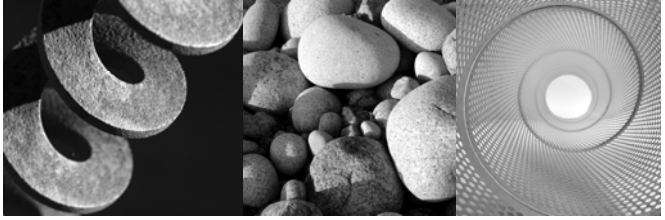

Geotechnical
Environmental and
Water Resources
Engineering

Specific Site Assessment for Coal Combustion Waste Impoundments at Duke Energy Indiana (DEI) Gibson Generating Station

Owensville, Indiana

Submitted to:

U.S. Environmental Protection Agency
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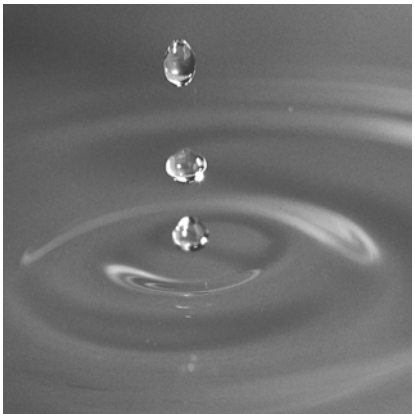

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1.0 Introduction

1.1 Purpose

This report presents the results of a specific site assessment of the dam safety of six coal combustion waste (CCW) impoundments at the Gibson Generating Station in Owensville, Indiana. The Gibson Generating Station is operated by Duke Energy Indiana, Inc. (DEI) and owned by DEI, Wabash Valley Power Association, Inc. and Indiana Municipal Power Agency. The six impoundments are the North Ash Pond, North Settling Basin, East Ash Ponds #1, #2, and #3, and the East Settling Basin. These six impoundments comprise the active coal combustion waste facility at the Gibson Generating Station. Other coal combustion waste impoundments at the Gibson Generating Station include the South Ash Pond and Basin, which have been closed under Indiana Beneficial Use Statute IC-13-19-3-3. The specific site assessment was performed on April 26 and 27 of 2010.

The specific site assessment was performed with reference to Federal Emergency Management Agency (FEMA) guidelines for dam safety, which includes other federal agency guidelines and regulations (such as U.S. Army Corps of Engineers [USACE] and U.S. Bureau of Reclamation [USBR]) for specific issues, and defaults to state requirements were not specifically addressed by federal guidance or if the state requirements were more stringent.

1.2 Scope of Work

The scope of work between GEI Consultants, Inc. (GEI) and the U.S. Environmental Protection Agency (EPA) for the specific site assessment is summarized in the following tasks:

1. Acquire and review existing reports and drawings relating to the safety of the project provided by the EPA and Owners.
2. Conduct detailed physical inspections of the project facilities. Document observed conditions on Field Assessment Check Lists provided by EPA for each management unit being assessed.
3. Review and evaluate stability analyses of the project's coal combustion waste impoundment structures.
4. Review the appropriateness of the inflow design flood (IDF), and adequacy of ability to store or safely pass the inflow design flood, provision for any spillways, including considering the hazard potential in light of conditions observed during the inspections or to the downstream channel.
5. Review existing dam safety performance monitoring programs and recommend additional monitoring, if required.

6. Review existing geologic assessments for the projects.
7. Submit draft and final reports.

1.3 Authorization

GEI performed the coal combustion waste impoundment assessment as a contractor to the EPA. This work was authorized by EPA under Delivery Order EP09W001698 between EPA and GEI, dated August 12, 2009.

1.4 Project Personnel

The scope of work for this task order was completed by the following personnel from GEI:

Stephen G. Brown, P.E.	Project Manager/Task Leader
Nicholas D. Miller, P.E.	Project Engineer
Bryan M. Scott, Ph.D., P.E.	Project Geotechnical Engineer

The Program Manager for the EPA was Stephen Hoffman.

1.5 Limitation of Liability

This report summarizes the assessment of dam safety of North Ash Pond, North Settling Basin, East Ash Ponds #1, #2, and #3, and the East Settling Basin coal combustion waste impoundments at Gibson Generating Station, Owensville, Indiana. The purpose of each assessment is to evaluate the structural integrity of the impoundments and provide summaries and recommendations based on the available information and on engineering judgment. GEI used a professional standard of practice to review, analyze, and apply pertinent data. No warrantees, express or implied, are provided by GEI. Reuse of this report for any other purpose, in part or in whole, is at the sole risk of the user.

1.6 Project Datum

The project datum was not identified on the documents reviewed by the assessment team.

1.7 Prior Inspections

The embankment dams for the six CCW impoundments are inspected monthly by a DEI Gibson Generating Station engineer but no written records of the inspections are maintained. A third-party engineering firm performed an informal visual inspection of the embankments in October 2008; however neither state nor federal regulatory officials have inspected the embankments within the last five years.

2.0 Description of Project Facilities

2.1 General

Gibson Generating Station is a coal-fired power plant consisting of five units that generate about 3,250 megawatts (MW) combined. The power plant is located in the town of Owensville, Gibson County, Indiana approximately 35 miles north of Evansville, Indiana; see Figure 1. Gibson Generating Station is a closed loop facility with no discharge of any process water to waters of the U.S. Storm water impacted from remote industrial activities on haul roads is regulated by Indiana Department of Environmental Management under Rule 6 National Pollutant Discharge Elimination System (NPDES) storm water permit. The six CCW impoundments are located adjacent to and northeast of the power plant (Figure 2). These six impoundments are the North Ash Pond, North Settling Basin, East Ash Ponds #1, #2, and #3, and the East Settling Basin. All units are operated by DEI, and co-owned by DEI, Wabash Valley Power Association, and Indiana Municipal Power Agency. The first unit went online in 1972.

2.2 Impoundment Dams and Reservoirs

The embankment dams of the six CCW impoundments have not been assigned a hazard potential by a state or federal agency. Based on the geometry of the impoundments and the facilities downstream, recommended hazard potential classifications for the impoundments have been developed in Section 4.0 of this report. The basic dimensions and geometry of the six CCW impoundments are summarized in Table 2.1. East Ash Ponds #1, #2, and #3, and the East Settling Basin are adjacent to each other. The North Ash Pond and North Settling Basin are adjacent to each other, but are separated from the East Ash Ponds.

East Ash Ponds #1, #2, and #3, and the North Ash Pond are used to store fly ash, bottom ash, boiler slag, flue gas emission control residuals and other waste. The East Settling Basin and the North Settling Basin store fly ash and other waste. DEI has identified other waste as landfill leachate, water treatment, boiler blow down, stormwater runoff, boiler chemical cleaning wastes, mill rejects, floor and laboratory drains, and drains from equipment cleaning.

The embankments are relatively homogeneous, and were constructed of onsite clayey material. The dam embankments have crests varying from 12 to 40 feet wide, downstream slopes of 3H:1V, and upstream slopes varying from 2H:1V to 3H:1V.

Table 2.1: Summary Information for Impoundment Dam Parameters

Parameter	Value					
Dam	East Ash Pond #1	East Ash Pond #2	East Ash Pond #3	East Settling Basin	North Ash Pond	North Settling Basin
Height (ft)	18.5	18.5	23	18.5	14	18
Estimated Perimeter Length (ft)	8,750	8,750	10,200	6,800	5,000	4,000
Crest Width (ft)	20	20	20	20	12 to 40	12
Crest Elevation (ft)	404.5	404.5	412.0	404.5	405.0	405.0
Design Side Slopes (H: V)	2:1 to 3:1	2:1 to 3:1	2:1 to 3:1	2:1 to 3:1	3:1	3:1
Estimated Freeboard (ft) at time of site visit	5.0	5.0	3.0	7.0	5.0	7.0
Storage Capacity (ac-ft)*	1733	1733	3325	743	350	150
Surface Area (acres)*	105	105	133	45	25	10

* Storage capacity and area values provided by DEI

2.3 Spillways

None of the six CCW impoundments have spillways.

2.4 Intakes and Outlet Works

The intake structures located in the East Ash Ponds #1, #2, and #3 and the North Ash Pond consists of a square concrete stop log weir structure approximately 9-feet long by 9-feet wide and 16-feet tall, that discharges through a 36-inch-diameter connecting pipe to an adjacent impoundment. Flow through the weir structures is controlled by manually adding or removing concrete stop logs into the guides.

The outlet works for the East Settling Basin consists of a pump station, ultrasonic water level indicator and operator, visual alarm, and a pipe that discharges to the Cooling Pond. The East Settling Basin pump station has an estimated maximum discharge capacity of 10,000 gallons per minute (gpm). The North Settling Basin has a similar pump station system that consists of two pumps, ultrasonic water level indicator and operator, visual alarm, and a pipeline that discharges to the Cooling Pond. The North Settling Basin pump station has an estimated maximum discharge capacity of 20,000 gpm.

2.5 Vicinity Map

Gibson Generating Station is located in the town of Owensville, Gibson County, Indiana approximately 35 miles north of Evansville, Indiana, as shown on Figure 1. The six CCW impoundments are located adjacent to, and northeast of, the station.

2.6 Plan and Sectional Drawings

Engineering drawings for the six CCW impoundments were prepared by Sargent & Lundy. Construction record drawings were not prepared.

2.7 Standard Operational Procedures

Gibson Generating Station is a coal-fired power plant composed of five 650 MW units producing a total combined capacity of 3,250 MW. Coal is delivered to the power plant by train, where it is then combusted to power the steam turbines. The burning of coal produces several gases which are vented from the boiler, and bottom ash, which is made of coarse fragments, falls to the bottom of the boiler, and is removed along with boiler slag. Currently, bottom ash and boiler slag from all five units are being wet sluiced to North Ash Pond where primary settling occurs. Fly ash from Units #1, #2, and #3 are also wet sluiced to the North Ash Pond where primary settling occurs. Fly ash from Units #4 and #5 are collected dry and managed in onsite landfills. According to DEI, Units 1 through 3 are scheduled to be converted to dry handling by the end of 2013. All process water generated at the Gibson Generating Station is managed within a closed-loop pond system with no discharge to waters of the United States.

The North Ash Pond is used for primary settling and for temporary storage for coal combustion waste that is wet sluiced from the boilers. Bottom ash and fly ash are physically segregated in the North Ash Pond by separating the wet sluice discharge pipes within the North Ash Pond. The fly ash is discharged to the north side of the pond and the bottom ash is discharged to the south end of the pond. The fly ash is removed from the pond by a hydraulic dredge with a booster pump that discharges to the East Ash Pond system. The bottom ash is decanted, excavated and then disposed of into one of the two onsite landfills. The North Ash Pond discharges decant water into the North Settling Basin. The water level in the North Ash Pond is controlled by concrete stop logs in the primary overflow structure to the North Settling Basin. The North Ash Pond can also discharge to the North Settling Basin through a second overflow structure that has a set discharge elevation of 397.57. The North Settling Basin provides secondary clarifying of solids before the effluent is discharged by pumping to the Cooling Pond. The discharge from the North Settling Basin is controlled by two pumps that are operated by an ultrasonic water level control system that is equipped with an alarm that triggers a flashing light at the pump station.

The East Ash Pond system consists of East Ash Ponds #1, #2, and #3 and the East Settling Basin. East Ash Ponds #1, #2, and #3 were designed to receive and store hydraulically dredged coal combustion waste that consists primarily of fly ash and lesser amounts of bottom ash, boiler slag, flue gas emission control residuals and a minor amount of process wastewater from the North Ash Pond. Water levels in the system are controlled by stop log overflow structures located in each cell. The decant water in the system was designed to

flow as follows: East Ash Pond #3 to East Ash Pond #2, East Ash Pond #2 to East Ash Pond #1, and East Ash Pond #1 to the East Settling Basin. However, East Ash Pond #3 of the system began closure in 2009 upon receipt of the Indiana Department of Environmental Management approved Closure/Post Closure Plans on March 7, 2009 and is no longer receiving the hydraulically dredged waste. Closure of this cell is expected to be completed by the end of 2012. East Ash Pond #1 is no longer receiving coal waste because it is near capacity, but a discharge channel is maintained for decant water from East Ash Pond #2 to discharge into the East Settling Basin. East Ash Pond #2 is actively receiving the hydraulically dredged coal waste from the North Ash Pond. The East Settling Basin provides secondary clarifying of solids before the effluent is discharged into the Cooling Pond. The discharge from the East Settling Basin is controlled by a pump that is operated by an ultrasonic water level control system that is equipped with an alarm that triggers a flashing light at the pump station.

3.0 Summary of Construction History and Operation

The first unit at Gibson Generating Station went online in 1972. The final unit (Unit 5) was online by 1983. Coal combustion waste was originally placed in ash ponds that are now closed. The North Ash Pond and North Settling Basin were commissioned in 1974. The East Settling Basin and East Ash Pond #1 were commissioned in 1991, East Ash Pond #2 in 1995, and East Ash Pond #3 in 1999.

The two north impoundments were constructed adjacent to each other such that a common interior embankment separates the ponds. The four east impoundments were also constructed adjacent to each other using common interior dikes. As a result, some of the embankments are exterior dikes (similar to typical embankment dams) and some of the embankments are interior dikes (designed to separate one pond from another pond).

The dikes were constructed of homogeneous fill material, typically with riprap and/or geotextile armoring on the upstream slope to protect against wave erosion. Typical geometries of the dikes are shown in Table 2.1 and Figure 3. The southern dike for East Ash Pond #3 was constructed as a raise of the northern dike for East Ash Ponds #1 and #2. This was completed as a "downstream raise," in which the raised East Ash Pond #3 embankment was constructed over the existing dikes and native ground. The raised embankment was not founded on the coal combustion waste contained in East Ash Ponds #1 and #2.

Original design drawings for the ponds and their embankments were available; however design reports and construction records were not available. Foundation preparation for the embankments included removal of 1 foot of topsoil. Clayey soil excavated from onsite borrow areas was utilized in the construction of the embankments. Evidence of prior releases, failures or patchwork construction were not observed during the site visit or disclosed by plant personnel during the site visit. However, DEI's interpretation of their groundwater monitoring program led them to believe that the bottom portion of the liner system was more permeable than the original design for the East Ash Pond #3. This led, in part, to the decision to close East Ash Pond #3, and the closure is currently in progress.

A fixated scrubber sludge (FSS) landfill was designed in 1999 by Fuller, Mosbarger, Scott & May that consisted of a landfill to be constructed over a portion of the North Ash Pond. The coal combustion waste placed in the FSS landfill includes:

- Dewatered FGD solids (synthetic gypsum) and FGD wastewater treatment solids from units 1, 2, and 3.
- Fly ash, FGD solids (calcium sulfite) and quicklime from Unit 4.
- Fly ash, FGD solids (synthetic gypsum) and quicklime from Unit 5.

Placement of this material is ongoing.

4.0 Hazard Potential Classification

4.1 Overview

According to the Federal Guidelines for Dam Safety the hazard potential classification for the CCW impoundments is based on the possible adverse incremental consequences that result from release of stored contents due to failure of the dam or misoperation of the dam or appurtenances. Impoundments are classified as Low, Significant, or High hazard, depending on the potential for loss of human life and/or economic and environmental damages. The Federal Guidelines for Dam Safety hazard potential classification categories are consistent with the Indiana Department of Natural Recourses Division of Water hazard potential classification categories.

4.2 East Ash Ponds and East Settling Basin

The East Ash Ponds and East Settling Basin are regulated by the Indiana Department of Natural Resources, Division of Water, Dams, and Levees. The East Ash Ponds and East Settling Basin are relatively small in size and storage capacity. The pond size and capacity of each unit provided by Duke Energy is summarized in Table 4.1.

Table 4.1: DEI Gibson Generating Station – Summary of East Impoundments Parameters

Pond Name	Height (ft)	Storage (ac-ft)	Surface Area (acres)
East Ash Pond #1	18.5	1,733	105
East Ash Pond #2	18.5	1,733	105
East Ash Pond #3	23	3,325	133
East Settling Basin	18.5	743	45

Based on current pond heights and storage capacity shown in Table 4.1 the size classification for the East Ash Ponds and East Settling Basin is “Small” in accordance with the USACE Recommended Guidelines for Safety Inspection of Dams ER 1110-2-106 criteria.

An uncontrolled release of the CCW impoundments contents due to a failure or misoperation is not considered to cause loss of human life and the economic and environmental damages would be relatively low based on our review. The flood extent and depth would be limited by the adjacent USACE levee on the Wabash River and the very flat surrounding topography. Flood waters would likely be widespread with shallow depths and gradually rising waters. Based on the pond height and volume, the majority of inundation would be limited to the undeveloped property owned by DEI to the south and east around the Cooling Pond and the surrounding wetlands. The county road adjacent to the west dike could potentially be flooded and temporarily interrupt local traffic in the event of a breach of the

west dike. However, the breach development time is expected to be relatively long and the associated flood depths and flow velocities would be relatively small and are not considered to pose a significant hazard to vehicles. Flood waters would eventually drain to the Wabash River at culverts through the USACE levee located about 3 miles downstream. There are no habitable structures in the flow path between the ash ponds and the Wabash River. Consistent with the Federal Guidelines for Dam Safety and the Department of Natural Resources Division of Water (DNR), Indiana General Guidelines for New Dams and Improvements to Existing Dams in Indiana, we recommend the East Ash Ponds #1 and #2, and the East Settling Basin dams be classified as "Low" hazard structures. We recommend the East Ash Ponds #3 be classified as “Less Than Low” hazard structure because this pond is currently in the process of being closed and no longer receives hydraulically dredged coal combustion waste.

4.3 North Ash Pond and North Settling Basin

The North Ash Ponds and North Settling Basin are regulated by the Indiana Department of Natural Resources, Division of Water, Dams, and Levees. The North Ash Pond and North Settling Basin are relatively small in size and storage capacity. The pond size and capacity of each unit provided by Duke Energy is summarized in Table 4.2.

Table 4.2: DEI Gibson Generating Station – Summary of North Impoundments Parameters

Pond Name	Height (ft)	Storage (Ac-ft)	Surface Area (acres)
North Ash Pond	14	350	25
North Settling Basin	18	150	10

Based on current pond heights and storage capacity shown in Table 4.2 the size classification for the North Ash Pond and North Settling Basin is “Small” in accordance with the USACE Recommended Guidelines for Safety Inspection of Dams ER 1110-2-106 criteria.

An uncontrolled release of the CCW impoundments contents due to a failure or misoperation is not considered to cause loss of human life and the economic and environmental damages would be relatively low based on our review. The flood extent and depth would be limited by the adjacent USACE levee on the Wabash River and the very flat surrounding topography. Flood waters would likely be widespread with shallow depths and gradually rising waters. Based on the pond height and volume, the majority of inundation would be limited to the undeveloped property owned by DEI to the south around the Cooling Pond and the surrounding wetlands. Flood waters would eventually drain to the Wabash River at culverts through the USACE levee located about 3 miles downstream. There are no habitable structures in the flow path between the ash ponds and the Wabash River. Consistent with the Federal Guidelines for Dam Safety and the DNR Indiana General Guidelines for New Dams and Improvements to Existing Dams in Indiana, we recommend the North Ash Pond and North Settling Basin dams be classified as "Low" hazard structures.

5.0 Hydrology and Hydraulics

5.1 Floods of Record

Floods of record have not been evaluated and documented for the six CCW impoundments at the Gibson Generating Station. The National Weather Service local rain gage data reportedly recorded maximum daily rainfall depths ranging from about 6.5 to 7.4 inches in the surrounding areas. Recently, in March of 2008, a maximum daily rainfall depth of 6.4 inches was reported at the Evansville Regional Airport gage. These rainfall events are not expected to result in overtopping of the dams under the current normal operating conditions. No documentation has been provided to verify the storm results.

5.2 Inflow Design Floods

Currently there is no hazard classification for the six CCW impoundments at the Gibson Generating Station. Based on observations during the field inspection, we recommend the six CCW impoundments be classified as "Low" hazard structures (Section 4). Based on the recommended "Low" hazard classification, the DNR General Guidelines for New Dams and Improvements to Existing Dams in Indiana specifies "Low" hazard dams be capable of passing a flood event that ranges from the 100-year storm to the 50 percent probable maximum precipitation (PMP) without overtopping the dam. The USACE Recommended Guidelines for Safety Inspection of Dams ER 1110-20106 recommends a small "Low" hazard dam be capable of passing the 50- to 100-year storm event without overtopping the dam. Considering the "Low" hazard rating, the relatively low economic and environmental damages that could potentially occur upon failure, and the recommended range of inflow design storms, it is reasonable to select the 100-year precipitation event as the inflow design storm for the six CCW impoundments at the Gibson Generating Station. According to the DNR Guidelines, the 6-hour 100-year precipitation event should be used to analyze the inflow design floods for the ash ponds because the time of concentration for the basins is less than 6 hours. Accordingly, the 6-hour 100-year precipitation at the Gibson Generating Station is about 4.75 inches.

5.2.1 East Ash Ponds and East Settling Basin

The contributing drainage area to the East CCW impoundments is limited to the impoundments surface area (Table 2.1) because the surrounding dikes eliminate the potential for surface water run-on. Based the East CCW impoundments facility layout, all rainfall over East Ash Ponds #1, #2 and #3 will be routed to the East Settling Basin through the decant structures located in each pond. Therefore, the total contributing drainage area to the East Settling Basin is approximately 388 acres. The East Settling Basin is not provided with a spillway for maintaining the reservoir level or storm water discharge; rather, the dam is

equipped with a pump station that discharges excess water to the Cooling Pond upon reaching a specified pool elevation. Currently, the East Settling Basin water level is maintained at an elevation of about 398.0 feet, which provides about 7 feet of freeboard and approximately 310 acre-feet of additional storage capacity. Based on the contributing drainage area and the 6-hour 100-year precipitation of 4.75 inches, the East Settling Basin would receive approximately 154 acre-feet of storm water, which would result in a water level at about El. 401.5, providing about 3.5 feet of freeboard. Based on these results, the East Ash Ponds and East Settling Basin meets the regulatory requirements for storage of the 6-hour 100-year inflow design flood without overtopping the dam.

5.2.2 North Ash Pond and North Settling Basin

The North Ash Pond has been significantly modified since the original design. The modifications have changed the site drainage. Currently, the majority of the southeast portion of the North Ash Pond has been converted into a Fixated Scrubber Sludge (FSS) landfill and the northwest corner has been converted into parking areas. Considering the current modifications, the North Ash Pond contributing drainage area was estimated to be approximately 230 acres, which includes runoff from the portions of the FSS landfill and the parking areas. The North Settling Basin surface area was estimated to be approximately 18 acres, which is nearly double the information provided by Duke Energy. Based on these estimates, the total contributing drainage area to the North CCW impoundments is approximately 248 acres.

Under the current configuration, decant water in the North Ash Pond is routed to the North Settling Basin through the two decant structure located through the interior separating dike. The North Settling Basin is not provided with a spillway for maintaining the reservoir level or storm water discharge; rather, the dam is equipped with a pump station that discharges excess water to the Cooling Pond upon reaching a specified pool elevation. Currently, the North Settling Basin water level is maintained at an elevation of about 398.0, which provides about 7 feet of freeboard and approximately 80 acre-feet of additional storage capacity. However, once the North Settling Basin water level reaches the elevation of the weir in the decant structure in the North Ash Pond, flow will begin to equalize and storage from both ponds will be utilized. During the field investigation, the weir elevation was estimated to be at least 2 feet below the North Ash Pond dam crest. Due to the irregular topography and continually changing geometry of the North Ash Pond it is difficult to estimate the available storage above the weir without conducting a detailed topographic map and calculating volumes; however estimates provided by Duke Energy indicate approximately 175 acre-feet of available storage.

Based on the contributing drainage area and the 6-hour 100-year precipitation of 4.75 inches, the North Settling Basin would receive approximately 98 acre-feet of storm water, assuming no losses. Based on this inflow volume, storage from both ponds would be utilized. It is difficult to estimate the resulting pond elevation and freeboard due to the irregular

topography and continually changing geometry of the North Ash Pond. However, the storm volume is relatively small compared to the estimated combined available storage capacity of both ponds and would likely result in a water surface elevation slightly above the decant weir elevation in the North Ash Pond. Based on these results, the North Ash Pond and North Settling Basin are expected to meet the regulatory requirements for storage of the 6-hour 100-year inflow design flood without overtopping the dam.

5.2.3 Determination of the PMF

Not applicable.

5.2.4 Freeboard Adequacy

Freeboard is adequate at all facilities.

5.2.5 Dam Break Analysis

No dam break analysis has been performed for the six CCW impoundments at the Gibson Generating Station. However, the dam break analysis and inundation mapping developed for the Gibson Generating Station Cooling Pond was provided as reference information and was used to evaluate the areal extent of inundation and flow direction.

5.3 Spillway Rating Curves

Not applicable.

5.4 Evaluation

Based on the current facility operations and inflow design floods documents, the six CCW impoundments at the Gibson Generating Station appear to have adequate capacity to store the regulatory design floods without overtopping the dams based on the recommended hazard classifications for the dams.

6.0 Geologic and Seismic Considerations

Based on the Sargent & Lundy Gibson Pond Examination Report (2008):

> The site is located in the Wabash Lowland Physiographic Unit. Glacial outwash sediments consisting of sands and gravels exist in the Wabash River Valley. These unconsolidated sediments vary in thickness from 50 to 150 feet in this area. Windblown soils and river alluvium sediments cover the glacial deposits. The glacial deposits are underlain by Pennsylvanian age shales and sandstones.
>
> Post-Pennsylvanian faults are present in the area. They trend north-northeast and are parallel to faults in Kentucky and Illinois. The stability analysis for the dikes included a horizontal seismic acceleration coefficient of 0.13g at the time of the original construction.

The seismic coefficient of 0.13g corresponds to a peak ground acceleration of 0.26g. This value is lower than an acceleration of approximately 0.32g as shown on the 2008 United States Geological Survey (USGS) probabilistic seismic hazard map for 2 percent Probability of Exceedance within 50 years (recurrence interval of approximately 2,500 years), but higher than an acceleration of approximately 0.19g as shown on the hazard map for 5 percent Probability of Exceedance in 50 years (recurrence interval of approximately 1,000 years). Application of a pseudo-static seismic coefficient of 0.13g in the facility design would be greater than the 1,000-year earthquake, which is within the appropriate range for application to low hazard classification impoundments based on federal dam safety guidance.

7.0 Field Assessment

7.1 General

A site visit to assess the condition of the six CCW impoundments at the Gibson Generating Station was performed on April 26 and 27 of 2010, by Stephen G. Brown, P.E., and Nicholas D. Miller, P.E., of GEI. Jim Meiers, Kevin Olivey, Ron Ehlers, Adam Deller, and Rebecca Sparks of Duke Energy assisted in the assessment

The weather during the site visit (April 26–27, 2010) was generally partly cloudy to sunny, with temperatures around 60 degrees Fahrenheit. The week preceding the inspection, a considerable amount of rainfall occurred at the site; however the majority of the ground was dry at the time of the site visit, except for the perennial wetland areas.

At the time of inspection, GEI completed an EPA inspection checklist which is provided in Appendix A and photographs are provided in Appendix B. Field assessment of the six CCW impoundments included a site walk to observe the dam crest, upstream slope, downstream slope, intake structures and pump structures. We saw no obvious signs of settlement or displacement or adverse seepage that would adversely affect the dam safety of the six CCW impoundments at the Gibson Generating Station.

7.2 Embankment Dam

7.2.1 Dam Crest

The dam crest of the six CCW impoundments appeared to be in good condition. No signs of cracking, settlement, movement, erosion or deterioration were observed during the assessment. The dam crest surface is generally composed of road base material that traverses the length of the dam for vehicle access.

7.2.2 Upstream Slope

The upstream slope of the six CCW impoundments is protected by either riprap or grassy vegetation. The upstream slope protection appeared to be in satisfactory condition. No scarps, sloughs, depressions or other indications of slope instability or signs of erosion were observed during the inspection of the six CCW impoundments. Several small trees were observed on the upstream slopes of the interior dikes at the East CCW impoundments.

7.2.3 Downstream Slope

The downstream slopes of the six CCW impoundments have well-established stands of grass, which provides some erosion protection. No scarps, sloughs, depressions or other indications of slope instability or signs of erosion were observed during the inspection of the six CCW impoundments. There were isolated areas at the East Settling Basin where minor transverse ruts were observed on the slope; however this likely resulted from the wheeled tractor that mowed the grass. Several large trees (2-foot-diameter or greater) were observed at the toe of the downstream slope of the north dike of the North Ash Pond. These trees appear to be part of the pre-existing wetlands that is adjacent to the North Ash Pond. A few small trees (about 3-inch-diameter) were also observed at the toe of the downstream slope of the south and east dike of the East CCW impoundments.

7.3 Seepage and Stability

No evidence of ongoing seepage was observed at the six impoundment embankments. No evidence of slumps, sloughs, settlement associated with slope instability. DEI reported that seepage from Ash Pond #3 had occurred in the past based on groundwater monitoring well data. The seepage was not through the embankment. This seepage was a contributing factor in the decision to close Ash Pond #3.

7.4 Appurtenant Structures

7.4.1 Overflow Structures

The overflow structures located in the East Ash Ponds #1, #2, #3, and the North Ash Pond appeared to be in fair to good condition. The structures were observed to be working properly, discharging decant water to the downstream facility. The outlet conduits were not visible and could not be inspected. The outlet conduits consist of galvanized corrugated metal pipe (CMP), which is susceptible to corrosion and have a reduced service life compared to more robust pipe materials.

7.4.2 Pump Structures

The pump structures and equipment located at the North and East Settling Basins appeared to be in fair to good condition. Operations tests were not performed at the time of inspection; therefore, capacity and functionality of the pump systems could not be confirmed.

7.4.3 Emergency Spillway

No emergency spillways are present at the six CCW impoundments.

7.4.4 Water Surface Elevations and Reservoir Discharge

The reservoir water surface elevations at the time of inspection for the six CCW impoundments were not provided by Duke Energy. The reservoir water surface elevations for the North and East Settling Basins are generally maintained at an elevation of 398.0, or about 7 feet of freeboard. The North Ash Pond and East Ash Ponds #1, and #2 are generally maintained at an elevation of 400.0, or about 5 feet of freeboard. Discharge through the overflow structures located in the North Ash Pond and East Ash Ponds #1, and #2 was observed at the time of inspection. Flow depths over the stop logs in the overflow structure were estimated to range from 0.1 to 0.3 feet. The East Ash Pond #3 is currently in the process of being closed and no long receives hydraulically dredged waste material, as a result it contains negligible amount of stored water. However, the elevation of coal combustion waste material contained in East Ash Pond #3 is approximately at elevation 409.0, or about 3 feet of freeboard. No discharge through the overflow structure located in the East Ash Pond #3 was observed at the time of inspection.

8.0 Structural Stability

8.1 Visual Observations

The assessment team saw no visible signs of instability associated with the interior or exterior dikes of the six impoundments during the April 26–27, 2010 site assessment.

8.2 Field Investigations

No subsurface investigation reports were provided for the North Settling Basin, East Ash Ponds #1 and #2, or the East Settling Basin. Based on the design drawings and specifications, the following subsurface investigations were performed at the site:

- Six borings to investigate the subsurface conditions below the eastern portion of the North Ash Pond. These borings were completed as part of a larger program for the original design of the generating station. Standard Penetration Tests (SPT) were performed as part of the investigation, with borings extending to depths of 30 feet to 81.5 feet. The logs of these borings are included in the original Gibson Generating Station drawings prepared by Sargent & Lundy in 1971.
- In 1989 and 1990, Bennett, Williams & Blattert performed a subsurface investigation at the location of the proposed East Ash Ponds. This program consisted of 45 borings within the footprint of the East Ash Ponds and Settling Basin. Most borings were completed to a depth of 31.5 feet, but several were extended up to 71.5 feet. The logs of these borings appear in the construction specifications for the East Ash Ponds. The locations of these borings are shown on the East Ash Pond design drawings.

A subsurface investigation report (Patriot Engineering and Environmental Co., LLC [Patriot], 1999) was provided for East Ash Pond #3. This investigation included:

- 10 borings around the perimeter of East Ash Pond #3 including Standard Penetration Testing. Limited laboratory tests were performed including Proctor compaction, unconfined compression tests, and a pair of consolidated undrained triaxial tests.

8.3 Methods of Analysis

The stability calculations for the Gibson Lake Cooling Pond were considered by the owner to be applicable to the design of the North Ash Pond, North Settling Basin, East Ash Ponds #1 and #2, and the East Settling Basin. The methods of structural stability analysis for the

cooling pond are described in a letter from Sargent and Lundy to PSI Energy dated February 11, 1980. The methods of analysis for East Ash Pond #3 are presented in Report of Geotechnical Engineering Investigation Slope Stability Analysis of Proposed Ash Pond Addition Phase III (Patriot, 1999).

The description of the original analyses indicates that a generalized section was evaluated. This section included a height of 25 feet, 3H:1V slopes both upstream and downstream, and a crest width of 40 feet. A generalized subsurface profile and soil parameters were used. Analyses considered long-term (steady-state) and pseudo-static loading cases for both the upstream and downstream slopes. The steady-state analyses were conducted using Sargent and Lundy's proprietary analysis software "BISHOP" using the Bishop method, and the pseudo-static analyses used the computer software "Ices Slopes" provided by McDonnell Douglas Automation Company using the Morgenstern and Price method. A seismic coefficient of 0.13g was used in the pseudo-static analyses.

The analyses for East Ash Pond #3 conducted by Patriot considered a generalized dike 21 feet high, with 3H:1V downstream slope and 2H:1V upstream slope, and a crest width of 20 feet. A generalized subsurface profile was considered. Analyses considered the upstream and downstream slopes, and considered long-term, short-term, and pseudo-static loading cases. Each of these analyses was conducted using the computer program STABL. The simplified Bishop method was used for these analyses. A seismic coefficient of 0.10g was used in the pseudo-static analyses.

8.4 Discussion of Stability Analysis and Results

The detailed results of the stability analyses completed as part of the original design are not included in the Sargent and Lundy letter in 1980 describing the analyses. The letter states that "the results showed that the minimum factor of safety against slope failure for steady state condition is in excess of 1.5." The letter adds that for the pseudo-static analysis, "the results indicated that the minimum factor of safety against slope failure is in excess of 1.1." The material properties used for slope stability indicate a cohesion for the embankment of 1316 pounds per square foot (psf) and a friction angle of 25 degrees. This cohesion appears unconservative for an application to a long-term steady seepage analysis. The stability analysis documented in the complete Sargent and Lundy letter in 1980 was not considered relevant and applicable to the design of the East Ash Pond, North Ash Pond, and the settling basins.

A detailed presentation of results is included in the Patriot (1999) report. The minimum factors of safety for each load case are shown in Table 8.1. The Patriot pseudo-static analyses considered a seismic coefficient of 0.10g.

It is typical to apply a seismic coefficient equal to one-half of the peak acceleration in the stability analysis. The peak acceleration for an earthquake with an approximate return period

of 1,000 years is 0.19g as described in Section 6.0. Therefore, use of a seismic coefficient of 0.10g is considered equivalent to an earthquake with an approximate return period of 1,000 years, which is within the appropriate range for application to a low hazard classification impoundment.

The material properties used in the Patriot stability analyses included a cohesion of 300 psf and a friction angle of 18 degrees for the embankment. These parameters are considered consistent with drained parameters for a clayey material.

The results of the Patriot (1999) stability analyses are considered appropriate for application to the six CCW impoundment embankments. GEI reviewed the computed factors of safety for the embankment stability analyses completed. We compared the reported calculated factors of safety (FOS) to minimum required factors of safety as required by FERC. Table 8.1 presents the calculated factors of safety and the required factors of safety.

Table 8.1: Stability Factors of Safety and Guidance Values

Loading Condition	Min. Calculated FOS*	Min. Required FOS (FERC)
End of Construction	2.67	1.3
Full Reservoir – Steady-state Seepage	1.58	1.5
Full Reservoir – Steady-state Seepage - Seismic	1.14	1.0

* Patriot, 1999

As indicated in Table 8.1, the calculated factors of safety for all cases are greater than the guidance values.

Stability analyses for the FSS landfill placed on top of part of the North Ash Pond were completed by Fuller, Mosbarger, Scott & May (1999). These analyses included strength parameters considered consistent with the materials being modeled. Two stability sections were analyzed using the UTEXAS computer program and Spencer's method for both static and pseudo-static loads. Based on the report:

- Along the ash pond section, static factor of safety ranged from 2.2 to 4.4 and dynamic factors of safety ranged from 1.3 to 2.2.
- Along the access road section, the minimum factors of safety for static conditions for two potentially critical failure modes were 2.1 and 2.4. For dynamic conditions the minimum factors of safety for the same two modes were both 1.3.

These calculated factors of safety are greater than the guidance values.

8.5 Seismic Stability - Liquefaction Potential

The liquefaction potential at the six CCW impoundments has not been previously evaluated based on review of the available documents. Certain conditions are necessary for liquefaction, including saturated, loose, granular soils and an earthquake of sufficient magnitude and duration to cause significant strength loss in the soil. The water table is relatively shallow based on information from the borings completed within the footprints of the impoundments. The borings at the North Ash Pond encountered granular soils in the dike foundation that are likely below the water table that are described as very loose with SPT N-values as low as 2. The borings at the East Ash Ponds and Settling Basin encountered granular soils in the dike foundation that are below the water table that are described as very loose with N-values as low as 1. The loose to very loose, saturated, granular foundation soils may be susceptible to liquefaction. However, the clayey soils used for construction of the dikes are not likely susceptible to significant strength loss during strong shaking.

8.6 Summary of Results

Based on the Patriot (1999) analyses, the stability analyses that have been performed for the embankments appear to adequately address the most critical sections. These analyses include use of appropriate material properties and loading conditions and the results exceed the minimum required factors of safety.

The liquefaction potential of the foundation soils has not been analyzed, and may be a critical loading condition. The loose to very loose, saturated, granular foundation soils foundation soils encountered in the borings are potentially susceptible to liquefaction.

9.0 Maintenance and Methods of Operation

9.1 Procedures

DEI's experience with management of the coal combustion waste management system has resulted in the development of standard operational procedures to inspect, maintain, and operate the system. To the knowledge of the assessment team, these procedures have not been formally documented in an Operation and Maintenance Manual. The power plant is manned 24 hours a day, seven days a week. Monthly inspections are performed for the entire ash pond facilities by operations staff to observe the general condition of structures and embankments. Written inspection records are not currently maintained.

9.2 Maintenance of Impoundments

Maintenance of the six CCW impoundments is performed by DEI staff under the guidance of DEI managers and engineers. Inspections of the East and North Ash Ponds and both settling basins are made every two years by an independent engineering firm. Dam safety inspections have not previously been required or performed by state or federal agencies. However, the independent engineering firm's inspection reports are submitted to the Indiana Department of Natural Resources Division of Water, Dams, and Levees (IDNR) every two years.

9.3 Surveillance

The ash ponds and settling basins are checked for fugitive dust issues once per shift by DEI operations personnel. Plant personnel are available at the power plant and on 24-hour call for emergencies that may arise. There is a visual automatic alarm system at the impoundments, but it does not transmit alarm information to the power station control room.

10.0 Conclusions

10.1 Assessment of Dams

10.1.1 Field Assessment

The dams and outlet works facilities associated with the six CCW impoundments at the Gibson Generating Station were generally found to be in **FAIR** condition. Issues of potential concern for the six CCW impoundments were identified from our field assessment as follows:

- The North Ash Pond dam have several large diameter trees (2-foot or greater) and vegetation located at the downstream toe of the north dike of the North Ash Pond. These trees appear to be part of the pre-existing wetlands that is adjacent to the North Ash Pond dam.

- The East CCW impoundments have several small diameter trees and vegetation located on the upstream and downstream slopes of the inner dikes. Additionally, there are several small diameter trees near the downstream toe of the south and east dikes.

- Isolated areas on the downstream slope of the East Settling Basin south dike were observed to have minor transverse ruts. The ruts are likely due to the wheeled tractor mowing the grass during wet or saturated soil conditions.

- A small excavated drain or sump pit was observed near the downstream toe of the west dike of East Ash Pond #2 (Photo 30). The excavated pit was previously used to drain the water from the dredge line out-of-service. The excavated pit could potentially initiate a seepage path through the foundation of the west dike if the area is not repaired.

10.1.2 Adequacy of Structural Stability

The factors of safety for the six CCW impoundments at the Gibson Generating Station meet stability criteria using assumptions and methods of analysis currently accepted by FERC Guidelines, with exception of liquefaction analysis, which has not been performed. The dike foundations include loose, saturated, granular soil, which may be susceptible to significant strength loss or settlement under the anticipated earthquake loading.

10.1.3 Adequacy of Hydrologic/Hydraulic Safety

The six CCW impoundments at the Gibson Generating Station currently have adequate freeboard and storage capacity to safely store the 6-hour 100-year inflow design flood.

10.1.4 Adequacy of Instrumentation and Monitoring of Instrumentation

Instrumentation and monitoring programs are considered inadequate for the current facility operations. Daily water levels are being measured at the North and East Settling Basins but not at the North or East Ash Ponds. No piezometers or settlement monuments are installed at any of the ash pond or settling basin dams. Several groundwater quality observation wells and a monitoring program are in place at the East CCW impoundments.

10.1.5 Adequacy of Maintenance and Surveillance

The six CCW impoundments at the Gibson Generating Station have fair maintenance and surveillance programs. The facilities are adequately maintained and routine monthly surveillance is performed by Duke Energy staff. However, there is no formal inspection of the six CCW impoundments at the Gibson Generating Station. An informal visual inspection of the ash impoundment structures is performed biennially in conjunction with the formal inspection of the Cooling Pond Dam.

10.1.6 Adequacy of Project Operations

Operating personnel are knowledgeable and are well trained in the operation of the project. The current operations of the facilities are satisfactory.

11.0 Recommendations

11.1 Corrective Measures and Analyses for the Structures

1. Several large diameter trees (2-foot or greater) and vegetation were observed at the downstream toe of the North Ash Pond dam. These trees appear to be part of the pre-existing wetlands that is adjacent to the North Ash Pond dam. Because the trees are well-established with considerable root systems and are part of the wetland, removal of the trees and root ball may cause further damage to the downstream slope of the dike and, is not recommended at this time. Duke Energy should continue to monitor the downstream slope for noticeable signs of seepage or transportation of embankment materials and obtain guidance from their engineers as to options and strategy for dealing with the trees. If cutting the trees is not possible due to the wetland status, one approach to address the concern of the trees would be to increase the structural stability of the dam (i.e. widening the dam in the upstream direction). Currently, DEI is in the process of widening this dike. This is one of the last original sections of the dike that remains; all others have been increased in width to accommodate other structures. This work is expected to be completed in 2010.
2. Several small diameter trees and vegetation were observed on the upstream and downstream slopes of the inner dikes at the East CCW impoundments. The trees on the inner dikes should be removed within the next year. If these trees are not removed, they could potentially initiate seepage paths or affect the stability of the slope. All vegetation on the inner dikes should be maintained to a level that does not obstruct visual dam safety inspections of the dam embankment.
3. Several small trees were observed near the downstream slope of the East CCW impoundments south and east dikes. A minimum of about 25 feet of clear spacing should be provided at the downstream toe. The trees within this area should be removed within the next year.
4. Isolated areas on the downstream slope of the East Settling Basin south dike were observed to have minor transverse ruts forming. The ruts are likely due to the wheeled tractor mowing the grass during wet or saturated soil conditions. Preventative measure should be taken not to mow the embankment when wet or modify and vary the mowing operations so as not to create ruts perpendicular to the embankment slope.
5. A small excavated drain or sump pit was observed near the downstream toe of the west dike of the East Ash Pond #2 (Photo 30). The excavated pit could potentially initiate a seepage path through the west dike if the area is not repaired. It is recommended that the excavation be backfilled with compacted clay.

6. A liquefaction susceptibility analysis should be conducted for the embankments. Based on the results of this analysis, additional corrective measures may be required.
7. Currently the six CCW impoundments have adequate freeboard and storage capacity to safely store the 6-hour 100-year inflow design flood. However, the storage capacity and water level of the ash pond units can vary depending on operations. Due to this variability, it is recommended that Duke Energy maintain the six CCW impoundments at a level that ensures sufficient storage capacity within the units to accept the inflow design storm volume without overtopping the dam.

11.2 Corrective Measures Required for Instrumentation and Monitoring Procedures

Daily water levels are measured at the North and East Settling Basins but not at the North and East Ash Ponds. No piezometers or settlement monuments are installed at the ash pond or settling basin dams. It is recommended that a more thorough instrumentation and monitoring program be developed and implemented that would include, at a minimum, piezometers and settlement monuments installed along the perimeter dikes of any impoundments that will continue to receive wet coal combustion waste. Additionally it is recommended that an additional alarm for the water level control system for the North and East Settling Basins be co-located with central plant operations.

11.3 Corrective Measures Required for Maintenance and Surveillance Procedures

Currently, the six CCW impoundments are visually inspected monthly by Duke Energy staff, and inspected by a third-party engineer biennially in conjunction with the formal inspection of the Cooling Pond Dam. It is recommended that Duke Energy develop and document formal inspections of the ash ponds and settling basins, at a minimum annually by plant staff and quinquennially by a third party. It is also recommended that a brief daily check inspection be conducted by DEI personnel and that a written record be maintained for the monthly inspections being conducted by DEI.

11.4 Corrective Measures Required for the Methods of Operation of the Project Works

None.

11.5 Acknowledgement of Assessment

I acknowledge that the management unit(s) referenced herein was personally inspected by me and was found to be in the following condition **(select one only):**

SATISFACTORY

FAIR

POOR

UNSATISFACTORY

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.

I acknowledge that the management unit referenced herein:

Has been assessed on April 26–27, 2010 (date)

Signature: _____

COLORADO REGISTERED PROFESSIONAL ENGINEER
STEPHEN G. BROWN
26679
9-30-2010

List of Participants:

Stephen G. Brown, P.E.,	Project Manager/Task Leader, GEI Consultants, Inc.
Nicholas D. Miller, P.E.,	Project Engineer, GEI Consultants, Inc.
Jim Meiers,	Principal Environmental Scientist, Duke Energy
Kevin Olivey,	Staff Engineer, Duke Energy

Ron Ehlers,	Senior Engineer, Duke Energy
Adam Deller,	Civil EngineerDuke Energy
Rebecca Sparks,	Environmental Coordinator,Duke Energy
Bill Goedde,	Engineering Manager, Duke Energy

12.0 References

Bennett, Williams, & Blattert, Inc. (1990). Boring Logs for East Ash Ponds, January, presented in Project Specifications for Ash Pond Phase I & Settling Basin.

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Sargent & Lundy (1980). "Response to Request for Lake Design Information," prepared for Public Service Indiana, February 11.

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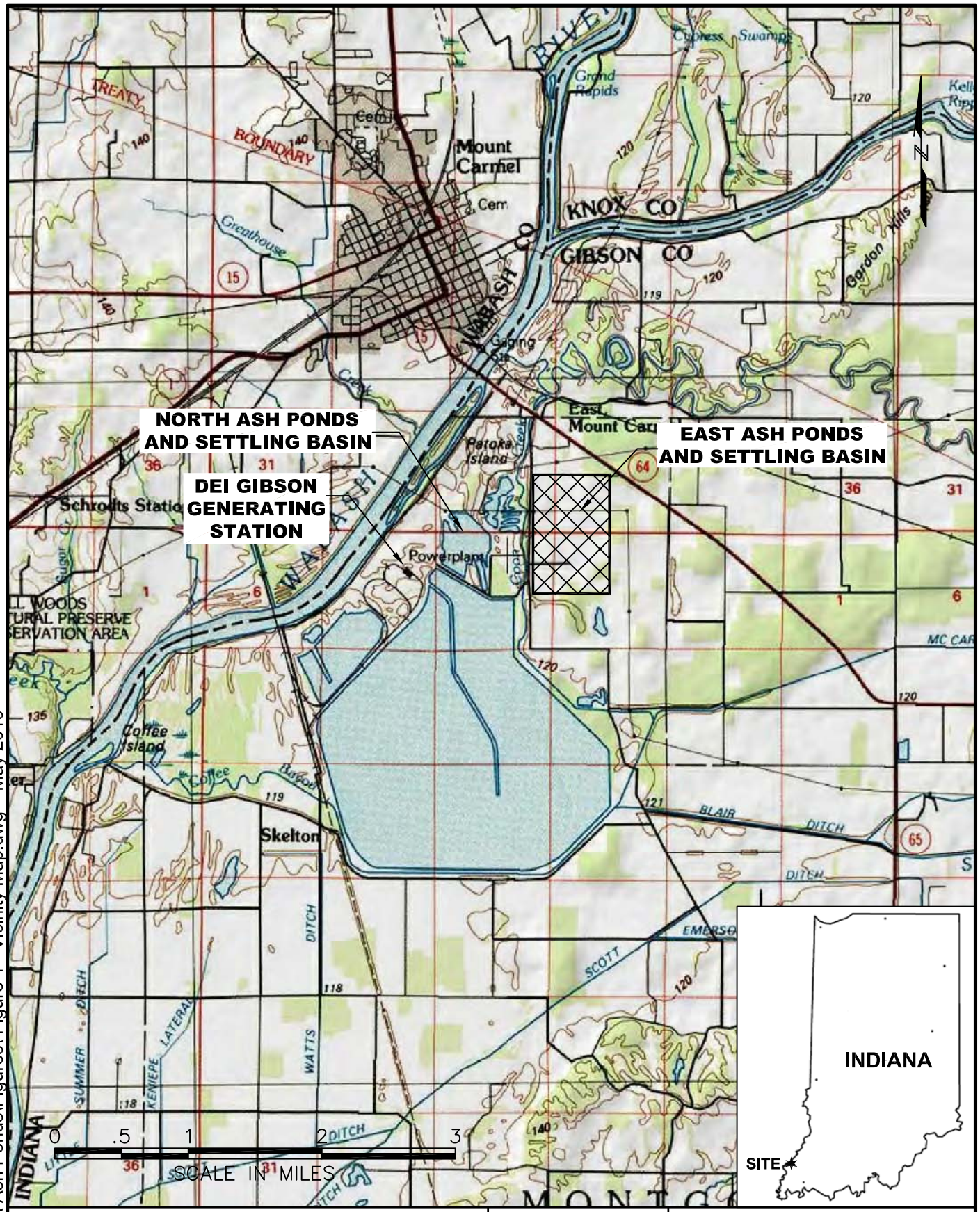
Figures and Exhibits



Assessment of Dam Safety of Coal Combustion Waste Impoundments at DEI Gibson Generating Station

Environmental Protection Agency
Washington, DC

GEI Consultants

Project 092880

SITE VICINITY MAP

May 2010

Figure 1

P:\092880 EPA Ash Ponds\Figures\ Figure 1 - Vicinity Map.dwg May 2010

Assessment of Dam Safety of Coal Combustion Waste Impoundments at DEI Gibson Generating Station

Environmental Protection Agency
Washington, DC

GEI Consultants

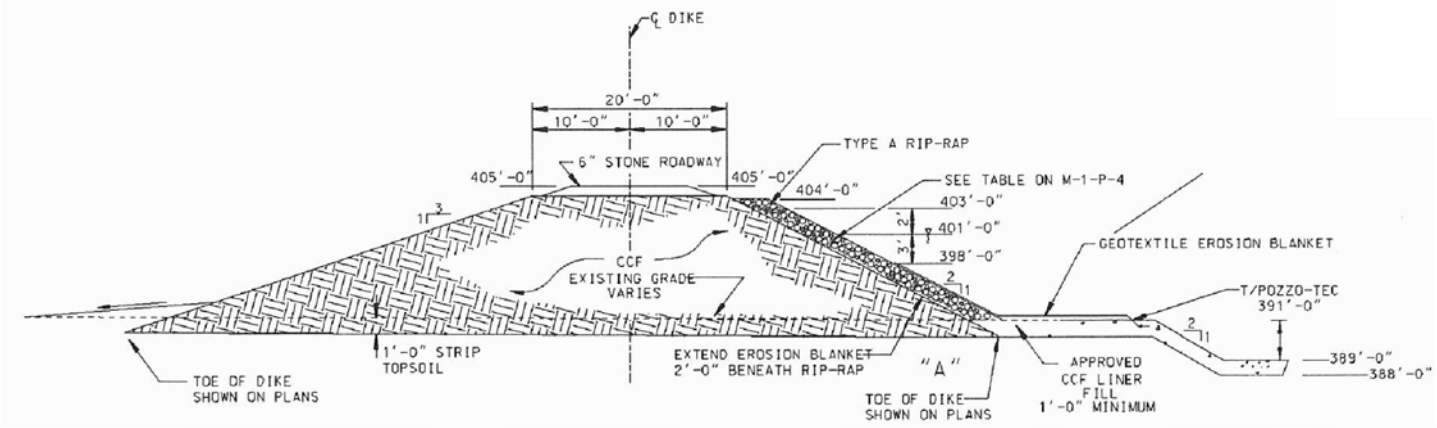
Project 092880

SITE AERIAL MAP

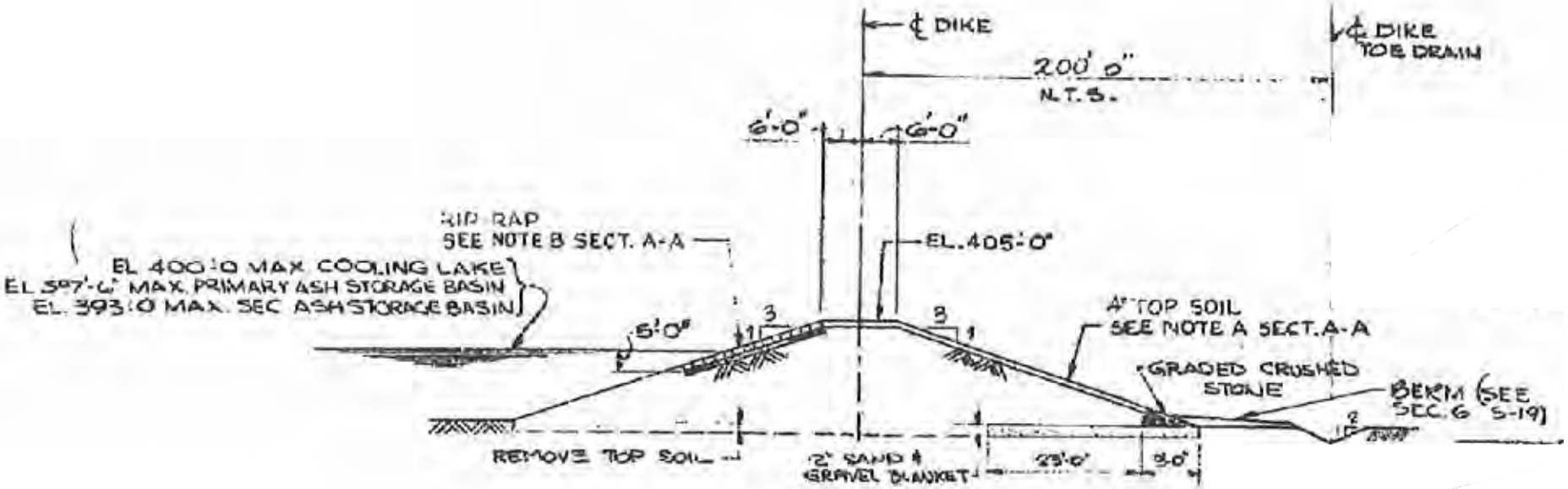
May 2010

Figure 2

P:\092880 EPA Ash Ponds\Figures\ Figure 2 - Aerial Map.dwg May 2010



EAST ASH PONDS & BASIN - TYPICAL SECTION



NORTH ASH POND & BASIN - TYPICAL SECTION

Assessment of Dam Safety of Coal Combustion Waste Impoundments at DEI Gibson Generating Station	GEI Consultants	TYPICAL DAM SECTIONS
Environmental Protection Agency Washington, DC	Project 092880	May 2010 Figure 3

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Appendix A

Inspection Checklists

April 26–27, 2010

Site Name: **Duke Energy, Gibson County, IN** Date: **April 26, 2010**

Unit Name: **East Settling Basin** Operator's Name: **Duke Energy**

Unit ID: **N/A** Hazard Potential Classification: High Significant Low **(see P.3)**

Inspector's Name: **Steve Brown/GEI Consultants, Nick Miller/GEI Consultants**

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?	**Monthly by Staff, Biennial 3rd Party**		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	~EL. 398.0		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	Pump Invt = 401.0		20. Decant Pipes		
4. Open channel spillway elevation (operator records)?	NA		Is water entering inlet, but not exiting outlet?		X
5. Lowest dam crest elevation (operator records)?	EL. 405.0		Is water exiting outlet, but not entering inlet?		X
6. If instrumentation is present, are readings recorded (operator records)?	X		Is water exiting outlet flowing clear?	NA	
7. Is the embankment currently under construction?		X	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)?	X		From underdrain?		X
9. Trees growing on embankment? (If so, indicate largest diameter below.)	X		At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?	NONE		From downstream foundation area?		X
13. Depressions or sink holes in tailings surface or whirlpool in the pool area		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?		X	Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?		X	22. Surface movements in valley bottom or on hillside?		X
16. Are outlets of decant or underdrains blocked?		X	23. Water against downstream toe?	X	
17. Cracks or scarps on slopes		X	24. Were Photos taken during the dam inspection?	X	

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. No formal inspections of CCW impoundments. Informal visual inspections performed biennially in conjuction with cooling pond inspection.	
3. Pump invert is the highest invert of gravity discharge pipe in system.	
6. Only reservoir water levels are measured. No piezometers or settlement monuments on dam. Groundwater quality wells installed near downstream toe of dam.	
9. Only on interior divider dikes; trees ~1" caliper.	
20. Pump not active during site visit and discharge end submerged in cooling pond.	
23. Adjacent wetland area on east side of facility.	

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # N/A INSPECTOR Steve Brown/GEI

Date April 26, 2010

Impoundment Name East Settling Basin, Duke Energy, Gibson County, IN

Impoundment Company Duke Energy

EPA Region 5

State Agency (Field Office) Address Indiana Dept. of Natural Resources Div. of Water, Dams & Levees
402 West Washington St, Room W264, Indianapolis, IN 46204

Name of Impoundment East Settling Basin
(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: Decant Water Storage

Nearest Downstream Town: Name Grayville, IN
Distance from the impoundment 35 miles

Impoundment Location:

Longitude	87	Degrees	44	Minutes	27	Seconds	W
Latitude	38	Degrees	22	Minutes	18	Seconds	N
State	IN	County	Gibson				

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

If So Which Sate Agency? Indiana Dept. of Natural Resources Div. of Water, Dams & Levees

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.

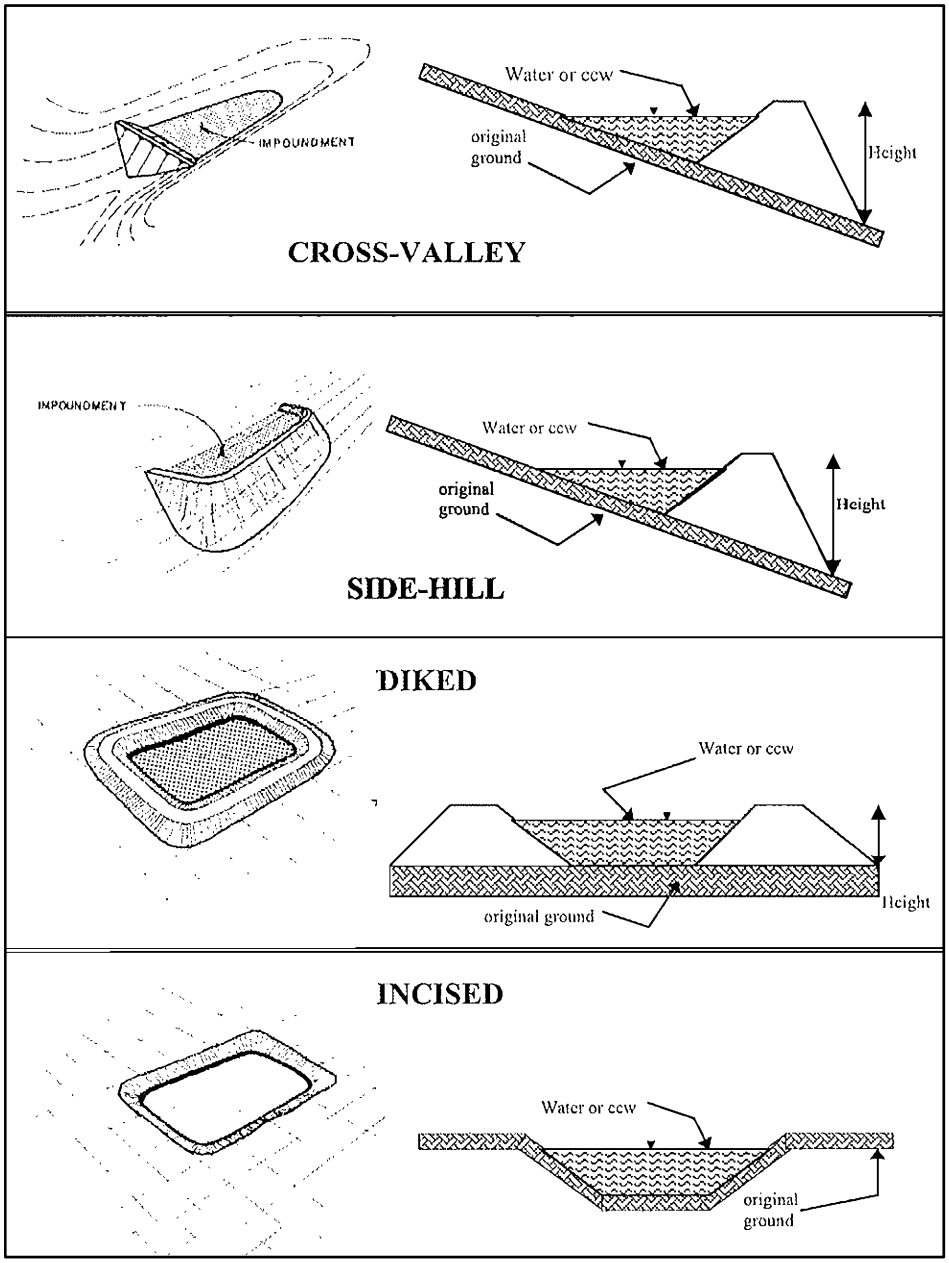
_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. 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:

An uncontrolled release of the structure's contents due to a failure or misoperation is not considered to cause loss of human life and the economic and environmental damages would be relatively low. The flood extext would be limited by the adjacent USACE levee on the Wabash River and the very flat surrounding topography. Flood waters would likely be widespread with shallow depths and gradually rising waters. Based on the pond height and volume, the majority of inundation would be limited to Company property to the south and east around the cooling pond and the surrounding wetlands. The county road adjacent to the west dike could potentially be flooded and temporarily interrupt local traffic. However, the flood depths and flow velocities would be relatively small and are not considered to pose a significant hazard to vehicles. Flood waters would eventually drain to the Wabash River at culverts through the USACE levee located about 3 miles downstream. Consistent with the Federal Guidelines for Dam Safety, the dam should be classified as a "Low" hazard structure.

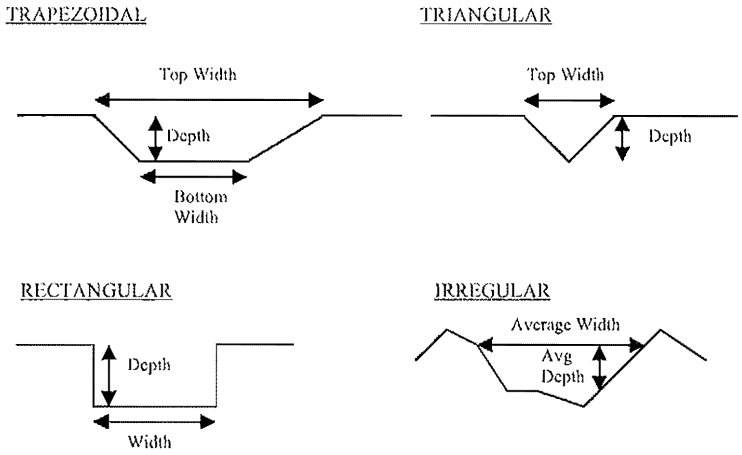
CONFIGURATION:



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

Embankment Height __15__ feet Embankment Material **Compacted fill**
Pool Area **45** acres Liner **Unlined**
Current Freeboard **7 ft** Liner Permeability **NA**

TYPE OF OUTLET (Mark all that apply)

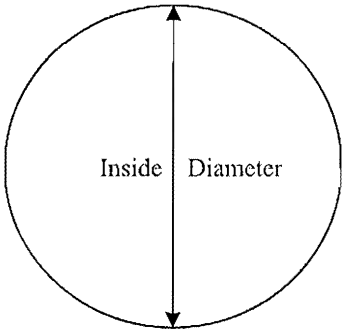


None **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Triangular

_____ Depth
_____ Bottom (or average) width
_____ Top width

X **Outlet**

24" inside diameter



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

Is water flowing through the outlet? YES_____ NO X - **Pump was not active.**

_____**No Outlet –**

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

The Impoundment was Designed By **Sargent and Lundy Engineers, Chicago, IL for Public Service Indiana (PSI) at the time. Original construction completed in 1991.**

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:

Site Name: **Duke Energy, Gibson County, IN** Date: **April 26, 2010**

Unit Name: **East Pond #1** Operator's Name: **Duke Energy**

Unit ID: **N/A** Hazard Potential Classification: High Significant Low **(see P.3)**

Inspector's Name: **Steve Brown/GEI Consultants, Nick Miller/GEI Consultants**

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?	**Monthly by Staff, Biennial 3rd Party**		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	~EL. 400.1		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	EL. 400.0		20. Decant Pipes		
4. Open channel spillway elevation (operator records)?	NA		Is water entering inlet, but not exiting outlet?		X
5. Lowest dam crest elevation (operator records)?	EL. 405.0		Is water exiting outlet, but not entering inlet?		X
6. If instrumentation is present, are readings recorded (operator records)?		X	Is water exiting outlet flowing clear?	X	
7. Is the embankment currently under construction?		X	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)?	X		From underdrain?		X
9. Trees growing on embankment? (If so, indicate largest diameter below.)	X		At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?		X	From downstream foundation area?		X
13. Depressions or sink holes in tailings surface or whirlpool in the pool area		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?		X	Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?		X	22. Surface movements in valley bottom or on hillside?		X
16. Are outlets of decant or underdrains blocked?		X	23. Water against downstream toe?	X	
17. Cracks or scarps on slopes		X	24. Were Photos taken during the dam inspection?	X	

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. No formal inspections of CCW impoundments. Informal visual inspections performed biennially in conjuction with cooling pond inspection.	
6. Groundwater quality wells installed near downstream toe of dam.	
9. Only on interior divider dikes; trees ~1" caliper.	
23. Adjacent wetland area on east side of facility.	

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # N/A INSPECTOR Steve Brown/GEI

Date April 26, 2010

Impoundment Name East Pond #1, Duke Energy, Gibson County, IN

Impoundment Company Duke Energy

EPA Region 5

State Agency (Field Office) Address Indiana Dept. of Natural Resources Div. of Water, Dams & Levees

402 West Washington St, Room W264, Indianapolis, IN 46204

Name of Impoundment East Pond #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: CCW and Decant Water Storage

Nearest Downstream Town: Name Grayville, IN
Distance from the impoundment 35 miles
Impoundment
Location:

Longitude	87	Degrees	44	Minutes	14	Seconds	W
Latitude	38	Degrees	22	Minutes	36	Seconds	N
State	IN	County	Gibson				

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

If So Which Sate Agency? Indiana Dept. of Natural Resources Div. of Water, Dams & Levees

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.

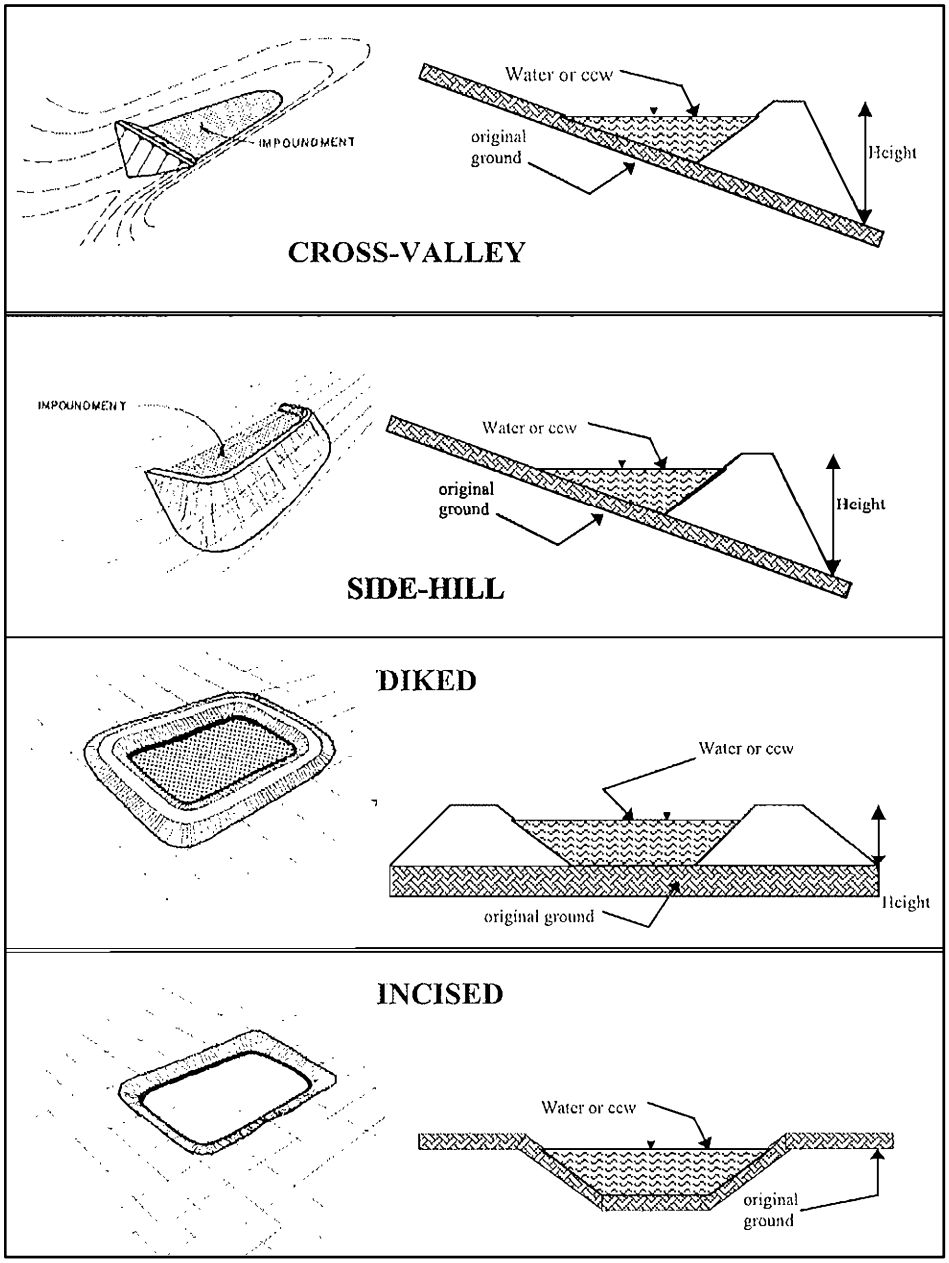
_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. 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:

An uncontrolled release of the structure's contents due to a failure or misoperation is not considered to cause loss of human life and the economic and environmental damages would be relatively low. The flood extent would be limited by the adjacent USACE levee on the Wabash River and the very flat surrounding topography. Flood waters would likely be widespread with shallow depths and gradually rising waters. Based on the pond height and volume, the majority of inundation would be limited to Company property to the south and east around the cooling pond and the surrounding wetlands. Flood waters would eventually drain to the Wabash River at culverts through the USACE levee located about 3 miles downstream. Consistent with the Federal Guidelines for Dam Safety, the dam should be classified as a "Low" hazard structure.

CONFIGURATION:



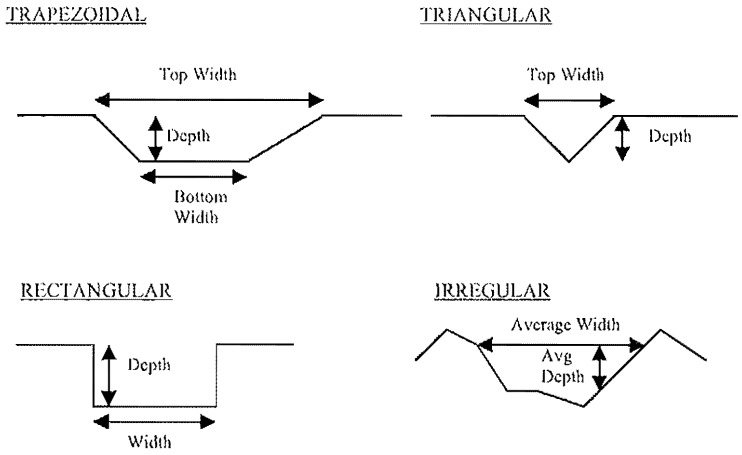
_____ Cross-Valley
_____ Side-Hill
__X__ Diked
_____ Incised (form completion optional)
_____ Combination Incised/Diked

Embankment Height __15__ feet Embankment Material **Compacted fill**
Pool Area **105** acres Liner **Unlined**
Current Freeboard **5 ft** Liner Permeability **NA**

TYPE OF OUTLET (Mark all that apply)

None **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Triangular

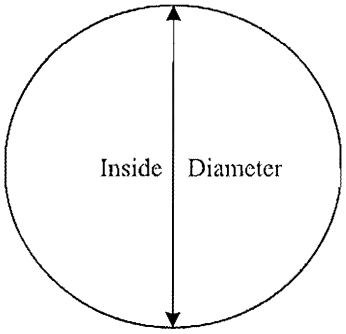
_____ Depth
_____ Bottom (or average) width
_____ Top width



X **Outlet**

36" inside diameter

Material
_____ corrugated metal
X 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 and Lundy Engineers, Chicago, IL for Public Service Indiana (PSI) at the time. Original construction completed in 1991.**

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:

Site Name: Duke Energy, Gibson County, IN Date: April 26, 2010

Unit Name: East Pond #2 Operator's Name: Duke Energy

Unit ID: N/A Hazard Potential Classification: High Significant Low (see P.3)

Inspector's Name: Steve Brown/GEI Consultants, Nick Miller/GEI Consultants

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?	Monthly by Staff, Biennial 3rd Party		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	~EL. 400.2		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	EL. 400.0		20. Decant Pipes		
4. Open channel spillway elevation (operator records)?	NA		Is water entering inlet, but not exiting outlet?		X
5. Lowest dam crest elevation (operator records)?	EL. 405.0		Is water exiting outlet, but not entering inlet?		X
6. If instrumentation is present, are readings recorded (operator records)?		X	Is water exiting outlet flowing clear?	X	
7. Is the embankment currently under construction?		X	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)?	X		From underdrain?		X
9. Trees growing on embankment? (If so, indicate largest diameter below.)	X		At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?		X	From downstream foundation area?		X
13. Depressions or sink holes in tailings surface or whirlpool in the pool area		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?		X	Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?		X	22. Surface movements in valley bottom or on hillside?		X
16. Are outlets of decant or underdrains blocked?		X	23. Water against downstream toe?		X
17. Cracks or scarps on slopes		X	24. Were Photos taken during the dam inspection?	X	

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. No formal inspections of CCW impoundments. Informal visual inspections performed biennially in conjuction with cooling pond inspection.	
6. Groundwater quality wells installed near downstream toe of dam.	
9. Only on interior divider dikes; trees ~1" caliper.	

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # N/A INSPECTOR Steve Brown/GEI

Date April 26, 2010

Impoundment Name East Pond #2, Duke Energy, Gibson County, IN

Impoundment Company Duke Energy

EPA Region 5

State Agency (Field Office) Address Indiana Dept. of Natural Resources Div. of Water, Dams & Levees

402 West Washington St, Room W264, Indianapolis, IN 46204

Name of Impoundment East Pond #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: CCW and Decant Water Storage

Nearest Downstream Town: Name Grayville, IN
Distance from the impoundment 35 miles
Impoundment
Location:

Longitude	87	Degrees	44	Minutes	34	Seconds	W
Latitude	38	Degrees	22	Minutes	36	Seconds	N
State	IN	County	Gibson				

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

If So Which Sate Agency? Indiana Dept. of Natural Resources Div. of Water, Dams & Levees

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.

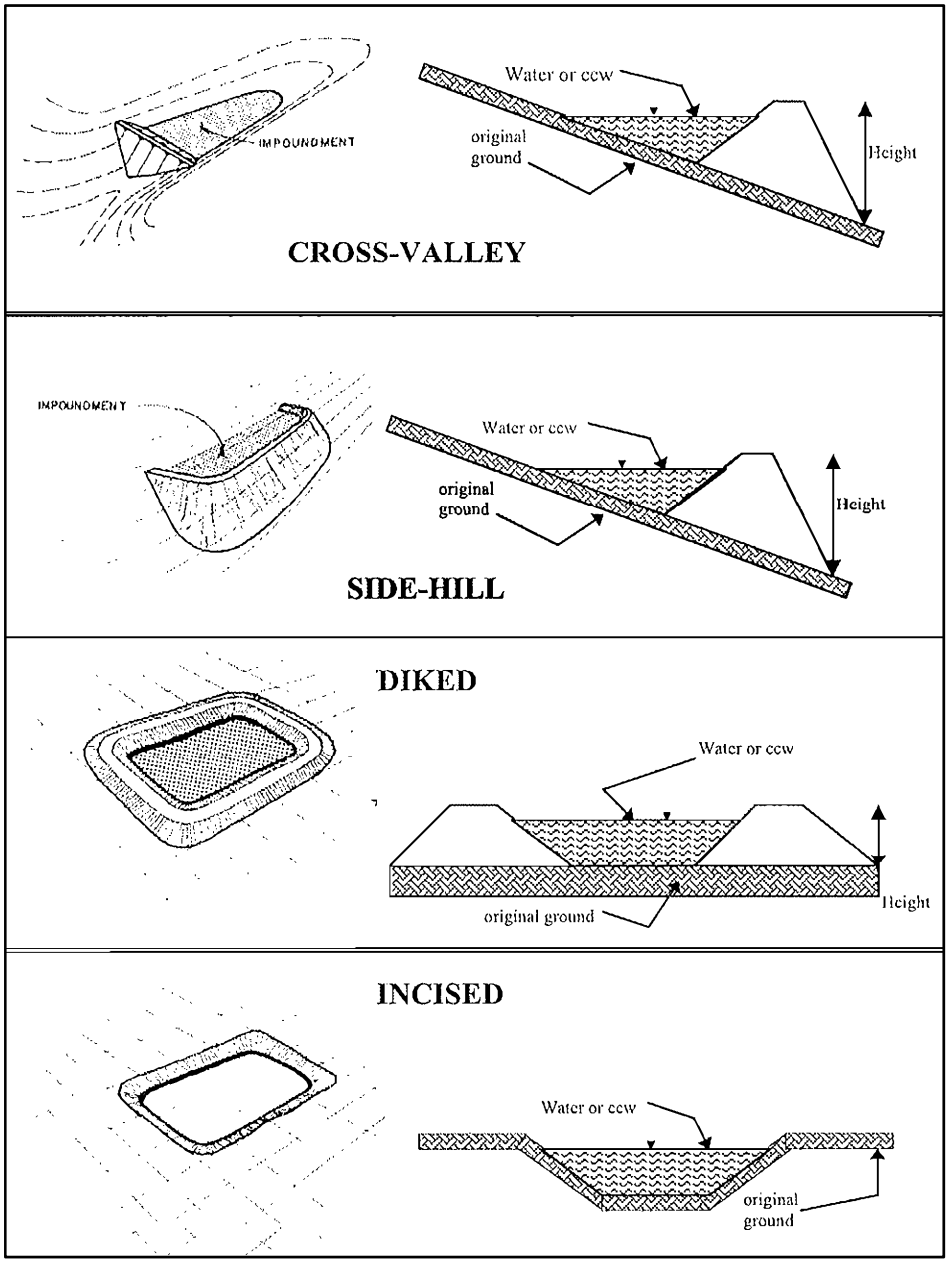
_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. 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:

An uncontrolled release of the structure's contents due to a failure or misoperation is not considered to cause loss of human life and the economic and environmental damages would be relatively low. The flood extent would be limited by the adjacent USACE levee on the Wabash River and the very flat surrounding topography. Flood waters would likely be widespread with shallow depths and gradually rising waters. Based on the pond height and volume, the majority of inundation would be limited to Company property to the south and east around the cooling pond and the surrounding wetlands. The county road adjacent to the west dike could potentially be flooded and temporarily interrupt local traffic. However, the flood depths and flow velocities would be relatively small and are not considered to pose a significant hazard to vehicles. Flood waters would eventually drain to the Wabash River at culverts through the USACE levee located about 3 miles downstream. Consistent with the Federal Guidelines for Dam Safety, the dam should be classified as a "Low" hazard structure.

CONFIGURATION:



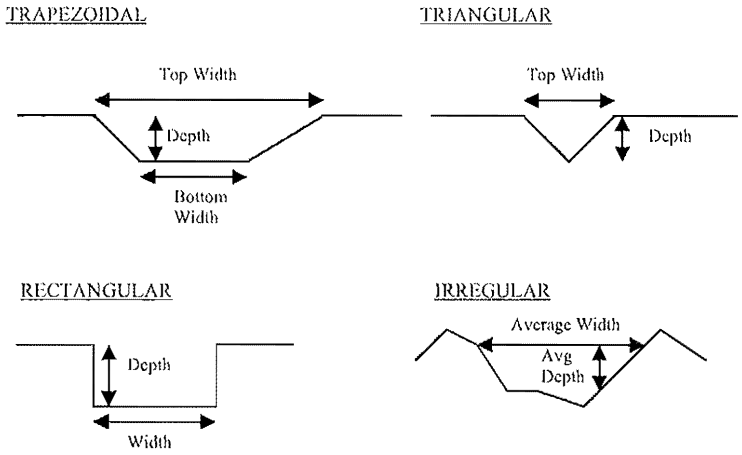
_____ Cross-Valley
_____ Side-Hill
__X__ Diked
_____ Incised (form completion optional)
_____ Combination Incised/Diked

Embankment Height __15__ feet Embankment Material **Compacted fill**
Pool Area **105** acres Liner **Unlined**
Current Freeboard **5 ft** Liner Permeability **NA**

TYPE OF OUTLET (Mark all that apply)

None **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Triangular

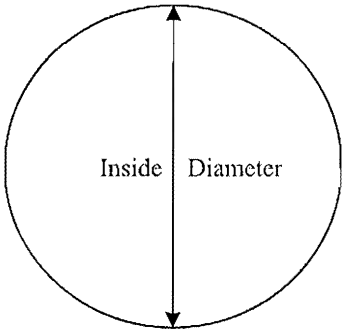
_____ Depth
_____ Bottom (or average) width
_____ Top width



X **Outlet**

(4)15" inside diameter

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



NOTE: The water drains by gravity thru the (4) 15" pipes or through the constructed emergency spillway into Cell 1.

Is water flowing through the outlet? YES X NO _____

_____ **No Outlet**

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

The Impoundment was Designed By **Sargent and Lundy Engineers, Chicago, IL for Public Service Indiana (PSI) at the time. Original construction completed in 1995.**

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:

Site Name: **Duke Energy, Gibson County, IN** Date: **April 26, 2010**

Unit Name: **East Pond #3** Operator's Name: **Duke Energy**

Unit ID: **N/A** Hazard Potential Classification: High Significant Low **(see P.3)**

Inspector's Name: **Steve Brown/GEI Consultants, Nick Miller/GEI Consultants**

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?	**Monthly by Staff, Biennial 3rd Party**		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	~EL. 409.1		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	EL. 409.0		20. Decant Pipes		
4. Open channel spillway elevation (operator records)?	NA		Is water entering inlet, but not exiting outlet?		X
5. Lowest dam crest elevation (operator records)?	EL. 412.0		Is water exiting outlet, but not entering inlet?		X
6. If instrumentation is present, are readings recorded (operator records)?		X	Is water exiting outlet flowing clear?	X	
7. Is the embankment currently under construction?		X	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)?	X		From underdrain?		X
9. Trees growing on embankment? (If so, indicate largest diameter below.)	X		At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?		X	From downstream foundation area?		X
13. Depressions or sink holes in tailings surface or whirlpool in the pool area		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?		X	Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?		X	22. Surface movements in valley bottom or on hillside?		X
16. Are outlets of decant or underdrains blocked?		X	23. Water against downstream toe?	X	
17. Cracks or scarps on slopes		X	24. Were Photos taken during the dam inspection?	X	

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. No formal inspections of CCW impoundments. Informal visual inspections performed biennially in conjuction with cooling pond inspection.	
2. Elevation varies, western portion of pond being capped for closure through IDEM. Cap elevation is about 7-feet higher than partially dewatered pond. Pond 3 is reported as 95% full of CCW.	
6. Groundwater quality wells installed near downstream toe of dam.	
9. Only on interior divider dikes; trees ~1" caliper.	
23. Adjacent wetland area on east side of facility	

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # N/A INSPECTOR Steve Brown/GEI

Date April 26, 2010

Impoundment Name East Pond #3, Duke Energy, Gibson County, IN

Impoundment Company Duke Energy

EPA Region 5

State Agency (Field Office) Address Indiana Dept. of Natural Resources Div. of Water, Dams & Levees

402 West Washington St, Room W264, Indianapolis, IN 46204

Name of Impoundment East Pond #3
(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: CCW and Decant Water Storage

Nearest Downstream Town: Name Grayville, IN
Distance from the impoundment 35 miles
Impoundment
Location:

Longitude	87	Degrees	44	Minutes	23	Seconds	W
Latitude	38	Degrees	22	Minutes	57	Seconds	N
State	IN	County	Gibson				

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

If So Which Sate Agency? Indiana Dept. of Natural Resources Div. of Water, Dams & Levees

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

X **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.

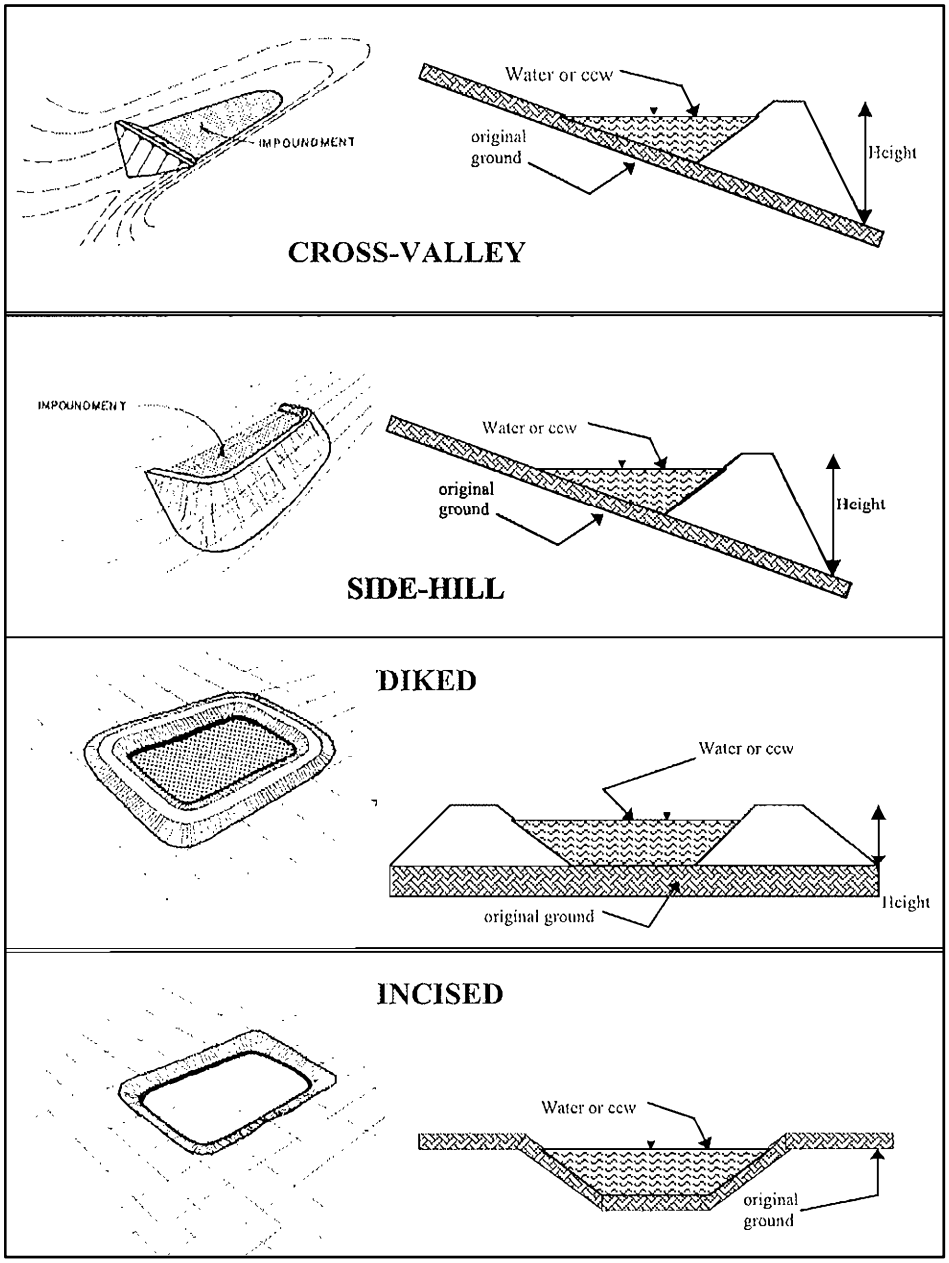
_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. 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.

DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

East Pond #3 is currently in a closure status and there is negligible amount of free standing water in East Pond #3. Consistent with the Federal Guidelines for Dam Safety, the dam should be classified as a "Less Than Low" hazard structure.

CONFIGURATION:



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

Embankment Height __22__ feet Embankment Material **Compacted fill**

Pool Area **133** acres Liner **Unlined**

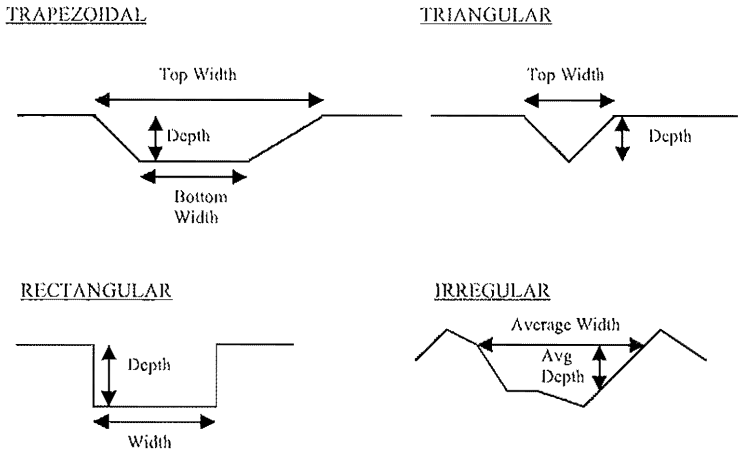
Current Freeboard **3 ft** Liner Permeability **NA**

(Note: Freeboard estimate is for the uncapped eastern portion of the pond only.)

TYPE OF OUTLET (Mark all that apply)

None **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Triangular

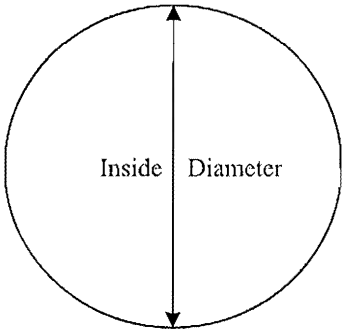
_____ Depth
_____ Bottom (or average) width
_____ Top width



X **Outlet**

30" inside diameter

Material
_____ corrugated metal
X 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 and Lundy Engineers, Chicago, IL for Public Service Indiana (PSI) at the time. Original construction completed in 1999.**

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: Existing piezometers/monitoring wells were installed in the vicinity of Pond 3 as part of a groundwater quality monitoring program for Pond 3 closure under IDEM and not directly in response to seepage events or breaches that pertain to dam safety issues with the containment dikes.

Site Name: **Duke Energy, Gibson County, IN** Date: **April 27, 2010**

Unit Name: **North Ash Pond** Operator's Name: **Duke Energy**

Unit ID: **N/A** Hazard Potential Classification: High Significant Low **(see P.3)**

Inspector's Name: **Steve Brown/GEI Consultants, Nick Miller/GEI Consultants**

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?	**Monthly by Staff, Biennial 3rd Party**		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	~EL. 400.1		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	EL. 400.0		20. Decant Pipes		
4. Open channel spillway elevation (operator records)?	NA		Is water entering inlet, but not exiting outlet?		X
5. Lowest dam crest elevation (operator records)?	EL. 405.0		Is water exiting outlet, but not entering inlet?		X
6. If instrumentation is present, are readings recorded (operator records)?		X	Is water exiting outlet flowing clear?	X	
7. Is the embankment currently under construction?		X	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)?	X		From underdrain?		X
9. Trees growing on embankment? (If so, indicate largest diameter below.)		X	At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?	NONE		From downstream foundation area?		X
13. Depressions or sink holes in tailings surface or whirlpool in the pool area		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?		X	Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?		X	22. Surface movements in valley bottom or on hillside?		X
16. Are outlets of decant or underdrains blocked?		X	23. Water against downstream toe?	X	
17. Cracks or scarps on slopes		X	24. Were Photos taken during the dam inspection?	X	

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. No formal inspections of CCW impoundments. Informal visual inspections performed biennially in conjuction with cooling pond inspection.	
4. No open channel spillway.	
6. No instrumentation.	
9. Large trees located at downstream toe, 2-ft dia. Trees are part of the wetland.	
23. Adjacent pre-existing wetland area on north side of facility.	

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # N/A INSPECTOR Steve Brown/GEI

Date April 27, 2010

Impoundment Name North Ash Pond, Duke Energy, Gibson County, IN

Impoundment Company Duke Energy

EPA Region 5

State Agency (Field Office) Address Indiana Dept. of Natural Resources Div. of Water, Dams & Levees

402 West Washington St, Room W264, Indianapolis, IN 46204

Name of Impoundment North Ash 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: CCW and Decant Water Storage

Nearest Downstream Town: Name Grayville, IN
Distance from the impoundment 35 miles
Impoundment
Location:

Longitude	87	Degrees	45	Minutes	29	Seconds	W
Latitude	38	Degrees	22	Minutes	38	Seconds	N
State	IN	County	Gibson				

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

If So Which Sate Agency? Indiana Dept. of Natural Resources Div. of Water, Dams & Levees

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.

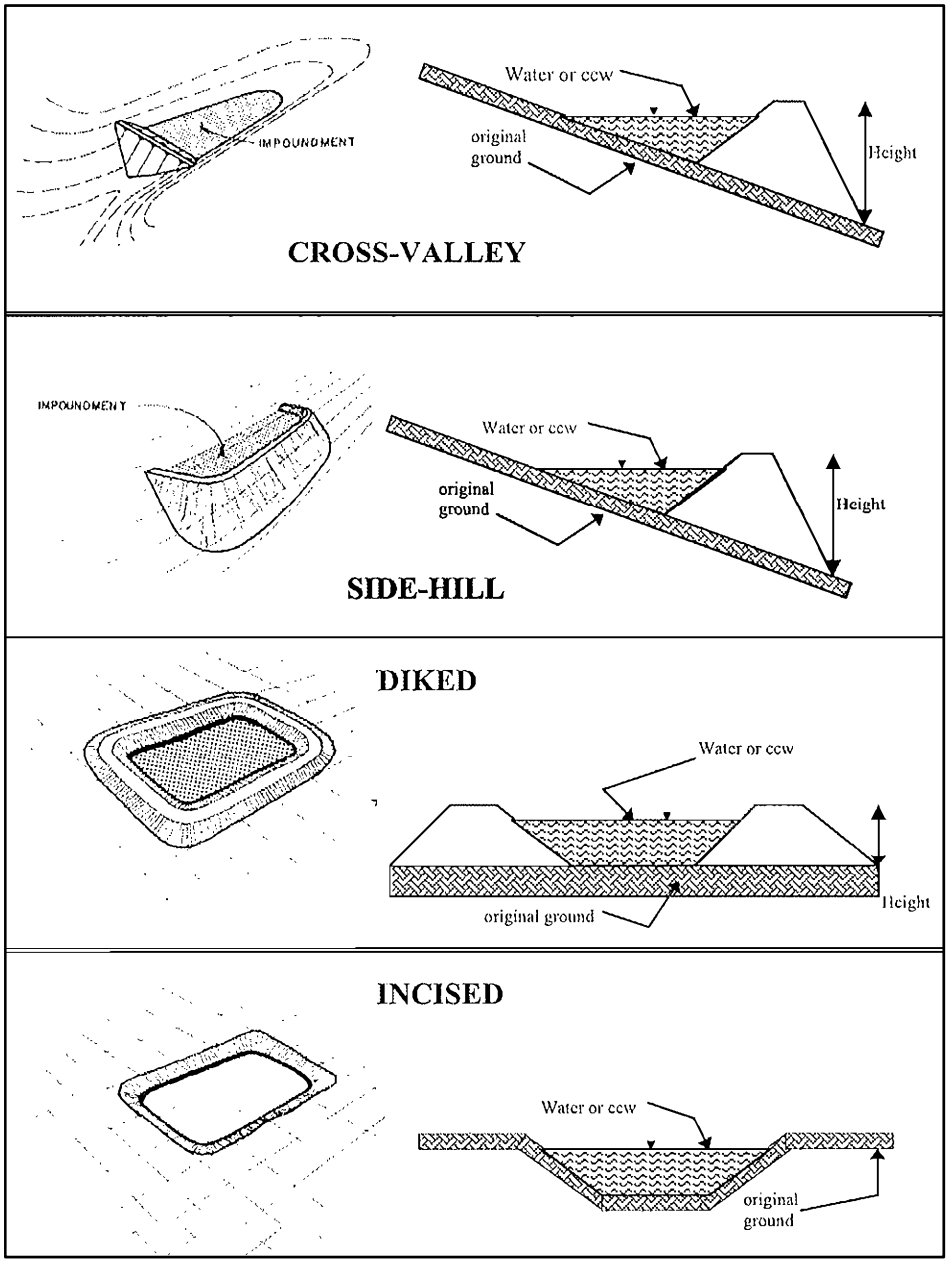
_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. 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:

An uncontrolled release of the structure's contents due to a failure or misoperation is not considered to cause loss of human life and the economic and environmental damages would be relatively low. The flood extent would be limited by the adjacent USACE levee on the Wabash River and the very flat surrounding topography. Flood waters would likely be widespread with shallow depths and gradually rising waters. Based on the pond height and volume, the majority of inundation would be limited to Company property to the southeast around the cooling pond and the surrounding wetlands. Flood waters would eventually drain to the Wabash River at culverts through the USACE levee located about 3 miles downstream. Consistent with the Federal Guidelines for Dam Safety, the dam should be classified as a "Low" hazard structure.

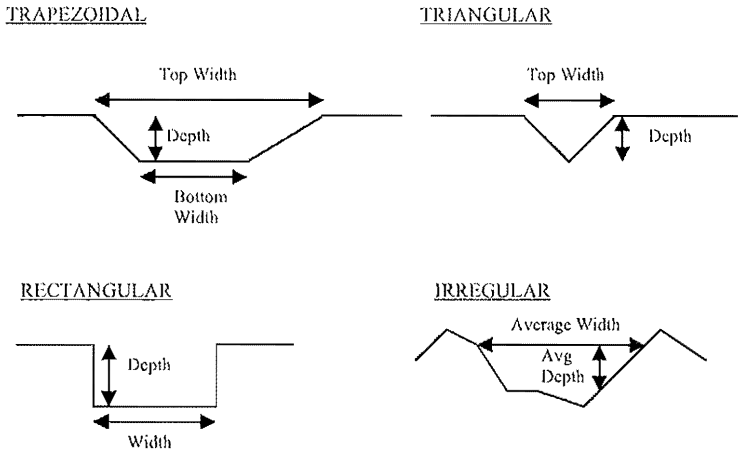
CONFIGURATION:



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

Embankment Height __15__ feet Embankment Material **Compacted fill**
Pool Area **25** acres Liner **Unlined**
Current Freeboard **5 ft** Liner Permeability **NA**

TYPE OF OUTLET (Mark all that apply)

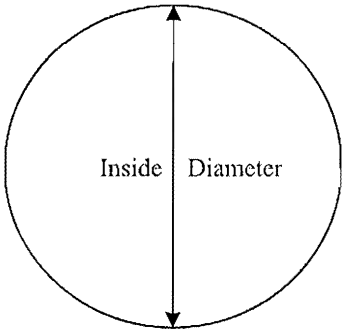


None **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Triangular

_____ Depth
_____ Bottom (or average) width
_____ Top width

X **Outlet**

24" 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 and Lundy Engineers, Chicago, IL for Public Service Indiana (PSI) at the time. Original construction completed in 1974.**

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:

Site Name: **Duke Energy, Gibson County, IN** Date: **April 27, 2010**

Unit Name: **North Settling Basin** Operator's Name: **Duke Energy**

Unit ID: **N/A** Hazard Potential Classification: High Significant Low **(see P.3)**

Inspector's Name: **Steve Brown/GEI Consultants, Nick Miller/GEI Consultants**

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?	**Monthly by Staff, Biennial 3rd Party**		18. Sloughing or bulging on slopes?		X
2. Pool elevation (operator records)?	~EL. 397.3		19. Major erosion or slope deterioration?		X
3. Decant inlet elevation (operator records)?	NA (pump)		20. Decant Pipes		
4. Open channel spillway elevation (operator records)?	NA		Is water entering inlet, but not exiting outlet?		X
5. Lowest dam crest elevation (operator records)?	EL. 405.0		Is water exiting outlet, but not entering inlet?		X
6. If instrumentation is present, are readings recorded (operator records)?	X		Is water exiting outlet flowing clear?	NA	
7. Is the embankment currently under construction?		X	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)?	X		From underdrain?		X
9. Trees growing on embankment? (If so, indicate largest diameter below.)		X	At isolated points on embankment slopes?		X
10. Cracks or scarps on crest?		X	At natural hillside in the embankment area?		X
11. Is there significant settlement along the crest?		X	Over widespread areas?		X
12. Are decant trashracks clear and in place?	NONE		From downstream foundation area?		X
13. Depressions or sink holes in tailings surface or whirlpool in the pool area		X	"Boils" beneath stream or ponded water?		X
14. Clogged spillways, groin or diversion ditches?		X	Around the outside of the decant pipe?		X
15. Are spillway or ditch linings deteriorated?		X	22. Surface movements in valley bottom or on hillside?		X
16. Are outlets of decant or underdrains blocked?		X	23. Water against downstream toe?		X
17. Cracks or scarps on slopes		X	24. Were Photos taken during the dam inspection?	X	

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. No formal inspections of CCW impoundments. Informal visual inspections performed biennially in conjunction with cooling pond inspection.	
4. No open channel spillway.	
6. Only reservoir water levels are measured. No piezometers or settlement monuments.	
20. Discharge not flowing at time of inspection.	

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # N/A INSPECTOR Steve Brown/GEI

Date April 27, 2010

Impoundment Name North Settling Basin, Duke Energy, Gibson County, IN

Impoundment Company Duke Energy

EPA Region 5

State Agency (Field Office) Address Indiana Dept. of Natural Resources Div. of Water, Dams & Levees
402 West Washington St, Room W264, Indianapolis, IN 46204

Name of Impoundment North Settling Basin
(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: Decant Water Storage

Nearest Downstream Town: Name Grayville, IN
Distance from the impoundment 35 miles
Impoundment Location:

Longitude	87	Degrees	45	Minutes	48	Seconds	W
Latitude	38	Degrees	22	Minutes	45	Seconds	N
State	IN	County	Gibson				

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

If So Which Sate Agency? Indiana Dept. of Natural Resources Div. of Water, Dams & Levees

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.

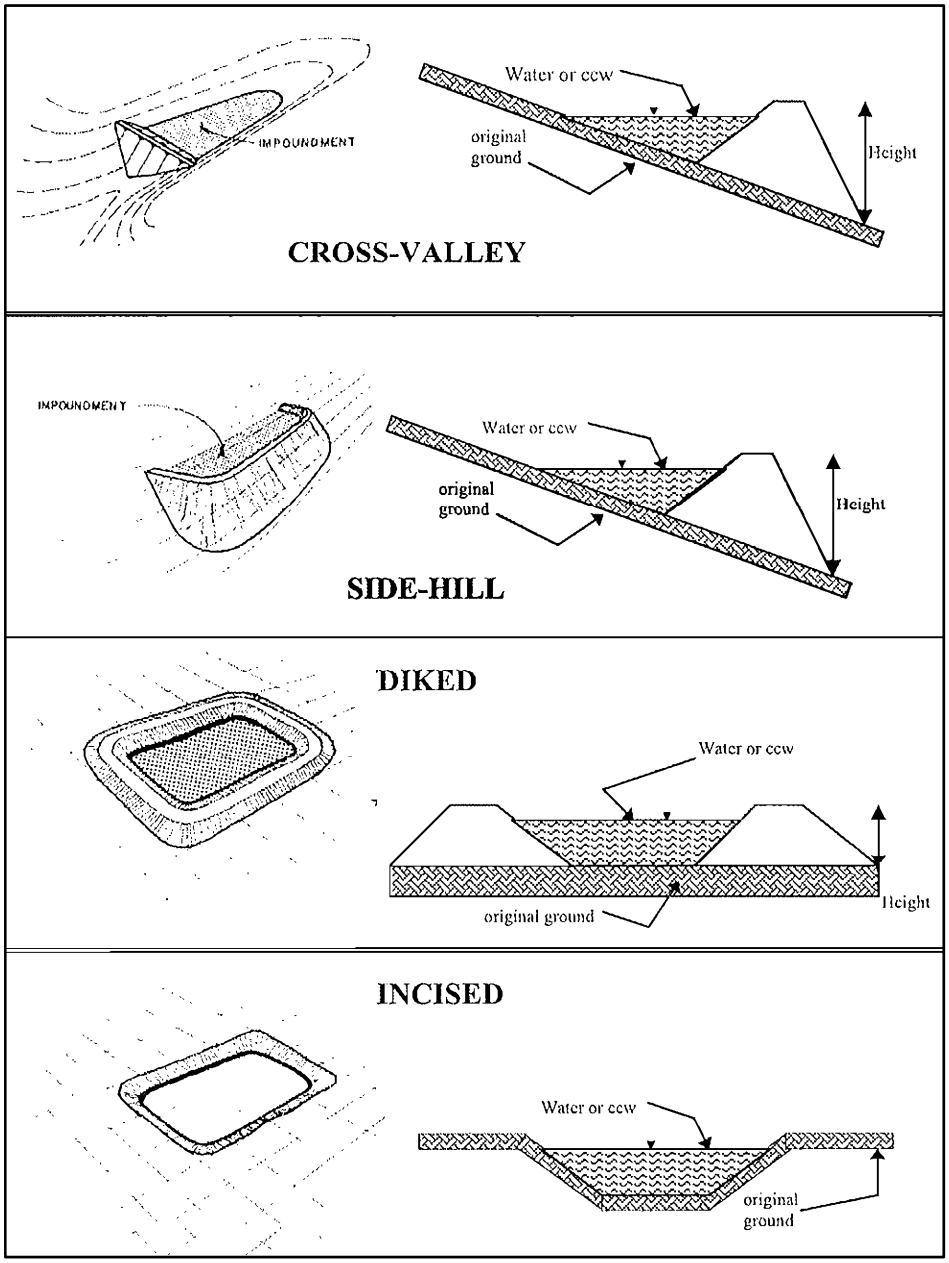
_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns. 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:

An uncontrolled release of the structure's contents due to a failure or misoperation is not considered to cause loss of human life and the economic and environmental damages would be relatively low. The flood extent would be limited by the adjacent USACE levee on the Wabash River and the very flat surrounding topography. Flood waters would likely be widespread with shallow depths and gradually rising waters. Based on the pond height and volume, the majority of inundation would be limited to Company property to the south east around the cooling pond and the surrounding wetlands. Flood waters would eventually drain to the Wabash River at culverts through the USACE levee located about 3 miles downstream. Consistent with the Federal Guidelines for Dam Safety, the dam should be classified as a "Low" hazard structure.

CONFIGURATION:



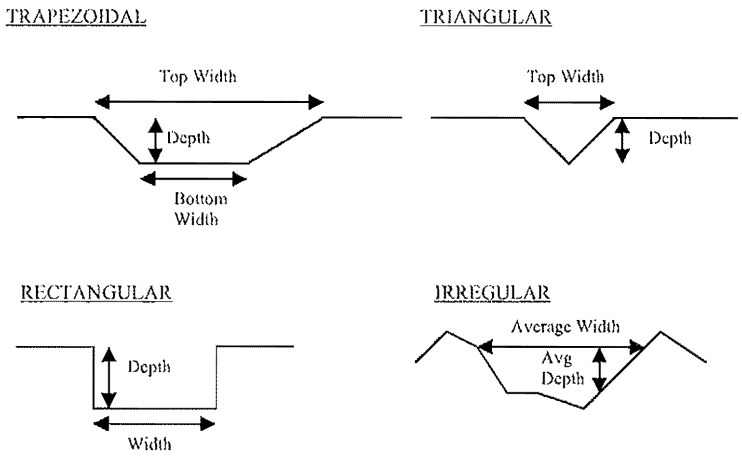
_____ Cross-Valley
_____ Side-Hill
__X__ Diked
_____ Incised (form completion optional)
_____ Combination Incised/Diked

Embankment Height __15__ feet Embankment Material **Compacted fill**
Pool Area **10** acres Liner **Unlined**
Current Freeboard **7.7 ft** Liner Permeability **NA**

TYPE OF OUTLET (Mark all that apply)

None **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Triangular

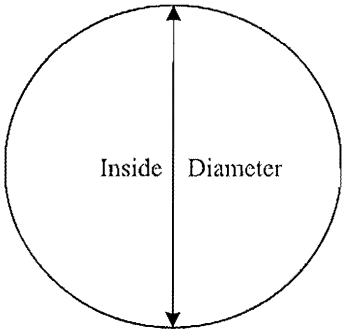
_____ Depth
_____ Bottom (or average) width
_____ Top width



X **Outlet**

24" inside diameter

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



Is water flowing through the outlet? YES_____ NO X - Pump was not active.

_____**No Outlet –**

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

The Impoundment was Designed By **Sargent and Lundy Engineers, Chicago, IL for Public Service Indiana (PSI) at the time. Original construction completed in 1974.**

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 B

Inspection Photographs

April 26-27, 2010

Assessment of Dam Safety of Coal Combustion Waste Impoundments at DEI Gibson Generating Station	GEI Consultants	EAST ASH PONDS & SETTLING BASIN PHOTOGRAPH LOCATION MAP
Environmental Protection Agency Washington, DC	Project 092880	May 2010

C:\Documents and Settings\nmiller\Desktop\Duke Gibson Photos\ Photo Location Map.dwg May 2010

Assessment of Dam Safety of Coal Combustion Waste Impoundments at DEI Gibson Generating Station	GEI Consultants	NORTH ASH POND & SETTLING BASIN PHOTOGRAPH LOCATION MAP
Environmental Protection Agency Washington, DC	Project 092880	May 2010

C:\Documents and Settings\nmiller\Desktop\Duke Gibson Photos\ Photo Location Map.dwg May 2010

Photo 1: East Settling Basin - South dike upstream slope, looking east from south west corner.

Photo 2: East Settling Basin –Pump intake that discharges to the Cooling Pond, looking north.

Photo 3: East Settling Basin – West dike upstream slope, looking north.

Photo 4: East Settling Basin – West dike downstream slope, looking north.

Photo 5: East Settling Basin – South dike upstream slope protection detail.

Photo 6: East Settling Basin – Reservoir area from south dike, looking north.

Photo 7: East Settling Basin – South Dike downstream slope, looking west.

Photo 8: East Settling Basin – East Dike upstream slope, looking north.

Photo 9: East Settling Basin – East and south dike downstream corner, looking south.

Photo 10: East Ash Pond #1 – Intake structure near southeast corner of EAP #1 that discharges to Settling Basin, looking west.

Photo 11: East Ash Pond #1 – EAP #1 reservoir area, approximately 95% full of CCW, looking west.

Photo 12: East Ash Pond #1 – Interior dike crest between EAP #1 and Settling Basin, looking west, notice several small trees.

Photo 13: East Ash Pond #1 – East Dike crest, road, and reservoir area, looking north from SE corner.

Photo 14: East Ash Pond #1 – East Dike crest and road, looking south from NE corner.

Photo 15: East Ash Pond #1 – Drainage swell on north side of EAP #1 that discharges to EAP #2, looking west.

Photo 16: East Ash Pond #3 – Interior dike crest and road between EAP #1 and EAP #3, looking west.

Photo 17: East Ash Pond #3 – EAP #3 reservoir area, about 95% full, in close out phase, looking northwest.

Photo 18: East Ash Pond #3 – EAP #3 Intake structure, looking north from interior dike between EAP #1 and EAP #3.

Photo 19: East Ash Pond #3 – Interior dike between EAP #1 and EAP #3, looking west, notice trees along dike.

Photo 20: East Ash Pond #3 – East dike downstream slope, looking north from the corner of EAP #1 and EAP #3 interior dike.

Photo 21: East Ash Pond #3 – North dike crest and reservoir area, looking northwest from northeast corner of EAP #3.

Photo 22: East Ash Pond #3 – EAP #3 capping construction, notice geofabric and geogrid, looking south from north dike.

Photo 23: East Ash Pond #3 – North dike crest and capping material, looking east from northwest corner of EAP #3.

Photo 24: East Ash Pond #3 – West dike crest and road, looking south, notice county road to the west.

Photo 25: East Ash Pond #2 – CCW discharge line crossing Coon Creek, downstream of west dike, looking west.

Photo 26: East Ash Pond #2 – CCW discharge line crossing under county road, looking southwest from west dike.

Photo 27: East Ash Pond #2 – CCW discharge line crossing west dike dam crest, looking north.

Photo 28: East Ash Pond #2 – EAP #2 west dike crest, looking south.

Photo 29: East Settling Basin – Interior dike crest between East Settling Basin and EAP #2, looking east.

Photo 30: East Ash Pond #2 - EAP #2 downstream slope, abandoned discharge lines and drainage sump, looking northwest.

Photo 31: North Ash Pond – Downstream slope and crest of northeast dike, looking southeast.

Photo 32: North Ash Pond – North Ash Pond reservoir area, looking south towards FSS landfill from northeast dike.

Photo 33: North Ash Pond – Downstream slope and crest of northeast dike, looking northwest.

Photo 34: North Ash Pond – Downstream slope of northeast dike looking northeast at wetlands area from crest.

Photo 35: North Ash Pond – North dike downstream slope, looking southeast at northeast dike.

Photo 36: North Ash Pond – North Ash Pond reservoir area and dredging equipment, looking southeast from north dike.

Photo 37: North Ash Pond – North Ash Pond reservoir area, looking east, notice upstream slope extended into reservoir.

Photo 38: North Ash Pond – North dike downstream slope, looking west, notice large trees in wetland at toe of slope.

Photo 39: North Ash Pond – Wetlands area downstream of north dike, looking north from interior dike between NAP and NSB.

Photo 40: North Settling Basin – USACE Levee, looking northeast from levee crest.

Photo 41: North Settling Basin – Pump intake structure that discharges to cooling pond, looking northeast.

Photo 42: North Settling Basin – Reservoir area looking northeast from pump intake structure.

Photo 43: North Settling Basin – Discharge into settling basin, looking northwest from interior dike between NAP and NSB.

Photo 44: North Ash Pond – Intake structure in NAP that discharges into NSB, looking southeast from interior dike.

Photo 45: North Ash Pond – Southeast dike upstream slope, crest and road, looking southeast from crest.

Photo 46: North Ash Pond – Southeast dike downstream, crest and cooling pond reservoir area, looking southeast.

Appendix C

Reply to Request for Information Under Section 104(e)

Duke Energy®

DUKE ENERGY CORPORATION
WP994 / 1000 East Main Street
Plainfield, IN 46168-1782

Via Certified Mail 7008 2810 0000 0830 9222

March 25, 2009

Mr. Richard Kinch
US Environmental Protection Agency (5306P)
1200 Pennsylvania Avenue, NW
Washington, DC 20460

RE: CERCLA 104(e) Request for Information
Gibson Generating Station
1097 North 950 West
Owensville, Indiana 47665

Dear Mr. Kinch,

Duke Energy Indiana, Inc. (DEI) hereby responds to the request for information the EPA submitted to the Gibson Generating Station, letter dated March 9, 2009, under Section 104(e) of CERCLA, 42 USC § 9604(e), relating to surface impoundments or similar diked / bermed management units which receive liquid-borne material for storage or disposal of residuals or by-products from the combustion of coal DEI received this request on March 12, 2009, and today's response complies with the 10-business day deadline.

The attached responses are full and complete and were developed under my supervision with assistance from Duke Energy's Engineering and Technical Services group. The following clarifications should be noted for the attached responses.

- The responses in this submittal are for surface impoundments and the associated secondary / clarifying ponds used for temporary or permanent storage of flyash, bottom ash, boiler slag, and flue gas emission control residues at this station (hereinafter "coal combustion by-products").
    - These ponds are also an integral part of the station's wastewater treatment system used to manage wastewater before discharge.
- The response to the questions does not include ponds that are retired / closed and which no longer contain free liquids.
- The response to questions does not include landfill runoff collection ponds or any other miscellaneous ponds / impoundments that are not designed to or do not regularly receive and store coal combustion by-products.
- Where actual measurements could not be collected within the timeframe allotted by EPA, DEI has provided estimates, which are noted as such.
- The criteria that DEI used to identify any spills or unpermitted releases over the last 10 years in the response to Question #9 include the failure of physical pond or impoundment structures (i.e. berms, dikes, and discharge structures).

I certify that the information contained in this response to EPA's request for information and the accompanying documents are true, accurate, and complete. As to the identified portions of this response for which I cannot personally verify their accuracy, I certify under penalty of law that this response and all attachments were prepared in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge, true,

accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

If you have any questions regarding today's submittal please contact Richard Meiers at our corporate offices at 317-838-1955.

Sincerely,
Duke Energy Indiana, Inc.

Barry E. Pulskamp
Senior Vice President Regulated Fleet Operations

Attachments (3)

Responses to Enclosure A
Inspection Report
Confidential Business Information

cc Thomas J. Guthrie
Gibson Generating Station
Vice President Regulated Fossil Station
Rebecca M. Sparks
Sr. EHS Professional
Richard J. Meiers
Principal Environmental Scientist

Attachment # 1

Response to Questions in Enclosure A

Gibson Generating Station

March 24, 2009

1. Relative to the National Inventory of Dams criteria for High, Significant, Low, or Less than Low Hazard Potential, please provide the rating for each management unit and indicate which State or federal regulatory agency assigned that rating. If the unit does not have a rating, please note that fact.

Duke Energy Indiana, Inc. (DEI) is not aware of any National Inventory of Dams criteria rating that has been assigned by a State or Federal Agency for the management units at the Gibson Generating Station of the management units listed in the response to Question #2 below.

2. What year was each management unit commissioned and expanded?

North Ash Pond was commissioned in 1974.

North Settling Basin was commissioned in 1974.

East Ash Pond #1 was commissioned in 1991.

East Ash Pond #2 was commissioned in 1995.

East Ash Pond #3 was commissioned in 1999.

East Ash Pond Settling Basin was commissioned in 1991.

3. What materials are temporarily or permanently contained in the unit? Use the following categories to respond to this question: (1) fly ash; (2) bottom ash: (3) boiler slag; (4) flue gas emission control residuals; (5) other. If the management unit contains more than one type of material, please identify all that apply. Also, if you identify "other," please specify the other types of materials that are temporarily or permanently contained in the unit(s).

Management Unit	East Ash Pond #1	East Ash Pond #2	East Ash Pond #3
Contents	1, 2, 3, 4, 5*	1, 2, 3, 4, 5*	1, 2, 3, 4, 5*
Management Unit	East Ash Pond Settling Basin	North Ash Pond	North Ash Pond Settling Basin
Contents	1, 5*	1, 2, 3, 4, 5*	1, 5*

* "Other" includes landfill leachate, water treatment, boiler blow down, stormwater runoff, boiler chemical cleaning wastes, mill rejects, floor and laboratory drains and drains from equipment cleaning.

4. Do you have a Professional Engineer's certification for the safety (structural integrity) of the management unit(s)? Please provide a copy if you have one. If you do not have such a certification, do you have other documentation attesting to the safety (structural integrity) of the management unit(s)? If so, please provide a copy of such documentation.

> The safety (structural integrity) was certified through the design documents when the Gibson Generating Station management units were designed and constructed. The Engineering firm responsible for the design was Sargent and Lundy Engineers. Copies of the design documents may be available from our drawing archives. Due to the expediency of the requested reply, DEI is not submitting these documents as part of our response; however, we can research our archival information should there be a future need to submit original design documentation.

5. When did the company last assess or evaluate the safety (i.e., structural integrity) of the management unit(s)?

> All management units listed in the response to question #2 were inspected in October 2008 by a third party firm.

Briefly describe the credentials of those conducting the structural integrity assessments/evaluations.

> There have been both third party engineers with P.E.s and Duke Energy's Generation Department civil engineers involved with the inspections.

Identify actions taken or planned by facility personnel as a result of these assessments or evaluations.

> See attached inspection reports (Attachment 2). The attached inspection reports identify findings, and corrective actions recommended and taken by facility personnel as a result of these inspections. Typical findings that require corrective actions are: Treat excess vegetation, clear ditch line of sediment and debris, re-seed sparsely vegetated and disturbed areas, and mow slopes in a diagonal pattern running transverse to existing rut lines. Other more site specific maintenance items are detailed in the reports.

If corrective actions were taken, briefly describe the credentials of those performing the corrective actions, whether they were company employees or contractors.

> Duke Energy's Generation Engineering Department provides engineering oversight, review, and documentation of maintenance done and repairs made.

If the company plans an assessment or evaluation in the future, when is it expected to occur?

> The next inspection is scheduled in the third quarter of 2009.

6. When did a State or a Federal regulatory official last inspect or evaluate the safety (structural integrity) of the management unit(s)? If you are aware of a planned state or federal inspection or evaluation in the future, when is it expected to occur? Please identify the Federal or State regulatory agency or department

which conducted or is planning the inspection or evaluation. Please provide a copy of the most recent official inspection report or evaluation.

The Gibson Generating Station has not had State or Federal regulatory officials performing ash pond dike inspections in the last five years. DEI is not aware of any federal or state agency inspection reports. The state regulatory agency governing dams would be the Indiana Department of Natural Resources (IDNR).

7. Have assessments or evaluations, or inspections conducted by State or Federal regulatory officials conducted within the past year uncovered a safety issue(s) with the management unit(s), and, if so, describe the actions that have been or are being taken to deal with the issue or issues. Please provide any documentation that you have for these actions.

DEI is not aware of any State or Federal regulatory officials conducting assessments, evaluations or inspections at the Gibson Generating Station within the past year.

8. What is the surface area (acres) and total storage capacity of each of the management units? What is the volume of material currently stored in each of the management unit(s). Please provide the date that the volume measurement was taken.

The response to this question contains Confidential Business Information, which is of a competitive and commercial nature, pursuant to 40 C.F.R. Part 2. Our response is therefore provided in a separate attachment (Attachment 3), which has been labeled "CBI." DEI requests that EPA treat the information in Attachment 3 as CBI and safeguard it from inadvertent disclosure and contact DEI if EPA receives a request for this CBI.

9. Please provide a brief history of known spills or unpermitted releases from the unit within the last ten years, whether or not these were reported to State or federal regulatory agencies. For purposes of this question, please include only releases to surface water or to the land (do not include releases to groundwater).

There have been no spills or unpermitted releases from any of the management units listed in response #2 over the past ten years.

10. Please identify all current legal owner(s) and operator(s) at the facility.

Duke Energy Indiana, Inc. is the operator of the facility.

Duke Energy Indiana Inc., Wabash Valley Power Association, Inc., and Indiana Municipal Power Agency are the legal owners of the facilities.

Attachment #3

CBI

This attachment contains Confidential Business Information, which is of a competitive and commercial nature, pursuant to 40 C.F.R. Part 2. DEI requests that EPA treat the information in Attachment 3 as CBI and safeguard it from inadvertent disclosure and contact DEI if EPA receives a request for this CBI.

Gibson Generating Station
Response to Question # 8

North Ash Pond was commissioned in 1974.

- 25 acres in total surface area with 350 acre/feet of total storage volume
- The station estimated in January 2009 that the pond was 50% full.

North Settling Basin was commissioned in 1974.

- 10 acres in total surface area with 150 acre/feet of total storage volume
- The station estimated in January 2009 that the pond was 30% full

East Ash Pond #1 was commissioned in 1991.

- 105 acres in total surface area with 1733 acre/feet of total storage volume
- The station estimated in January 2009 that the pond was 95% full

East Ash Pond #2 was commissioned in 1995.

- 105 acres in total surface area with 1733 acre/feet of total storage volume
- The station estimated in January 2009 that the pond was 50% full

East Ash Pond #3 was commissioned in 1999.

- 133 acres in total surface area with 3325 acre/feet of total storage volume
- The station estimated in January 2009 that the pond was 95% full.

East Ash Pond Settling Basin was commissioned in 1991.

- 45 acres in total surface area with 743 acre/feet of total storage volume
- The station estimated that the pond was 20% full