DRAFT REPORT
ROUND 10 DAM ASSESSMENT - MAY 18, 2011
PPL GENERATION, LLC.
BRUNNER ISLAND POWER STATION
ASH BASIN NO. 6 WITH POLISHING POND, EQUALIZATION POND AND INCIDENTAL WASTE TREATMENT BASIN (IWTB)
YORK HAVEN, PENNSYLVANIA

PREPARED FOR:

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

PREPARED BY:

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One Edgewater Drive
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GZA File No. 01.0170142.30

GZA
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Engineers and
Scientists

March 12, 2012
GZA File No. 170142.30

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

Dear Mr. Hoffman,

In accordance with our proposal 01.P0000177.11 dated March 28, 2011, and U.S. Environmental Protection Agency (EPA) Contract No. EP10W001313, Order No. EP-B115-00049, GZA GeoEnvironmental, Inc. (GZA) has completed our inspection of the Brunner Island Power Station Ash Basin No. 6, Incidental Waste Treatment Basin (IWTB), and the Equalization Pond, located in York Haven, Pennsylvania. The Site visit was conducted on May 18, 2011. The purpose of our efforts was to provide the EPA with a site specific inspection of the impoundments to assist EPA in assessing the structural stability of the impoundments under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 104(e). We are submitting one hard copy and one CD-ROM copy of this Draft Report directly to the EPA.

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The IWTB and Equalization Pond do not meet the criteria set forth by the U.S. EPA with regard to coal ash impoundments. These structures were inspected during the site visit and checklists included in **Appendix C**, however no further study or discussion of the IWTB and Equalization Pond is necessary.

Based on our visual inspection, and in accordance with the EPA criteria, the Ash Basin No. 6 was in **POOR** condition at the time of our inspection, in our opinion. Further discussion of our evaluation and recommended actions are presented in the Task 3 Dam Assessment Report. The report includes: (a) a completed Coal Combustion Dam Inspection Checklist Form for each Basin; (b) a field sketch; and (c) selected photographs with captions. Our services and report are subject to the Limitations found in **Appendix A** and the Terms and Conditions of our contract agreement.

We are happy to have been able to assist you with this inspection and appreciate the opportunity to continue to provide you with dam engineering consulting services. Please contact the undersigned if you have any questions or comments regarding the content of this Task 3 Dam Assessment Report.

Sincerely,

GZA GeoEnvironmental, Inc.

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PREFACE

The assessment of the general condition of the dam reported herein was based upon available data and visual inspections. Detailed investigations and analyses involving topographic mapping, subsurface investigations, testing and detailed computational evaluations were beyond the scope of this report.

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

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

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_____

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EXECUTIVE SUMMARY

This Inspection Report presents the results of a visual inspection of the PPL Generation, LLC. (PPL) – Brunner Island Power Station Coal Combustion Waste (CCW) Impoundments located at Wago Road, York Haven, Pennsylvania. These inspections were performed on May 18, 2011 by representatives of GZA GeoEnvironmental, Inc (GZA), accompanied by representatives of PPL, the Pennsylvania Department of Environmental Protection (PADEP) Dam Safety and Waste Management.

Brunner Island Power Station is a three unit coal fired power plant with a maximum generating capacity of approximately 1,490 Megawatts. Unit 1 began operation in 1961 and units 2 and 3 became operational in 1965 and 1969, respectively. At the time of the inspection there were three active impoundments at the site. Two of the impoundments, the Incidental Waste Treatment Basin (IWTB) and the Equalization Pond, do not meet the criteria set forth by the U.S. EPA for coal ash impoundments. The IWTB, designed in 1972, impounds and treats surface water runoff from the raw coal storage pile north of the power station. The Equalization pond, designed in 1992, impounds surface water runoff and incidental station waste flows from station processes. Small amounts of CCWs may be present in the waste flows entering the Equalization Pond, in particular from the dry storage silo was area, although quantities are considered minimal. Waste water is pumped from the Equalization Pond to the Ash Basin No. 6. ***Both the IWTB and Equalization Pond were inspected during the site visit and checklists have been included in Appendix C, however no further study or discussion herein in this report for the IWTB and Equalization Pond is necessary.***

Ash Basin No. 6 was designed in 1979 for the purpose of storing CCWs pumped into the basin as water slurry. The basin is filled via ash lines at the northeast and northwest corners. Ash is allowed to settle from the slurry for storage and beneficial reuse. Water is treated for pH entering the Polishing Pond, prior to discharging in the Susquehanna River. The Polishing Pond is considered part of the Ash Basin No. 6, however for further detail a separate checklist was performed during the site visit which is attached in **Appendix C**. Station waste waters are also pumped to the Ash Basin No. 6 from the Equalization Pond, entering the basin at the northeast corner.

Ash Basin No. 6 in its current configuration has a maximum embankment height of approximately 30 feet to natural ground and an original storage volume of approximately 2,600 acre-feet at the top of embankment. Therefore in accordance with USACE criteria the Ash Basin No. 6 is classified as an **Intermediate** sized structure. According to guidelines established by the U.S. Army Corps of Engineers dams with a storage volume between 1,000 and 50,000 acre-feet and/or a height between 40 and 100 feet are classified as Intermediate sized structures. It is noted that the State of Pennsylvania uses the same classification guidelines as the USACE. Under the PADEP guidelines the dam is classified as a **Class B** structure (Intermediate).

In GZA's opinion, Ash Basin No. 6 is a **Significant** Hazard Structure as classified under the Environmental Protection Agency (EPA) hazard rating criteria. The hazard potential rating is based on GZA's opinion that failure of the embankment is not likely to result in loss of human life, due to the size of the structure, limited habitation adjacent to the basin buffering of impacts by the Susquehanna River.

Based on the results of the visual inspection, discussions with PPL personnel, and a review of available design documentation, Ash Basin No. 6 was judged to be in **POOR** condition. The following deficiencies were noted at the CCW impoundment, Ash Basin No. 6:

1. Based on the results of a stability analysis by PPL's independent dam engineering consultant HDR Engineering, Inc., of Portland, Maine. insufficient factors of safety were calculated for the rapid drawdown condition. This is the primary reason for the impoundment's Poor Condition rating.
2. Overgrown vegetation, up to 36 inches high, at outside embankment slopes and portions of inside embankment slopes. Overgrown vegetation may obscure potential detrimental embankment conditions.
3. Ruts and depressions observed at portions of the embankment toe from vehicles.
4. Saturated portions of embankment and standing water observed at the toe of dam at various locations around the polishing pond and east embankment. Conditions possibly due to heavy rainfall over the prior week. According to PPL personnel waters of the Susquehanna River had recently receded from the areas surrounding the toe of the embankment, which may also have contributed to the standing water and saturated conditions.
5. Sloughing observed at inside slope of the Polishing Pond, especially near the water line at the east side. Sloughs and scarps observed generally less than 3 feet deep.
6. Erosion from surface water runoff observed at the inside face of the Polishing Pond near the north end.
7. Approximately 40 foot long section of spongy/soft soil observed the east embankment near the south side from the toe to approximately 1/3 the height of the embankment. Note this condition was also reported on previous inspection reports by HDR Engineering, Inc.
8. Minor depressions and erosion observed at the crest.
9. 10 to 15 foot wide slough/scarp at the east embankment approximately 75 feet south of the access stairway on the outside face.
10. Large stock pile of top soil adjacent to the west embankment slope just north of the electric wire stanchion, possibly surcharging the embankment.

Studies and Analyses:

1. Perform a detailed hydrologic and hydraulic study using current methodology to evaluate the impoundment's ability to safely pass the SDF at Ash Basin No. 6 and the Polishing Pond.

2. Perform a seepage analysis to assess the factor of safety of piping failure, at the Ash Basin No. 6.

3. A slope stability analysis has already been performed by HDR Engineering, Inc. in 2009. Results indicated that the stability of the downstream embankment is below required factors of safety for the rapid drawdown condition due to flooding from the Susquehanna River at the downstream slope during the 100 and 500-year floods. GZA concurs with HDR's recommendation that additional analyses could be performed to assess transient seepage conditions which may determine that an embankment breach as a result of rapid drawdown on the downstream side would not occur. Otherwise remediation of the embankment is warranted.

4. Investigate cause of spongy/soft ground observed at the east embankment.

Operations and Maintenance Activities:

1. Maintain grass cover on the downstream slope and approximately 15 feet beyond the toe area. USACE recommends vegetation be kept less than 12 inches in height on embankments. This may required mowing more frequently than bi-annually.

2. Fill ruts, depressions, and animal burrows and reseed if necessary.

3. Monitor and repair sloughing at the inside slope at the Polishing Pond and outside slope at the east embankment, or other locations sloughing is observed.

4. Exercise stoplogs and slide gates at least once annually.

5. Monitor spongy/soft ground observed at the east embankment.

Minor Repairs:

1. Repair sloughs and scarps on the embankment and provide future erosion protection as necessary.

Remedial Measures:

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

2. If the results of additional stability analyses (recommended above) continue to indicate inadequate factors of safety or in the absence of additional stability analyses, take the necessary actions required to remediate the embankment such that adequate factors of safety are met.

It is our understanding that permanent closure of the basin is expected to begin approximately 1 to 1.5 years after the date of this inspection based on conversations with PPL personnel during the on-site inspection. In GZA's opinion it would be prudent for PPL to at least implement the above recommended operations and maintenance and minor repair activities. We acknowledge that implementation of some of the above studies and analyses and remedial measures recommendations may not be critical given the current permanent closure plans. However based on our review of the HDR report, we understand that the factor of safety for the rapid drawdown condition, which could occur during the recession of major flooding on the Susquehanna River, is below required minimum values. Therefore it must be noted that regardless of whether or not the basin is permanently closed, PPL will at a minimum need to address this stability inadequacy which exists on downstream embankment portions adjacent to/along the river.

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1.0 DESCRIPTION OF PROJECT

1.1 General

1.1.1 Authority

The United States Environmental Protection Agency (EPA) has retained GZA GeoEnvironmental, Inc. (GZA) to perform visual inspections and develop a report of conditions for the PPL Generation, LLC. (PPL, Owner) Brunner Island Power Station, Coal Combustion Waste (CCW) impoundments in York Haven, Pennsylvania. These inspections were authorized by the EPA under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 104(e). These inspections and report were performed in accordance with Task 3 of RFQ-DC-16 Round 10 for EPA's Office of Resource Conservation and Recovery in support for the Assessment of Dam Safety of Coal Combustion Surface Impoundments, dated March 16, 2011. The inspection generally conformed to the requirements of the Federal Guidelines for Dam Safety[1], and this report is subject to the limitations contained in **Appendix A** and the Terms and Conditions of our Contract Agreement.

1.1.2 Purpose of Work

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

The investigation was divided into four parts: 1) obtain and review available reports, investigations, and data from the Owner pertaining to the dam and appurtenant structures; 2) perform an on site review with the Owner of available design, inspection, and maintenance data and procedures for the management unit(s); 3) perform a visual inspection of the site; and 4) prepare and submit a draft and a final report presenting the evaluation of the structure, including recommendations and proposed remedial actions.

1.1.3 Definitions

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

1.2 Description of Project

1.2.1 Location

Brunner Island Power Station is located approximately 15 miles southeast of Harrisburg, Pennsylvania. The power station is accessible from the North via Route 382 off

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

Interstate Highway I-83. Ash Basin No. 6 and associated Polishing Pond are located approximately 1.5 miles south of the power station. The Incidental Waste Treatment Basin (IWTB) and Equalization Pond are located adjacent to the power station to the northeast and southeast, respectively. Brunner Island Power Station is approximately located at latitude 40° 05' 46" N and longitude 76° 41' 46" West. A site locus of the impoundments and surrounding area is shown in **Figure 1**. An aerial photograph of the impoundments and surrounding area is provided in **Figure 2**. The impoundments can be access by vehicles via, asphalt paved and gravel paved roads from Wago Road.

1.2.2 Owner/Caretaker

The basins and power station are owned and operated by the PPL Generation, LLC.

	Dam Owner/Caretaker
Name	PPL Generation, LLC[2]
Mailing Address	Two North Ninth Street
City, State, Zip	Allentown, PA 18101-1179
Contact	Craig S. Shamory
Title	Environmental Supervisor
E-Mail	csshamory@pplweb.com
Daytime Phone	(610)774-5653
Emergency Phone	911

1.2.3 Purpose of the Basins

Brunner Island Power Station is a three unit coal fired power plant with a maximum generating capacity of approximately 1,490 Megawatts. Unit 1 began operation in 1961 and units 2 and 3 became operational in 1965 and 1969, respectively. At the time of the inspection there were three active impoundments at the site. Two of the impoundments, the Incidental Waste Treatment Basin (IWTB) and the Equalization Pond, do not meet the criteria set forth by the U.S. EPA for coal ash impoundments. The IWTB, designed in 1972, impounds and treats surface water runoff from the raw coal storage pile north of the power station. The Equalization Pond, designed in 1992, impounds surface water runoff and incidental station waste flows from station processes. Small amounts of CCWs may be present in the waste flows entering the Equalization Pond, in particular from the dry storage silo wash area, although quantities are considered minimal. Waste water is then pumped from the Equalization Pond to the Ash Basin No. 6. ***Both the IWTB and Equalization Pond were inspected during the site visit and checklists have been included in* Appendix C*, however no further study or discussion herein in this report for the IWTB and Equalization Pond is necessary.***

Ash Basin No. 6 was designed in 1979 for the purpose of storing CCWs pumped into the basin as water slurry. The basin is filled via ash lines at the northeast and northwest corners. Ash is allowed to settle from the slurry for storage and beneficial reuse. Water is treated for pH entering the Polishing Pond, prior to discharging into the Susquehanna River. The Polishing

[2] PPL Generation, LLC is PPL Corporation company.

Pond is considered part of the Ash Basin No. 6, however for further detail a separate inspection checklist was performed during the site visit which is attached in **Appendix C**. Station waste waters are also pumped to the Ash Basin No. 6 from the Equalization Pond, entering the basin at the northeast corner.

According PPL personnel all bottom ash, which formerly went to Ash Basin No. 6, now goes to a "concrete bottom ash sluice trough/pond" tank constructed, approximately 2 to 3 years prior to this inspection, for the purpose of removing and collecting bottom ash for beneficial reuse. Ash Basin No. 6 at the time of this inspection still received water from the Equalization Pond and residual treatment water from the bottom ash sluice trough/pond. At the time of this inspection PPL was in the process of constructing a waste water treatment facility, which when completed will treat the residual water currently sent to Ash Basin No. 6 from the Equalization Pond and bottom ash sluice trough/pond. Upon completion of the treatment plant discharge into Ash Basin No. 6 will be ceased and closure of Ash Basin No. 6 will begin. PPL personnel estimate closure of the basin may begin in approximately 1 to 1.5 years from the date of this inspection.

1.2.4 Description of Ash Basin No. 6 Embankments and Appurtenances

The following description of the Ash Basin No. 6 and associated Polishing Pond is based conversations with PPL personnel, design drawings, previous inspection reports, and field observations by GZA.

Ash Basin No. 6 was designed by Pennsylvania Power and Light Company of Allentown Pennsylvania in 1979. The Basin is formed of an approximately 8,300 foot long perimeter embankment creating a 70-acre impoundment. Originally the basin had a storage capacity of approximately 2,600 acre-ft and a height from the top of embankment (EL. 290 feet) to natural ground of approximately 30 feet (outside slope) and a depth of approximately 39 feet from the top of embankment to the bottom of the basin (inside slope). The Embankments are constructed of native sandy silt and silty clay[3] with a 10-foot thick clay liner at the inside face from elevation 287.5 feet to bedrock. At the time of the inspection it is estimated, due to infilling, the pool area was about 11 acres.

Ash lines enter the basin from the northeast and northwest corners. The ash-line at the northeastern corner of the basin formerly carried CCWs from Unit 3 however now only carries water pumped from the equalization basin from surface water runoff and incidental plant waste flows. The effluent can carry fly ash from the dry storage silo wash area, however any amounts are typically minimal. Ash lines entering the northwest corner formerly carried CCWs from Units 1 & 2. CCWs from those units are now processed separately. According to PPL personnel approximately 2 to 3 years prior to the date of this inspection a concrete "bottom ash sluice trough/pond" tank was constructed to settle and remove bottom ash, from units 1 & 2. Residual water from this process may still be pumped to the northwest corner of Ash Basin No. 6. At the time of this inspection PPL was in the process of constructing a waste water treatment facility, which when completed will treat the residual water currently sent to Ash Basin No. 6 and permit closure of the basin.

Two dikes split the Ash Basin No. 6 into three sub-basins. The "median dike" used to control suspended solids when fly ash was being discharged had a crest width of 15 feet and 3H:1V

[3] From "Slope Stability Assessment Brunner Island Ash Basin No. 6" by HDR Engineering, Inc. 2009.

north and south slopes. Originally twenty 12-inch uncontrolled pipes allowed water to pass through the embankment into the central basin, however the dike has since been breached, near the middle, to improve flow. At the time of the inspection the northern basin was almost completely filled in, though waste water is still routed through this area.

A second dike, at the southern end of the impoundment, separates the central sub-basin from the Polishing Pond. The dike was constructed similarly to the outer embankments however both the north and south slopes have approximately 10-foot thick clay liners. Discharge through the dike to the Polishing pond is via a 10-foot wide stoplog weir drop inlet, which joins a 48-inch concrete culvert and sluiceway. Water discharging from the central sub-basin to the Polishing Pond may be treated (if necessary) by treatment facilities housed on the dike.

Water exits the Polishing pond via two 60-inch diameter reinforced concrete drop inlet pipes at the eastern side of the inside embankments which joins a 48-inch reinforced concrete pipe (RCP) prior to discharging into the Susquehanna River. A headwall and 48-inch flap valve resides at the downstream discharge to prevent rising river water from charging the impoundment.

1.2.5 Operations and Maintenance

The embankment and its impoundment are operated and maintained by PPL personnel. Operations of the basin are limited to operation of pumps discharging waste water into the basin, operation of stoplogs (if necessary), and control of the pH water treatment facility at the Polishing Pond. According to PPL personnel maintenance of the dam includes bi-annually mowing slopes and repairs to erosion and sloughs.

Operation and maintenance of the Ash Basin No. 6 is regulated by the EPA under the National Pollutant Discharge Elimination System (NPDES) Permit No. PA 0008281. The basin is also regulated by the PADEP Office of Dam Safety and the PADEP Bureau of Land Recycling and Waste Management. Quarterly visual inspections are performed for the Office of Dam Safety at the Ash Basin No. 6 as well as more detailed annual inspections as required by the impoundments General Permit.

Fly ash is collected and stored in silos and bottom ash slurry sent through a bottom ash sluice trough/pond, adjacent to the power station. It is the intent of PPL that all ash be collected and beneficially used. Formerly, when ash was being sluiced to the basin, bottom ash was collected and sorted by a series of conveyors and screens and marketed. Most of the ash sent to the basin was collected by dredging out of the channel at the ash marketing area.

1.2.6 Size Classification

For the purposes of this EPA-mandated inspection, the size of the dam and its impoundment will be based on United States Army Corps of Engineers (USACE) criteria. Ash Basin No. 6 in its current configuration has a maximum embankment height of approximately 30 feet to natural ground and an original storage volume of approximately 2,600 acre-feet at the top of embankment. Therefore in accordance with USACE criteria the Ash Basin No. 6 is classified as an **Intermediate** sized structure. According to guidelines established by the U.S. Army Corps of Engineers dams with a storage volume between 1,000 and 50,000 acre-feet and/or a height between 40 and 100 feet are classified as Intermediate sized structures. It is noted that the State of Pennsylvania uses the same classification

guidelines as the USACE. Under the PADEP guidelines the dam is classified as a **Class B** structure (Intermediate).

The maximum dam height of approximately 30 feet is based on the height of the dam at the outside face from the crest to natural ground surface. Based upon original design drawings, the top of dam has an elevation of approximately 290 feet, and low point along the toe of the embankment is approximately 260 feet. This is consistent with the dam height reported by PPL's independent dam engineering consultant HDR Engineering, Inc. of Portland Maine (HDR) in their 2009 inspection report. Note that the inside face has an approximate height from the crest to bottom of basin of 39 feet.

1.2.7 Hazard Potential Classification

Under the EPA classification system, as presented on page 2 of the EPA check list (**Appendix C**) and Definitions section (**Appendix B**), it is GZA's opinion that the Ash Basin No. 6 is a **Significant** Hazard potential structure. The hazard potential rating is based on GZA's opinion that failure of the embankment is not likely to result in loss of human life, due to the size of the structure, limited habitation adjacent to the basin buffering of impacts by the Susquehanna River. Additionally it is noted that the majority of the 70 acre-sized impoundment has been filled with ash waste covered with soil, there is no contributing watershed and only approximately 11 acres has standing water. Never the less, given the height of the embankment, and the amount of water and ash stored therein, a sudden uncontrolled release could cause economic loss and environmental damage to the adjacent Susquehanna River or adjacent rural land. The area downstream of the dam is shown in **Figure 4**.

The Ash Basin No. 6 has been classified as a Category 2 hazard potential structure according to the PADEP Dam Safety Regulations. Failure of a Category 2 structure may lead to "appreciable" economic loss and loss of life is "few."

1.3 Pertinent Engineering Data

1.3.1 Drainage Area

Based on the design documents and as estimated by GZA, Ash Basin No. 6 does not receive drainage from the surrounding areas. Water entering the basin is pumped from the Equalization Pond (entering northeast corner) and residual waste water from the bottom ash sluice trough/pond tank (entering the northwest corner). The only uncontrolled water that enters the impoundments is from direct precipitation. The estimated drainage area is shown in **Figure 3A**. Note as described in Section 1.2.4 CCWs are no longer sluiced into Ash Basin No. 6 as they formerly were due to the construction of dry fly ash handling silos and the sluice trough/pond tank for bottom ash handling.

According to PPL personnel within approximately 1 to 1.5 years from the time of this inspection, the Ash Basin No. 6 will be closed and capped. Topsoil is being stockpiled at the impoundment currently.

1.3.2 Impoundment

The Ash Basin No. 6 has a surface area of approximately 70 acres and an original storage volume of 2,600 acre-feet at the top of embankment, elevation 290 feet. The basin is formed of an approximately 8,300 foot perimeter dike with an approximate height to natural ground of 30 feet and a depth from the top of embankment to the bottom of the basin of approximately 39 feet. Two intermediate dikes divide the basin into three sub-basins. The northern sub-basin was almost entirely silted in with ash at the time of this inspection and the center basin, was partially full. The southern basin, or polishing pond, is used for final clarification and pH treatment of water prior to being discharged into the Susquehanna River.

1.3.3 Discharges at the Dam Site

Plant waste water from the Equalization Pond and residual waste water from the bottom ash sluice trough/pond enter the impoundment at the northeast and northwest corners, respectively. Water flows south through the filled in north sub-basin through an approximately 12 to 20 foot wide channel[4] prior to entering the central sub-basin. The central sub-basin drains into the polishing pond and water treatment facility through a 10-foot wide stoplog weir drop inlet, which joins a 48-inch concrete culvert and sluiceway. Water exits the Ash Basin No. 6 Polishing Pond via two 60-inch diameter reinforced concrete drop inlet pipes at the eastern side of the inside embankments which joins a 48-inch reinforced concrete pipe (RCP) prior to discharging into the Susquehanna River. A headwall and 48-inch flap valve resides at the downstream discharge to prevent rising river water from charging the impoundment.

Formerly when CCWs were being discharged into the impoundment, discharges had been as high as 15 MGD. Flows at the time of inspection were significantly smaller.

1.3.4 General Elevations (feet)

Elevations are from design drawings, reports and data provided by PPL.

A.	Top of Dam (Minimum)	290 ± feet
B.	Spillway Design Flood Pool (Design)	Unknown
C.	Low Point along Toe of Dam	± 260 feet
D.	Downstream Tail Water at Time of Inspection	± 252 feet

Central Sub-Basin:

A.	Normal Pool	287 feet
B.	Spillway Crest	286.25 feet[5]
C.	Pool at Time of Inspection	± 286.5 feet

Polishing Pond:

A.	Normal Pool (Polishing Pond)	268 feet
B.	Spillway Crest	268 feet

[4] Channel width estimated by Google Earth.
[5] One level of stoplogs removed in 2009, lowering the weir crest approximately 9 inches.

C. Pool at Time of Inspection ± 268 feet

1.3.5 Spillway Data

Central Sub-Basin:

A.	Type	Concrete stoplog weir
B.	Weir Length	10 feet 48-inch RCP & Sluiceway
C.	Weir Crest/Control Elevation	287 feet

Polishing Pond:

A.	Type	RCP Drop Inlets
B.	Diameter	60-inches (Two) Joining a; 48-inch RCP Outlet
C.	Weir Crest/Control Elevation	268 feet

1.3.6 Design and Construction Records and History

The Ash Basin No. 6 was designed by Pennsylvania Power and Light Company approximately 1979. Subsurface explorations were performed at the site in February and March of 1975 and January and February of 1977. Bedrock was encountered between approximate elevations 242 and 252 feet and according to a report for Pennsylvania Power and Light Company bedrock conditions consisted of the following:

Triassic Age New Orford formation which consists of light colored sandstone, conglomeratic sandstone, red to purplish red sandstone, shale and mudstone… The rock is highly fractured as a result of its vertical joint pattern which is very closely spaced, moderately developed and open.[6]

Because of the relatively shallow bedrock, it was determined to proved adequate cutoff the embankments were to be constructed directly on bedrock. Embankments were constructed of native sandy silt and silty clay identified during the subsurface explorations and excavated as part of the basin construction. An approximately 10 foot thick relatively impermeable clay liner was also constructed at the inside face from elevation 287.5 feet to bedrock.

According to PPL personnel approximately 2 to 3 years prior to the date of this inspection a concrete bottom ash sluice trough/pond tank was constructed for the purpose of removing and collecting bottom ash CCWs prior to reaching the Ash Basin No. 6. Dry fly ash precipitators and silos also remove fly ash CCWs for beneficial reuse. Residual water from the bottom ash and fly ash treatment facilities at the time of this inspection was pumped to Ash Basin No. 6. A waste water treatment facility was under construction at the time of this inspection adjacent to the sluice trough/pond tank, which will treat residual water from the CCW collection facilities, eliminating discharges into the Ash Basin No. 6. Upon completion of the residual waste water treatment facility, PPL intends to terminate all discharges into and close Ash Basin No. 6. PPL estimates closure of the basin may begin in 1 to 1.5 years from the date of

[6] Report on Investigation of Foundation Conditions for Ash Storage Basins 6 and 7 Brunner Island S.E.S., Prepared by Borings, Soils & Testing Company, Harrisburg, PA for Pennsylvania Power and Light Company.

this inspection. Final cover soil was observed stockpiled at the north sub-basin (filled in) and is reportedly from farmland previously owned by PPL which is currently being developed into a golf course. Approximately 1 foot of clay (or synthetic liner), drainage layer, and two feet of soil are proposed to create an impermeable cap for the basin.

In 2009, stability analyses were performed by HDR. As part of the investigation four open standpipe piezometers were installed (B09-1 to B09-4). Refer to Section 2.6 below for additional discussion of the results of this study.

1.3.7 Operating Records

No operating records were available for GZA to review at the time of this inspection.

1.3.8 Previous Inspection Reports

Quarterly visual inspections are performed for the Office of Dam Safety at the Ash Basin No. 6 as well as more detailed annual inspections as required by the impoundments General Permit. The two most recent annual inspections of the dam, by HDR were conducted on November 4, 2009 and December 17, 2010. A summary of recommendations from the 2009 report are as follows:

- Continue regular maintenance of the slopes including mowing, repairing sloughs, and plan vegetation cutting beyond the toe.
- Eradicate burrowing animals and fill burrows whenever they are encountered in the embankment or within 50 feet of the toe.
- Address historic slope sloughing and wet areas on the embankments as well as address the recommendations for slope stability by HDR.
- PPL staff should monitor discharge levels to verify no constrictions occur upstream of the discharge points into the Ash Basin No. 6.
- Investigate the effect of the broken corrugated metal pipe and joint in the sedimentation basin at the northwest corner of the basin on seepage observed at the toe.
- Investigate the 2 to 3 foot high diversion dike on the interior of the basin at the northeast corner and the possibility of it retaining ash and water. Installation of a monitoring and/or warning system is recommended.

PPL continues to mow embankments bi-annually. Actions to remediate slope stability deficiencies have not yet been undertaken, however at the time of the inspection PPL was further investigating slope stability concerns and seepage recommendations.

2.0 INSPECTION

2.1 Visual Inspection

Ash Basin No. 6 was inspected on May 18, 2011 by Brad Nourse and James P. Guarente, P.E. of GZA GeoEnvironmental, Inc. At the time of the inspection the weather was cloudy with occasional rain and temperatures in the 60°s Fahrenheit. Photographs to document the current conditions of the embankments were taken during the inspection and are included in **Appendix D**. At the time of the inspection the water level in Ash Basin No. 6 was

approximately 286.5 feet, based on stop log settings. Underwater areas were not inspected, as this level of investigation was beyond that of GZA's scope of services. Copies of the EPA checklists are included in **Appendix C**. For additional detail a separate inspection checklist for the Polishing Pond has been provided.

With Respect to our visual inspection there was no evidence of prior releases or failures observed by GZA.

2.1.1 Ash Basin No. 6 General Findings

Overall the Ash Basin No. 6 was found to be in **POOR** condition primarily due to inadequate factors of safety for the rapid drawdown condition, which exists for downstream embankment slopes that are in close proximity to the Susquehanna River as reported by HDR during their 2009 stability analysis. An overall site plan showing the Ash Basin No. 6 and associated Polishing Pond is provided as **Figure 5A**. The location and orientation of photographs provided in Appendix D is shown on the Photo Location Plan in **Figure 6A and 6B**. The specific concerns are identified in more detail in the sections below.

The IWTB and the Equalization Pond, do not meet the criteria set forth by the U.S. EPA for coal ash impoundments as described in Section 1.2.3. ***Both the IWTB and Equalization Pond were inspected during the site visit and checklists have been included in*** **Appendix C*, however no further discussion is provided below.*** Photographs, site sketches, and figure have been included for the IWTB and Equalization Pond for reference.

2.1.2 East Embankment

The East embankment generally appeared to be in fair condition. Grass and vegetation was overgrown at the outside slope and was approximately 12 to 36 inches in height (Photos 6 & 12). Standing water was observed at the toe, however heavy rains from the week prior to the inspection and recently high river levels from the Susquehanna may have contributed to the conditions at the toe (Photo 13). An approximately 40 foot wide spongy/soft area of ground was noted at the southern portion near the Polishing Pond to approximately 1/3 up the embankment, no movement was noted. A scarp was observed at the downstream toe approximately 75 feet south of the stairs from the crest (Photo 14).

The crest of the west embankment consisted of a crushed stone travel way. Minor depressions and ruts were noted a various locations along the crest (Photo7).

A corrugated metal pipe was observed approximately 100 feet south of the access stairs on the outside east embankment slope (Photo 15). This appears to be a remnant discharge structure for a sedimentation basin used during the construction of the Ash Basin No. 6. Reportedly another exists at the West Embankment, however this was not observed by GZA during this inspection.

2.1.3 West Embankment

The West embankment generally appeared to be in fair condition. Overgrown vegetation approximately 12 to 36 inches in height was observed at the outside slope.

The crest of the west embankment consisted of a crushed stone travelway. Minor depressions and ruts were noted a various locations along the crest.

Stockpiles of top soil, for use during basin closure, were observed within the filled portion of the basin adjacent to the embankment. Material stockpiled close to an embankment may surcharge the embankment and put undue stress on it.

2.1.4 North Embankment (Photos 16, 17, & 19)

The north embankment separates Ash Basin No. 5 (closed) and Ash Basin No. 6. Most of the embankment crest is paved except at its east and west ends where the embankment crest is crushed stone. Both sides of the embankment are filled. Discharge pipes enter the basin at the northeast and northwest corners of the basin.

2.1.5 South Embankment (Polishing Pond)

Generally the Polishing Pond appeared to be in fair condition at the time of our inspection. Vegetation was observed to be overgrown to approximately 12 to 36 inches in height at both the inside and outside slopes, possibly obscuring deficiencies. Standing water and tire tracks/ruts were observed at the toe of slope near the southern most side and close to the new gate vault (Photos 31 & 32). According to PPL personnel, heavy rains and recently receded river levels may have contributed to abnormally wet conditions at the toe. A concrete patch was observed at the eastern side of the outside embankment (Photo 30), possibly a repaired seep or slough. PPL personnel on-site did not know the purpose of the concrete patch.

Several minor sloughs and scarps were observed near the waterline at the east side near the two 60-inch drop inlets and minor erosion at the downstream face of the southern separation dike (Photos 27. These sloughs appeared to be shallow (less than three feet deep). Stone and riprap was observed at the western side of the inside slope (Photo 26).

The crest generally appeared to be in satisfactory condition. Some depressions and tire tracks were noted from regular maintenance traffic.

2.1.6 Discharge Pipes and Decant Outflow Structures

Discharge pipes enter northeast and northwest corners of the Ash Basin No. 6. Waste water flow from the northeast discharge pipe is due to plant waste water flow pumped from the equalization pond and was flowing at the time of inspection (Photo 17). Water flows south in a discharge channel approximately 12 to 20 feet in width, through the filled in north sub-basin and joins with flow from the northwest corner prior to flowing into the central sub-basin. Discharge from the northwest corner is from residual waste water from the concrete bottom ash sluice trough/pond. At the time of the inspection discharge water appeared to contain CCWs (Photo 19). These

pipes will be taken off line when the Ash Basin No. 6 is closed in 1 to 1.5 years according to PPL personnel.

Water from the central basin flows into the Polishing Pond and water treatment system via a 10 foot wide decant stoplog weir and 48-inch pipe and sluiceway. At the time of the inspection the water was at approximate elevation 286.5 feet in the central basin. The structure appeared to be in satisfactory condition at the time of this inspection. Winches, cable, and skimmer gates appeared to be in satisfactory condition (Photo 4).

The outlet structure from the Polishing Pond consists of two 60-inch drop inlets feeding into a 48 inch RCP (Photos 24 & 25). The 48-inch pipe leads to a new gate vault just downstream of the toe of slope and upstream of the discharge point to the Susquehanna River (Photos 28 & 32). The Vault was designed by Kleinschmidt in 2007. Water then discharges through a headway and 48-inch flap gate to an approximately 10 foot wide discharge channel to the Susquehanna River (Photos 33 & 34). The drop inlets and gate vault appeared to be in satisfactory condition at the time of the inspection. Some surface erosion was observed at the discharge headwall.

2.2 Caretaker Interview

GZA met with Craig Shamory of PPL during the site visit on May 18, 2011 and discussed the operations and maintenance procedures, regulatory requirements, and the history of the impoundments since their construction. The observations, descriptions and findings presented herein this report reference our discussions with Mr. Shamory.

Mr. Shamory indicated during the on-site inspection that the Ash Basin No. 6, or IWTB and Equalization Pond, had failed since their construction.

2.3 Operation and Maintenance Procedures

As discussed in Section 1.2.5, PPL personnel are responsible for the regular operations and maintenance of the basin.

2.4 Emergency Warning System

No emergency action plan has been prepared for the Ash Basin No. 6.

2.5 Hydrologic/Hydraulic Data

No hydrologic or hydraulic data was available for review by GZA at the time of this inspection. GZA did not perform an independent assessment of the hydraulics and hydrology for the basins as this was beyond the scope of our services.

2.6 Structural and Seepage Stability

Field investigations and slope stability analysis were performed by HDR. A complete summary of parameters, loading conditions, and results are presented in their report entitled "Slope Stability Assessment Brunner Island Ash Basin No. 6" report by HDR dated December 2009. The evaluation included four borings drilled at the east embankment; two at the crest

and two at the downstream slope near the toe. HDR performed their stability analysis using the software UTEXAS4 and verified using SLOPE/W. HDR's analysis indicated that for the normal and surcharge loading condition, the stability of the embankment was slightly below recommended values. HDR however considered this condition as satisfactory as per their interpretation of COE Manual EM 1110-2-1902 which states: *"Acceptable values of factors of safety for existing dams may be less than those for design of new dams, considering the benefits of being able to observe the actual performance of the embankment over a period of time."* However factors of safety for the rapid drawdown condition were calculated by HDR to be less than the required minimum of 1.1 for the downstream embankment due to flooding from the Susquehanna River at the downstream slope during the 100 and 500-year floods. HDR therefore recommended that additional analyses could be performed to assess transient seepage conditions which may determine that a breach of the downstream embankment as a result of rapid drawdown would not occur. Otherwise they stated that remediation of the embankment would be warranted. GZA did not perform an independent assessment of the structural stability of the basins as this was beyond our scope of services.

Seepage is controlled by a 10 foot thick clay liner at the inside face of the embankment from elevation 287.5 feet to bedrock. No seepage analyses were available for review by GZA at the time of this inspection. GZA did not perform an independent assessment of the seepage stability of the basins as this was beyond our scope of services.

3.0 ASSESSMENTS AND RECOMMENDATIONS

3.1 Assessments

While GZA's visual inspection indicated the overall condition of Ash Basin No. 6 to generally be in FAIR condition, a rating of **POOR** has been assigned based primarily on the fact that results of the aforementioned stability analysis by HDR indicate insufficient factors of safety exist for the downstream embankment under the rapid drawdown scenario. Additional deficiencies are noted as follows:

1. Overgrown vegetation, up to 36 inches high, at outside embankment slopes and portions of inside embankment slopes. Overgrown vegetation may obscure potential detrimental embankment conditions.
2. Ruts and depressions observed at portions of the embankment toe from vehicles.
3. Saturated portions of embankment and standing water observed at the toe of dam at various locations around the polishing pond and east embankment. Conditions possibly due to heavy rainfall over the prior week. According to PPL personnel waters of the Susquehanna River had recently receded from the areas surrounding the toe of the embankment, which may also have contributed to the standing water and saturated conditions.
4. Sloughing observed at inside slope of the Polishing Pond, especially near the water line at the east side. Sloughs and scarps observed generally less than 3 feet deep.
5. Erosion from surface water runoff observed at the inside face of the Polishing Pond near the north end.
6. Approximately 40 foot long section of spongy/soft soil observed at the east embankment near the south side from the toe to approximately 1/3 the height of the embankment. Note this condition was also reported on previous inspection reports by HDR.
7. Minor depressions and erosion observed at the crest.

8. 10 to 15 foot wide slough/scarp at the east embankment approximately 75 feet south of the access stairway.
9. Large stock pile of top soil adjacent to the west embankment slope just north of the electric wire stanchion, possibly surcharging the embankment.

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

3.2 Studies and Analyses

GZA recommends the following studies and analyses:

1. Perform a detailed hydrologic and hydraulic study using current methodology to evaluate the impoundment's ability to safely pass the SDF at Ash Basin No. 6 and the Polishing Pond.

2. Perform a seepage analysis to assess the factor of safety of piping failure, at the Ash Basin No. 6.

3. A slope stability analysis had been performed by HDR in 2009. Results indicated that the stability of the downstream embankment is below required factors of safety for the rapid drawdown condition due to flooding from the Susquehanna at the downstream slope during the 100 and 500-yr floods. GZA concurs with HDR's recommendation that additional analyses could be performed to assess transient seepage conditions which may determine that an embankment breach, as a result of rapid drawdown on the downstream side, would not occur. Otherwise remediation of the embankment is warranted.

4. Investigate cause of spongy/soft ground observed at the east embankment.

3.3 Recurrent Operation & Maintenance Recommendations

GZA recommends the following operation and maintenance level activities:

1. Maintain grass cover on the downstream slope and approximately 15 feet beyond the toe area. USACE recommends vegetation be kept less than 12 inches in height on embankments. This may required mowing more frequently than bi-annually.

2. Fill ruts, depressions, and animal burrows and reseed if necessary.

3. Monitor and repair sloughing at the inside slope at the Polishing Pond and outside slope at the east embankment, or other locations sloughing is observed.

4. Exercise stoplogs and slide gates at least once annually.

5. Monitor spongy/soft ground observed at the east embankment.

3.4 Minor Repair Recommendations

GZA recommends the following minor repairs which may improve the overall condition of the basins, but do not alter their current design. The recommendations may require design by a professional engineer and construction contractor experienced in dam construction.

1. Repair sloughs and scarps on the embankment and provide future erosion protection as necessary.

3.5 Remedial Measures Recommendations

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

It is our understanding that permanent closure of the basin is expected to begin sometime in 2011 based on conversations with PPL personnel during the on-site inspection. In GZA's opinion it would be prudent for PPL to at least implement the above recommended operations and maintenance and minor repair activities. We acknowledge that implementation of some of the above studies and analyses and remedial measures recommendations may not be critical given the current permanent closure plans. However based on our review of the HDR report, we understand that the factor of safety for the rapid drawdown condition, which could occur during the recession of major flooding on the Susquehanna River, is below required minimum values. Therefore it must be noted that regardless of whether or not the basin is permanently closed, PPL will at a minimum need to address this stability inadequacy which exists on downstream embankment portions adjacent to/along the river.

3.6 Alternatives

There are no alternatives currently recommended.

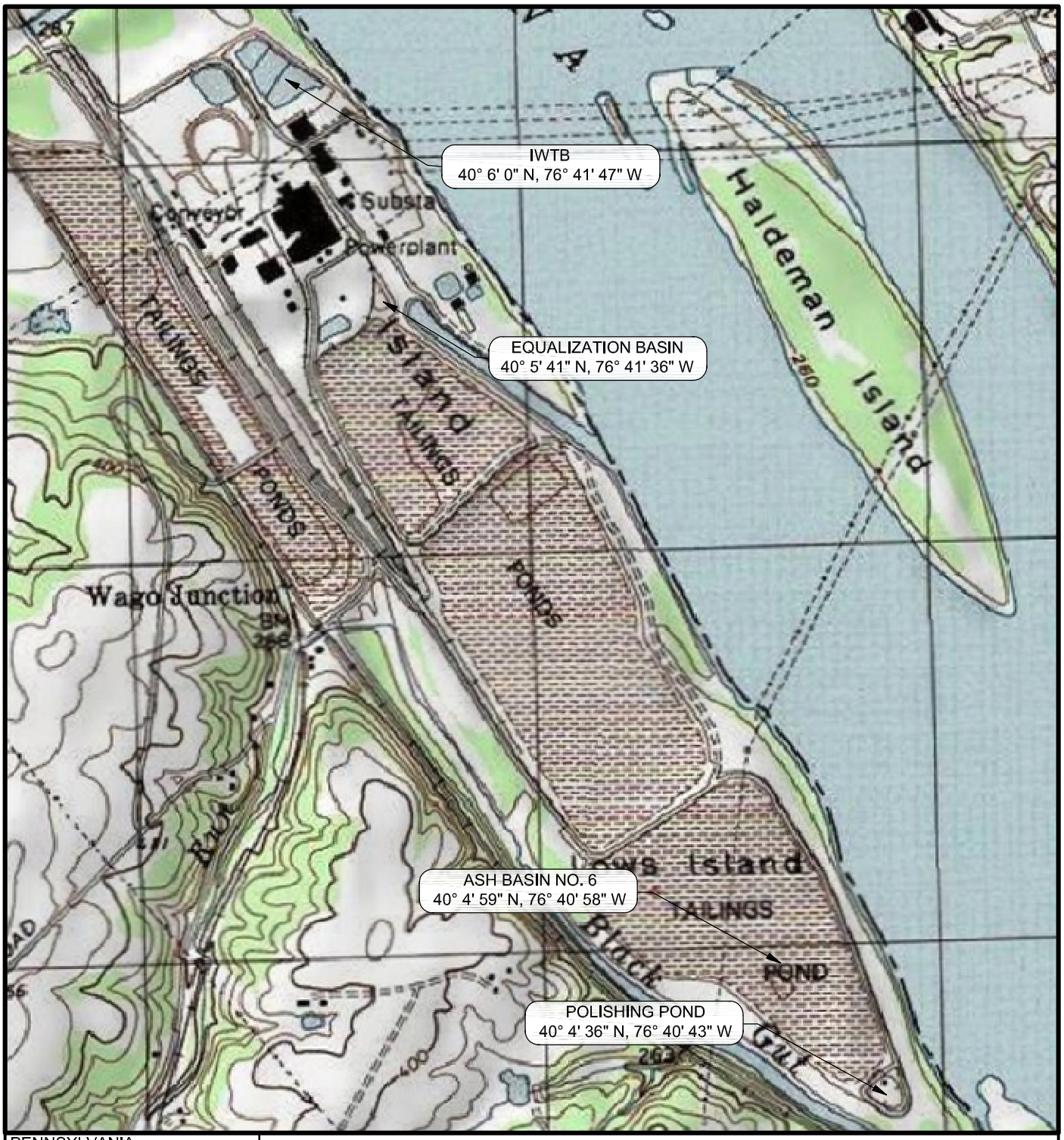
4.0 ENGINEER'S CERTIFICATION

I acknowledge that the management units referenced herein, Ash Basin No. 6 has been assessed to be in **POOR** condition on May 18, 2011.

James P. Guarente, P.E.
Senior Project Manager

J:\170,000-179,999\170142\170142-30 Round 10\PPL Brunner Island\Report\Stability Calc Edits\2nd Draft Report_text.docx

FIGURES



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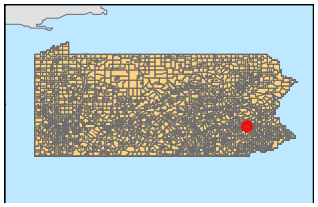

APPROXIMATE SITE LOCATION

SOURCE:

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

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SCALE IN FEET

PPL BRUNNER ISLAND
WAGO ROAD
YORK HAVEN, PA 17370

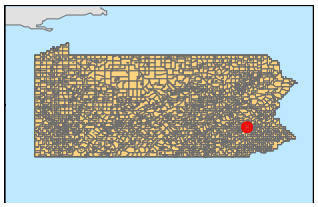
PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
THE U.S. ENVIRONMENTAL PROTECTION AGENCY RESOURCE AND RECOVERY

LOCUS MAP
COAL COMBUSTION
SURFACE IMPOUNDMENTS

PROJ MGR: UPG	REVIEWED BY: UPG	CHECKED BY: CKD	FIG OR DWG 1
DESIGNED BY: CBN	DRAWN BY: JRC	SCALE: 1":1200'	
DATE: 08-05-2011	PROJECT NO. 170142.30	REVISION NO.	SHEET NO.

PENNSYLVANIA



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ORTHO-PHOTO LOCUS MAP
COAL COMBUSTION
SURFACE IMPOUNDMENTS

PROJ MGR: UPG	REVIEWED BY: UPG	CHECKED BY: CKD	FIG OR DWG 2
DESIGNED BY: CBN	DRAWN BY: JRC	SCALE: 1":1200'	
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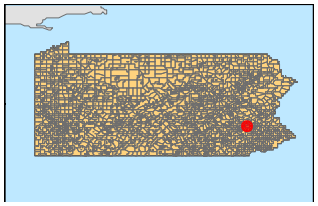

APPROXIMATE SITE LOCATION

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SCALE IN FEET

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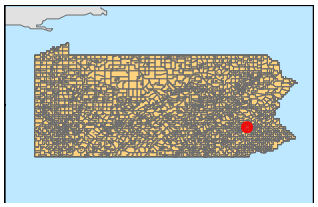
DOWNSTREAM AREA MAP
COAL COMBUSTION
SURFACE IMPOUNDMENTS

PROJ MGR: JPG	REVIEWED BY: JPG	CHECKED BY: CKD	FIG OR DWG 3
DESIGNED BY: CBN	DRAWN BY: CBN	SCALE: 1":5000'	
DATE: 08-05-2011	PROJECT NO. 170142.30	REVISION NO.	SHEET NO.

PENNSYLVANIA



APPROXIMATE SITE LOCATION

SOURCE:

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SCALE IN FEET

PPL BRUNNER ISLAND
WAGO ROAD
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ASH BASIN NO. 6 (WITH ASSOCIATED POLISHING POND) DRAINAGE AREA
COAL COMBUSTION SURFACE IMPOUNDMENTS

PROJ MGR: JPG	REVIEWED BY: JPG	CHECKED BY: CKD	FIG OR DWG 4
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DATE: 08-05-2011	PROJECT NO. 170142.30	REVISION NO.	SHEET NO.

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1" = 400'

PENNSYLVANIA

APPROXIMATE SITE LOCATION

SOURCE:

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PPL BRUNNER ISLAND
WAGO ROAD
YORK HAVEN, PA 17370

SITE PLAN/FIELD SKETCH
ASH BASIN NO. 6 & POLISHING POND
COAL COMBUSTION SURFACE IMPOUNDMENTS

PREPARED BY:		PREPARED FOR:	
GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		THE U.S. ENVIRONMENTAL PROTECTION AGENCY RESOURCE AND RECOVERY	
PROJ MGR: JPG	REVIEWED BY: JPG	CHECKED BY: PHB	FIGURE 5
DESIGNED BY: CBN	DRAWN BY: CBN	SCALE: 1" = 400'	SHEET NO.
DATE: 08-05-2011	PROJECT NO. 170142.30	REVISION NO.	

LEGEND

1 GZA PHOTO LOCATION/DIRECTION

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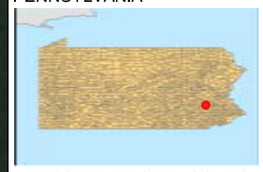

APPROXIMATE SITE LOCATION

SOURCE:

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

PPL BRUNNER ISLAND
WAGO ROAD
YORK HAVEN, PA 17370

PHOTO LOCATION PLAN
BASIN 6
COAL COMBUSTION SURFACE IMPOUNDMENTS

PREPARED BY:		PREPARED FOR:	
GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		THE U.S. ENVIRONMENTAL PROTECTION AGENCY RESOURCE AND RECOVERY	
PROJ MGR: JPG	REVIEWED BY: JPG	CHECKED BY: PHB	FIGURE 6A
DESIGNED BY: CBN	DRAWN BY: CBN/OCO	SCALE: 1" = 300'	
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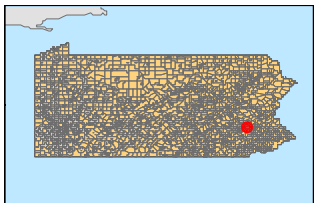
PENNSYLVANIA



APPROXIMATE SITE LOCATION

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PPL BRUNNER ISLAND
WAGO ROAD
YORK HAVEN, PA 17370

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
THE U.S. ENVIRONMENTAL PROTECTION AGENCY RESOURCE AND RECOVERY

PHOTO LOCATION PLAN
BOTTOM ASH TREATMENT SYSTEM
COAL COMBUSTION SURFACE IMPOUNDMENTS

PROJ MGR: JPG	REVIEWED BY: JPG	CHECKED BY: PHB	FIGURE 6B
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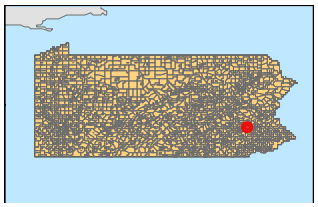
DATE: 08-05-2011	PROJECT NO. 170142.30	REVISION NO.	SHEET NO.

PENNSYLVANIA



APPROXIMATE SITE LOCATION

SOURCE:

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

0 50 100 200

1" = 100'

N W E S

PPL BRUNNER ISLAND
WAGO ROAD
YORK HAVEN, PA 17370

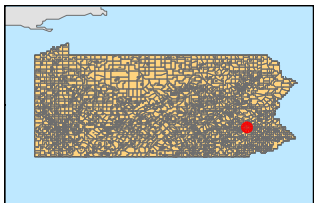
PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
THE U.S. ENVIRONMENTAL PROTECTION AGENCY RESOURCE AND RECOVERY

PHOTO LOCATION PLAN
BASIN 6 POLISHING POND
COAL COMBUSTION SURFACE IMPOUNDMENTS

PROJ MGR: JPG	REVIEWED BY: JPG	CHECKED BY: PHB	FIGURE 6C
DESIGNED BY: CBN	DRAWN BY: CBN	SCALE: 1" = 100'	
DATE: 08-05-2011	PROJECT NO. 170142.30	REVISION NO.	SHEET NO.

PENNSYLVANIA



APPROXIMATE SITE LOCATION

SOURCE:

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

0 50 100 200

1" = 100'

N W E S

PPL BRUNNER ISLAND
WAGO ROAD
YORK HAVEN, PA 17370

PREPARED BY:
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Engineers and Scientists
www.gza.com

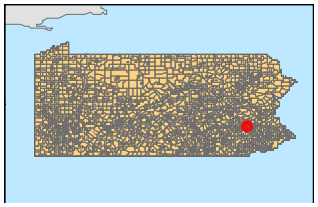
PREPARED FOR:
THE U.S. ENVIRONMENTAL PROTECTION AGENCY RESOURCE AND RECOVERY

PHOTO LOCATION PLAN
EQUALIZATION POND
COAL COMBUSTION SURFACE IMPOUNDMENTS

PROJ MGR: JPG	REVIEWED BY: JPG	CHECKED BY: PHB	FIGURE 6D
DESIGNED BY: CBN	DRAWN BY: CBN/OCO	SCALE: 1"=100'	
DATE: 08-05-2011	PROJECT NO. 170142.30	REVISION NO.	SHEET NO.

NOTE:
SOME PHOTO LOCATION INDICATORS WERE MOVED FOR CONVENIENCE AND MAY NOT BE IN THE EXACT LOCATION OF THE PHOTO.

PENNSYLVANIA



APPROXIMATE SITE LOCATION

SOURCE:

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

0 75 150 300

1"=150'

N W E S

PPL BRUNNER ISLAND
WAGO ROAD
YORK HAVEN, PA 17370

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
THE U.S. ENVIRONMENTAL PROTECTION AGENCY RESOURCE AND RECOVERY

PHOTO LOCATION PLAN
INCIDENTAL WASTE TREATMENT BASIN (IWTB)
COAL COMBUSTION SURFACE IMPOUNDMENTS

PROJ MGR: JPG	REVIEWED BY: JPG	CHECKED BY: PHB	FIGURE 6E
DESIGNED BY: CBN	DRAWN BY: OCO	SCALE: 1" = 150'	
DATE: 08-05-2011	PROJECT NO. 170142.30	REVISION NO.	SHEET NO.

APPENDIX A

LIMITATIONS

DAM ENGINEERING & VISUAL INSPECTION LIMITATIONS

1. The observations described in this report were made under the conditions stated herein. The conclusions presented in the report were based solely on the services described therein, and not on scientific tasks or procedures beyond the scope of described services.

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

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

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

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

6. GZA's comments on the hydrology, hydraulics, and embankment stability for the dam are based on a limited review of available design documentation provided by PPL Generation, LLC.

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

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

APPENDIX B

DEFINITIONS

COMMON DAM SAFETY DEFINITIONS

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

Orientation

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

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

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

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

Dam Components

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

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

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

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

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

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

General

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

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

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

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

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

Hydraulic Height – means the height to which water rises behind a dam and the difference between the lowest point in the original streambed at the axis of the dam and the maximum controllable water surface.

Maximum Water Storage Elevation – means the maximum elevation of water surface which can be contained by the dam without overtopping the embankment section.

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

Maximum Storage Capacity – The volume of water contained in the impoundment at maximum water storage elevation.

Normal Storage Capacity – The volume of water contained in the impoundment at normal water storage elevation.

Condition Rating

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

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

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

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

Hazard Potential

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

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

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

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

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

APPENDIX C

INSPECTION CHECKLISTS

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	PPL Brunner Island	Date:	May 18, 2011
Unit Name:	Ash Basin No. 6 Impoundment	Operator's Name:	PPL Brunner Island, LLC
Unit I.D.:		Hazard Potential Classification:	High Significant Low ✓
Inspector's Name:	James P. Guarente, P.E. and C. Brad Nourse (GZA GeoEnvironmental, Inc.)		

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

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Daily		18. Sloughing or bulging on slopes?	✓	
2. Pool elevation (operator records)?	287.3' +/-		19. Major erosion or slope deterioration?		✓
3. Decant inlet elevation (operator records)?	See note		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?		✓
5. Lowest dam crest elevation (operator records)?	N/A		Is water exiting outlet, but not entering inlet?		✓
6. If instrumentation is present, are readings recorded (operator records)?	✓		Is water exiting outlet flowing clear?	✓	
7. Is the embankment currently under construction?		✓	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	✓		From underdrain?		✓
9. Trees growing on embankment? (If so, indicate largest diameter below)	✓		At isolated points on embankment slopes?	✓	
10. Cracks or scarps on crest?		✓	At natural hillside in the embankment area?		✓
11. Is there significant settlement along the crest?		✓	Over widespread areas?		✓
12. Are decant trashracks clear and in place?	✓		From downstream foundation area?		✓
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		✓	"Boils" beneath stream or ponded water?		✓
14. Clogged spillways, groin or diversion ditches?		✓	Around the outside of the decant pipe?		✓
15. Are spillway or ditch linings deteriorated?		✓	22. Surface movements in valley bottom or on hillside?		✓
16. Are outlets of decant or underdrains blocked?		✓	23. Water against downstream toe?		✓
17. Cracks or scarps on slopes?		✓	24. Were Photos taken during the dam inspection?	✓	

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

Inspection Issue #	Comments
1.	Daily walk over by plant personnel; quarterly inspection by civil engineer from operator's home office. Yearly inspection with report by independent outside consultant.
3.	Invert of pipe leading to polishing pond is at elevation 271.0'. Skimmer gates and stoplogs at intake structure serve to maintain pool level within basin generally between el. 286.5 to 287.5' +/-.
6.	Four embankment piezometers generally read during annual inspection; staff gage at inlet and electric water level transducers are read/monitored regularly.
9.	Dense phragmites and related grass/shrubbery present on slope around entire inside of free standing water limits. Presence prevented close inspection of these areas.
18.	Occasional minor sloughing at various locations on downstream slopes of embankment. Site monitors conditions and repairs/regrades when necessary.
21.	Saturated conditions and shallow standing water observed along a portion of the downstream toe. May be a result of past month's heavy rainfall and high river conditions. No flow/active seepage observed. All standing water clear.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # PA 0008281 INSPECTOR James P. Guarente, P.E.
C. Brad Nourse

Date May 18, 2011

Impoundment Name PPL Brunner Island - Ash Basin No. 6 Impoundment
Impoundment Company PPL Brunner Island, LLC
EPA Region Region III
State Agency (Field Office) Addresss DEP South Central Regional Office
909 Elmerton Avenue, Harrisburg, PA 17710
Name of Impoundment PPL Brunner Island - Ash Basin No. 6
(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New _____ Update X

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

IMPOUNDMENT FUNCTION: Receives inflow from bottom ash slurry treatment system and residual waste water from the equalization pond.

Nearest Downstream Town : Name Saginaw, PA
Distance from the impoundment 1.0 miles measured in straight line on Google Earth.
Impoundment
Location: Longitude 76 Degrees 40 Minutes 58 Seconds
Latitude 40 Degrees 4 Minutes 59 Seconds
State PA County York

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

If So Which State Agency? PADEP Office of Dam Safety and PADEP Bureau of Land Recycling and Waste Management

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

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

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

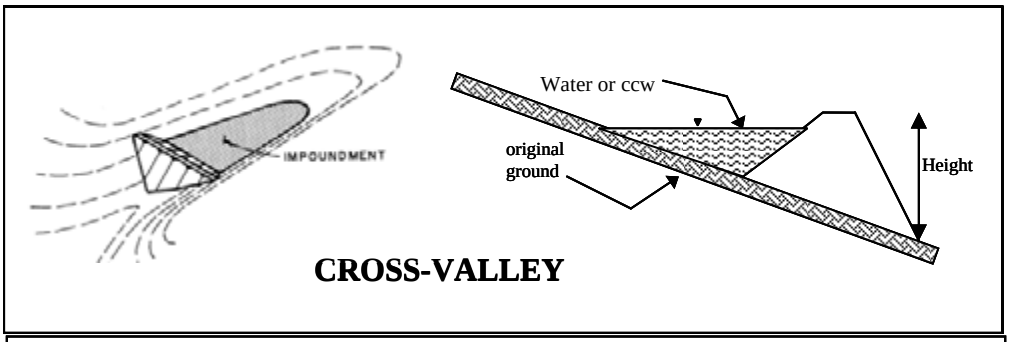
__X__ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns.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

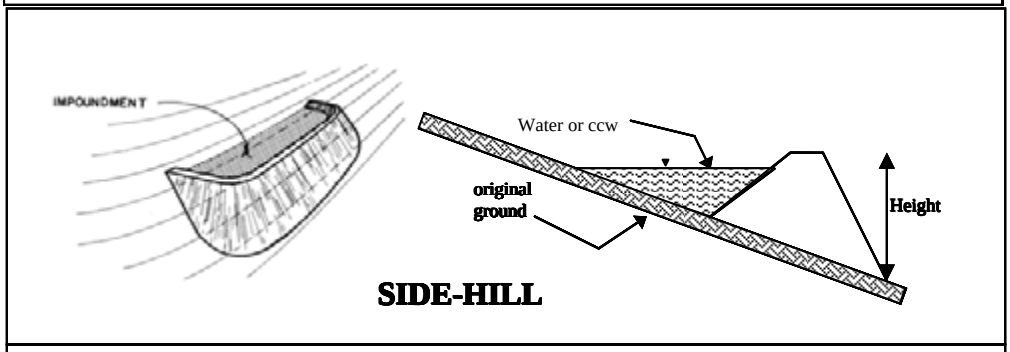
_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

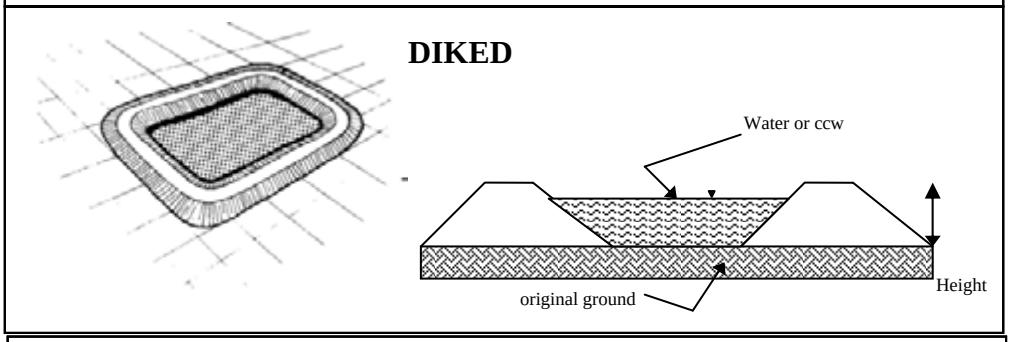
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

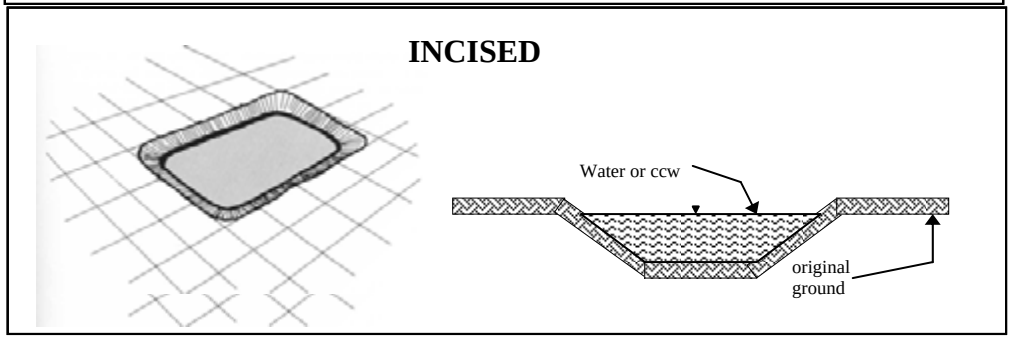
According to the 2010 Annual Inspection Report by HDR Engineering, Inc., the Ash Basin Dam is classified as a Size B, Hazard Classification 2 by the Pennsylvania Department of Environmental Protection (PADEP) corresponding to a medium sized, significant hazard potential dam. In our opinion, failure of the impoundment is not likely to result in loss of human life. Additionally, it is noted that the majority of the 70 acre-sized impoundment has been filled with ash waste covered with soil, there is no contributing watershed and only approximately 11 acres has free standing water. Nevertheless given the height of the embankment, and the amount of water and ash stored therein, a sudden uncontrolled release could cause economic loss and environmental damage to the adjacent Susquehanna River or adjacent rural land area.

CONFIGURATION:









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

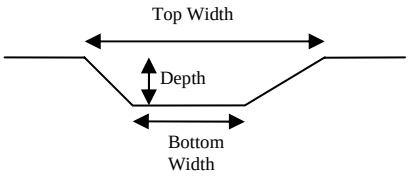
Embankment Height **up to 39** feet
Pool Area **approximately 11** acres
Current Freeboard **approximately 3** feet

Embankment Material **Original design drawings specified inorganic fill from basin excavation be used to construct embankment slopes.**
Liner **Original design drawings specified a 10-foot thick clay liner on the upstream slope.**
Liner Permeability **Essentially impermeable.**

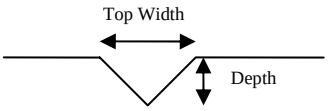
TYPE OF OUTLET (Mark all that apply)

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

TRAPEZOIDAL

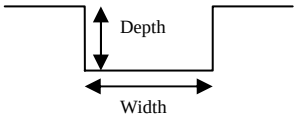


TRIANGULAR

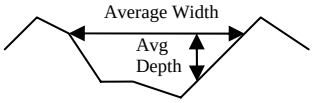


_____ depth
_____ bottom (or average) width
_____ top width

RECTANGULAR

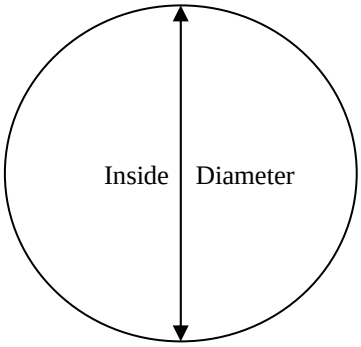


IRREGULAR



__X__ **Outlet**

__48"__ inside diameter



Material
_____ corrugated metal
_____ welded steel
__X__ 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 **Original (circa 1978) design by Pennsylvania Power and Light Company; modifications by Kleinschmidt Energy and Water Resource Consultants.**

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: _____

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	PPL Brunner Island	Date:	May 18, 2011
Unit Name:	Ash Basin No. 6 (Polishing Pond)	Operator's Name:	PPL Brunner Island, LLC
Unit I.D.:		Hazard Potential Classification:	High Significant Low ✓
Inspector's Name:	James P. Guarente, P.E. and C. Brad Nourse (GZA GeoEnvironmental, Inc.)		

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

	Yes	No		Yes	No
1. Frequency of Company's Dam Inspections?	Daily		18. Sloughing or bulging on slopes?	✓	
2. Pool elevation (operator records)?	268'		19. Major erosion or slope deterioration?		✓
3. Decant inlet elevation (operator records)?	See note		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?		✓
5. Lowest dam crest elevation (operator records)?	N/A		Is water exiting outlet, but not entering inlet?		✓
6. If instrumentation is present, are readings recorded (operator records)?		✓	Is water exiting outlet flowing clear?	✓	
7. Is the embankment currently under construction?		✓	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	✓		From underdrain?		✓
9. Trees growing on embankment? (If so, indicate largest diameter below)		✓	At isolated points on embankment slopes?	✓	
10. Cracks or scarps on crest?		✓	At natural hillside in the embankment area?		✓
11. Is there significant settlement along the crest?		✓	Over widespread areas?		✓
12. Are decant trashracks clear and in place?	✓		From downstream foundation area?		✓
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		✓	"Boils" beneath stream or ponded water?		✓
14. Clogged spillways, groin or diversion ditches?		✓	Around the outside of the decant pipe?		✓
15. Are spillway or ditch linings deteriorated?		✓	22. Surface movements in valley bottom or on hillside?		✓
16. Are outlets of decant or underdrains blocked?		✓	23. Water against downstream toe?		✓
17. Cracks or scarps on slopes?		✓	24. Were Photos taken during the dam inspection?	✓	

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

Inspection Issue #	Comments
1.	Daily walk over by plant personnel; quarterly inspection by civil engineer from operator's home office. Yearly inspection with report by independent outside consultant.
3.	Invert of 48-inch diameter outlet pipe leading to Susquehanna River outfall is at elevation 253'. Outlet structure consists of two 60-inch diameter reinforced riser pipes with skimmer gates which serve to maintain pool level generally at elevation 268.0'.
9.	Moderate to dense grass growth present on slopes around entire inside of pond. Presence prevented close inspection of these areas.
18.	Occasional minor sloughing at various locations on downstream slopes of embankment. Site monitors conditions and repairs/regrades when necessary.
21.	Saturated conditions and shallow standing water observed along a majority of the downstream toe. May be a result of past month's heavy rainfall and high river conditions. No flow/active seepage observed. All standing water clear.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # PA 0008281 INSPECTOR C. Brad Nourse
James P. Guarente, P.E.
Date May 18, 2011

Impoundment Name PPL Brunner Island (Ash Basin No. 6) Polishing Pond
Impoundment Company PPL Brunner Island LLC
EPA Region Region III
State Agency (Field Office) Addresss DEP South Central Regional Office
909 Elmerton Ave.,Harrisburg,PA 17710
Name of Impoundment PPL Brunner Island (Ash Basin No. 6) Polishing Pond
(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New _____ Update X

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

(water enters polishing pond via gravity flow from Ash Basin No. 6 intake structure outlet pipe)

IMPOUNDMENT FUNCTION: Receives decant inflow from Ash Basin No. 6 Impoundment.

Nearest Downstream Town : Name Saginaw, Pa
Distance from the impoundment 1.0 miles measured in a straight line on Google Earth.
Impoundment
Location: Longitude 76 Degrees 40 Minutes 43 Seconds
Latitude 40 Degrees 4 Minutes 36 Seconds
State PA County York

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

If So Which State Agency? PADEP Office of Dam Safety and PADEP Bureau of Land Recycling and Waste Management

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.

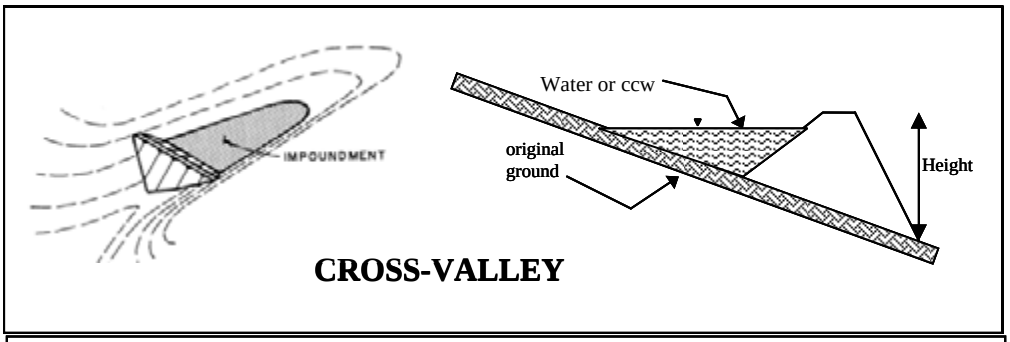
_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns.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

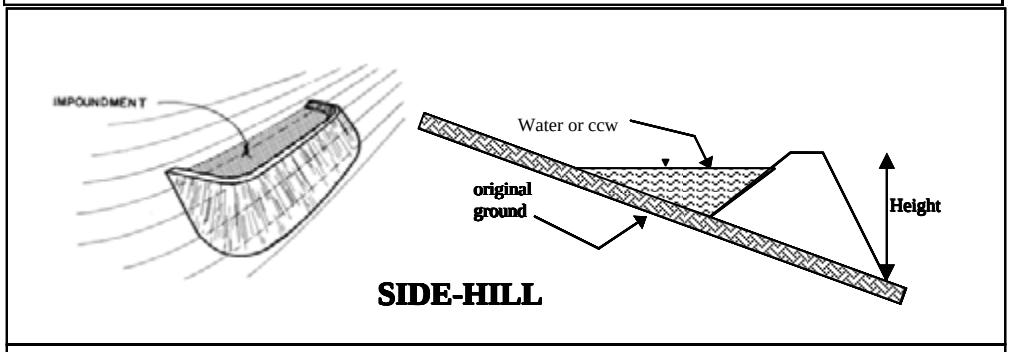
_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

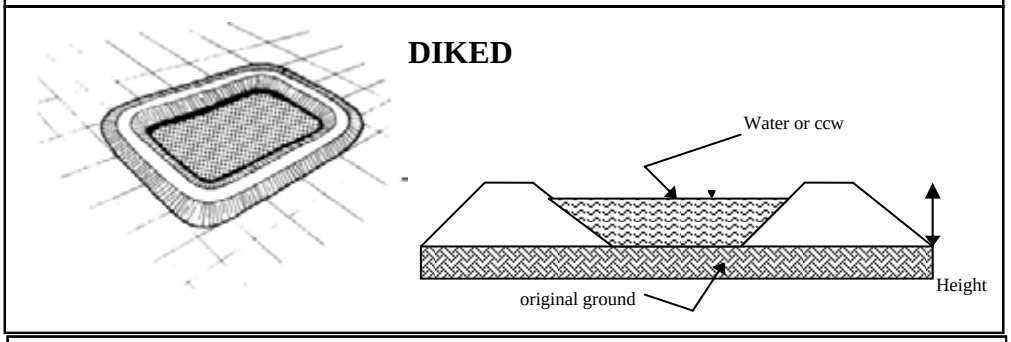
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

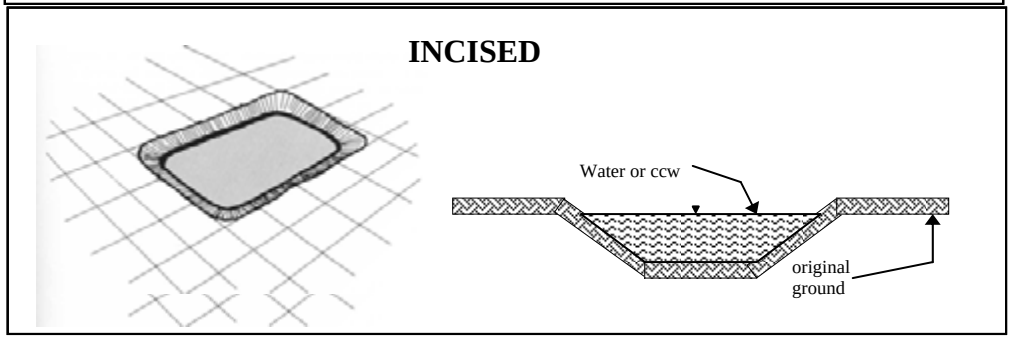
In our opinion, failure of the polishing pond embankment is not likely to results in loss of human life. Additionally, considering the size of the pond is less than one acre, environmental damage to the Susquehanna River or adjacent land area resulting from a failure is estimated to be low.

CONFIGURATION:









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

Embankment Height **up to 39** feet
Pool Area **less than one** acres
Current Freeboard **approx. 22** feet

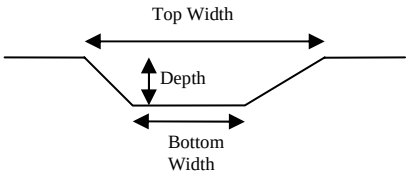
Embankment Material **Original design drawings specified inorganic fill from excavation be used to construct embankment slopes.**
Liner **Original design drawing specified a 10-foot thick clay liner on the upstream slope.**
Liner Permeability **Essentially impermeable.**

TYPE OF OUTLET (Mark all that apply)

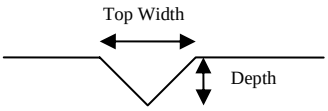
_____ **Open Channel Spillway**
_____ Trapezoidal
_____ Triangular
_____ Rectangular
_____ Irregular

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

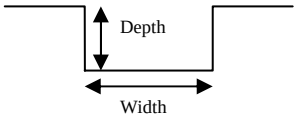
TRAPEZOIDAL



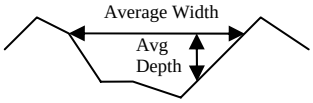
TRIANGULAR



RECTANGULAR

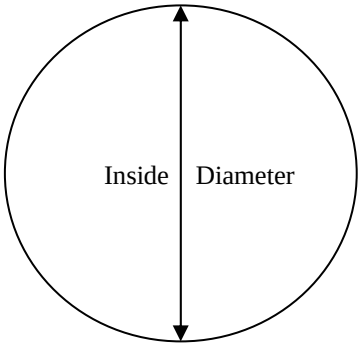


IRREGULAR



__X__ **Outlet**

__48"__ inside diameter



Material
_____ corrugated metal
_____ welded steel
__X__ 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 **Originally designed by Pennsylvania Power and Light Company; modifications by Kleinschmidt Energy and Water Resource Consultants.**

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 : _____

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

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

If so Please Describe : _____

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	PPL Brunner Island	Date:	May 18, 2011
Unit Name:	Incidental Waste Treatment Basin	Operator's Name:	PPL Brunner Island, LLC
Unit I.D.:		Hazard Potential Classification:	High Significant Low ✓
Inspector's Name:	James P. Guarente, P.E. and C. Brad Nourse (GZA GeoEnvironmental, Inc.)		

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?	See note		18. Sloughing or bulging on slopes?		✓
2. Pool elevation (operator records)?	267' +/-		19. Major erosion or slope deterioration?		✓
3. Decant inlet elevation (operator records)?	265.3' +/-		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?		✓
5. Lowest dam crest elevation (operator records)?	272.5' +/-		Is water exiting outlet, but not entering inlet?		✓
6. If instrumentation is present, are readings recorded (operator records)?	See	note	Is water exiting outlet flowing clear?	✓	
7. Is the embankment currently under construction?		✓	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	✓		From underdrain?		✓
9. Trees growing on embankment? (If so, indicate largest diameter below)	✓		At isolated points on embankment slopes?		✓
10. Cracks or scarps on crest?	✓		At natural hillside in the embankment area?		✓
11. Is there significant settlement along the crest?		✓	Over widespread areas?		✓
12. Are decant trashracks clear and in place?		✓	From downstream foundation area?		✓
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		✓	"Boils" beneath stream or ponded water?		✓
14. Clogged spillways, groin or diversion ditches?		✓	Around the outside of the decant pipe?		✓
15. Are spillway or ditch linings deteriorated?		✓	22. Surface movements in valley bottom or on hillside?		✓
16. Are outlets of decant or underdrains blocked?		✓	23. Water against downstream toe?		✓
17. Cracks or scarps on slopes?		✓	24. Were Photos taken during the dam inspection?	✓	

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

Inspection Issue #	Comments
1.	Semi-annual inspection documented by plant personnel. Plant personnel also conduct a daily walk around inspection.
3.	Skimmer gate generally controls water elevation within pool at approximately 267' +/-.
6.	Series of observation wells installed outside diked area adjacent to impoundment (primarily north and east sides). Wells are periodically sampled for water quality; no formal documentation of water level is maintained.
9.	High vegetation with moderately-sized shrubbery present on embankment slopes in need of maintenance. Large trees (up to 24" diameter) on outside slopes of adjacent north and east side outer dike which also serves as a Susquehanna River flood control dike.
19.	Occasional localized erosion/washout from surface water runoff observed on crest and interior dike slopes.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # PA 0008281

INSPECTOR C. Brad Nourse
James P. Guarente, P.E.

Date May 18, 2011

Impoundment Name PPL Brunner Island - Incidental Waste Treatment Basin
Impoundment Company PPL Brunner Island, LLC
EPA Region Region III
State Agency (Field Office) Addresss DEP South Central Regional Office
909 Elmerton Ave.,Harrisburg,PA 17110
Name of Impoundment PPL Brunner Island - Incidental Waste Treatment Basin
(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New _____ Update X

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

IMPOUNDMENT FUNCTION: Receives effluent from the onsite water treatment plant and surface water/stormwater runoff from the coal storage pile.

Nearest Downstream Town : Name Manchester, PA
Distance from the impoundment Approximately 1.0 miles measured in straight line on Google Earth.
Impoundment
Location: Longitude 76 Degrees 41 Minutes 47 Seconds
Latitude 40 Degrees 6 Minutes 0 Seconds
State PA County York

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

If So Which State Agency? Pennsylvania Department of Environmental Protection (DEP), Bureau of Land Recycling and Waste Management

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.

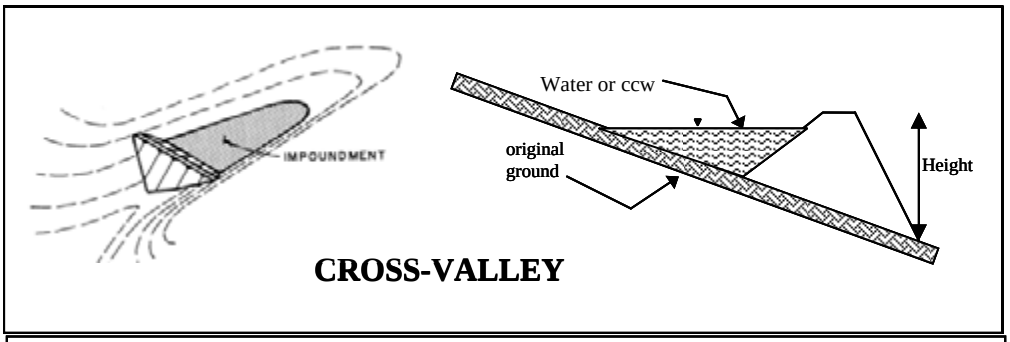
_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns.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

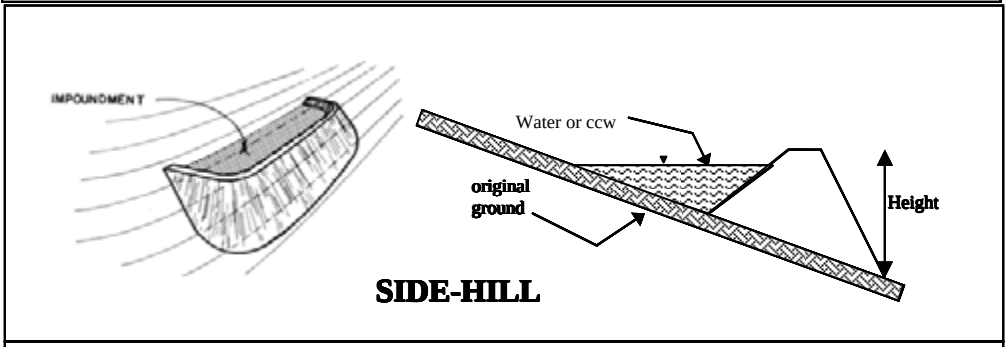
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

Although the impoundment is diked on all sides, the land outside the dikes immediately surrounding its south and west sides is generally at a higher elevation. Land beyond the dike along the north and east sides is generally only 3 to 5 feet lower than the highest water level which could be impounded. Review of original design drawings indicates a majority of the impoundment was incised below original grades when constructed. Failure is not likely to result in loss of human life and environmental damage, if any, would primarily be limited to owner's property.

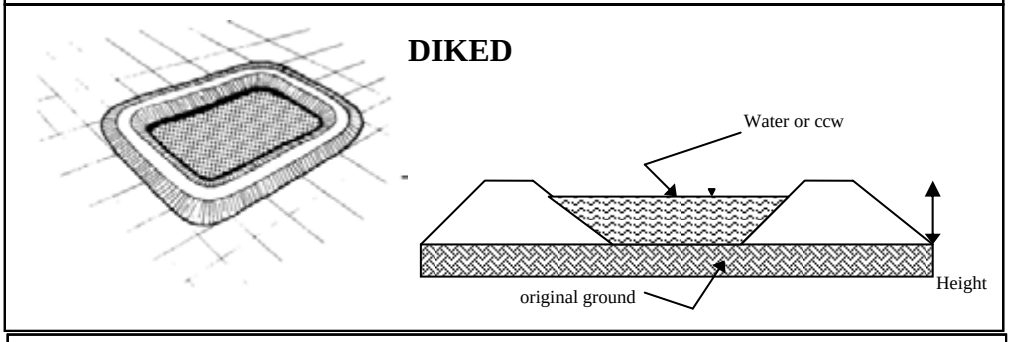
CONFIGURATION:



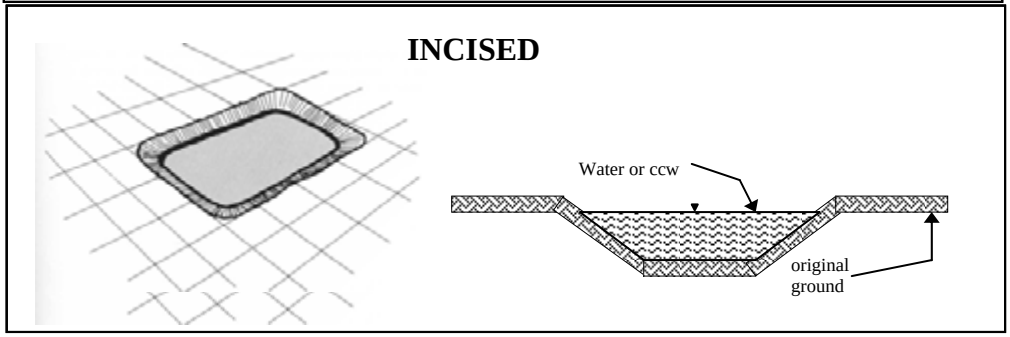
CROSS-VALLEY



SIDE-HILL



DIKED



INCISED

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

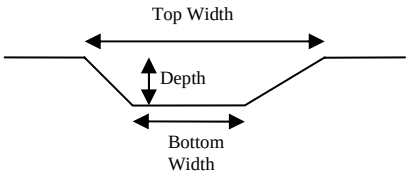
Embankment Height **See Note 1** feet
Embankment Material **Review of design drawings indicate majority of impoundment was incised.**
Pool Area **approximately 7** acres
Liner **None indicated**
Current Freeboard **See Note 2** feet
Liner Permeability **N/A**

Note 1: Approximately 19' along north and east sides. 8.5' along south and west sides.
Note 2: Approximately 16' along north and east sides. 5.5' along south and west sides.

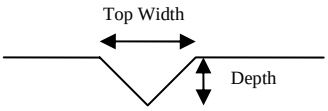
TYPE OF OUTLET (Mark all that apply)

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

TRAPEZOIDAL

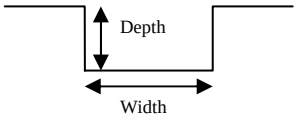


TRIANGULAR

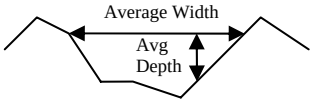


_____ depth
_____ bottom (or average) width
_____ top width

RECTANGULAR

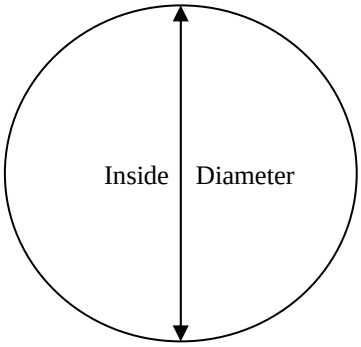


IRREGULAR



__X__ **Outlet**

__36"__ 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 **Original (circa 1972 as modified at various times) by Pennsylvania Power and Light Company In-House Design Engineers.**

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

If So When? _____

If So Please Describe : _____

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

If So When? _____

IF So Please Describe: _____

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

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

If so Please Describe : _____

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	PPL Brunner Island	Date:	May 18, 2011
Unit Name:	Equalization Pond	Operator's Name:	PPL Brunner Island, LLC
Unit I.D.:		Hazard Potential Classification:	High Significant Low ✓
Inspector's Name:	James P. Guarente, P.E. and C. Brad Nourse (GZA GeoEnvironmental, Inc.)		

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?	See Note		18. Sloughing or bulging on slopes?		✓
2. Pool elevation (operator records)?	Varies		19. Major erosion or slope deterioration?		✓
3. Decant inlet elevation (operator records)?	268.3' +/-		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	N/A		Is water entering inlet, but not exiting outlet?		✓
5. Lowest dam crest elevation (operator records)?	282.0' +/-		Is water exiting outlet, but not entering inlet?		✓
6. If instrumentation is present, are readings recorded (operator records)?		✓	Is water exiting outlet flowing clear?		N/A
7. Is the embankment currently under construction?		✓	21. Seepage (specify location, if seepage carries fines, and approximate seepage rate below):		
8. Foundation preparation (remove vegetation,stumps, topsoil in area where embankment fill will be placed)?	✓		From underdrain?		✓
9. Trees growing on embankment? (If so, indicate largest diameter below)	✓		At isolated points on embankment slopes?		✓
10. Cracks or scarps on crest?		✓	At natural hillside in the embankment area?		✓
11. Is there significant settlement along the crest?		✓	Over widespread areas?		✓
12. Are decant trashracks clear and in place?	N/A		From downstream foundation area?		✓
13. Depressions or sinkholes in tailings surface or whirlpool in the pool area?		✓	"Boils" beneath stream or ponded water?		✓
14. Clogged spillways, groin or diversion ditches?		✓	Around the outside of the decant pipe?		✓
15. Are spillway or ditch linings deteriorated?		✓	22. Surface movements in valley bottom or on hillside?		✓
16. Are outlets of decant or underdrains blocked?		✓	23. Water against downstream toe?		✓
17. Cracks or scarps on slopes?		✓	24. Were Photos taken during the dam inspection?	✓	

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

Inspection Issue #	Comments
1.	Semi-annual inspection documented by plant personnel.
8.	Knee-high vegetation with moderately-sized shrubbery present on east slope in need of maintenance.
20.	Outlet from pond leads to adjacent sump pit and is then pumped to discharge channel outfall at north end of Ash Basin No. 6.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # PA 0008281

INSPECTOR C. Brad Nourse
James P. Guarente, P.E.

Date May 18, 2011

Impoundment Name PPL Brunner Island - Equalization Pond
Impoundment Company PPL Brunner Island, LLC
EPA Region Region III
State Agency (Field Office) Addresss DEP South Central Regional Office
909 Elmerton Ave.,Harrisburg,PA 17110
Name of Impoundment PPL Brunner Island - Equalization Pond
(Report each impoundment on a separate form under the same Impoundment NPDES Permit number)

New _____ Update X

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

IMPOUNDMENT FUNCTION: Receives runoff and incidental plant waste flows.

Nearest Downstream Town : Name Manchester, PA
Distance from the impoundment Approximately 1.0 miles measured in straight line on Google Earth.
Impoundment
Location: Longitude 76 Degrees 41 Minutes 36 Seconds
Latitude 40 Degrees 5 Minutes 41 Seconds
State PA County York

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

If So Which State Agency? Pennsylvania Department of Environmental Protection (DEP), Bureau of Water Quality

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.

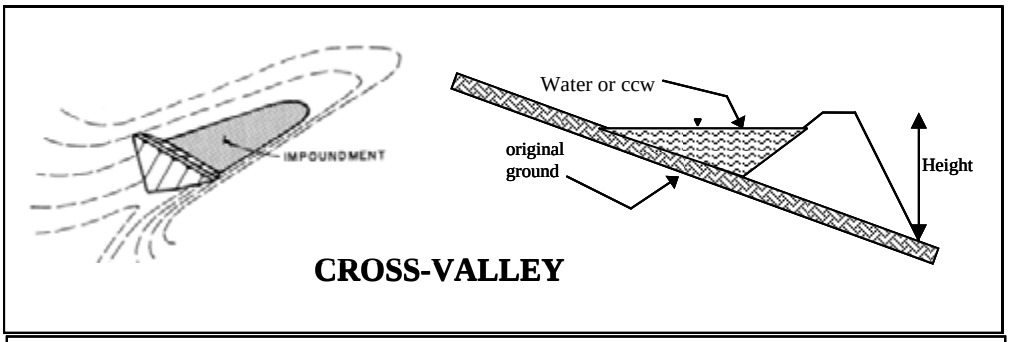
_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns.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

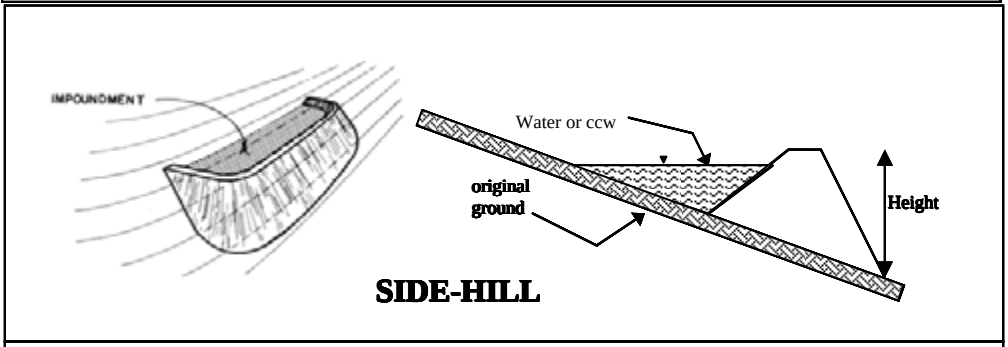
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

The size of the pond is less than one acre with a storage capacity of approximately 5 acre-feet. In our opinion, failure of the impoundment is not likely to result in loss of human life and environmental damage if any would primarily be limited to the owner's property.

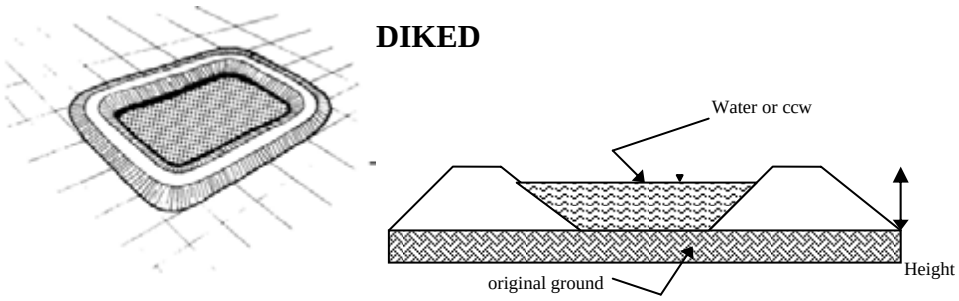
CONFIGURATION:



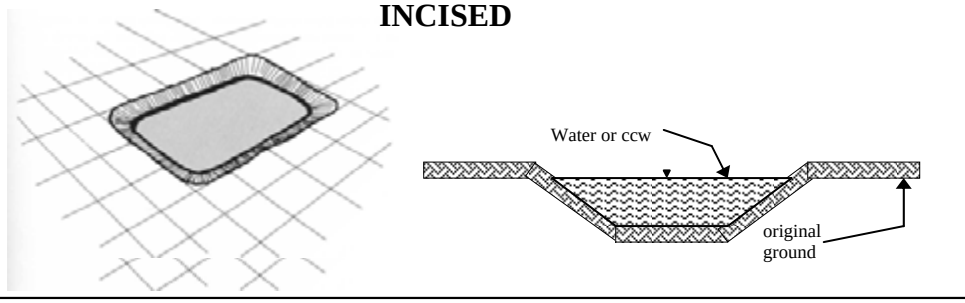
CROSS-VALLEY



SIDE-HILL



DIKED



INCISED

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

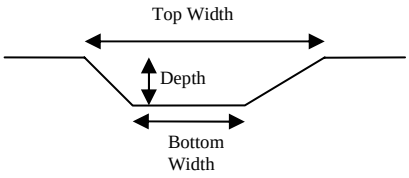
Embankment Height **See Note 1** feet
Embankment Material **Design drawing specifies cohesive fill.**
Pool Area **Less than 1** acres
Liner **See Note 2**
Current Freeboard **Empty at time of inspection** feet
Liner Permeability **Essentially impermeable**

Note 1: Approximately 15 feet along east side only.
Note 2: Design drawing specifies clay subgrade overlain by layered geosynthetics covered by concrete erosion control revetment.

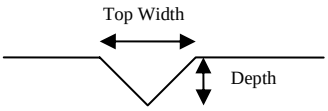
TYPE OF OUTLET (Mark all that apply)

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

TRAPEZOIDAL

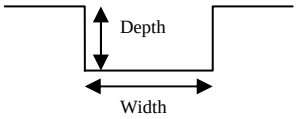


TRIANGULAR

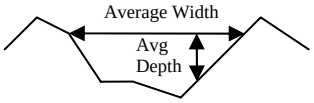


_____ depth
_____ bottom (or average) width
_____ top width

RECTANGULAR

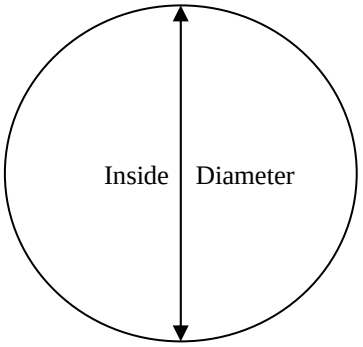


IRREGULAR



__X__ **Outlet**

__27"__ inside diameter



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

Is water flowing through the outlet? YES _____ NO __X (Pond essentially empty at time of inspection)__

_____ **No Outlet**

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

The Impoundment was Designed By **Circa 1992 by Gilbert/Commonwealth, Inc.**

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

If So When? _____

If So Please Describe : _____

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

If So When? _____

IF So Please Describe: _____

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

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

If so Please Describe : _____

APPENDIX D

PHOTOS

ASH BASIN NO. 6 IMPOUNDMENT

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station Ash Basin No. 6, York Haven, PA	170142.30

Photo No.	Date:
1	5/18/2011

Direction Photo Taken:
Northwesterly

Description:
Overview of Ash Basin No. 6 impoundment.

Photo No.	Date:
2	5/18/2011

Direction Photo Taken:
Westerly

Description:
Overview of west side of Ash Basin No. 6 as viewed from the decant intake structure. Note high vegetation/reeds along inside slope of basin.

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station Ash Basin No. 6, York Haven, PA	170142.30

Photo No.	Date:
3	5/18/2011

Direction Photo Taken:
Northerly

Description:
Overview of east side of Ash Basin No. 6 as viewed from the decant intake structure. Note high vegetation/reeds along inside slope of basin.

Photo No.	Date:
4	5/18/2011

Direction Photo Taken:
Northerly

Description:
Decant intake structure at south end of Ash Basin No. 6. Flow from structure outfalls into the Polishing Pond.

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station Ash Basin No. 6, York Haven, PA	170142.30

Photo No.	Date:
5	5/18/2011

Direction Photo Taken:
Northwesterly

Description:
Portion of common embankment separating Ash basin No. 6 and the Polishing Pond (shown in foreground). Note Ash Basin No. 6 Water Treatment Building and 48-inch-dameter outfall from Ash Basin No. 6 into Polishing Pond.

Photo No.	Date:
6	5/18/2011

Direction Photo Taken:
Northerly

Description:
Outside slope of Ash Basin No. 6 east side embankment taken from the southeast corner of the basin.

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station Ash Basin No. 6, York Haven, PA	170142.30

Photo No.	Date:
7	5/18/2011

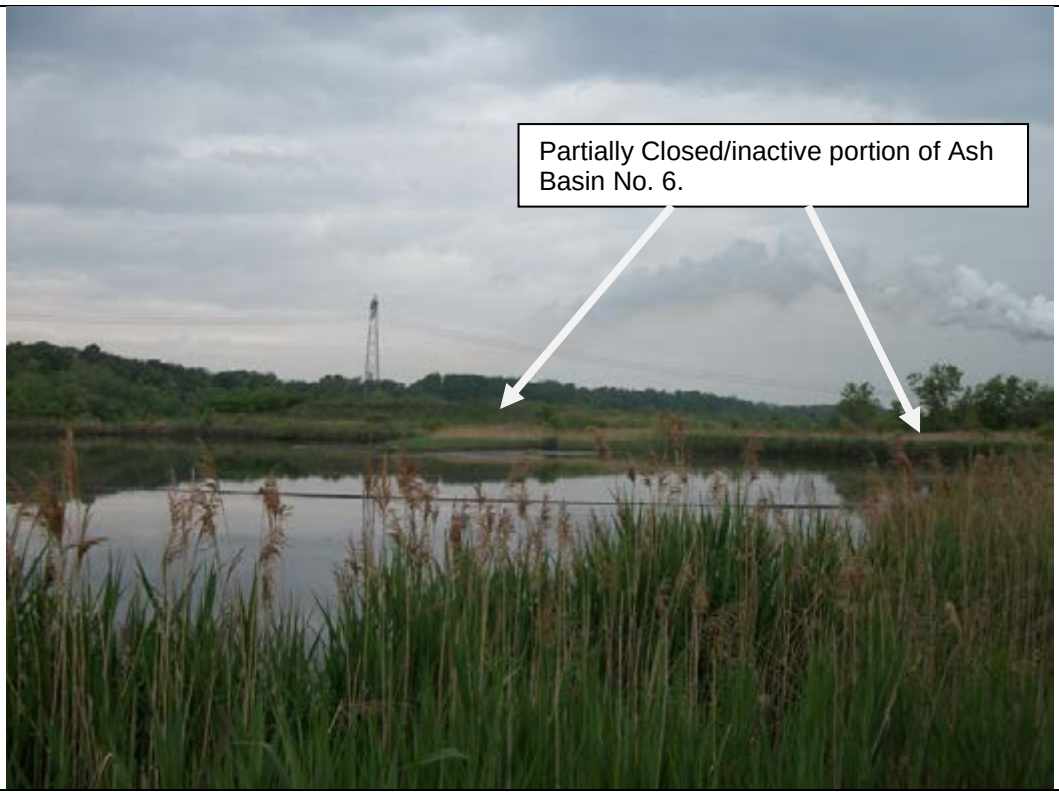
Direction Photo Taken:
Northerly

Description:
Crest of Ash Basin No. 6 east side embankment looking north.

Photo No.	Date:
8	5/18/2011

Direction Photo Taken:
Westerly

Description:
Overview of Ash Basin No. 6 impoundment as viewed from the crest of embankment near the southeast end. Note partially closed/inactive portion of basin beyond the far shore.



Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station Ash Basin No. 6, York Haven, PA	170142.30

Photo No.	Date:
9	5/18/2011

Direction Photo Taken:
Southerly

Description:
View of water portion of Ash Basin No. 6 looking southwest. Note decant intake structure.

Photo No.	Date:
10	5/18/2011

Direction Photo Taken:
Westerly

Description:
Transition area between partially closed/inactive and water portion of Ash Basin No. 6 from embankment crest at east end.

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station Ash Basin No. 6, York Haven, PA	170142.30

Photo No.	Date:
11	5/18/2011

Direction Photo Taken:
Northwesterly

Description:
Overview of partially closed/inactive portion of Ash Basin No. 6 along the east side of the north end of the basin.

Photo No.	Date:
12	5/18/2011

Direction Photo Taken:
Northeasterly

Description:
Outside slope along east side embankment near southeastern end. Heavy tree/forest growth abuts toe of embankment along the majority of the east side. Note water through/beyond the trees is the Susquehanna River.

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station Ash Basin No. 6, York Haven, PA	170142.30

Photo No.	Date:
13	5/18/2011

Direction Photo Taken:
Westerly

Description:
Standing water observed just beyond toe of east side embankment. According to Plant Representatives this water is likely remnants of previous weeks flooding along the Susquehanna River.

Photo No.	Date:
14	5/18/2011

Direction Photo Taken:
Southeasterly

Description:
Localized scarp/erosion observed scarp near toe of embankment on the east side.

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station Ash Basin No. 6, York Haven, PA	170142.30

Photo No.	Date:
15	5/18/2011

Direction Photo Taken:
Southeasterly

Description:
Perforated CMP near in the area between the toe and the Susquehanna River at approximately the mid-point of the east side embankment. According to review of the design drawings, the pipe appears to be remnants of a temporary sedimentation pond associated with Ash Basin No's 6 original (circa 1978) construction.

Photo No.	Date:
16	5/18/2011

Direction Photo Taken:
Easterly

Description:
View of Ash Slurry Treatment System effluent discharge piping situated at the north end of the basin. Note Ash Basin No. 6 (left side of drive is partially closed/inactive (though not officially capped); Ash Bain No. 5 (right side of drive) has long been capped.

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station Ash Basin No. 6, York Haven, PA	170142.30

Photo No.	Date:
17	5/18/2011

Direction Photo Taken:
Westerly

Description:
Decanted effluent discharge outfall from the Equalization Pond. Outfall situated at the north end of the basin.

Photo No.	Date:
18	5/18/2011

Direction Photo Taken:
Southerly

Description:
Decanted effluent from outfall in previous photo meanders its way to the water portion of Ash Basin no. 6 via a channel traversing the partially closed/inactive portion.

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station Ash Basin No. 6, York Haven, PA	170142.30

Photo No.	Date:
19	5/18/2011

Direction Photo Taken:
Northeasterly

Description:
Outflow from Boiler Unit Nos. 1 and 2 Bottom Ash Slurry Treatment System discharging into the northeast end of (the partially closed/inactive portion) of Ash Basin No. 6.

Photo No.	Date:
19A	5/18/2011

Direction Photo Taken:
Easterly

Description:
View of Bottom Ash Treatment System. Note angled auger mechanism which serves to separate a majority of the ash from the raw CCW slurry. The separated ash is temporarily stored adjacent to the facility to allow for final drying and then processed on and off-site for beneficial reuse. Effluent slurry from the treatment system is pumped to Ash Basin No. 6.

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station Ash Basin No. 6, York Haven, PA	170142.30

Photo No.	Date:
19B	5/18/2011

Direction Photo Taken:
Southeasterly

Description:
Overview of auger mechanism and conveyor system which directs separated ash to the temporary storage area (at the right of the photo) for final drying.

Photo No.	Date:
19C	5/18/2011

Direction Photo Taken:
Northerly

Description:
Portion of pipe network which routes effluent slurry from Bottom Ash Treatment System to Ash Basin No. 6.

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station Ash Basin No. 6, York Haven, PA	170142.30

Photo No.	Date:
20	5/18/2011

Direction Photo Taken:
Southerly

Description:
View of outside slope and toe area beyond along the west side of Ash Basin No. 6 near the north end looking south. Note high vegetation particularly on slope. Annual mowing normally occurs in June.

Photo No.	Date:
21	5/18/2011

Direction Photo Taken:
Northwesterly

Description:
Overview along west side of Ash Basin No. 6 embankment looking north.

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station Ash Basin No. 6, York Haven, PA	170142.30

Photo No.	Date:
22	5/18/2011

Direction Photo Taken:
Northwesterly

Description:
Close-up view of west side embankment looking north. Note knee-high vegetation precluded close visual inspection. Annual mowing occurs in June.

ASH BASIN NO. 6 (POLISHING POND)

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station (Ah Basin No. 6) Polishing Pond, York Haven, PA	170142.30

Photo No.	Date:
23	5/18/2011

Direction Photo Taken:
Southwesterly

Description:
North end of polishing pond as viewed from the crest of the east embankment. Ash Basin No.6 Water Treatment Building (right) conveys water from Ash Basin No. 6 to the Polishing Pond via a 48-inch RCP pipe.

Photo No.	Date:
24	5/18/2011

Direction Photo Taken:
Southeasterly

Description:
Overview of the Polishing Pond from northeast end. Note stairway leading down to the impoundment's decant outflow structure.

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station (Ah Basin No. 6) Polishing Pond, York Haven, PA	170142.30

Photo No.	Date:
25	5/18/2011

Direction Photo Taken:
Westerly

Description:
Decant overflow structure Note dual 60-inch-diameter riser pipes and skimmer structure which control level of Polishing Pond.

Photo No.	Date:
26	5/18/2011

Direction Photo Taken:
Northwesterly

Description:
Inside slope of west embankment as viewed from overflow structure. Note stone riprap protection placed as a maintenance action to mitigate erosion along toe.

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station (Ah Basin No. 6) Polishing Pond, York Haven, PA	170142.30

Photo No.	Date:
27	5/18/2011

Direction Photo Taken:
Southeasterly

Description:
Small scarp near waterline observed on inside slope on east side.

Photo No.	Date:
28	5/18/2011

Direction Photo Taken:
Southeasterly

Description:
Gate structure for 48-inch discharge pipe from Polishing Pond overflow structure as viewed from crest of east embankment.

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station (Ah Basin No. 6) Polishing Pond, York Haven, PA	170142.30

Photo No.	Date:
29	5/18/2011

Direction Photo Taken:
Southerly

Description:
Outside slope along west embankment. Note knee-high vegetation precluded close visual inspection. Annual mowing occurs in June.

Photo No.	Date:
30	5/18/2011

Direction Photo Taken:
Easterly

Description:
Concrete patch/backfill near toe of embankment at west side of Polishing pond. Concrete apparently placed as part of slope maintenance program.

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station (Ah Basin No. 6) Polishing Pond, York Haven, PA	170142.30

Photo No.	Date:
31	5/18/2011

Direction Photo Taken:
Southeasterly

Description:
Ruts observed along toe of west embankment. It appears that standing water is more a result of recent heavy rainfall rather than seepage through the embankment.

Photo No.	Date:
32	5/18/2011

Direction Photo Taken:
Northerly

Description:
Gate structure for 48-inch-diameter outfall pipe located on east side of Polishing Pond.

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station (Ah Basin No. 6) Polishing Pond, York Haven, PA	170142.30

Photo No.	Date:
33	5/18/2011

Direction Photo Taken:
Easterly

Description:
Discharge channel which conveys decanted Polishing Pond discharge via the 48-inch-diameter outfall to the Susquehanna River beyond.

Photo No.	Date:
34	5/18/2011

Direction Photo Taken:
Westerly

Description:
View of flap valve over the 48-inch-diameter outfall pipe. Discharge channel flows to the Susquehanna River.

EQUALIZATION POND

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station Equalization Pond, York Haven, PA	170142.30

Photo No.	Date:
35	5/18/2011

Direction Photo Taken:
Northerly

Description:
Overview of the Equalization Pond from the southern end. Note concrete erosion control revetment matting along inside slopes.

Photo No.	Date:
36	5/18/2011

Direction Photo Taken:
Northwesterly

Description:
View of west inside slope depicting incised nature of construction. Note discharge pipe from plant storm water runoff.

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station Equalization Pond, York Haven, PA	170142.30

Photo No.	Date:
37	5/18/2011

Direction Photo Taken:
Westerly

Description:
Overview of inside slope at south end of pond.

Photo No.	Date:
38	5/18/2011

Direction Photo Taken:
Northwesterly

Description:
Crest of east embankment as viewed from the south. Note high vegetation/shrubbery along outside slope.

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station Equalization Pond, York Haven, PA	170142.30

Photo No.	Date:
39	5/18/2011

Direction Photo Taken:
Westerly

Description:
North end of equalization pond. Note slide gate and 24-inch-diameter pipe. Pipe conveys discharge of a portion of the Plant's interior drainage collection system.

Photo No.	Date:
40	5/18/2011

Direction Photo Taken:
Southeasterly

Description:
Outside slope of east embankment as viewed from the north. Shrubbery and high vegetation.

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station Equalization Pond, York Haven, PA	170142.30

Photo No.	Date:
41	5/18/2011

Direction Photo Taken:
Southerly

Description:
View of northern end of the Equalization Pond.

Photo No.	Date:
42	5/18/2011

Direction Photo Taken:
Easterly

Description:
Local minor erosion observed along the outside of the east embankment.

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station Equalization Pond, York Haven, PA	170142.30

Photo No. 43 | **Date:** 5/18/2011

Direction Photo Taken:
Southeasterly

Description:
Toe of eastern embankment slope as viewed from the north. Access road area immediately beyond toe.

Photo No. 44 | **Date:** 5/18/2011

Direction Photo Taken:
Southwesterly

Description:
Toe of southern embankment slope looking west.

INCIDENTAL WASTE TREATMENT BASIN (IWTB)

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station Incidental Waste Treatment Basin (IWTB), York Haven, PA	170142.30

Photo No.	Date:
45	5/18/2011

Direction Photo Taken:
Northwesterly

Description:
Overview of the south lagoon from the Decant Gate and Sensor Equipment Monitoring Structure. Note north side of north lagoon as well as the east sides of the north, middle and south lagoons are bordered by the Susquehanna Flood Control Levee, the top of which is approximately 11 feet higher than the incised IWTB lagoons.

Photo No.	Date:
46	5/18/2011

Direction Photo Taken:
Easterly

Description:
Overview of Decant Gate and Sensor Equipment Monitoring Structure at the southeast corner of the south lagoon. A 36-inch-diameter CMP discharges decanted water to the Susquehanna River. Note water may also be diverted back into the adjacent Intake Water Treatment Plant solids settling basin (located to the right of the dike in photo) for re-treatment as necessary.

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station Incidental Waste Treatment Basin (IWTB), York Haven, PA	170142.30

Photo No.	Date:
47	5/18/2011

Direction Photo Taken:
Southwesterly

Description:
Intake Water Treatment Plant solids settling basin situated at the southern most portion of the IWTB. Note water flows to the canal which runs along the west side of the IWTB to the Coal Pile Runoff Treatment Facility.

Photo No.	Date:
48	5/18/2011

Direction Photo Taken:
Southerly

Description:
Stone protection over CMP discharge pipe at eastern end of Intake Water Treatment Plant solids settling basin. Flow through pipe is discharge from the Intake Water Treatment Plant which is located approximately 650 feet southeast of this location.

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station Incidental Waste Treatment Basin (IWTB), York Haven, PA	170142.30

Photo No.	Date:
49	5/18/2011

Direction Photo Taken:
Easterly

Description:
Intake Water Treatment Plant solids settling basin viewed from the west end. Note common dike separating the basin and south lagoon (left).

Photo No.	Date:
50	5/18/2011

Direction Photo Taken:
Easterly

Description:
View of inside slope of south side dike at the south lagoon. Note heavy vegetation and shrubbery precluded close visual inspection of slope.

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station Incidental Waste Treatment Basin (IWTB), York Haven, PA	170142.30

Photo No.	Date:
51	5/18/2011

Direction Photo Taken:
Northeasterly

Description:
(At left) view of inside slope of common dike between the middle and south lagoons. Note heavy shrub/small tree growth and high vegetation. Also note the higher elevation Susquehanna Flood Control Levee in the background which forms the east side of the north, middle and south lagoons.

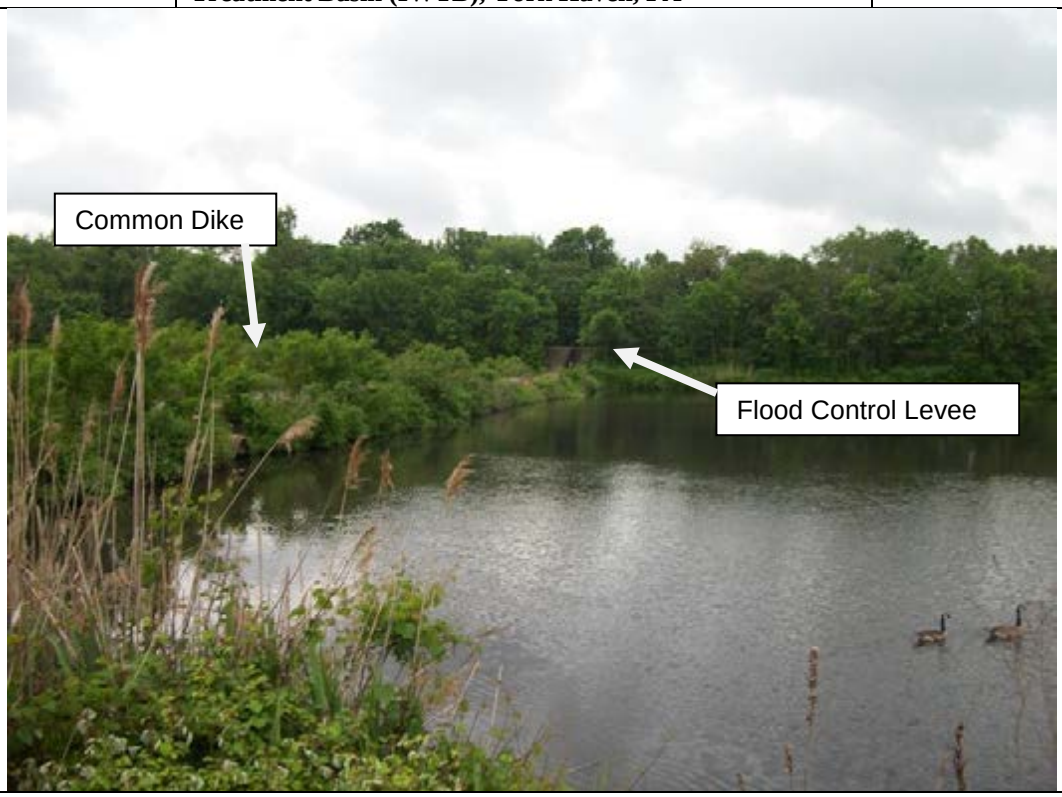


Photo No.	Date:
52	5/18/2011

Direction Photo Taken:
Northeasterly

Description:
Crest of common dike between the middle and south lagoons. Note overgrown vegetation on slopes. Staircase at end of dike leads up to crest of Susquehanna Flood Control Levee which borders the east side of the north, middle and south lagoons.

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station Incidental Waste Treatment Basin (IWTB), York Haven, PA	170142.30

Photo No.	Date:
53	5/18/2011

Direction Photo Taken:
Southeasterly

Description:
Travel way dike along western side of IWTB. Canal along right side of travel way conveys water to the Coal Pile Runoff Treatment Facility for eventual discharge into the north lagoon.

Photo No.	Date:
54	5/18/2011

Direction Photo Taken:
Southwesterly

Description:
Slide gate (normally closed as shown), at western canal allows conveyance of water via a 24-inch CMP to the middle lagoon if necessary.

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station Incidental Waste Treatment Basin (IWTB), York Haven, PA	170142.30

Photo No.	Date:
55	5/18/2011

Direction Photo Taken:
Easterly

Description:
Overview of middle lagoon from western end. Note moderate to heavy vegetation, shrubbery and small trees along inside slopes.

Photo No.	Date:
56	5/18/2011

Direction Photo Taken:
Northeasterly

Description:
Inside slope of common dike between middle lagoon (right) and north lagoon. Note moderate to heavy vegetation, shrubbery and small trees along inside slopes.

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station Incidental Waste Treatment Basin (IWTB), York Haven, PA	170142.30

Photo No.	Date:
57	5/18/2011

Direction Photo Taken:
Southeasterly

Description:
Overview of canal along western side of IWTB looking southeasterly. Note minor to moderate erosion/scarps along slope.

Photo No.	Date:
58	5/18/2011

Direction Photo Taken:
Northeasterly

Description:
Crest of common dike between middle and north lagoons. Note moderate to heavy vegetation, shrubbery and small trees along inside slopes.

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station Incidental Waste Treatment Basin (IWTB), York Haven, PA	170142.30

Photo No.	Date:
59	5/18/2011

Direction Photo Taken:
Northwesterly

Description:
View of Coal Pile Runoff Water Treatment Facility at northwestern portion of the IWTB. Note concrete intake from west side canal (lower left).

Photo No.	Date:
60	5/18/2011

Direction Photo Taken:
Westerly

Description:
Intake, from west side canal, to the Coal Pile Runoff Water Treatment Facility.

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station Incidental Waste Treatment Basin (IWTB), York Haven, PA	170142.30

Photo No.	Date:
61	5/18/2011

Direction Photo Taken:
Easterly

Description:
Mixing tanks at Coal Pile Runoff Treatment Facility. Note water is discharged from the treatment facility to the north lagoon.

Photo No.	Date:
62	5/18/2011

Direction Photo Taken:
Southerly

Description:
Discharge outfall from Coal Pile Runoff Treatment Facility into the north lagoon. Discharge pipe is fully surrounded by turbidity curtains. Note high vegetation on inside slopes.

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station Incidental Waste Treatment Basin (IWTB), York Haven, PA	170142.30

Photo No.	Date:
63	5/18/2011

Direction Photo Taken:
Northeasterly

Description:
North lagoon as viewed from the southwest. North lagoon is bounded on the north and east sides by the Susquehanna Flood Control Levee (mostly hidden just beyond the trees).

Photo No.	Date:
64	5/18/2011

Direction Photo Taken:
Northerly

Description:
View of Susquehanna Flood Control Levee which makes up the north embankment of the north IWTB lagoon (as well as the east side of the north, middle and south lagoons).

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station Incidental Waste Treatment Basin (IWTB), York Haven, PA	170142.30

Photo No.	Date:
65	5/18/2011

Direction Photo Taken:
Southerly

Description:
View of north lagoon and the Coal Pile Runoff Treatment Facility.

Photo No.	Date:
66	5/18/2011

Direction Photo Taken:
Northeasterly

Description:
View of the crest along the Susquehanna Flood Control Levee which forms the north embankment of the north lagoon and the east embankment of the north, middle and south lagoons. North lagoon is at right.

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station Incidental Waste Treatment Basin (IWTB), York Haven, PA	170142.30

Photo No.	Date:
67	5/18/2011

Direction Photo Taken:
Southerly

Description:
Overview of north lagoon as viewed from the crest of the Susquehanna Flood Control Levee. Note middle pond is at left.

Photo No.	Date:
68	5/18/2011

Direction Photo Taken:
Southwesterly

Description:
Overview of common dike between the middle and north lagoons from the crest of the Susquehanna Flood Control Levee. Note moderate to locally heavy erosion, scarps and high vegetation along both sides of dike.

Client Name:	Site Location:	Project No.
U.S. Environmental Protection Agency	PPL Brunner Island Station Incidental Waste Treatment Basin (IWTB), York Haven, PA	170142.30

Photo No. 69 | **Date:** 5/18/2011

Direction Photo Taken:
Southwesterly

Description:
Overview of common dike between the south and middle lagoons from the crest of the Susquehanna Flood Control Levee. Note the ground water quality testing well in the foreground.

Photo No. 70 | **Date:** 5/18/2011

Direction Photo Taken:
Southeasterly

Description:
View of south lagoon from common dike between the south and middle lagoons. Note Decant Gate and Sensor Monitoring Structure at left side.

APPENDIX E

REFERENCES

PREVIOUS REPORTS AND REFERENCES

The following is a list of drawings and related information that was located during the file review, or was referenced in previous reports.

1. HDR Engineering, Inc., Slope Stability Assessment Brunner Island Ash Basin No. 6, December 2009.

2. HDR Engineering, Inc., 2010 Annual Inspection Report Brunner Island Ash Basin No. 6, December 2010.

3. HDR Engineering, Inc., 2009 Annual Inspection Report Brunner Island Ash Basin No. 6, November 2009.

4. Borings, Soil & Testing Company Geotechnical Engineers, Report on Investigation of Foundation Conditions for Ash Storage Basins 6 and 7 Brunner Island S.E.S., August 1977.

5. Power Plant Engineering Development, Initial Inspection Report Brunner Island SES Ash Basin No. 6, June 1981

6. PADEP, Form 1R Facility Plan For Residual Waste Facility, PPL Generation, LLC.

7. PADEP, Form 12R Operation Plan – Phase II, PPL Generation, LLC.

8. Pennsylvania Power & Light Company, Drawing E158596-4, Brunner Island S.E.S., Ash Basin No. 6 And Polishing Pond Plan & Sections, January 1978.

9. Pennsylvania Power & Light Company, Drawing E158596-6, Brunner Island S.E.S., Ash Basin No. 6 And Polishing Pond Plan & Sections, January 1978.

10. Pennsylvania Power & Light Company, Drawing E-178085, Brunner Island S.E.S., Ash Basin No. 6 – Polishing Pond Enlarged Plan, June 1979.

The following references were utilized during the preparation of this report and the development of the recommendations presented herein.

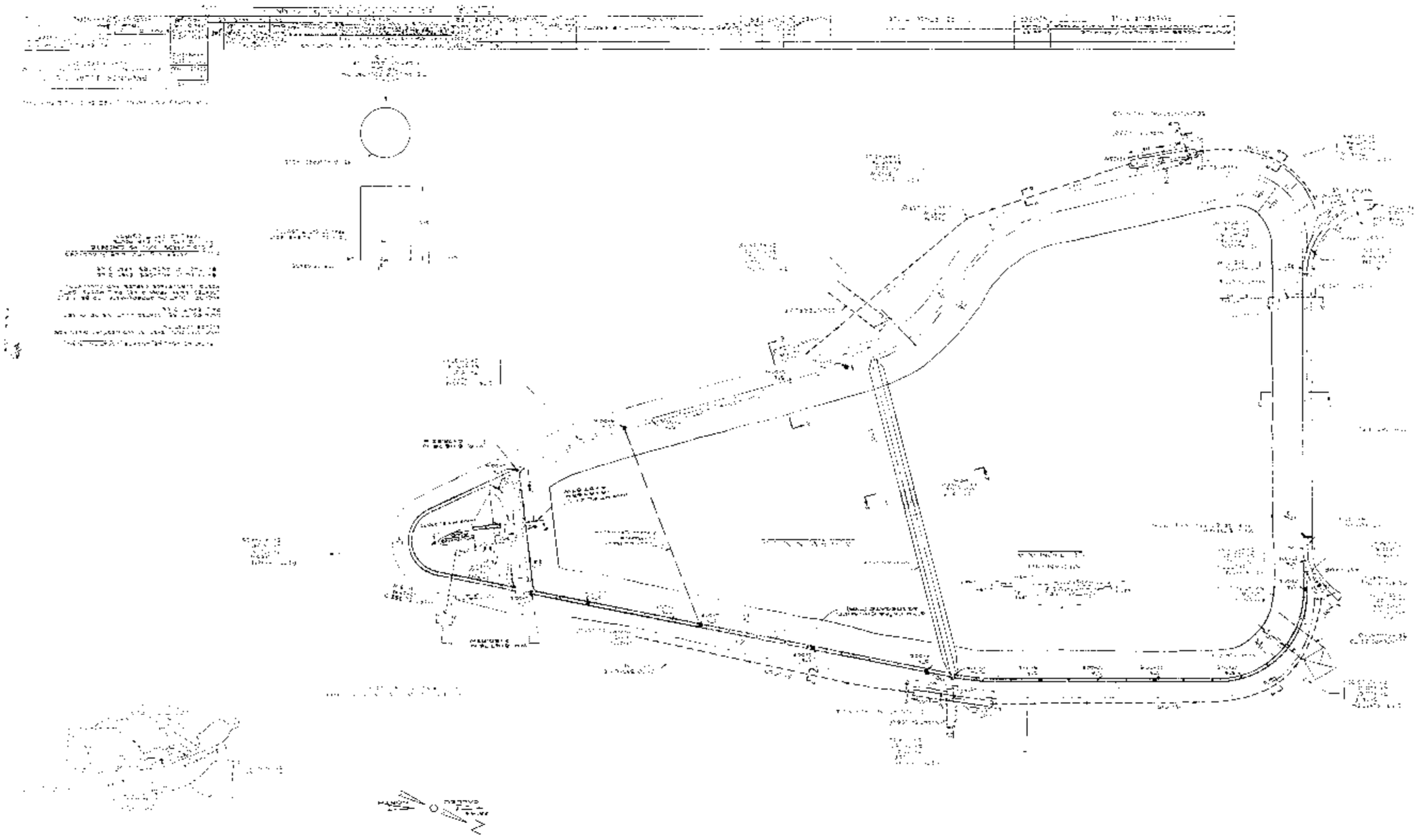
1. USACE, “Recommended guidelines for safety inspection of dams,” EM 1110-2-106, 1979.

2. FEMA, “Federal Guidelines for Dam Safety,” May 2005.

3. Pennsylvania Code Title 25, Chapter 105, Dam Safety and Waterway Management

APPENDIX F

SELECTED RECORD INFORMATION



SECTION "E-E"

SECTION "F-F"
(SCALE 1"=50')

DETAIL "X"
(TYPICAL SECTION THROUGH DITCH)

SECTION "G-G"

SECTION "H-H"

SECTION "I-I"

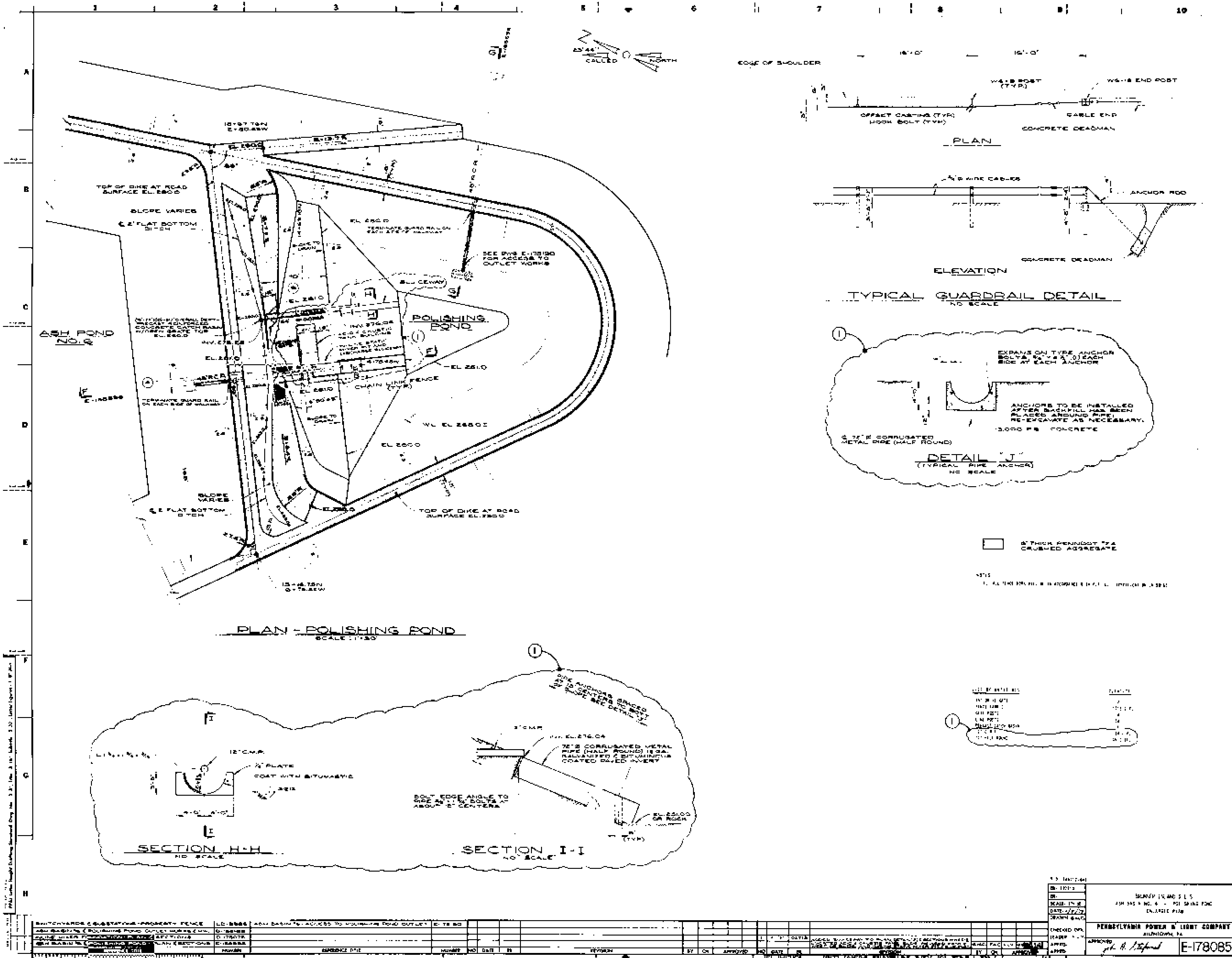
CLASS "A" BACKFILL

CLASS "B" BACKFILL

DETAIL "A"

NOTES:

PENNSYLVANIA POWER & LIGHT COMPANY
ALLENTOWN, PA



ASH POND NO. 6
POLISHING POND
PLAN - POLISHING POND
SCALE 1"=30'
TOP OF DIKE AT ROAD SURFACE EL. 2800
SLOPE VARIES
SPILLWAY
CHAIN LINK FENCE (TYP)
WL EL 2680
SEE DWG E-175190 FOR ACCESS TO OUTLET WORKS
TERMINATE GUARD RAIL ON EACH SIDE OF WALKWAY
EDGE OF SHOULDER
W6x8 POST (TYP)
W6x15 END POST
OFFSET CASTING (TYP)
HOOK BOLT (TYP)
CABLE END
CONCRETE DEADMAN
PLAN
ANCHOR ROD
ELEVATION
TYPICAL GUARDRAIL DETAIL
NO SCALE
EXPANSION TYPE ANCHOR
ANCHORS TO BE INSTALLED AFTER BACKFILL HAS BEEN PLACED AROUND PIPE; RE-EXCAVATE AS NECESSARY.
3,000 PSI CONCRETE
72" Ø CORRUGATED METAL PIPE (HALF ROUND)
DETAIL "J"
(TYPICAL PIPE ANCHOR)
NO SCALE
6" THICK PENNDOT 2A CRUSHED AGGREGATE
12" C.M.P.
¼" PLATE
COAT WITH BITUMASTIC
PIPE ANCHORS SPACED AT 15' CENTERS ON SLOPE. SEE DETAIL "J"
72" Ø CORRUGATED METAL PIPE (HALF ROUND) 12 GA. GALVANIZED & BITUMINOUS COATED PAVED INVERT
BOLT EDGE ANGLE TO PIPE
SECTION H-H
NO SCALE
SECTION I-I
NO SCALE
PENNSYLVANIA POWER & LIGHT COMPANY
ALLENTOWN, PA.
E-178085-1

ER-DWM-11

PERMIT NO. D 67-496

COPY

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES

PERMIT

The Department of Environmental Resources "Department", established by the Act of December 3, 1970 (71 P.S. §510-1 *et seq.*) and empowered to exercise certain powers and perform certain duties under and by virtue of the Act of November 26, 1978, P.L. 1375, No. 325, as amended by the Act of October 23, 1979, No. 70, known as the "Dam Safety and Encroachments Act"; and the Administrative Code, Act of April 9, 1929, P.L. 177, *as amended*, which empowers the Department to exercise certain powers and perform certain duties by law vested in and imposed upon the Water Supply Commission of Pennsylvania and the Water and Power Resources Board, hereby issues this permit to:

PENNSYLVANIA POWER & LIGHT COMPANY
Two North Ninth Street, Allentown, PA 18101

giving its consent to

operate and maintain an existing dam (Ash Basin No. 6) located on Bronner Island between the Susquehanna River and Black Gut Creek in York Haven, York County.

This permit is issued in response to an application filed with the Department of Environmental Resources on the 7th day of April A.D. 19 81, and with the understanding that the work shall be performed in accordance with the maps, plans, profiles and specifications filed with and made part of the application

Subject, however, to the provisions of the Dam Safety and Encroachments Act, the Administrative Code, and the following conditions, regulations, and restrictions (YOUR ATTENTION IS DRAWN TO CONDITION NUMBER 12).

1. This permit does not give any property rights, either in real estate or material, nor any exclusive privileges, nor shall it be construed to grant or confer any right, title, easement, or interest in, to, or over any land belonging to the Commonwealth of Pennsylvania; any infringement of Federal, State, or local laws or regulations; nor does it obviate the necessity of obtaining Federal assent when necessary;

2. The work shall at all times be subject to supervision and inspection by representatives of the Department, and no changes in the maps, plans, profiles and specifications as approved shall be made except with the written consent of the Department. The Department, however, reserves the right to require such changes or modifications in the maps, plans, profiles, and specifications as may be considered necessary. The Department further reserves the right to suspend or revoke this permit if in its opinion the best interest of the Commonwealth will be subserved thereby;

3. The work shall be under the direction of a competent engineer, and he or a competent representative shall be on the ground constantly during construction and until the completion of the dam;

4. The Department shall be notified in advance of the proposed time of commencement of this work, and a detailed report upon the status of the construction shall be mailed to the "Division of Dam Safety, P. O. Box 2357, Harrisburg, Pennsylvania 17120" on the first of each month until work upon the dam has been completed. Within thirty (30) days after the completion of the work authorized

in this permit, the permittee shall file with the Division of Dam Safety, a statement certifying that the work has been performed in accordance with this permit and the approved maps, plans, profiles and specifications. Further, the permittee shall submit to the Division of Dam Safety, within ninety (90) days of the date of final completion of the dam authorized by this permit, a set of "as built" plans for the project;

5. If this work is not completed on or before the N/A day of _____ A.D. 19_____, this permit, if not previously revoked or specifically extended, shall cease and be null and void; and if, upon the expiration or revocation of this permit, the work shall not be completed, the permittee shall, at his own expense and to such extent and in such time and manner as the said Department may require, remove all or any portion of the incompleted work and restore the watercourse to its former condition. No claim shall be made against the Commonwealth of Pennsylvania on account of any such removal or alteration;

6. No material shall be placed on any portion of the foundation until such portion of the foundation has been approved, in writing, by a representative of the Department; no earth or other embankment material which is in a frozen condition shall be covered or placed in embankments; concrete shall not be placed in freezing weather except under conditions approved by the Department;

7. The Department shall be notified at least one week in advance of the time when it is proposed to begin to store water in the reservoir or pond created by the dam for which this permit is issued. The Department will require the permittee to allow a portion of the natural stream flow to pass the dam while the reservoir or pond is being filled, and this notice is required in order that arrangements may be made to have a representative on the ground before or during the filling if the Department considers it desirable. Sufficient water to support fish life shall be allowed to flow into the stream below the dam, during the period of its construction or repair and while the reservoir is being filled. The permittee agrees to abide by such rules and regulations as to the storage and discharge of water, and as to the level of the reservoir created by said dam, as may be prescribed from time to time by the said Department;

8. All trees of no value and brush cleared from the area under this permit shall be burned at such time and under such conditions as to prevent the fire from spreading to adjoining timber land; provided, however, that before such burning is begun, the Regional Air Pollution Control Engineer of the Department of Environmental Resources in charge of the Region in which the area is located shall be notified;

9. The permittee agrees in accepting this permit, to install, upon the request of the Pennsylvania Fish Commission, such fishway or fishways as the said Department may require. (See Section 185, of the Act of May 2, 1925, P.L. 448, as amended by Act of April 22, 1929, P.L. 621) Attention is also called to Section 191 of the Act of May 2, 1925, P.L. 448, as amended by Act No. 113, approved May 25, 1935, which provides that no person owning, leasing or maintaining a dam, holding back waters inhabited by fish, shall draw off such waters without first receiving written permission from the Pennsylvania Fish Commission;

10. Performance of the work authorized shall constitute an acceptance of the various conditions contained in the permit; provided; that if the permittee fails to file acceptance of the permit in accordance with Condition 12, the permit becomes null and void and the permittee shall remove all works constructed and restore the area in a manner specified by the Department;

11. The Engineer and the Contractor shall be apprised of all of the provisions and conditions and shall signify their acknowledgement of being so apprised on the form herein attached. Copy of this signed form, together with copy of the permit shall be available for inspection at the project site at all times. Copy of the acknowledgement shall also be forwarded to the office issuing the permit. Failure to have copies of the permit and acknowledgement available for inspection at the project site shall be considered sufficient cause for issuance of a cease and desist order by the authorized Commonwealth personnel;

12. This permit shall not become effective until and unless the permittee shall file with the Department within thirty (30) days from the date thereof, upon a form furnished by the Department, its written acceptance of the terms and conditions imposed therein. Failure to submit such acceptance will render the permit null and void;

13. The permittee is advised that this project may be subject to the regulation of Section 404 of the Federal Clean Water Act of 1977. The permittee is directed to immediately contact the following District Office of the U.S. Army Corps of Engineers for further information:

Chief, Regulatory Functions Branch
U.S. Army Corps of Engineers District
Baltimore District
P. O. Box 1715
Baltimore, MD 21203

14. SEE SPECIAL CONDITIONS ON ATTACHED SHEET.

Date MAR 5 1982

DEPARTMENT OF ENVIRONMENTAL RESOURCES

COPY

By: Joseph J. Ellam
Joseph J. Ellam, Chief
Division of Dam Safety

ATTEST:

Cody Leidt

PENNSYLVANIA POWER & LIGHT COMPANY

By: E H Seidler
Permittee (signature)

E. H. Seidler
V.P. Engineering & Construction SP&E

SPECIAL CONDITION

The permittee is required to submit annual reports regarding the condition of the dam, certified by a registered professional engineer, to the Division of Dam Safety on or before October 1 of each year.

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