secondary No. 2 (from the top of the embankment between Secondary No. 2 and Primary No. 2 to the bottom of Primary No. 2) is approximately 29 feet.

The BAA consists of an area of compacted sand that was placed on top of the natural ground surface for the purpose of directing boiler slag runoff to the FSP. It has one embankment that is shared with the FSP. This embankment has a maximum height of 2 feet.

The FSP consists of an earthfill embankment with a crest length of approximately 2,500 feet and a maximum height (from the top of the embankment to the estimated elevation of Lake Michigan) of approximately 18 feet. A gravel road along the top of the crest has a width of approximately 20 feet and at its lowest elevation is approximately 587.72 feet. The inner slopes of the embankments are approximately 2.5 horizontal to 1 vertical (2.5H:1V). The northern perimeter of the FSP is a sheet pile wall.

The Impoundments do not meet the definition of a dam in the State of Indiana and are therefore not regulated by the IDNR, nor assigned a hazard potential rating. Under the EPA classification system, it is GZA's opinion that the Secondary No. 1, Secondary No. 2, BAA, and FSP would be

[1] Unless otherwise stated, elevations in this report are given in NGVD 29.

considered as having a **Low** hazard potential. This hazard potential rating was assigned because failure or misoperation of these Impoundments would result in no probable loss of human life and low economic or environmental losses. Any economic or environmental losses would be primarily limited to the MCGS property.

It is GZA's opinion that the Primary No. 1 and Primary No. 2 would be considered as having a **Significant** hazard potential. This hazard potential rating was assigned because, in the unlikely event of dike failure, the coal ash stored in the primary impoundments may discharge into Lake Michigan and could potentially cause environmental damage. Additionally, a dike failure would cause disruption of lifeline facilities as the MCGS depends upon the water within the Impoundments. Note that MCGS alternates use of Primary No. 1 and Primary No. 2 such that only one primary impoundment is utilized at a time. Primary No. 1 is currently operational.

In GZA's professional opinion, each of the Impoundments appear to be sound and no immediate remedial action appears to be necessary, based upon the information provided and our observations. However, based on EPA's inspection criteria, the overall condition of the Impoundments is judged to be **POOR** because no geotechnical computations were made available to GZA for review. Thus, the stability of the Impoundments could not be independently verified**.**

The Impoundments were found to have the following deficiencies:

1. Piezometers of unknown depth or construction were located throughout the Impoundments;
2. No formal operation and maintenance plan or inspection checklist in place to observe and document the structural condition of the Impoundments;
3. The discharge pipes within the Impoundments have not been inspected internally since they were installed;
4. There was an obstruction at the decant inlet and lack of a trash rack in Secondary No. 2;
5. The trash rack in Primary No. 2 was bent;
6. There was a pipe of unknown use observed near the overflow pipes at the FSP; and,
7. No design information available for the steel sheet piling used to support the northwestern sides/ends of the Impoundments.

The following recommendations and remedial measures generally describe the recommended approach to address current deficiencies at the Impoundments. Prior to undertaking recommended maintenance, repairs, or remedial measures, the applicability of environmental permits needs to be determined for activities that may occur within resource areas under the jurisdiction of the appropriate regulatory agencies.

Studies and Analyses

GZA recommends the following studies and analyses:

1. If an analysis of the allowable bending moments and applied bending moments to the steel sheet piling has not been performed previously or is not available, this type of analysis should be performed to verify that the installed sheet piling has sufficient strength to support the loading applied by the Impoundments.
2. Perform a seepage and stability analysis to evaluate the embankment slopes;

3. Perform a hydrologic and hydraulic analyses of the individual Impoundments to determine the adequacy of intake/discharge features and adequacy of current operating water levels

Operation & Maintenance Recommendations

GZA recommends the following operation and maintenance level activities:

1. If they are not necessary for the operation of the Impoundments, abandon the piezometers that are located near the Impoundments brush piles since their depth in unknown;

2. Clear the obstruction from the decant inlet in Secondary No. 2 and install a trash rack;

3. Exercise stops logs and related water level control mechanisms at exiting decant structures;

4. Increase/adjust the frequency of vegetative maintenance activity such that overgrowth is minimized;

5. Perform a video camera survey of the intake and discharge pipe network within the Impoundments to verify that they are operating correctly and are in suitable condition; and,

6. Create a formal checklist for visual inspections of the Impoundments and associated appurtenances and maintain the inspection records on file.

Minor Repair Recommendations

GZA recommends the following repairs which may improve the overall condition of the Impoundments and water storage system, but do not alter the current design of the embankment. The recommendations may require design by a professional engineer and construction contractor experienced in embankment construction.

1. Repair the bent trash rack in Primary No. 2 before this Impoundment is put back in service;
2. Repair sloughs and scarps on the embankments and provide future erosion protection as necessary and,
3. Evaluate the function and necessity of the unknown pipe found on the northeast side of the FSP and remove the pipe if it is not needed.

<u>Remedial Measures Recommendations</u>

1. In conjunction with the results of the seepage and stability analyses make provisions to address inadequate factors of safety as applicable; and

2. In conjunction with the results of the hydrologic and hydraulic analyses, make provisions for an emergency overflow spillway.

PREFACE

The assessment of the general condition of the embankment at the Northern Indiana Public Service Company, Michigan City Generating Station located in Michigan City, Indiana is based upon available data and visual inspections. Detailed investigations and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of this report.

In reviewing this report, it should be realized that the reported condition of the embankment is based on observations of field conditions at the time of inspection, along with data available to the inspection team. In cases where an impoundment is lowered or drained prior to inspection, such action, while improving the stability and safety of the embankment, removes the normal load on the structure and may obscure certain conditions, which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is critical to note that the condition of the embankment depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the embankment will continue to represent the condition of the embankment at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions be detected.

Prepared by:

GZA GeoEnvironmental, Inc.

Walter Kosinski, P.E.
Principal
Indiana License No.: PE10201153

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COAL ASH IMPOUNDMENTS
NIPSCO – MICHIGAN CITY GENERATING STATION
MICHIGAN CITY, INDIANA

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1.0 DESCRIPTION OF PROJECT

1.1 General

1.1.1 Authority

The United States Environmental Protection Agency (EPA) has retained GZA GeoEnvironmental, Inc. (GZA) to perform a visual assessment and develop a report of conditions for the Northern Indiana Public Service Company (NIPSCO, Owner), a division of NiSource, Michigan City Generating Station (MCGS, Site) coal ash impoundments (Impoundments) located in Michigan City, Indiana. This evaluation was authorized by the EPA under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 104(e). This assessment and draft report were performed in accordance with Round 10 of the Assessment of Dam Safety of Coal Combustion Surface Impoundments, RFQ-DC-16, dated March 16, 2011, and EPA Contract No. EP10W001313, Order No. EP-B11S-00049. The assessment generally conformed to the requirements of the Federal Guidelines for Dam Safety[1], and this report is subject to the limitations contained in **Appendix A** and the Terms and Conditions of our Contract Agreement.

1.1.2 Purpose of Work

The purpose of this assessment was to visually assess and evaluate the present condition of the Impoundments and appurtenant structures to attempt to identify conditions that may adversely affect their structural stability and functionality, to note the extent of any deterioration that may be observed, review the status of maintenance and needed repairs, and to evaluate the conformity with current design and construction standards of care.

The assessment was divided into five parts: 1) obtain and review available reports, investigations, and data from the Owner pertaining to the impoundments and appurtenant structures; 2) perform an on-Site review with the Owner of available design, inspection, and maintenance data and procedures for the Impoundments; 3) perform a visual assessment of the Site; 4) prepare and submit a field assessment checklist; and, 5) prepare and submit a draft and a final report presenting the evaluation of the Impoundments, including recommendations and proposed remedial actions.

1.1.3 Definitions

To provide the reader with a better understanding of the report, definitions of commonly used terms associated with dams are provided in **Appendix B**. Some of these terms may be included within this report. The terms are presented under common categories associated with dams which include: 1) orientation; 2) dam components; 3) size classification; 4) hazard classification; 5) general; and, 6) condition rating.

[1] FEMA/ICODS, April 2004: http://www.ferc.gov/industries/hydropower/safety/guidelines/fema-93.pdf

1.2 Description of Project

1.2.1 Location

The MCGS is located on the shores of Lake Michigan about one mile northwest of Michigan City, Indiana, at the address 101 Wabash Street, Michigan City, Indiana 46360. The Impoundments are located less than a mile southwest of the MCGS at latitude 41˚ 43' 07" North and longitude 86 ˚ 54' 48" West. A Site locus map of the MCGS, Impoundments, and surrounding area is shown on **Figure 1**. An aerial photograph of the MCGS, Impoundments, and surrounding area is provided as **Figure 2**.

1.2.2 Owner/Caretaker

The Impoundments are owned and operated by NIPSCO, a wholly owned division of NiSource.

	Dam Owner/Caretaker
Name	NIPSCO, Michigan City Generating Station
Mailing Address	101 Wabash Street
City, State, Zip	Michigan City, Indiana 46360
Contact	Greg Costakis
Title	Manager - Environmental Services
E-Mail	gcostakis@nisource.com
Phone Number	(219) 956-5125

1.2.3 Purpose of the Impoundments

The MCGS was originally constructed in 1929 and commercial operation began in 1931. Currently, the MCGS is a single-unit coal-fired power plant with a maximum generating capacity of approximately 515 megawatts. The Impoundments were constructed in the early 1970's for the purpose of storing and disposing coal combustion byproducts and began operation in 1973. Prior to 1973, fly ash was used as structural fill to fill in the shoreline of Lake Michigan. In 1999, the MCGS switched to a dry fly ash handling system. The Impoundments have been utilized from 1973 to date.

Wastewater discharged from the Site is regulated under one National Pollution Discharge Elimination System (NPDES) permit[2]. NIPSCO personnel indicated that the majority of the wastewater discharged to the Impoundments is recycled back to the MCGS. Any wastewater discharged from the Impoundments under the NPDES permit is discharged to Lake Michigan through Outfall 001 as shown on **Figure 2**.

[2] National Pollutant Discharge Elimination System (NPDES) Permit No. IN0000116, NIPSCO – Michigan City Generating Station, Indiana Department of Environmental Management, March 15, 2011.

1.2.4 Description of the Impoundments and Appurtenances

The following description of the Impoundments is based on the Owner interviews, design reports, as-built drawings, and field observations by GZA.

As shown on **Figures 2 and 3**, there are six separate impoundments: Primary Settling Pond No. 1 (Primary No. 1), Secondary Settling Pond No. 1 (Secondary No. 1), Primary Settling Pond No. 2 (Primary No. 2), Secondary Settling Pond No. 2 (Secondary No. 2), the Bottom Ash Area (BAA), and the Final Settling Pond (FSP).

In general, wastewater flows through the Impoundments by gravity from southwest to northeast to the FSP where it is either pumped (recycled back) to the MCGS or discharged to Outfall 001 by gravity through two 24-inch-diameter overflow pipes. Each impoundment receives the following types of wastewater:

1. Primary No. 1 receives economizer ash sluice, precipitator ash sluice, air heater washwater, boiler blowdown water, boiler fireside wash water, filter backwash, reverse osmosis reject water, and miscellaneous low volume wastes;
2. Secondary No. 1 is the polishing pond for Primary No. 1 and as such only receives flow from Primary No. 1;
3. Primary No. 2 can receive the same wastewaters as Primary No. 1. Currently, no wastewater is discharged into Primary No. 2. No wastewater will be discharged into Primary No. 2 until Primary No. 1 is filled with ash;
4. Secondary No. 2 is the polishing pond for Primary No. 2 and as such, only receives wastewater from Primary No. 2;
5. The BAA receives boiler slag sluice, coal pile stormwater runoff, and coal handling area floor drain water; and,
6. The Final Settling Pond receives flow from Secondary No. 1, Secondary No. 2, and the BAA.

The Impoundments were constructed on the natural ground surface. Since the embankments were constructed on the natural ground surface, the structural height is approximately the same as the maximum embankment height. The embankments were constructed with compacted sand. There is no lining beneath the Impoundments. There are two rows of sheet piling that separate the Impoundments from Lake Michigan. The northernmost row was reportedly installed between 1935 and 1950 and was primarily installed to protect the MCGS from wave erosion. The second row of sheet piling was installed in 1973 in conjunction with the Impoundments for the primary purpose of supporting the structural integrity of the Impoundments and further protection from Lake Michigan. Heavy rip rap was placed in between the two rows of sheet piling.

Primary No. 1, Primary No. 2, and Secondary No. 1 consist of an earthfill embankment with a crest length of approximately 3,050 feet and a maximum height (from the lowest elevation of Secondary No. 1 to the top of embankment) of approximately 29 feet. A gravel road along the top of the crest has a width of approximately 20 feet and an elevation of approximately 608.72 feet, National Geodetic Vertical Datum of 1929 (NGVD 29)[3]. The outer and inner slopes of the embankments are approximately 2.5 horizontal to 1 vertical (2.5H:1V).

[3] Unless otherwise stated, elevations in this report are given in NGVD 29.

The perimeter of Secondary No. 1 is a sheet pile wall. Crushed stone up to 8-inch diameter was placed on the upper portion of the inner slope from the top of the sheet pile wall up to the crest.

Secondary No. 2 consists of a sheet pile wall impounded area and is surrounded by an earthfill embankment with a crest length of approximately 450 feet. Secondary No. 2 shares its southwestern slope with Primary No. 2. The southwestern upstream slope of Secondary No. 2 is the northeastern downstream slope of Primary No. 2 as shown in **Figure 2**. As such, the maximum embankment height of Secondary No. 2 (from the top of the embankment between Secondary No. 2 and Primary No. 2 to the bottom of Primary No. 2) is approximately 29 feet.

The BAA consists of an area of compacted sand that was placed on top of the natural ground surface for the purpose of directing boiler slag runoff to the FSP. It has one embankment that is shared with the FSP. This embankment has a maximum height of 2 feet.

The FSP consists of an earthfill embankment with a crest length of approximately 2,500 feet and a maximum height (from the top of the embankment to the estimated elevation of Lake Michigan) of approximately 18 feet. A gravel road along the top of the crest has a width of approximately 20 feet and at its lowest elevation is approximately 587.72 feet. The inner slopes of the embankments are approximately 2.5 horizontal to 1 vertical (2.5H:1V). The northern perimeter of the FSP is a sheet pile wall.

The Impoundments have not been expanded since they were constructed in the 1970's.

The discharge structures in each Impoundment are summarized in the following table.

Impoundment Name	Number of Decant Structures	Decant Structure Pipe Diameter and Type	Inlet Elevation of Decant Structures (feet)	Purpose
Primary No. 1	1	24-inch Corrugated Metal	602.92	Transfer liquids to Secondary No. 1
Secondary No. 1	1	24-inch Corrugated Metal	588.82	Transfer liquids to FSP
Primary No. 2	1	24-inch Corrugated Metal	587.72	Transfer liquids to Secondary No. 2
Secondary No. 2	1	24-inch Corrugated Metal	588.12	Transfer liquids to FSP
BAA	5	12-inch PVC	587.72	Transfer liquids to FSP
FSP	None	N/A	N/A	Pump liquids to the MCGS

Two of the Impoundments have emergency overflow pipes. Primary No. 1 has a 24-inch diameter corrugated metal pipe set at a decant inlet elevation of approximately 606.72 feet that discharges to Secondary No. 1. The FSP has two 24-inch diameter welded steel pipes set at a decant inlet elevation of approximately 585.72 feet that discharge to Outfall 001.

Instrumentation at the Impoundments includes several monitoring wells to conduct groundwater sampling and approximately eight piezometers.

Further discussion of the hydrology and hydraulics of the Impoundments are provided in Section 2.5.

1.2.5 Operations and Maintenance of the Impoundments

NIPSCO personnel visually inspect the Impoundments on an infrequent basis but generally not for structural purposes. There are limited formal operation and maintenance procedures. Vegetation is sprayed once or twice per year to prohibit growth. The Impoundments do not meet the definition of a dam in the State of Indiana and are therefore not regulated by the Indiana Department of Natural Resources (IDNR). Note that MCGS alternates use of Primary No. 1 and Primary No. 2 such that only one primary impoundment is utilized at a time. Primary No. 1 is currently operational. Primary No. 2 was last utilized in 2003 and the settled fly ash has since been removed.

1.2.6 Size Classification

For the purposes of this EPA-mandated inspection, the size classifications will be based on United States Army Corps of Engineers (COE) criteria. According to guidelines established by the COE, dams with a storage volume less than 1,000 acre-feet and/or a height less than 40 feet are classified as Small sized structures. Based on their respective maximum heights and storage volumes (refer to Section 1.3), each of the Impoundments is classified as a **Small** sized structure. It is noted that the IDNR does not set size criteria for dams.

1.2.7 Hazard Potential Classification

Given that the Impoundments do not meet the definition of a dam in the State of Indiana and are therefore not regulated by the IDNR, the IDNR has not assigned them a hazard potential rating. Under the EPA classification system, as presented in the Definitions section (**Appendix B**) and on page 2 of each EPA checklist (**Appendix C**), it is GZA's opinion that the Secondary No. 1, Secondary No. 2, BAA, and FSP would be considered as having a **Low** hazard potential. This hazard potential rating was assigned because failure or misoperation of these Impoundments would result in no probable loss of human life and low economic or environmental losses. Any economic or environmental losses would be primarily limited to the MCGS property.

It is GZA's opinion that the Primary No. 1 and Primary No. 2 would be considered as having a **Significant** hazard potential. This hazard potential rating was assigned because, in the unlikely event of dike failure, the coal ash stored in the primary impoundments may discharge into Lake Michigan and could potentially cause environmental damage. Additionally, a dike failure would cause disruption of lifeline facilities served by MCGS as the MCGS depends upon the water within the Impoundments in the production of electricity. Note that MCGS alternates use of Primary No. 1 and Primary No. 2 such that only one primary impoundment is utilized at a time. Primary No. 1 is currently operational.

1.3 Pertinent Engineering Data

The Impoundments are located near Lake Michigan and are approximately bordered by the Indiana National Dunes Lakeshore to the southwest, by Lake Michigan to the north and west, Trail Creek to the east, and Michigan City to the south and east. The Impoundments were reportedly constructed on the natural ground surface with completed structural fill. Soil boring logs indicate that the Impoundments were constructed on top of a layer of natural fine sand underlain by silty sand[4]. The construction specifications indicate that the embankments were primarily constructed with compacted sand from on-Site sources. The fill was specified to be placed in loose lifts of 6 to 8 inches and compacted to a minimum dry density of 98 pounds per cubic foot. According to the specification, prior to placing the fill, the area to be filled was to be cleared of all vegetation, top soil, and organic material. The remaining soil underlying the filled area was specified to be turned to a depth of 6-inches prior to placing the fill[5].

The size, capacity, and current storage volume of each Impoundment based on information provided by NIPSCO[6] are included in the following table.

Impoundment	Size (Acres)	Total Storage Capacity (Cubic Yards)	Current Material Storage Volume (Cubic Yards)
Primary No. 1	2.2	57,250	42,938
Secondary No. 1	0.2	4,440	120
Primary No. 2	2.6	70,260	3,513
Secondary No. 2	0.2	5,344	267
BAA	0.7	2,296	459
FSP	5.7	137,361	6,868

As mentioned previously, there are two rows of continuous sheet piling at the MCGS. The northernmost row was primarily installed to protect the MCGS from wave erosion and abuts Lake Michigan. The second row of sheet piling was installed primarily along/adjacent to the northwestern side/end of the Impoundments for the primary purpose of supporting the structural integrity of the Impoundments and further shoreline protection. Heavy rip rap was placed in between the two rows of sheet piling. The sheet pile walls are thick (3/8-inch) sheet steel and are constructed with interlocked Z-sections. The Z-shape of the sheet pile cross section is designed to help the wall resist bending and the interlock serves to make the wall act like one continuous wall.

NIPSCO did not have design information for the northern row of sheet piling. The second row was installed at the same time the Impoundments were constructed. According to the design drawings[7], the horizontal lengths, vertical lengths, sheet piling type, and construction method consisted of the following:

[4] Log of Soil Borings, Drawing No. B-252, Sargent & Lundy Engineers, February 4, 1970.
[5] Specification W-2539 for Ash Settling Basins Work, Michigan City Generating Station - Unit 12, Sargent & Lundy Engineers, August 11, 1972.
[6] NIPSCO Response to EPA Information Request for Information for the Michigan City Generating Station, October 4, 2010.
[7] Ash Settling Basins Tower Piling & Pond, Drawing No. B-473, Sargent & Lundy Engineers, December 19, 1972.

Location of Sheet Piling	Horizontal Length (feet)	Vertical Length (feet)	Type of Piling	Construction Method
Adjacent to Primary No. 1	420	42	280-PZ38	ASTM A-572-50
Adjacent to Primary No. 1 and Primary No. 2	1,084.5	42	724-PZ38	ASTM A-572-50
Adjacent to FSP	934.5	42	623-PZ27	ASTM A-328
Adjacent to northern embankment of FSP	54	42	36-PZ27	None specified

1.3.1 Drainage Area

The Impoundments are enclosed embankments built up from the natural ground surface. As such, the contributory drainage area is the surface area of the Impoundments, approximately 12 acres, plus the surface stormwater runoff from the on-Site coal pile, which is approximately 10 acres in size. As such, the total drainage area for the Impoundments is approximately 22 acres. The coal pile was not evaluated by GZA during the Impoundment assessment.

1.3.2 Discharges at the Site

Discharges at the Site are regulated under the previously noted NPDES Permit. During normal operating conditions, all of the wastewater discharged to the Impoundments is recycled back to the MCGS by a pump house located on the east side of the FSP. If the water level in the FSP reached the emergency overflow discharge pipes, water would be discharged to Outfall 001 which empties into Lake Michigan and is permissible under the NPDES Permit.

1.3.3 General Elevations

Impoundment elevations presented in this report are taken from design drawings and reports provided by NIPSCO personnel. Elevations are based upon the NGVD 29 vertical datum.

Impoundment Name	Lowest Dam Crest Elevation (feet)	Normal Operating Pool Elevation (feet)	Current Operating Pool Elevation (feet)	Emergency Overflow Elevation (feet)
Primary No. 1	608.72	602.92	602.92	606.72
Secondary No. 1	599.72	589.02	589.02	None
Primary No. 2	608.72	602.92	587.72	None
Secondary No. 2	594.72	588.12	586.12	None
BAA	589.92	N/A[1]	587.72[1]	None
FSP	587.72	584.22	584.22	585.72

Note:
1. The BAA does not have a normal operating pool elevation because it is typically empty. The current operating pool elevation provided is the decant inlet elevation.

1.3.4 Design and Construction Records and History of the Impoundments

According to the information provided by NIPSCO, the Impoundments were designed by Sargent & Lundy Engineers. Construction of the Impoundments and sheet piling associated therewith was completed in 1973. The structure of the Impoundments has not been modified since it was constructed. In 1999, the MCGS switched to a dry fly ash handling system instead of the wet fly ash handling system that had been in use previously. The dry fly ash handling system decreased the volume of sluice water discharged to the Impoundments.

1.3.5 Operating Records

Minimal operating records are recorded by MCGS personnel and were not available to GZA at the time of the assessment.

1.3.6 Previous Inspection Reports

According to NIPSCO personnel, previous inspection reports regarding the structural stability of the Impoundments have not been completed.

2.0 INSPECTION

2.1 Visual Inspection

The Impoundments were evaluated on May 23, 2011 by Walter Kosinski, P.E., and Thomas Boom, P.E., of GZA. The weather was mostly cloudy with temperatures in the 60°s to 70°s Fahrenheit. Underwater areas were not inspected as this level of investigation was beyond GZA's scope of services. A copy of the EPA Checklist for each Impoundment is included in **Appendix C**. Photographs to document the current conditions of the Impoundments were taken during the inspection and are included in **Appendix D**. With respect to our visual evaluation, there was no evidence of prior releases, failures, or patchwork observed by GZA.

2.1.1 General Findings

In GZA's professional opinion, each of the Impoundments appear to be sound and no immediate remedial action appears to be necessary. However, based on EPA's inspection criteria, each of the Impoundments have been given a **POOR** Condition Rating, because no geotechnical computations were made available to GZA for review. Thus, the stability of the Impoundments could not be independently verified. Specific concerns are identified in more detail in the sections below.

An overall plan showing the pertinent features, including the location and orientation of photographs provided in **Appendix D**, is detailed on **Figure 3**.

2.1.2 Primary No. 1 (Photo Nos. 1 – 8, 50, and 51)

Primary No. 1 generally appeared to be in good condition. Wastewater was being discharged into it during GZA's assessment. The outer embankment slope generally appeared to be in good condition. A layer of rip rap was evident on the outer embankment slope. There was a minimal amount of vegetation on the outer slope. No unusual movement or sloughing was

observed on the outer slope. The alignment of the sheet piling appeared straight with no lateral displacement (Photo Nos. 50 and 51).

The crest of Primary No. 1 also functions as a gravel road. The alignment of the top of the embankment appeared generally level, with no depressions or irregularities observed.

Most of the interior slope could not be observed due to the water elevation within Primary No. 1. The parts of the interior slope that could be observed appeared to be in good condition. Some minor erosion channels were observed (Photo 8) and some minor sloughing was noted near the emergency overflow pipe (Photo 7).

There are two discharge structures in Primary No. 1, the discharge structure and the emergency overflow pipe. The concrete discharge structure utilizes stop logs to control the elevation of the water within Primary No. 1. The concrete above the water level appeared intact. The interior of the discharge structure could not be observed. The transfer and discharge pipes could not be visually inspected during the assessment. MCGS reportedly has never had an issue with any of the discharge pipes since the Impoundment was originally constructed.

The exterior of the corrugated metal emergency overflow pipe (Photo No. 7) appeared to be in poor condition with significant corrosion observed in the exposed portion. GZA was not able to observe its interior portion beneath the embankment.

A piezometer of unknown depth or construction was observed on the northwest side of Primary No. 1 (Photo 3).

2.1.3 Secondary No. 1 (Photo Nos. 9-14)

Secondary No. 1 generally appeared to be in good condition. A continuous row of sheet piling encloses the pool area of Secondary No. 1 (Photo 9). The inner embankment slope appeared to be in good condition. A continuous layer of rip rap was evident on the inner embankment slope. There was a minimal amount of vegetation on the inner slope. No unusual movement was observed on the inner slope and some minor erosion channeling and sloughing was observed (Photos 12 and 14).

The alignment of the sheet piling appeared straight with no lateral displacement. It appeared that one section of the sheet piling in the southeastern corner was at a lower elevation than the rest of the sheet piling (Photos 10 and 14). The condition of the sheet piling could not be observed because it was underwater.

The crest of Secondary No. 1 also functions as a gravel road. The alignment of the top of the embankment appeared generally level, with no depressions or irregularities observed.

There is one discharge structure in Secondary No. 1. The inlet of the discharge structure was obstructed with debris and there did not appear to be a trashrack in place (Photo No. 11). The interior of the discharge structure and discharge pipe could not be observed during the assessment. MCGS reportedly has never had an issue with the discharge pipe since the Impoundment was originally constructed.

Several piezometers of unknown depth or construction were observed on the southeast side of Secondary No. 1.

2.1.4 Primary No. 2 (Photo Nos. 15 - 23, 47, 48, and 49)

Primary No. 2 generally appeared to be in good condition. This Impoundment was not in use during GZA's assessment and, according to NIPSCO personnel, it has not been used since 2003. The outer embankment slope generally appeared to be in good condition. A layer of rip rap was evident on the outer embankment slope (i.e. the slope along the Lake Michigan side). There was a minimal amount of vegetation on the outer slope. No unusual movement or sloughing was observed on the outer slope. The alignment of the sheet piling appeared straight with no lateral displacement (Photo Nos. 47, 48, and 49).

The crest of Primary No. 2 also functions as a gravel road. The alignment of the top of the embankment appeared generally level, with no depressions or irregularities observed.

The interior slope appeared to be in good condition. Some minor erosion channels were observed and some minor sloughing was noted near the emergency overflow pipe (Photos 16 and 22).

There is one discharge structure in Primary No. 2. The concrete discharge structure utilizes stop logs to control the elevation of the water within Primary No. 2. The concrete appeared intact but the trash rack appeared bent (Photo 17). The discharge pipe could not be visually inspected during the assessment. MCGS reportedly has never had an issue with the discharge pipe since the Impoundment was originally constructed.

2.1.5 Secondary No. 2 (Photo Nos. 24, 25, and 26)

Secondary No. 2 generally appeared to be in good condition but was not in use at the time of GZA's assessment. A continuous row of sheet piling encloses the pool area of Secondary No. 2. The alignment of the sheet piling generally appeared straight but its condition could not generally be observed because it was underwater. There is no inner embankment slope.

There is one discharge structure in Secondary No. 2 that could not be observed because of vegetation within the Impoundment. MCGS reportedly has never had an issue with the discharge pipe since the Impoundment was originally constructed.

2.1.6 Bottom Ash Area (Photo Nos. 27 through 30)

Bottom ash sluice water is discharged to the BAA which acts as a temporary holding area for bottom ash before it is sold for commercial use. The discharged water immediately drains to the FSP through one of five discharge pipes. The BAA ground surface slopes toward the FSP with a small embankment/road along the northwest side, located between the BAA and FSP. The embankment is relatively small, approximately two feet in height, and appeared to be in good condition. The discharge pipes were in fair condition. Given that the BAA does not satisfy the criteria set forth by the U.S. EPA for units requiring further evaluation the Checklist and photos provided herein are for reference only.

2.1.7 Final Settling Pond (Photo Nos. 31 through 46)

The FSP generally appeared to be in good condition. The alignment of the sheet piling on the northwest side of the FSP generally appeared straight (Photo Nos. 45 and 46). The crest of the FSP also functions as a gravel road. The alignment of the top of the embankment appeared generally level, with no depressions or irregularities observed. Most of the interior slope could not be observed due to the water elevation within the FSP. The parts of the interior slope that could be observed appeared to be in good condition.

The primary method to remove water from the FSP is by pumping. The pumphouse contains pumps that transfer water from the FSP to the MCGS and controls the level of water within the FSP. Additionally, there are two overflow pipes (Photo No. 31) that discharge to Outfall 001. If water is discharged to Outfall 001, totalizers located on the overflow pipes (Photo No. 33) will measure the volume of wastewater discharged. According to NIPSCO personnel, the totalizers were operational. The concrete manholes housing the totalizers (Photo Nos. 32 and 33) appeared to be in good condition. The interior of the overflow pipes could not be visually inspected during the assessment. MCGS reportedly has never had an issue with the discharge pipes since the Impoundment was originally constructed.

The pumphouse was not assessed during GZA's site visit as this was outside of our scope of work (Photo 44). An unknown pipe was observed penetrating through the embankment with an outfall end above the current waterline on the northeast side of the FSP (Photo 31).

2.1.8 Steel Sheet Piling

The steel sheet piling generally appeared to be in good condition with no indications of lateral wall movement and little corrosion. GZA did not evaluate the sheet piling as part of the inspection but has provided some general comments. As mentioned previously, there are two rows of continuous sheet piling at the MCGS. Heavy rip rap was placed in between the two rows of sheet piling. The sheet pile walls are thick (3/8-inch) sheet steel and are constructed with interlocked Z-sections. The Z-shape of the sheet pile cross section is designed to help the wall resist bending and the interlock serves to make the wall act like one continuous wall. Design information such as the allowable bending moments and applied bending moments was not available at the time of the inspection.

2.2 Caretaker Interview

Maintenance of the dam is the responsibility of MCGS personnel. GZA met with MCGS personnel and discussed the current operations and maintenance procedures, regulatory requirements, and the history of the Impoundments since they were constructed. The observations, descriptions and findings presented in this Report reference these discussions.

2.3 Operation and Maintenance Procedures

As discussed in Section 1.2.5, MCGS personnel are responsible for the regular operation and maintenance of the Impoundments but there are no formal operation and maintenance procedures in place. The Impoundments are typically observed at least once per day for anything unusual.

2.4 Emergency Action Plan

There is no Emergency Action Plan (EAP) developed for the Impoundments. An EAP is not required under Indiana regulations.

2.5 Hydrologic/Hydraulic Data

GZA did not perform an independent assessment of the hydraulics and hydrology for the Impoundments as this was beyond our scope of services. During normal operating conditions, there is approximately six feet of freeboard in Primary No.1 and Primary No. 2, approximately 10.5 feet in Secondary No. 1, approximately 6.5 feet in Secondary No. 2, and approximately 3.5 feet in the FSP. The BAA is generally empty.

2.6 Structural and Seepage Stability

The original structural and seepage stability analyses, if any, were not available to GZA at the time of inspection. Slope stability analyses, seepage analyses, foundation liquefaction analyses, and settlement analyses reports were not available.

3.0 ASSESSMENTS AND RECOMMENDATIONS

3.1 Assessments

In GZA's professional opinion, each of the Impoundments appear to be sound and no immediate remedial action appears to be necessary. However, based on EPA's inspection criteria, each of the Impoundments have been given a **POOR** Condition Rating, because no geotechnical computations were made available to GZA for review. Thus, the stability of the Impoundments could not be independently verified.

The Impoundments were found to have the following deficiencies:

1. Piezometers of unknown depth or construction were located throughout the Impoundments;
2. No formal operation and maintenance plan or inspection checklist in place to observe and document the structural condition of the Impoundments;
3. The discharge pipes within the Impoundments have not been inspected internally since they were installed;
4. There was an obstruction at the decant inlet and lack of a trash rack in Secondary No. 2;
5. The trash rack in Primary No. 2 was bent;
6. There was a pipe of unknown use observed near the overflow pipes at the FSP; and,
7. No design information available for the steel sheet piling used to support the northwestern sides/ends of the Impoundments.

The following recommendations and remedial measures generally describe the recommended approach to address current deficiencies at the Impoundments. Prior to undertaking recommended maintenance, repairs, or remedial measures, the applicability of environmental permits needs to be determined for activities that may occur within resource areas under the jurisdiction of the appropriate regulatory agencies.

3.2 Studies and Analyses

GZA recommends the following studies and analyses:

1. If an analysis of the allowable bending moments and applied bending moments to the steel sheet piling has not been performed previously or is not available, this type of analysis should be performed to verify that the installed sheet piling has sufficient strength to support the loading applied by the Impoundments.
2. Perform a seepage and stability analysis to evaluate the embankment slopes;
3. Perform a hydrologic and hydraulic analyses of the individual Impoundments to determine the adequacy of intake/discharge features and adequacy of current operating water levels

3.3 Recurrent Operation & Maintenance Recommendations

GZA recommends the following operation and maintenance level activities:

1. If they are not necessary for the operation of the Impoundments, abandon the piezometers that are located near the Impoundments brush piles since their depth is unknown;

2. Clear the obstruction from the decant inlet in Secondary No. 2 and install a trash rack;

3. Exercise stops logs and related water level control mechanisms at exiting decant structures;

4. Increase/adjust the frequency of vegetative maintenance activity such that overgrowth is minimized;

5. Perform a video camera survey of the intake and discharge pipe network within the Impoundments to verify that they are operating correctly and are in suitable condition; and,

6. Create a formal checklist for visual inspections of the Impoundments and associated appurtenances and maintain the inspection records on file.

3.4 Minor Repair Recommendations

GZA recommends the following repairs which may improve the overall condition of the Impoundments and water storage system, but do not alter the current design of the embankment. The recommendations may require design by a professional engineer and construction contractor experienced in embankment construction.

1. Repair the bent trash rack in Primary No. 2 before this Impoundment is put back in service;
2. Repair sloughs and scarps on the embankments and provide future erosion protection as necessary, and,

3. Evaluate the function and necessity of the unknown pipe found on the northeast side of the FSP and remove the pipe if it is not needed.

3.5 Remedial Measures Recommendations

1. In conjunction with the results of the seepage and stability analyses make provisions to address inadequate factors of safety as applicable; and

2. In conjunction with the results of the hydrologic and hydraulic analyses, make provisions for an emergency overflow spillway.

3.6 Alternatives

There are no practical alternatives to the repairs itemized above.

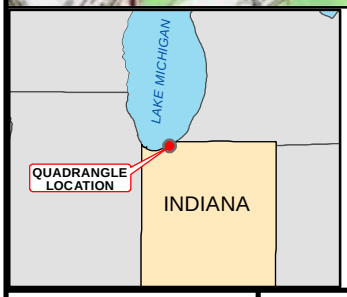
4.0 ENGINEER'S CERTIFICATION

I acknowledge that the management units referenced herein, the Michigan City Generating Station Impoundments, have been assessed to be in **POOR** condition, based on EPA's inspection criteria, on May 23, 2011.

Walter Kosinski, P.E.
Principal

Y:\01.xx Norwood\01.0170142.30 CCW Dams Round 10\NIPSCO_Michigan City\Draft Report\MI City - Report Draft_REV1.docx

Figures



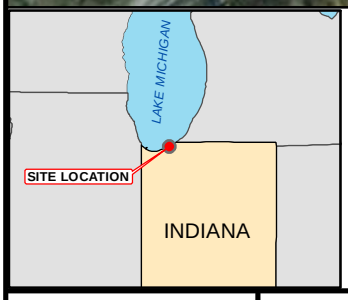
SOURCE : This map contains the ESRI ArcGIS Online World Topographic Map service, published February 2011 by ESRI ARCIMS Services. The service was compiled to uniform cartography using a variety of best available sources from several data providers.

Data Supplied by : esri

0 750 1,500 3,000 4,500 6,000 Feet

N W E S

GZA	PROJ. MGR.: TRB DESIGNED BY: TRB REVIEWED BY: PHB OPERATOR: GAS/EMD DATE: 08-28-2011	LOCUS PLAN (USGS TOPOGRAPHIC QUAD) NIPSCO MICHIGAN CITY GENERATING STATION 101 WABASH STREET MICHIGAN CITY, INDIANA	JOB NO. 01.0170142.30 FIGURE NO. 1



SOURCE : This map contains the ESRI ArcGIS Online World Imagery Map service, published February 2011 by ESRI ARCIMS Services. The service was compiled to uniform cartography using a variety of best available sources from several data providers.

Data Supplied by : esri

0 250 500 1,000 1,500 Feet

N W E S

GZA	PROJ. MGR.: TRB DESIGNED BY: TRB REVIEWED BY: PHB OPERATOR: GAS/EMD DATE: 08-28-2011	LOCUS PLAN (DIGITAL ORTHOPHOTO/AERIAL IMAGERY) NIPSCO MICHIGAN CITY GENERATING STATION 101 WABASH STREET MICHIGAN CITY, INDIANA	JOB NO. 01.0170142.30 FIGURE NO. 2

LEGEND

27 PHOTO LOCATION / DIRECTION

SOURCE: This map contains the ESRI ArcGIS Online World Imagery Map service, published February 2011 by ESRI ARCIMS Services. The service was compiled to uniform cartography using a variety of best available sources from several data providers.

Data Supplied by : esri

0 150 300 600

SCALE IN FEET

NIPSCO MICHIGAN CITY GENERATING STATION
101 WABASH STREET
MICHIGAN CITY, INDIANA

PHOTOLOG

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR:	
PROJ MGR: TRB	REVIEWED BY: PHB	CHECKED BY: TRB	FIGURE 3
DESIGNED BY: TRB	DRAWN BY: GAS	SCALE: 1 in = 300 ft	
DATE: 09/06/2011	PROJECT NO. 01.0170142.30	REVISION NO.	

Appendix A

Limitations

DAM ENGINEERING & VISUAL INSPECTION LIMITATIONS

1. The observations described in this report were made under the conditions stated herein. The conclusions presented in the report were based solely on the services described therein, and not on scientific tasks or procedures beyond the scope of described services or the time and budgetary constraints imposed by the United States Environmental Protection Agency (EPA).

2. In preparing this report, GZA GeoEnvironmental, Inc. (GZA) has relied on certain information provided by the Northern Indiana Public Service Company (NIPSCO) as well as Federal, state, and local officials and other parties referenced therein. GZA has also relied on certain information contained on the State of Indiana's website as well as Federal, state, and local officials and other parties which were available to GZA at the time of the inspection. Although there may have been some degree of overlap in the information provided by these various sources, GZA did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this work.

3. In reviewing this Report, it should be noted that the reported condition of the Ash Pond is based on observations of field conditions during the course of this study along with data made available to GZA. The observations of conditions at the Ash Pond reflect only the situation present at the specific moment in time the observations were made, under the specific conditions present. It may be necessary to reevaluate the recommendations of this report when subsequent phases of evaluation or repair and improvement provide more data.

4. It is important to note that the condition of a dam or embankment depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam or embankment will continue to represent the condition of the dam or embankment at some point in the future. Only through continued care and inspection can there be any chance that unsafe conditions may be detected.

5. Water level readings have been reviewed and interpretations have been made in the text of this report. Fluctuations in the level of the groundwater and surface water may occur due to variations in rainfall, temperature, and other factors different than at the time measurements were made.

6. GZA's comments on the history, hydrology, hydraulics, and embankment stability for the Impoundments are based on a limited review of available design documentation for the NIPSCO facility. Calculations and computer modeling used in these analyses were not available and were not independently reviewed by GZA.

7. This report has been prepared for the exclusive use of EPA for specific application to the existing dam facilities, in accordance with generally accepted dam engineering practices. No other warranty, express or implied, is made.

8. This dam inspection verification report has been prepared for this project by GZA. This report is for broad evaluation and management purposes only and is not sufficient, in and of itself, to prepare construction documents or an accurate bid.

Appendix B

Definitions

COMMON DAM SAFETY DEFINITIONS

For a comprehensive list of dam engineering terminology and definitions refer to references published by the U.S. Army Corps of Engineers, the Federal Energy Regulatory Commission, the Department of the Interior Bureau of Reclamation, or the Federal Emergency Management Agency.

Orientation

Upstream – Shall mean the side of the dam that borders the impoundment.

Downstream – Shall mean the high side of the dam, the side opposite the upstream side.

Right – Shall mean the area to the right when looking in the downstream direction.

Left – Shall mean the area to the left when looking in the downstream direction.

Dam Components

Dam – Shall mean any artificial barrier, including appurtenant works, which impounds or diverts water.

Embankment – Shall mean the fill material, usually earth or rock, placed with sloping sides, such that it forms a permanent barrier that impounds water.

Crest – Shall mean the top of the dam, usually provides a road or path across the dam.

Abutment – Shall mean that part of a valley side against which a dam is constructed. An artificial abutment is sometimes constructed as a concrete gravity section, to take the thrust of an arch dam where there is no suitable natural abutment.

Appurtenant Works – Shall mean structures, either in dams or separate there from, including but not be limited to, spillways; reservoirs and their rims; low level outlet works; and water conduits including tunnels, pipelines, or penstocks, either through the dams or their abutments.

Spillway – Shall mean a structure over or through which water flows are discharged. If the flow is controlled by gates or boards, it is a controlled spillway; if the fixed elevation of the spillway crest controls the level of the impoundment, it is an uncontrolled spillway.

General

EAP – Emergency Action Plan - Shall mean a predetermined plan of action to be taken to reduce the potential for property damage and/or loss of life in an area affected by an impending dam break.

O&M Manual – Operations and Maintenance Manual; Document identifying routine maintenance and operational procedures under normal and storm conditions.

Normal Pool – Shall mean the elevation of the impoundment during normal operating conditions.

Acre-foot – Shall mean a unit of volumetric measure that would cover one acre to a depth of one foot. It is equal to 43,560 cubic feet. One million U.S. gallons = 3.068 acre feet.

Height of Dam – Shall mean the vertical distance from the lowest portion of the natural ground, including any stream channel, along the downstream toe of the dam to the crest of the dam.

Spillway Design Flood (SDF) – Shall mean the flood used in the design of a dam and its appurtenant works particularly for sizing the spillway and outlet works, and for determining maximum temporary storage and height of dam requirements.

Condition Rating

SATISFACTORY - No existing or potential management unit safety deficiencies are recognized. Acceptable performance is expected under all applicable loading conditions (static, hydrologic, seismic) in accordance with the applicable criteria. Minor maintenance items may be required.

FAIR - Acceptable performance is expected under all required loading conditions (static, hydrologic, seismic) in accordance with the applicable safety regulatory criteria. Minor deficiencies may exist that require remedial action and/or secondary studies or investigations.

POOR - A management unit safety deficiency is recognized for any required loading condition (static, hydrologic, seismic) in accordance with the applicable dam safety regulatory criteria. Remedial action is necessary. POOR also applies when further critical studies or investigations are needed to identify any potential dam safety deficiencies.

UNSATISFACTORY - Considered unsafe. A dam safety deficiency is recognized that requires immediate or emergency remedial action for problem resolution. Reservoir restrictions may be necessary.

Hazard Potential

(In the event the impoundment should fail, the following would occur):

LESS THAN LOW HAZARD POTENTIAL: Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

LOW HAZARD POTENTIAL: Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

SIGNIFICANT HAZARD POTENTIAL: Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

HIGH HAZARD POTENTIAL: Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

Appendix C

Inspection Checklists

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	Michigan City Generating Station	Date:	May 24, 2011
Unit Name:	Primary Settling Basin No. 1	Operator's Name:	NIPSCO
Unit I.D.:	N/A	Hazard Potential Classification:	High **Significant** Low
Inspector's Name:	Walter Kosinski, P.E. & Thomas Boom, P.E.		

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Daily		18. Sloughing or bulging on slopes?		✔
2. Pool elevation (operator records)?	602.92 ft		19. Major erosion or slope deterioration?		✔
3. Decant inlet elevation (operator records)?	602.92 ft		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?		✔
5. Lowest dam crest elevation (operator records)?	608.72 ft		Is water exiting outlet, but not entering inlet?		✔
6. If instrumentation is present, are readings recorded (operator records)?		✔	Is water exiting outlet flowing clear?	✔	
7. Is the embankment currently under construction?		✔	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	✔		From underdrain?	N/A	
9. Trees growing on embankment? (If so, indicate largest diameter below)		✔	At isolated points on embankment slopes?		✔
10. Cracks or scarps on crest?		✔	At natural hillside in the embankment area?		✔
11. Is there significant settlement along the crest?		✔	Over widespread areas?		✔
12. Are decant trashracks clear and in place?	✔		From downstream foundation area?		✔
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		✔	"Boils" beneath stream or ponded water?		✔
14. Clogged spillways, groin or diversion ditches?		✔	Around the outside of the decant pipe?		✔
15. Are spillway or ditch linings deteriorated?	N/A		22. Surface movements in valley bottom or on hillside?	N/A	
16. Are outlets of decant or underdrains blocked?		✔	23. Water against downstream toe?	✔	
17. Cracks or scarps on slopes?		✔	24. Were Photos taken during the dam inspection?	✔	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # Comments

1) Impoundment is not regulated by Indiana Department of Natural Resources (DNR) but daily routine maintenance is conducted for security and operations although not specifically for the impoundment structure.
3) Stoplogs and a concrete structure control the pool elevation. The invert evaluation of the outlet pipe within the concrete structure is 588.72 feet. Water discharges to the Secondary Settling Basin No. 1.
6) Monitoring wells are present but not monitored.
8) According to plans and specifications, the foundation was prepared.
12) Decant pipe uses stoplogs which were clear of any materials.
20) Appeared to be clear based on our observations.
21) Unable to observe the outside of the decant pipe.
23) Water was against the northeast side toe adjacent to Secondary Settling Basin No. 1. Water (Lake Michigan) was also against the northern most sheet pile wall. There is also a second sheet pile wall at the northern edge of Primary Settling Basin No. 1.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # IN0000116 INSPECTOR Walter Kosinski, P.E. & Thomas Boom, P.E.

Date May 24, 2011

Impoundment Name Michigan City Generating Station

Impoundment Company NIPSCO

EPA Region 5

State Agency (Field Office) Addresss Not regulated by Indiana DNR

Name of Impoundment Primary Settling Basin No. 1

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update _____

	Yes	No
Is impoundment currently under construction?		X
Is water or ccw currently being pumped into the impoundment?	X	

IMPOUNDMENT FUNCTION: Settling of coal combustion ash.

Nearest Downstream Town : Name N/A - Lake Michigan

Distance from the impoundment 100 feet

Impoundment Location:

Longitude 86 Degrees 54 Minutes 56 Seconds

Latitude 41 Degrees 42 Minutes 59 Seconds

State IN County LaPorte County

Does a state agency regulate this impoundment? YES _____ NO X

If So Which State Agency? N/A

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

_____ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

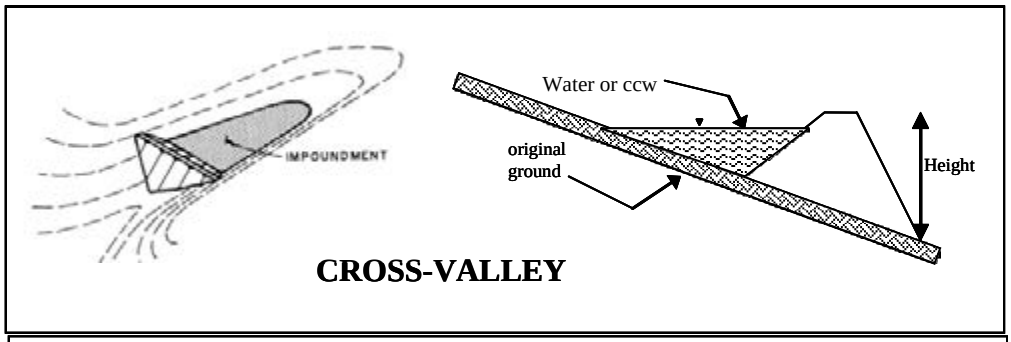
__X__ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

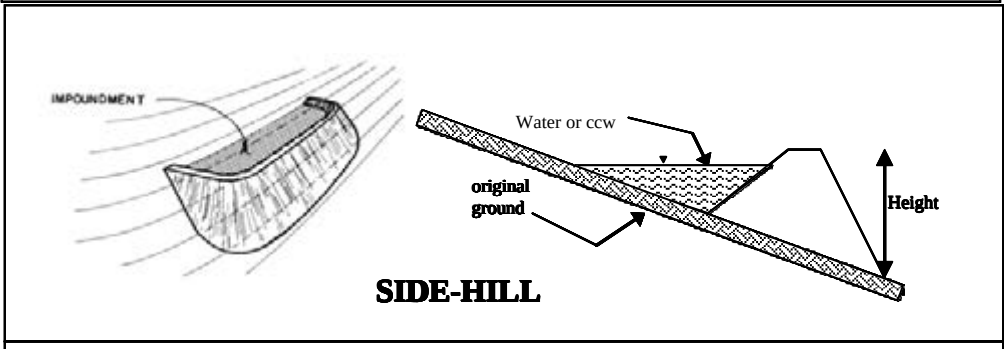
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

A significant hazard rating was selected because in the unlikely event of dike failure, the coal ash stored in the impoundment may discharge into Lake Michigan and cause environmental damage. Although this condition is unlikely due to the presence of two protective sheet pile walls separating Lake Michigan from the impoundment, by definition, the potential for environmental impact is possible. Additionally, a dike failure would cause disruption of lifeline facilities as the generating station depends upon the water within the impoundments. Failure of the dike would not likely result in loss of human life. Note that the generating station alternates use of Primary Settling Basin No. 1 with Primary Settling Basin No. 2 such that only one primary basin is utilized at a time.

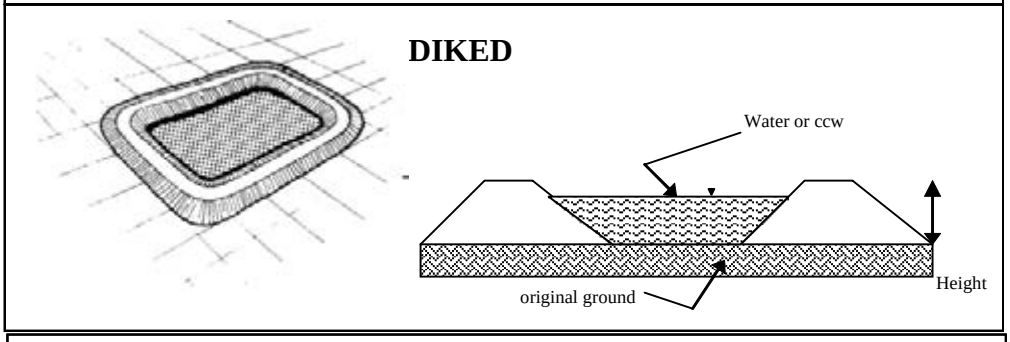
CONFIGURATION:



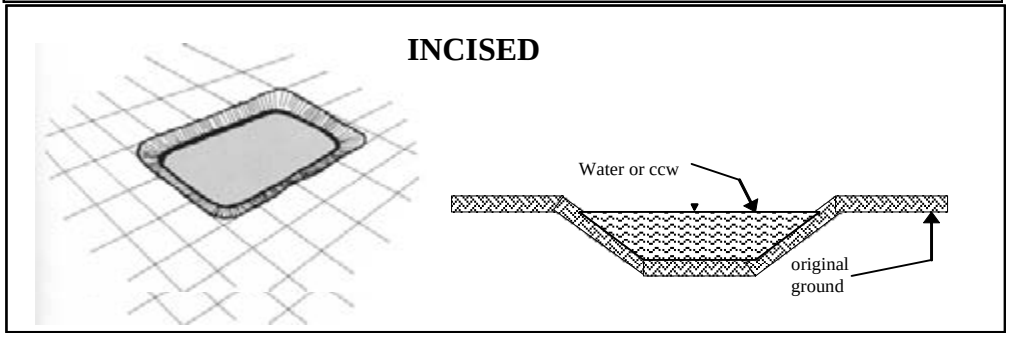
CROSS-VALLEY



SIDE-HILL



DIKED



INCISED

_____ Cross-Valley
_____ Side-Hill
_____ Diked
_____ Incised (form completion optional)
__X__ Combination Incised/Diked

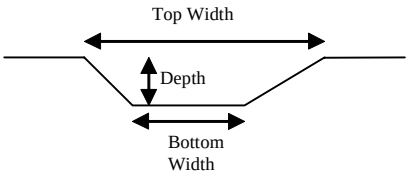
Embankment Height 28* feet Embankment Material Compacted sand and sheet pile wall
Pool Area 2.2 acres Liner None
Current Freeboard _____ feet Liner Permeability N/A

*Maximum height from top of embankment to Lake Michigan.

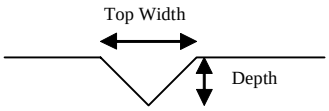
TYPE OF OUTLET (Mark all that apply)

_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

TRAPEZOIDAL

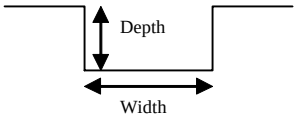


TRIANGULAR

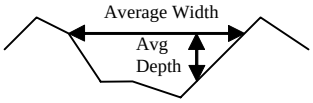


_____ depth
_____ bottom (or average) width
_____ top width
_____

RECTANGULAR



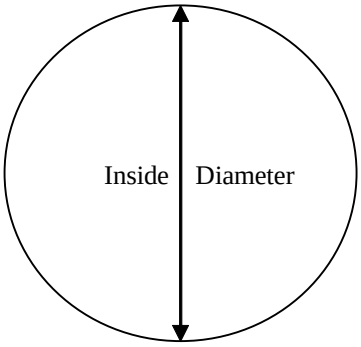
IRREGULAR



__X__ **Outlet***

24 in. inside diameter

*Inside concrete structure with stoplogs



Material
__X__ corrugated metal
_____ welded steel
_____ concrete
_____ plastic (hdpe, pvc, etc.)
_____ other (specify) _____

_____

Is water flowing through the outlet? YES __X__ NO _____

_____ **No Outlet**

_____

__X__ **Other Type of Outlet** (specify) Emergency Overflow - 24-inch corrugated metal

The Impoundment was Designed By Sargent & Lundy Engineers
_____

Has there ever been a failure at this site? YES _____ NO ___X_____

If So When? _____

If So Please Describe : _____

Has there ever been significant seepages at this site? YES _____ NO __X__

If So When? _____

IF So Please Describe: _____

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____ NO ___X____

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe : _____

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	Michigan City Generating Station	Date:	May 24, 2011
Unit Name:	Secondary Settling Basin No. 1	Operator's Name:	NIPSCO
Unit I.D.:	N/A	Hazard Potential Classification:	High Significant **Low**
Inspector's Name:	Walter Kosinski, P.E. & Thomas Boom, P.E.		

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Daily		18. Sloughing or bulging on slopes?		✔
2. Pool elevation (operator records)?	589.02 ft +/-		19. Major erosion or slope deterioration?		✔
3. Decant inlet elevation (operator records)?	588.82 ft		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?		✔
5. Lowest dam crest elevation (operator records)?	599.72 ft		Is water exiting outlet, but not entering inlet?		✔
6. If instrumentation is present, are readings recorded (operator records)?		✔	Is water exiting outlet flowing clear?	✔	
7. Is the embankment currently under construction?		✔	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	✔		From underdrain?	N/A	
9. Trees growing on embankment? (If so, indicate largest diameter below)		✔	At isolated points on embankment slopes?		✔
10. Cracks or scarps on crest?		✔	At natural hillside in the embankment area?		✔
11. Is there significant settlement along the crest?		✔	Over widespread areas?		✔
12. Are decant trashracks clear and in place?		✔	From downstream foundation area?		✔
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		✔	"Boils" beneath stream or ponded water?		✔
14. Clogged spillways, groin or diversion ditches?		✔	Around the outside of the decant pipe?		✔
15. Are spillway or ditch linings deteriorated?	N/A		22. Surface movements in valley bottom or on hillside?	N/A	
16. Are outlets of decant or underdrains blocked?		✔	23. Water against downstream toe?	✔	
17. Cracks or scarps on slopes?		✔	24. Were Photos taken during the dam inspection?	✔	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # Comments

1) Impoundment is not regulated by Indiana Department of Natural Resources (DNR) but daily routine maintenance is conducted for security and operations although not specifically for the impoundment structure.
6) Monitoring wells are present but not monitored.
8) According to plans and specifications, the foundation was prepared.
12) No trashrack but there was debris in the pipe inlet.
19) Some minor erosion noted on the interior slope.
20) Appeared to be clear based on our observations.
23) Water against the downstream toe to the west is from the Primary Settling Basin No. 1 and against the downstream toe to the north is Lake Michigan however the northern portion of the impoundment is bound by two protective sheet pile walls separating Lake Michigan from the impoundment.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # IN0000116 INSPECTOR Walter Kosinski, P.E. & Thomas Boom, P.E.

Date May 24, 2011

Impoundment Name Michigan City Generating Station
Impoundment Company NIPSCO
EPA Region 5
State Agency (Field Office) Addresss Not regulated by Indiana DNR

Name of Impoundment Secondary Settling Basin No. 1
(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update _____

	Yes	No
Is impoundment currently under construction?		X
Is water or ccw currently being pumped into the impoundment?	X	

IMPOUNDMENT FUNCTION: Settling of coal combustion ash.

Nearest Downstream Town : Name N/A - Lake Michigan
Distance from the impoundment 100 feet
Impoundment Location: Longitude 86 Degrees 54 Minutes 54 Seconds
Latitude 41 Degrees 43 Minutes 03 Seconds
State IN County LaPorte County

Does a state agency regulate this impoundment? YES _____ NO X

If So Which State Agency? N/A

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

__X__ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

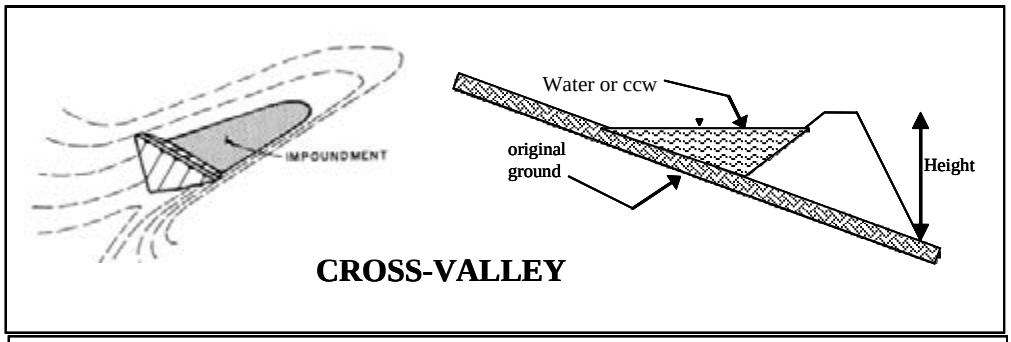
_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

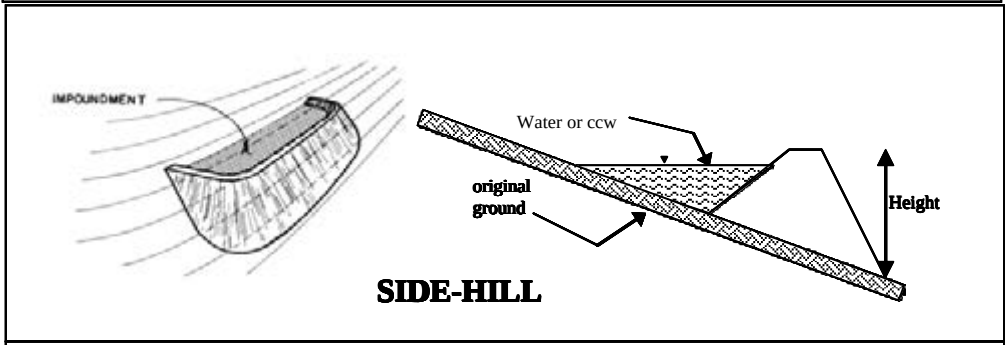
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

Low hazard potential was selected because in the event of dike failure the losses would be minimal due to the relatively small volume of water and potential ash in the impoundment, the losses would be principally limited to the owner's property, and there are two rows of protective sheet piling between the dike and Lake Michigan.

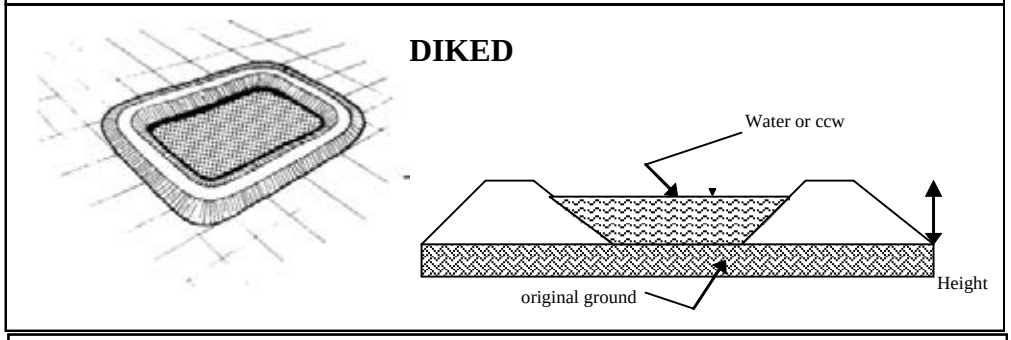
CONFIGURATION:

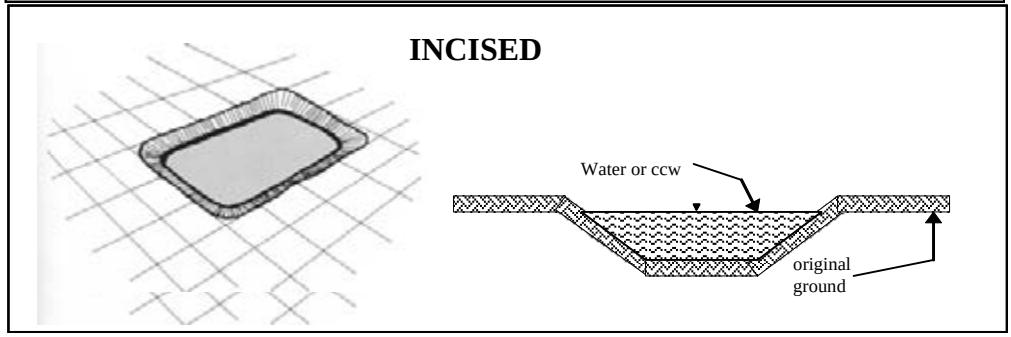


CROSS-VALLEY



SIDE-HILL





_____ Cross-Valley
_____ Side-Hill
__X__ Diked
_____ Incised (form completion optional)
_____ Combination Incised/Diked

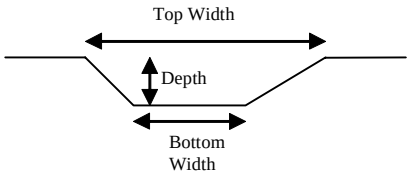
Embankment Height ____28*____ feet Embankment Material Compacted sand and sheet pile wall
Pool Area ____0.2____ acres Liner None
Current Freeboard ____11____ feet Liner Permeability N/A

*Maximum height from top of embankment to Lake Michigan.

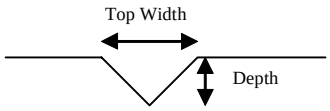
TYPE OF OUTLET (Mark all that apply)

_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

TRAPEZOIDAL

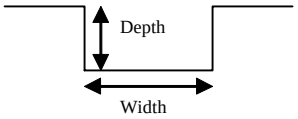


TRIANGULAR

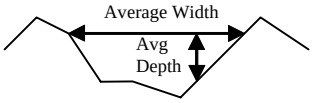


_____ depth
_____ bottom (or average) width
_____ top width
_____

RECTANGULAR

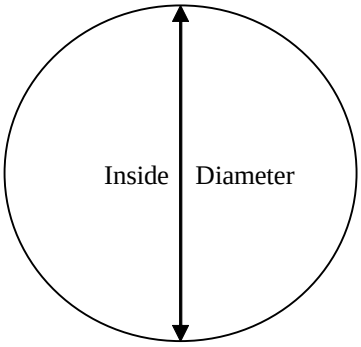


IRREGULAR



__X__ **Outlet**

24 in. inside diameter



Material
__X__ corrugated metal
_____ welded steel
_____ concrete
_____ plastic (hdpe, pvc, etc.)
_____ other (specify) _____

_____

Is water flowing through the outlet? YES __X__ NO _____

_____ **No Outlet**

_____

_____ **Other Type of Outlet** (specify) _____

The Impoundment was Designed By Sargent & Lundy Engineers
_____

Has there ever been a failure at this site? YES _____ NO ___X_____

If So When? _____

If So Please Describe : _____

Has there ever been significant seepages at this site? YES _____ NO __X__

If So When? _____

IF So Please Describe: _____

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____ NO ___X____

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe : _____

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	Michigan City Generating Station	Date:	May 24, 2011
Unit Name:	Primary Settling Basin No. 2	Operator's Name:	NIPSCO
Unit I.D.:	N/A	Hazard Potential Classification:	High **Significant** Low
Inspector's Name:	Walter Kosinski, P.E. & Thomas Boom, P.E.		

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Daily		18. Sloughing or bulging on slopes?		✔
2. Pool elevation (operator records)?	See Note		19. Major erosion or slope deterioration?		✔
3. Decant inlet elevation (operator records)?	587.72 ft		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?	N/A	
5. Lowest dam crest elevation (operator records)?	608.72 ft		Is water exiting outlet, but not entering inlet?	N/A	
6. If instrumentation is present, are readings recorded (operator records)?		✔	Is water exiting outlet flowing clear?	N/A	
7. Is the embankment currently under construction?		✔	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	✔		From underdrain?	N/A	
9. Trees growing on embankment? (If so, indicate largest diameter below)		✔	At isolated points on embankment slopes?	N/A	
10. Cracks or scarps on crest?		✔	At natural hillside in the embankment area?	N/A	
11. Is there significant settlement along the crest?		✔	Over widespread areas?	N/A	
12. Are decant trashracks clear and in place?	✔		From downstream foundation area?	N/A	
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		✔	"Boils" beneath stream or ponded water?	N/A	
14. Clogged spillways, groin or diversion ditches?		✔	Around the outside of the decant pipe?	N/A	
15. Are spillway or ditch linings deteriorated?	N/A		22. Surface movements in valley bottom or on hillside?	N/A	
16. Are outlets of decant or underdrains blocked?		✔	23. Water against downstream toe?	✔	
17. Cracks or scarps on slopes?		✔	24. Were Photos taken during the dam inspection?	✔	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # Comments

1) Impoundment is not regulated by Indiana Department of Natural Resources (DNR) but daily routine maintenance is conducted for security and operations although not specifically for the impoundment structure.
2) The impoundment is not currently in use but there was standing rain water in it during the assessment that is allowed to evaporate.
6) Monitoring wells are present but not monitored.
8) According to plans and specifications, the foundation was prepared.
12) In place and clear but not in use. Appeared to be bent.
13, 14, 16, 20, 21) The impoundment is not currently in use.
19) Some erosion channels on interior slope.
23) Water (Lake Michigan) was against the north toe against the northern most sheet pile wall, against the west toe in the Secondary Settling Basin No. 1, and against the northeast toe in the Secondary Settling Basin No. 2.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # IN0000116 INSPECTOR Walter Kosinski, P.E. & Thomas Boom, P.E.

Date May 24, 2011

Impoundment Name Michigan City Generating Station
Impoundment Company NIPSCO
EPA Region 5
State Agency (Field Office) Addresss Not regulated by Indiana DNR

Name of Impoundment Primary Settling Basin No. 2
(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update _____

	Yes	No
Is impoundment currently under construction?		X
Is water or ccw currently being pumped into the impoundment?		X

IMPOUNDMENT FUNCTION: Settling of coal combustion ash.

Nearest Downstream Town : Name N/A - Lake Michigan
Distance from the impoundment 100 feet
Impoundment Location: Longitude 86 Degrees 54 Minutes 52 Seconds
Latitude 41 Degrees 43 Minutes 05 Seconds
State IN County LaPorte County

Does a state agency regulate this impoundment? YES _____ NO X

If So Which State Agency? N/A

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

_____ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

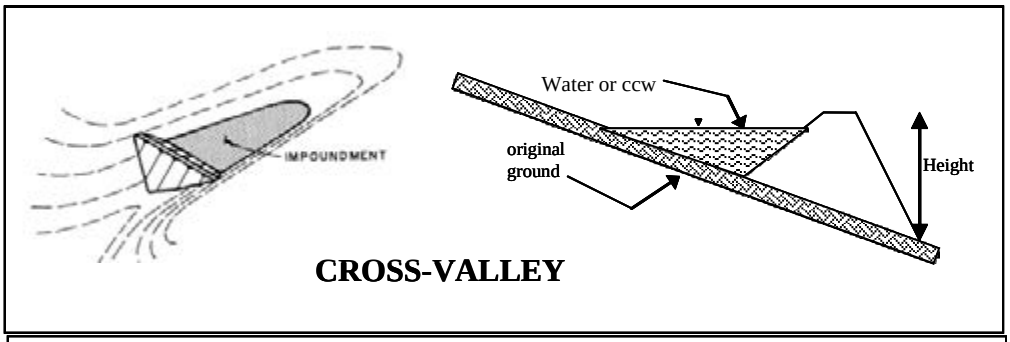
__X___ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

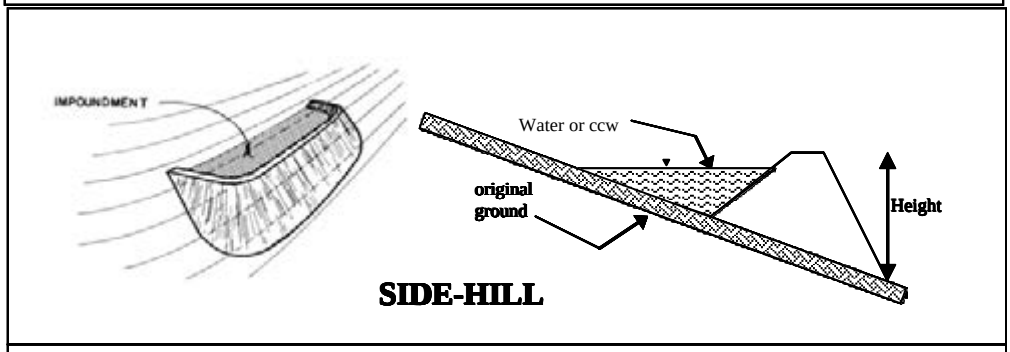
_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

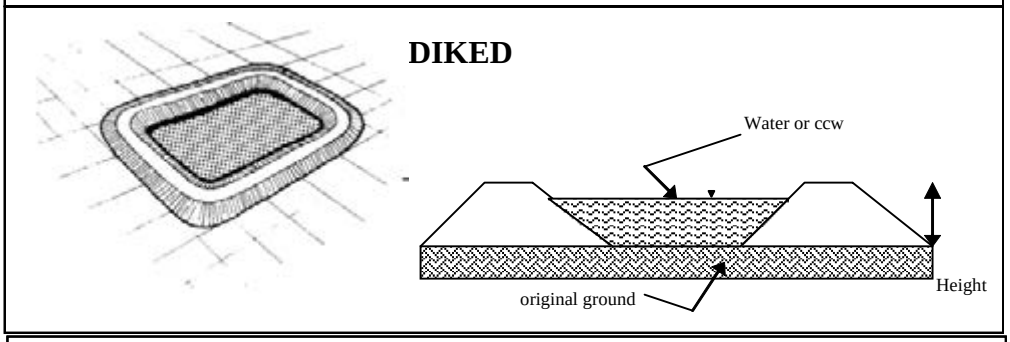
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

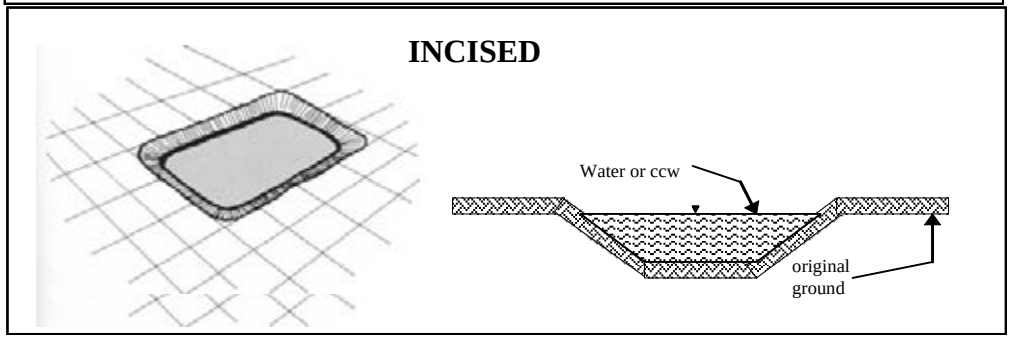
Although this impoundment was not in use at the time of the inspection, a significant hazard rating was selected based on the maximum volume of coal ash storage capacity. In the unlikely event of dike failure, the coal ash stored in the impoundment may discharge into Lake Michigan and cause environmental damage. Although this condition is unlikely due to the presence of two protective sheet pile walls separating Lake Michigan from the impoundment, by definition, the potential for environmental impact is possible. Additionally, a dike failure would cause disruption of lifeline facilities as the generating station depends upon the water within the impoundments. Failure of the dike would not likely result in loss of human life. Currently the impoundment has little to no coal ash stored in it and is not being used for impounding coal ash slurry. The generating station alternates use of Primary Settling Basin No. 2 with Primary Settling Basin No. 1 such that only one primary basin is utilized at a time.

CONFIGURATION:









_____ Cross-Valley
_____ Side-Hill
__X__ Diked
_____ Incised (form completion optional)
_____ Combination Incised/Diked

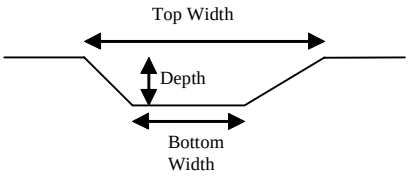
Embankment Height 29* feet Embankment Material Compacted sand and sheet piling
Pool Area 2.6 acres Liner None
Current Freeboard 20 feet Liner Permeability N/A

*Maximum height from top of embankment to Lake Michigan.

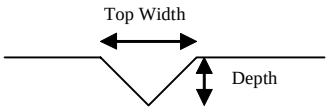
TYPE OF OUTLET (Mark all that apply)

_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

TRAPEZOIDAL

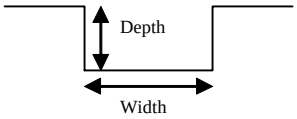


TRIANGULAR

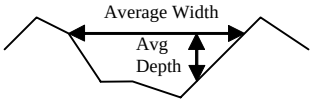


_____ depth
_____ bottom (or average) width
_____ top width
_____

RECTANGULAR

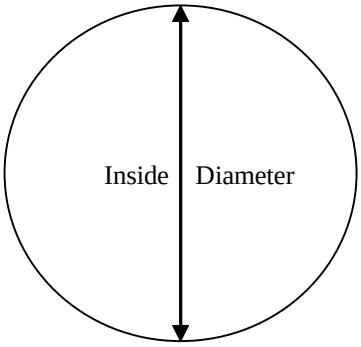


IRREGULAR



__X__ **Outlet**

24 in. inside diameter



Material
__X__ corrugated metal
_____ welded steel
_____ concrete
_____ plastic (hdpe, pvc, etc.)
_____ other (specify) _____

_____

Is water flowing through the outlet? YES _____ NO __X (impoundment is fundamentally empty)

_____ **No Outlet**

_____

_____ **Other Type of Outlet** (specify) _____

The Impoundment was Designed By Sargent & Lundy Engineers
_____

Has there ever been a failure at this site? YES _____ NO ___X_____

If So When? _____

If So Please Describe : _____

Has there ever been significant seepages at this site? YES _____ NO __X__

If So When? _____

IF So Please Describe: _____

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____ NO ___X____

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe : _____

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	Michigan City Generating Station	Date:	May 24, 2011
Unit Name:	Secondary Settling Basin No. 2	Operator's Name:	NIPSCO
Unit I.D.:	N/A	Hazard Potential Classification:	High Significant Low (Low circled)
Inspector's Name:	Walter Kosinski, P.E. & Thomas Boom, P.E.		

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Daily		18. Sloughing or bulging on slopes?		✔
2. Pool elevation (operator records)?	See Note		19. Major erosion or slope deterioration?		✔
3. Decant inlet elevation (operator records)?	588.12 ft		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?	N/A	
5. Lowest dam crest elevation (operator records)?	594.72 ft		Is water exiting outlet, but not entering inlet?	N/A	
6. If instrumentation is present, are readings recorded (operator records)?		✔	Is water exiting outlet flowing clear?	N/A	
7. Is the embankment currently under construction?		✔	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	✔		From underdrain?	N/A	
9. Trees growing on embankment? (If so, indicate largest diameter below)		✔	At isolated points on embankment slopes?	N/A	
10. Cracks or scarps on crest?		✔	At natural hillside in the embankment area?	N/A	
11. Is there significant settlement along the crest?		✔	Over widespread areas?	N/A	
12. Are decant trashracks clear and in place?	✔		From downstream foundation area?	N/A	
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		✔	"Boils" beneath stream or ponded water?	N/A	
14. Clogged spillways, groin or diversion ditches?	N/A		Around the outside of the decant pipe?	N/A	
15. Are spillway or ditch linings deteriorated?	N/A		22. Surface movements in valley bottom or on hillside?	N/A	
16. Are outlets of decant or underdrains blocked?	N/A		23. Water against downstream toe?	✔	
17. Cracks or scarps on slopes?		✔	24. Were Photos taken during the dam inspection?	✔	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # Comments

1) Impoundment is not regulated by Indiana Department of Natural Resources (DNR) but daily routine maintenance is conducted for security and operations although not specifically for the impoundment structure.
2) The impoundment is not currently in use but there was standing rain water in it during the assessment.
6) Monitoring wells are present but not monitored.
12) Not able to observe during the assessment.
13, 14, 16, 20, 21) The impoundment is not currently active and was virtually empty during the assessment.
23) Currently none, but there would be if Primary Settling Basin No. 2 was active.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # IN0000116 INSPECTOR Walter Kosinski, P.E. & Thomas Boom, P.E.

Date May 24, 2011

Impoundment Name Michigan City Generating Station

Impoundment Company NIPSCO

EPA Region 5

State Agency (Field Office) Addresss Not regulated by Indiana DNR

Name of Impoundment Secondary Settling Basin No. 2

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update _____

	Yes	No
Is impoundment currently under construction?	_____	X
Is water or ccw currently being pumped into the impoundment?	_____	X

IMPOUNDMENT FUNCTION: Secondary settling of coal combustion ash.

Nearest Downstream Town : Name N/A - Lake Michigan

Distance from the impoundment 100 feet

Impoundment Location: Longitude 86 Degrees 54 Minutes 50 Seconds

Latitude 41 Degrees 43 Minutes 08 Seconds

State IN County LaPorte County

Does a state agency regulate this impoundment? YES _____ NO X

If So Which State Agency? N/A

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

__X__ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

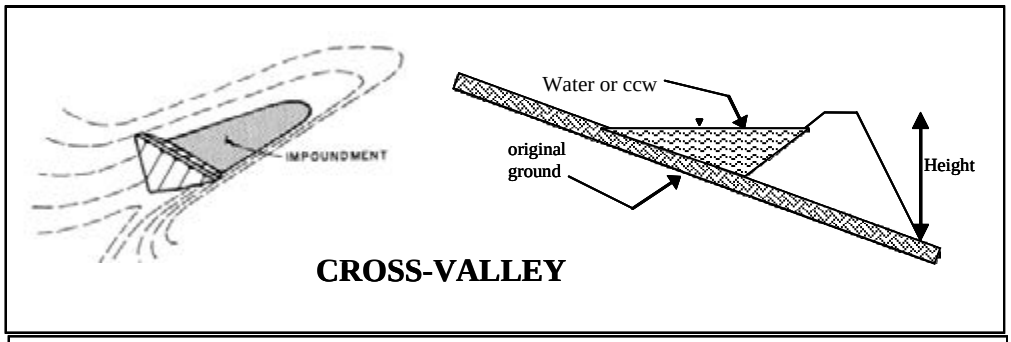
_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

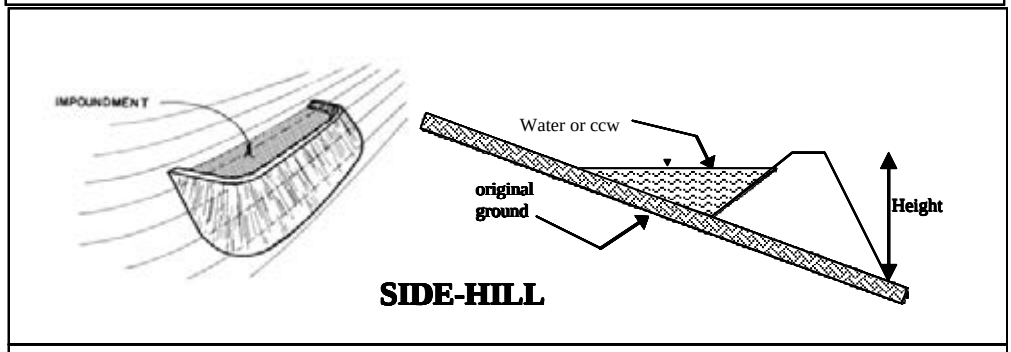
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

Low hazard potential was selected because in the event of dike failure the losses would be minimal, the losses would be principally limited to the owner's property, and there are two rows of protective sheet piling between the dike and Lake Michigan.

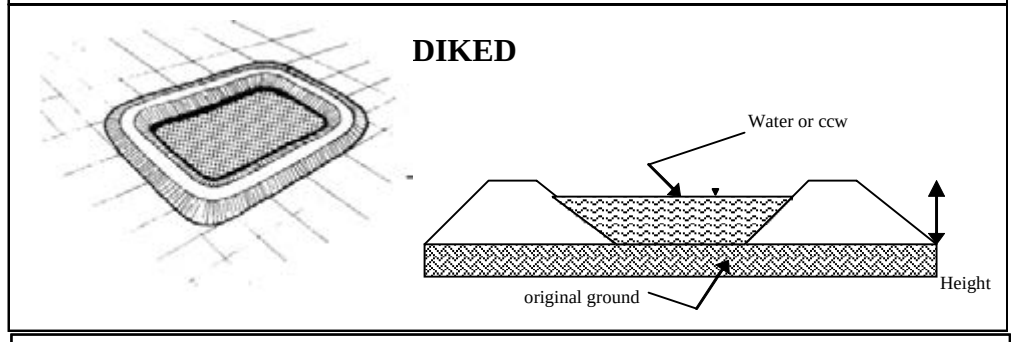
CONFIGURATION:



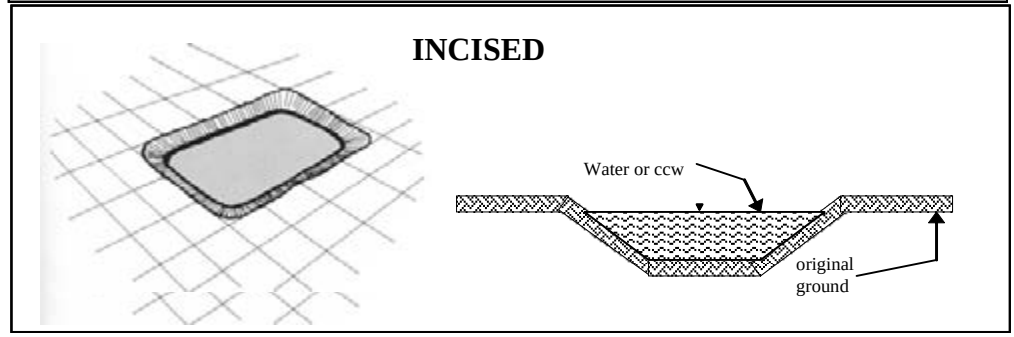
CROSS-VALLEY



SIDE-HILL



DIKED



INCISED

_____ Cross-Valley
_____ Side-Hill
__X__ Diked
_____ Incised (form completion optional)
_____ Combination Incised/Diked

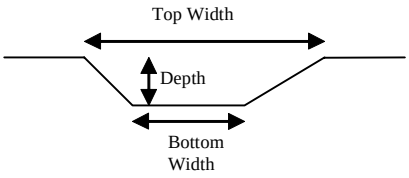
Embankment Height 29* feet
Pool Area 0.2 acres
Current Freeboard 6 feet
Embankment Material Compacted sand and sheet pile wall
Liner None
Liner Permeability N/A

*Maximum height from top of embankment to Lake Michigan.

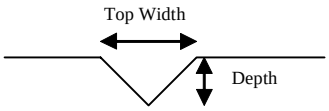
TYPE OF OUTLET (Mark all that apply)

_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

TRAPEZOIDAL

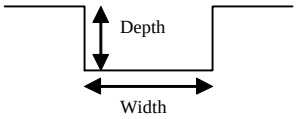


TRIANGULAR

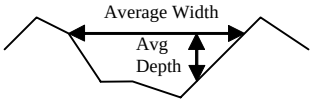


_____ depth
_____ bottom (or average) width
_____ top width
_____

RECTANGULAR

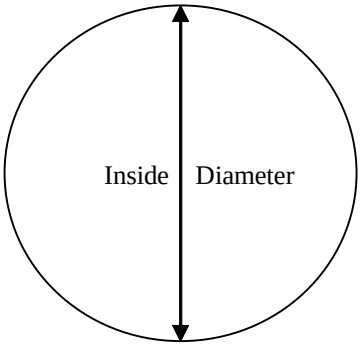


IRREGULAR



__X__ **Outlet**

24 in. inside diameter



Material
__X__ corrugated metal
_____ welded steel
_____ concrete
_____ plastic (hdpe, pvc, etc.)
_____ other (specify) _____

_____

Is water flowing through the outlet? YES _____ NO __X (not currently in use)__

_____ **No Outlet**

_____

_____ **Other Type of Outlet** (specify) _____

The Impoundment was Designed By __Sargent & Lundy Engineers_____
_____

Has there ever been a failure at this site? YES _____ NO ___X_____

If So When? _____

If So Please Describe : _____

Has there ever been significant seepages at this site? YES _____ NO __X__

If So When? _____

IF So Please Describe: _____

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____ NO ___X____

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe : _____

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	Michigan City Generating Station	Date:	May 24, 2011
Unit Name:	Bottom Ash Storage Area	Operator's Name:	NIPSCO
Unit I.D.:	N/A	Hazard Potential Classification:	High Significant (Low)
Inspector's Name:	Walter Kosinski, P.E. & Thomas Boom, P.E.		

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Daily		18. Sloughing or bulging on slopes?		✔
2. Pool elevation (operator records)?	N/A		19. Major erosion or slope deterioration?		✔
3. Decant inlet elevation (operator records)?	587.72 ft		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?		✔
5. Lowest dam crest elevation (operator records)?	589.92 ft		Is water exiting outlet, but not entering inlet?		✔
6. If instrumentation is present, are readings recorded (operator records)?		✔	Is water exiting outlet flowing clear?	✔	
7. Is the embankment currently under construction?		✔	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	✔		From underdrain?	N/A	
9. Trees growing on embankment? (If so, indicate largest diameter below)		✔	At isolated points on embankment slopes?		✔
10. Cracks or scarps on crest?		✔	At natural hillside in the embankment area?		✔
11. Is there significant settlement along the crest?		✔	Over widespread areas?		✔
12. Are decant trashracks clear and in place?		✔	From downstream foundation area?		✔
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		✔	"Boils" beneath stream or ponded water?		✔
14. Clogged spillways, groin or diversion ditches?	N/A		Around the outside of the decant pipe?		✔
15. Are spillway or ditch linings deteriorated?	N/A		22. Surface movements in valley bottom or on hillside?		✔
16. Are outlets of decant or underdrains blocked?		✔	23. Water against downstream toe?	✔	
17. Cracks or scarps on slopes?		✔	24. Were Photos taken during the dam inspection?	✔	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # Comments

1) Impoundment is not regulated by Indiana Department of Natural Resources (DNR) but daily routine maintenance is conducted for security and operations although not specifically for the impoundment structure.
2) The sluice water drains immediately to the Final Settling Pond.
6) Monitoring wells are present but not monitored.
8) According to plans and specifications the foundation was prepared.
23) The water against the downstream toe is the Final Settling Pond.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # IN0000116 INSPECTOR Walter Kosinski, P.E. & Thomas Boom, P.E.

Date May 24, 2011

Impoundment Name Michigan City Generating Station

Impoundment Company NIPSCO

EPA Region 5

State Agency (Field Office) Addresss Not regulated by Indiana DNR

Name of Impoundment Bottom Ash Storage Area

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update _____

	Yes	No
Is impoundment currently under construction?	_____	X
Is water or ccw currently being pumped into the impoundment?	X	_____

IMPOUNDMENT FUNCTION: Temporary storage of bottom ash prior to selling it for off-site use.

Nearest Downstream Town : Name N/A - Lake Michigan

Distance from the impoundment 100 feet

Impoundment Location:

Longitude 86 Degrees 54 Minutes 47 Seconds

Latitude 41 Degrees 43 Minutes 09 Seconds

State IN County LaPorte County

Does a state agency regulate this impoundment? YES _____ NO X

If So Which State Agency? N/A

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

__X__ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

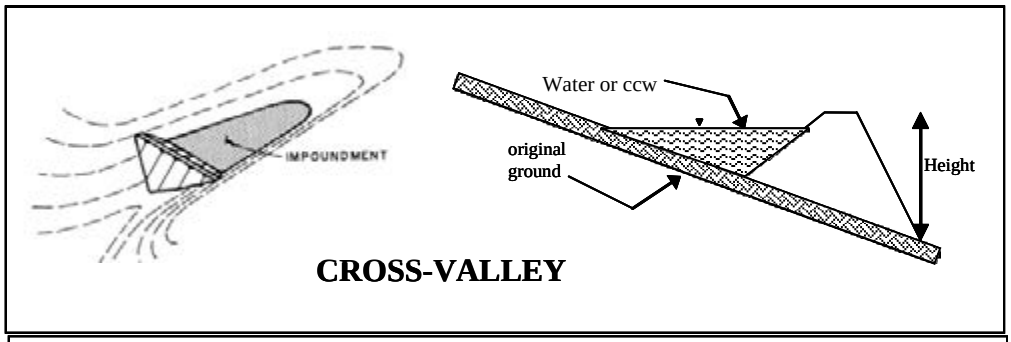
_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

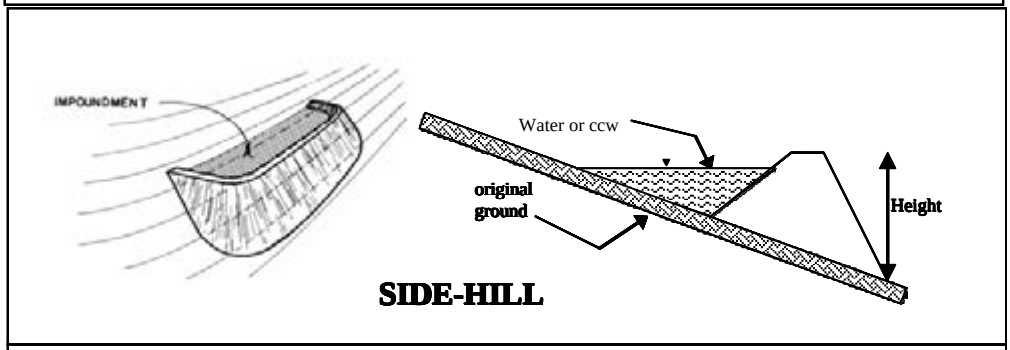
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

Low hazard potential was selected because failure of the dike would lead to a discharge into the Final Settling Pond, which is where the Bottom Ash Storage Area currently drains. As a result, the losses would be minimal and principally limited to the owner's property.

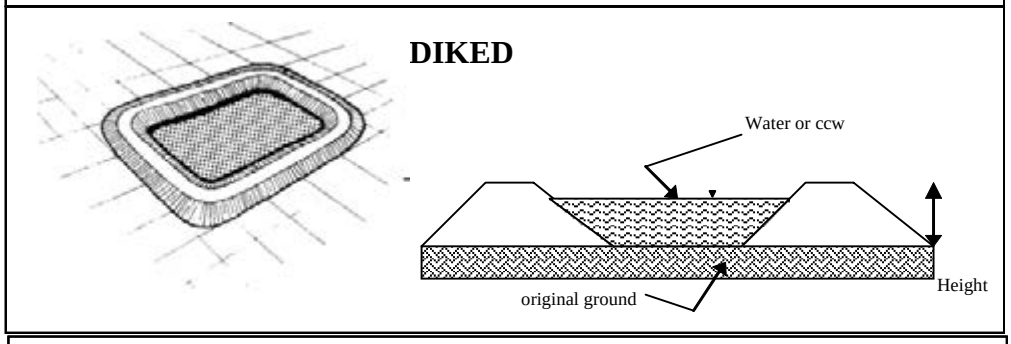
CONFIGURATION:



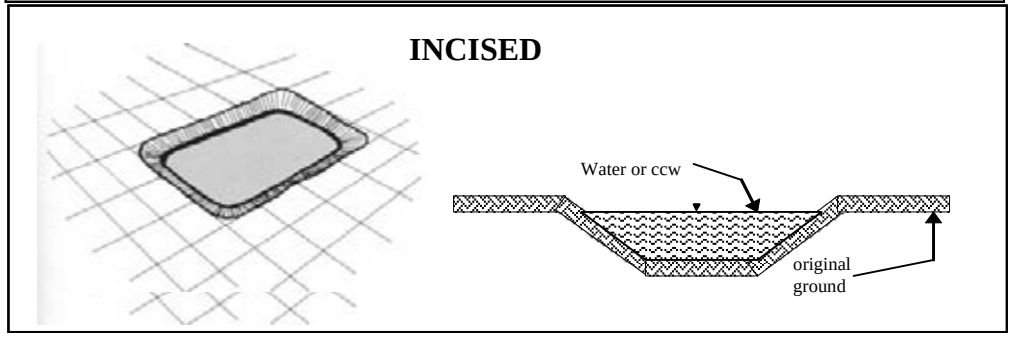
CROSS-VALLEY



SIDE-HILL



DIKED



INCISED

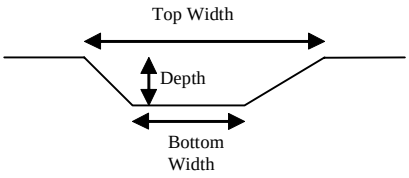
_____ Cross-Valley
_____ Side-Hill
_____ Diked
_____ Incised (form completion optional)
__X__ Combination Incised/Diked

Embankment Height ____2____ feet Embankment Material Compacted sand
Pool Area ____N/A____ acres Liner None
Current Freeboard ____2____ feet Liner Permeability N/A

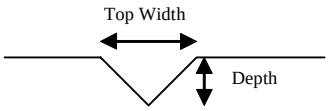
TYPE OF OUTLET (Mark all that apply)

_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

TRAPEZOIDAL

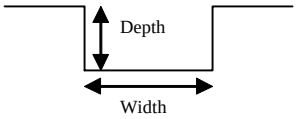


TRIANGULAR

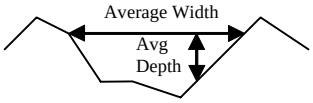


_____ depth
_____ bottom (or average) width
_____ top width
_____

RECTANGULAR

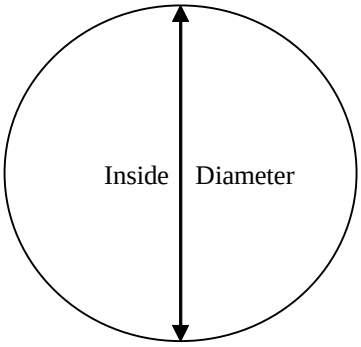


IRREGULAR



__X__ **Outlet** (5 pipes)

12 in. inside diameter



Material
_____ corrugated metal
_____ welded steel
_____ concrete
__X__ plastic (hdpe, pvc, etc.)
_____ other (specify) _____

_____

Is water flowing through the outlet? YES __X__ NO _____

_____ **No Outlet**

_____

_____ **Other Type of Outlet** (specify) _____

The Impoundment was Designed By Sargent & Lundy Engineers
_____

Has there ever been a failure at this site? YES _____ NO ___X_____

If So When? _____

If So Please Describe : _____

Has there ever been significant seepages at this site? YES _____ NO __X__

If So When? _____

IF So Please Describe: _____

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____ NO ___X____

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe : _____

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	Michigan City Generating Station	Date:	May 24, 2011
Unit Name:	Final Settling Pond	Operator's Name:	NIPSCO
Unit I.D.:	N/A	Hazard Potential Classification:	High Significant Low (Low circled)
Inspector's Name:	Walter Kosinski, P.E. & Thomas Boom, P.E.		

Check the appropriate box below. Provide comments when appropriate. If not applicable or not available, record "N/A". Any unusual conditions or construction practices that should be noted in the comments section. For large diked embankments, separate checklists may be used for different embankment areas. If separate forms are used, identify approximate area that the form applies to in comments.

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Daily		18. Sloughing or bulging on slopes?		✔
2. Pool elevation (operator records)?	584.22 ft		19. Major erosion or slope deterioration?		✔
3. Decant inlet elevation (operator records)?	N/A		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?	N/A	
5. Lowest dam crest elevation (operator records)?	587.72 ft		Is water exiting outlet, but not entering inlet?	N/A	
6. If instrumentation is present, are readings recorded (operator records)?		✔	Is water exiting outlet flowing clear?	N/A	
7. Is the embankment currently under construction?		✔	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	✔		From underdrain?	N/A	
9. Trees growing on embankment? (If so, indicate largest diameter below)		✔	At isolated points on embankment slopes?		✔
10. Cracks or scarps on crest?		✔	At natural hillside in the embankment area?		✔
11. Is there significant settlement along the crest?		✔	Over widespread areas?		✔
12. Are decant trashracks clear and in place?	N/A		From downstream foundation area?		✔
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		✔	"Boils" beneath stream or ponded water?		✔
14. Clogged spillways, groin or diversion ditches?		✔	Around the outside of the decant pipe?	N/A	
15. Are spillway or ditch linings deteriorated?	N/A		22. Surface movements in valley bottom or on hillside?	N/A	
16. Are outlets of decant or underdrains blocked?	N/A		23. Water against downstream toe?	✔	
17. Cracks or scarps on slopes?		✔	24. Were Photos taken during the dam inspection?	✔	

Major adverse changes in these items could cause instability and should be reported for further evaluation. Adverse conditions noted in these items should normally be described (extent, location, volume, etc.) in the space below and on the back of this sheet.

Inspection Issue # Comments

1) Impoundment is not regulated by Indiana Department of Natural Resources (DNR) but daily routine maintenance is conducted for security and operations although not specifically for the impoundment structure.
3, 16, 20) There are no decant pipes because the water in the Final Settling Pond is pumped back to the Michigan City Generating Station for recycling. There are two emergency overflow pipes at elevation 585.72 feet.
6) Monitoring wells are present but not monitored.
8) According to plans and specifications the foundation was prepared.
23) Lake Michigan was against the toe to the north behind two walls of sheet piles.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # IN0000116 INSPECTOR Walter Kosinski, P.E. & Thomas Boom, P.E.

Date May 24, 2011

Impoundment Name Michigan City Generating Station

Impoundment Company NIPSCO

EPA Region 5

State Agency (Field Office) Addresss Not regulated by Indiana DNR

Name of Impoundment Final Settling Pond

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New X Update _____

	Yes	No
Is impoundment currently under construction?		X
Is water or ccw currently being pumped into the impoundment?	X	

IMPOUNDMENT FUNCTION: Final settling basin prior to recycling water

Nearest Downstream Town : Name N/A - Lake Michigan

Distance from the impoundment 100 feet

Impoundment Location:

Longitude 86 Degrees 54 Minutes 48 Seconds

Latitude 41 Degrees 43 Minutes 15 Seconds

State IN County LaPorte County

Does a state agency regulate this impoundment? YES _____ NO X

If So Which State Agency? N/A

HAZARD POTENTIAL (In the event the impoundment should fail, the following would occur):

_____ **LESS THAN LOW HAZARD POTENTIAL:** Failure or misoperation of the dam results in no probable loss of human life or economic or environmental losses.

__X__ **LOW HAZARD POTENTIAL:** Dams assigned the low hazard potential classification are those where failure or misoperation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.

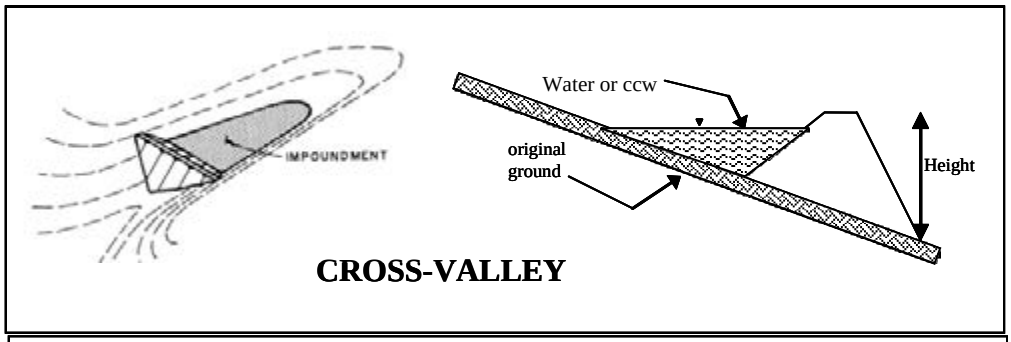
_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. Significant hazard potential classification dams are often located in predominantly rural or agricultural areas but could be located in areas with population and significant infrastructure.

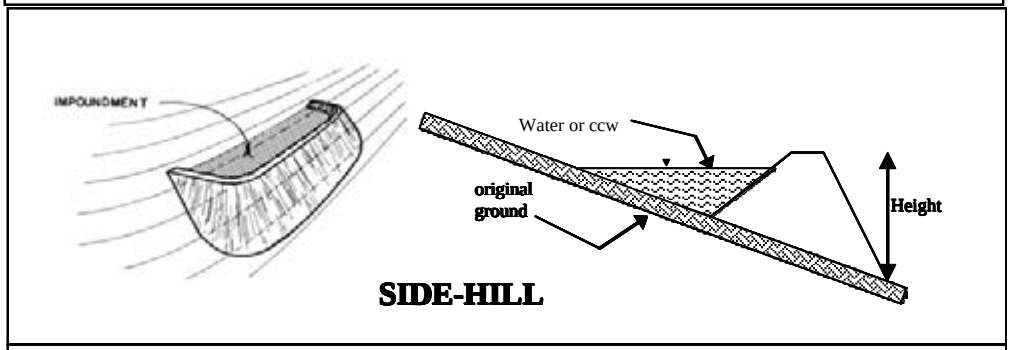
_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

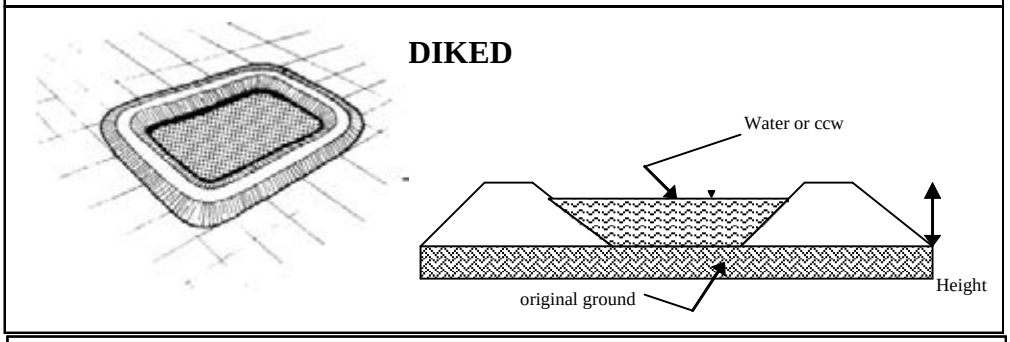
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

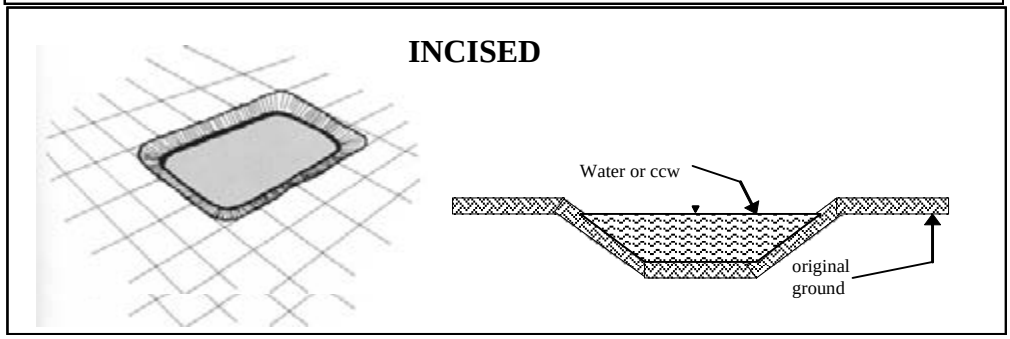
Low hazard potential was selected because in the event of dike failure the losses would be minimal, the environmental impact would be minimal since the impoundment contains little (if any) ash, the losses would be principally limited to the owner's property, and there are two rows of protective sheet piling between the dike and Lake Michigan.

CONFIGURATION:









_____ Cross-Valley
_____ Side-Hill
__X__ Diked
_____ Incised (form completion optional)
_____ Combination Incised/Diked

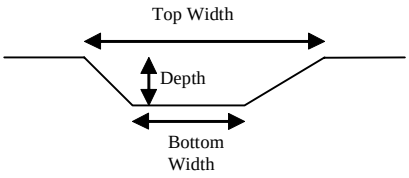
Embankment Height 18* feet Embankment Material Compacted sand and sheet piling
Pool Area 5.7 acres Liner None
Current Freeboard 3.5 feet Liner Permeability N/A

*Maximum height from top of embankment to Lake Michigan.

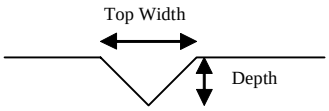
TYPE OF OUTLET (Mark all that apply)

_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

TRAPEZOIDAL

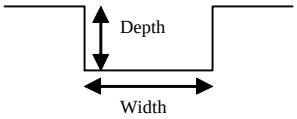


TRIANGULAR

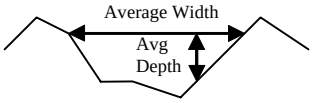


_____ depth
_____ bottom (or average) width
_____ top width
_____

RECTANGULAR

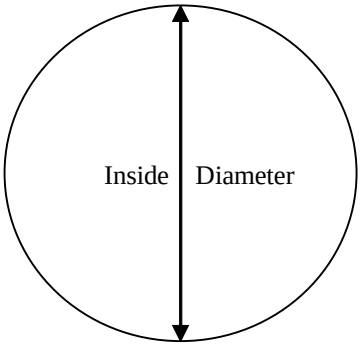


IRREGULAR



_____ **Outlet**

_____ inside diameter



Material
_____ corrugated metal
_____ welded steel
_____ concrete
_____ plastic (hdpe, pvc, etc.)
_____ other (specify) _____

_____

Is water flowing through the outlet? YES _____ NO _____

__X*__ **No Outlet** *Except for emergency overflow. Pumps are used to recirculate water to the generating station.

_____

__X__ **Other Type of Outlet** (specify) Emergency overflow pipe - 24 in. All water is recycled.

The Impoundment was Designed By Sargent & Lundy Engineers

_____

Has there ever been a failure at this site? YES _____ NO ___X_____

If So When? _____

If So Please Describe : _____

Has there ever been significant seepages at this site? YES _____ NO __X__

If So When? _____

IF So Please Describe: _____

Has there ever been any measures undertaken to monitor/lower Phreatic water table levels based on past seepages or breaches at this site? YES _____ NO ___X____

If so, which method (e.g., piezometers, gw pumping,...)? _____

If so Please Describe : _____

Appendix D

Photographs

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. Environmental Protection Agency	Site Location: NIPSCO Michigan City Generating Station Michigan City, Indiana	Project No. 01.0170142.30

Photo No.	Date:
1	05/23/11

Direction Photo Taken:
North

Description:
Primary Settling Basin No. 1 influent discharge area.

Photo No.	Date:
2	05/23/11

Direction Photo Taken:
Northeast

Description:
Primary Settling Basin No. 1 settling area.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. Environmental Protection Agency	Site Location: NIPSCO Michigan City Generating Station Michigan City, Indiana	Project No. 01.0170142.30

Photo No.	Date:
3	05/23/11

Direction Photo Taken:
Northeast

Description:
Piezometer near the crest of the Primary Settling Basin No. 1.

Photo No.	Date:
4	05/23/11

Direction Photo Taken:
South

Description:
Discharge pipes leaking waste water into the Primary Settling Basin No. 1.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. Environmental Protection Agency	Site Location: NIPSCO Michigan City Generating Station Michigan City, Indiana	Project No. 01.0170142.30

Photo No.	Date:
5	05/23/11

Direction Photo Taken:
East

Description:
Inner slope of crest of Primary Settling Basin No. 1.

Photo No.	Date:
6	05/23/11

Direction Photo Taken:
Northwest

Description:
Monitoring well at the crest of Primary Settling Basin No. 1. The Indiana Dunes National Lakeshore national park property is visible beyond the chain link fence.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. Environmental Protection Agency	Site Location: NIPSCO Michigan City Generating Station Michigan City, Indiana	Project No. 01.0170142.30

Photo No.	Date:
7	05/23/11

Direction Photo Taken:
Northeast

Description:
The overflow pipe in the Primary Settling Basin No. 1 that discharges into the Secondary Settling Basin No. 1.

Photo No.	Date:
8	05/23/11

Direction Photo Taken:
East

Description:
Inner slope of the Primary Settling Basin No. 1 embankment and discharge structure. Note minor erosion channeling.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. Environmental Protection Agency	Site Location: NIPSCO Michigan City Generating Station Michigan City, Indiana	Project No. 01.0170142.30

Photo No.	Date:
9	05/23/11

Direction Photo Taken:
North

Description:
Secondary Settling Pond No. 1. Note the continuous sheet piling at the toe of the embankment.

Photo No.	Date:
10	05/23/11

Direction Photo Taken:
Southeast

Description:
Decant structure in Secondary Settling Pond No. 1. The sheet piling to the right of the photograph appears to be at a lower elevation than the rest of the sheet piling in Secondary Settling Pond No. 2.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. Environmental Protection Agency	Site Location: NIPSCO Michigan City Generating Station Michigan City, Indiana	Project No. 01.0170142.30

Photo No.	Date:
11	05/23/11

Direction Photo Taken:
North

Description:
Debris in the Secondary Settling Pond No. 1 outlet structure.

Photo No.	Date:
12	05/23/11

Direction Photo Taken:
West

Description:
Overflow structure outlet from Primary Settling Pond No. 1 into Secondary Settling Pond No. 1. Note the minor erosion channels and minor sloughing on the slope.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. Environmental Protection Agency	**Site Location:** NIPSCO Michigan City Generating Station Michigan City, Indiana	**Project No.** 01.0170142.30

Photo No.	Date:
13	05/23/11

Direction Photo Taken:
Northwest

Description:
Discharge structure from Primary Settling Pond No. 1 into Secondary Settling Pond No. 1.

Photo No.	Date:
14	05/23/11

Direction Photo Taken:
South

Description:
West embankment in Secondary Settling Pond No. 1

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. Environmental Protection Agency	Site Location: NIPSCO Michigan City Generating Station Michigan City, Indiana	Project No. 01.0170142.30

Photo No.	Date:
15	05/23/11

Direction Photo Taken:
North

Description:
Overview of Primary Settling Pond No. 2.

Photo No.	Date:
16	05/23/11

Direction Photo Taken:
West

Description:
Erosion channels and sloughing in Primary Settling Pond No. 2.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. Environmental Protection Agency	Site Location: NIPSCO Michigan City Generating Station Michigan City, Indiana	Project No. 01.0170142.30

Photo No.	Date:
17	05/23/11

Direction Photo Taken:
Northwest

Description:
Decant structure in Primary Settling Pond No. 2. Note the decant trashrack is bent.

Photo No.	Date:
18	05/23/11

Direction Photo Taken:
South

Description:
Exterior slope of Primary Settling Pond No. 2.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. Environmental Protection Agency	Site Location: NIPSCO Michigan City Generating Station Michigan City, Indiana	Project No. 01.0170142.30

Photo No.	Date:
19	05/23/11

Direction Photo Taken:
Southeast

Description:
Embankment between the Primary Settling Pond No. 2 and the Secondary Settling Pond No. 1.

Photo No.	Date:
20	05/23/11

Direction Photo Taken:
Southeast

Description:
Embankment between Primary Settling Pond No. 2 and Secondary Settling Pond No. 2.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. Environmental Protection Agency	Site Location: NIPSCO Michigan City Generating Station Michigan City, Indiana	Project No. 01.0170142.30

Photo No.	Date:
21	05/23/11

Direction Photo Taken:

Description:
Discharge pipes into Primary Settling Pond No. 2.

Photo No.	Date:
22	05/23/11

Direction Photo Taken:
West

Description:
Inner slope of Primary Settling Pond No. 2.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. Environmental Protection Agency	Site Location: NIPSCO Michigan City Generating Station Michigan City, Indiana	Project No. 01.0170142.30

Photo No.	Date:
23	05/23/11

Direction Photo Taken:
Northeast

Description:
Inner slope and discharge pipes in Primary Settling Pond No. 2.

Photo No.	Date:
24	05/23/11

Direction Photo Taken:
Southeast

Description:
Secondary Settling Pond No. 2.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. Environmental Protection Agency	Site Location: NIPSCO Michigan City Generating Station Michigan City, Indiana	Project No. 01.0170142.30

Photo No.	Date:
25	05/23/11

Direction Photo Taken:
Northeast

Description:
Secondary Settling Pond No. 2 with the Bottom Ash Storage Area in the background.

Photo No.	Date:
26	05/23/11

Direction Photo Taken:
North

Description:
Secondary Settling Pond No. 2 with the Final Settling Pond and Lake Michigan in the background.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. Environmental Protection Agency	Site Location: NIPSCO Michigan City Generating Station Michigan City, Indiana	Project No. 01.0170142.30

Photo No.	Date:
27	05/23/11

Direction Photo Taken:
Northwest

Description:
Bottom Ash Storage Area.

Photo No.	Date:
28	05/23/11

Direction Photo Taken:
North

Description:
Bottom Ash Storage Area discharge pipes.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. Environmental Protection Agency	Site Location: NIPSCO Michigan City Generating Station Michigan City, Indiana	Project No. 01.0170142.30

Photo No.	Date:
29	05/23/11

Direction Photo Taken:
Northwest

Description:
Runoff from the Bottom Ash Storage Area that flows into the Final Settling Pond.

Photo No.	Date:
30	05/23/11

Direction Photo Taken:
Northwest

Description:
One of the discharge locations from the Bottom Ash Storage Area to the Final Settling Pond.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. Environmental Protection Agency	Site Location: NIPSCO Michigan City Generating Station Michigan City, Indiana	Project No. 01.0170142.30

Photo No.	Date:
31	05/23/11

Direction Photo Taken:
North

Description:
Final Settling Pond interior slope. The purpose of the black pipe in the foreground in unknown. The two pipes with 90 degree bends shown in the background are overflow pipes.

Photo No.	Date:
32	05/23/11

Direction Photo Taken:
South

Description:
Manholes to monitor overflow.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. Environmental Protection Agency	Site Location: NIPSCO Michigan City Generating Station Michigan City, Indiana	Project No. 01.0170142.30

Photo No.	Date:
33	05/23/11

Direction Photo Taken:
Northeast

Description:
Interior of manhole to monitor overflow.

Photo No.	Date:
34	05/23/11

Direction Photo Taken:
South

Description:
Crest of embankment and interior slope of Final Settling Pond.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. Environmental Protection Agency	Site Location: NIPSCO Michigan City Generating Station Michigan City, Indiana	Project No. 01.0170142.30

Photo No.	Date:
35	05/23/11

Direction Photo Taken:
Southwest

Description:
Crest of embankment and interior slope of Final Settling Pond.

Photo No.	Date:
36	05/23/11

Direction Photo Taken:
South

Description:
Monitoring wells at the crest of the Final Settling Pond.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. Environmental Protection Agency	Site Location: NIPSCO Michigan City Generating Station Michigan City, Indiana	Project No. 01.0170142.30

Photo No.	Date:
37	05/23/11

Direction Photo Taken:
Northeast

Description:
Crest of embankment and interior slope of Final Settling Pond.

Photo No.	Date:
38	05/23/11

Direction Photo Taken:
South

Description:
Interior slope of the Final Settling Pond. The white pipe to the right of the photograph is the effluent for road drainage.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. Environmental Protection Agency	Site Location: NIPSCO Michigan City Generating Station Michigan City, Indiana	Project No. 01.0170142.30

Photo No.	Date:
39	05/23/11

Direction Photo Taken:
East

Description:
Crest and interior slope of the Final Settling Pond.

Photo No.	Date:
40	05/23/11

Direction Photo Taken:
East

Description:
Interior slope of the Final Settling Pond. The black pipe in the photograph is a drain pipe from the Bottom Ash Area. The concrete structure in the water is the drainage structure from the Secondary Settling Pond Numbers 1 and 2.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. Environmental Protection Agency	Site Location: NIPSCO Michigan City Generating Station Michigan City, Indiana	Project No. 01.0170142.30

Photo No.	Date:
41	05/23/11

Direction Photo Taken:
Northwest

Description:
Concrete drainage structure in the Final Settling Pond drains from the Secondary Settling Pond Numbers 1 and 2.

Photo No.	Date:
42	05/23/11

Direction Photo Taken:
West

Description:
Crest and interior slope of the Final Settling Pond.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. Environmental Protection Agency	Site Location: NIPSCO Michigan City Generating Station Michigan City, Indiana	Project No. 01.0170142.30

Photo No.	Date:
43	05/23/11

Direction Photo Taken:
North

Description:
Partitioning dike in the Final Settling Pond.

Photo No.	Date:
44	05/23/11

Direction Photo Taken:
Northwest

Description:
Pump house at the Final Settling Pond.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. Environmental Protection Agency	Site Location: NIPSCO Michigan City Generating Station Michigan City, Indiana	Project No. 01.0170142.30

Photo No. 45	Date: 05/23/11

Direction Photo Taken:
North

Description:
Two rows of sheet piling along the Final Settling Pond. Note the heavy rip rap between the rows of sheet piling.

Photo No. 46	Date: 05/23/11

Direction Photo Taken:
North

Description:
Two rows of sheet piling along the Final Settling Pond. Note the heavy rip rap between the rows of sheet piling.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. Environmental Protection Agency	Site Location: NIPSCO Michigan City Generating Station Michigan City, Indiana	Project No. 01.0170142.30

Photo No.	Date:
47	05/23/11

Direction Photo Taken:
Southwest

Description:
Two rows of sheet piling between the impoundments and Lake Michigan. Note the heavy rip rap between the rows of sheet piling.

Photo No.	Date:
48	05/23/11

Direction Photo Taken:
Southwest

Description:
Exterior slope of Primary Settling Pond No. 2. Note the two rows of sheet piling and rip rap.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. Environmental Protection Agency	Site Location: NIPSCO Michigan City Generating Station Michigan City, Indiana	Project No. 01.0170142.30

Photo No.	Date:
49	05/23/11

Direction Photo Taken:
Southwest

Description:
Exterior slope of Primary Settling Pond No. 2. Note the two rows of sheet piling and rip rap.

Photo No.	Date:
50	05/23/11

Direction Photo Taken:
Southwest

Description:
Exterior slope of Primary Settling Pond No. 1.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name: U.S. Environmental Protection Agency	Site Location: NIPSCO Michigan City Generating Station Michigan City, Indiana	Project No. 01.0170142.30

Photo No.	Date:
51	05/23/11

Direction Photo Taken:

Description:
Exterior slope of the Primary Settling Pond No. 1.

Photo No.	Date:
52	05/23/11

Direction Photo Taken:
Northwest

Description:
NPDES outfall location into Lake Michigan.

Appendix E

References

NIPSCO –MICHIGAN CITY GENERATING STATION
REFERENCE LIST

1. NPDES Permit No. IN0000116 issued to NIPSCO Michigan City Generating Station, dated March 15, 2011.

2. October 4, 2010 response by NIPSCO to EPA (5306P) Request for Information regarding the Michigan City Generating Station.