PRELIMINARY REPORT

Dam Safety Assessment of CCW Impoundments

GenOn Energy – Shawville Generating Station
Shawville, Clearfield County, Pennsylvania

United States Environmental Protection Agency
Washington, DC

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O'BRIEN & GERE
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GenOn Energy – Shawville Generating Station

Prepared for:
US Environmental Protection Agency
Washington, DC

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1. INTRODUCTION

1.1. GENERAL

In response to the coal combustion waste (CCW) impoundment failure at the TVA/Kingston coal-fired electric generating station in December of 2008, the U. S. Environmental Protection Agency has initiated a nationwide program of structural integrity and safety assessments of coal combustion waste impoundments or "management units". A CCW management unit is defined as a surface impoundment or similar diked or bermed management unit or management units designated as landfills that receive liquid-borne material and are used for the storage or disposal of residuals or by-products from the combustion of coal, including, but not limited to, fly ash, bottom ash, boiler slag, or flue gas emission control residuals. Management units also include inactive impoundments that have not been formally closed in compliance with applicable federal or state closure/reclamation regulations.

The USEPA has authorized O'Brien & Gere to provide site specific impoundment assessments at selected facilities. This project is being conducted in accordance with the terms of BPA# EP10W000673, Order EP-B12S-00065, dated July 18, 2012.

1.2. PROJECT PURPOSE AND SCOPE

The purpose of this work is to provide Dam Safety Assessment of CCW management units, including the following:

- Identify conditions that may adversely affect the structural stability and functionality of a management unit and its appurtenant structures
- Note the extent of deterioration, status of maintenance, and/or need for immediate repair
- Evaluate conformity with current design and construction practices
- Determine the hazard potential classification for units not currently classified by the management unit owner or by state or federal agencies

O'Brien & Gere's scope of services for this project includes performing a site specific dam safety assessment of all CCW management units at the subject facility. Specifically, the scope includes the following tasks:

- Perform a review of pertinent records (prior inspections, engineering reports, drawings, etc.) made available at the time of the site visit to review previously documented conditions and safety issues and gain an understanding of the original design and modifications of the facility.
- Perform a site visit and visual inspection of each CCW management unit and complete the visual inspection checklist to document conditions observed.
- Perform an evaluation of the adequacy of the outlet works, structural stability, quality and adequacy of the management unit's inspection, maintenance, and operations procedures.
- Identify critical infrastructure within 5 miles down gradient of management units.
- Evaluate the risks and effects of potential overtopping and evaluate effects of flood loading on the management units.
- Immediate notification of conditions requiring emergency or urgent corrective action.
- Identify all environmental permits issued for the management units
- Identify all leaks, spills, or releases of any kind from the management units within the last 5 years.
- Prepare a report summarizing the findings of the assessment, conclusions regarding the safety and structural integrity, recommendations for maintenance and corrective action, and other action items as appropriate.

This report addresses the above issues for Ash Ponds A and B at the Shawville Generating Station in Shawville, Pennsylvania. The above impoundments are owned and operated by GenOn REMA, LLC (GenOn). In the course of this assessment, we obtained information from representatives of GenOn and the Pennsylvania Department of Environmental Protection (PADEP).

2. PROJECT/FACILITY DESCRIPTION

The Shawville Generating Station is located at 250 Power Plant Drive in Shawville, Pennsylvania. A Site Location Map is included as Figure 1. The coal-fired power station includes four generating units with a combined generation capacity of approximately 626 MW. Operation is intermittent on an as-needed basis to meet demand. Coal combustion waste that is produced during power generation is managed on-site with one CCW impoundment and a "dry" landfill.

The facility utilizes one impoundment separated into two cells known as Ash Pond A and Ash Pond B for bottom ash management. Fly ash is dry-handled and disposed of in the on-site plant landfill. This safety assessment report summarizes the September 2012 inspection of Ash Ponds A and B at the Shawville Generating Station.

2.1. MANAGEMENT UNIT IDENTIFICATION

The locations of the CCW impoundment and its two component cells inspected during this safety assessment are identified on Figure 2 – Site Aerial Photograph and Photograph Location Map.

2.1.1. Ash Ponds A and B

Ash Ponds A and B are located to the southwest of the power plant on the southern bank of the West Branch of the Susquehanna River. The impoundment is currently not regulated by the Pennsylvania Department of Environmental Protection (PADEP) Division of Dam Safety.

Ash Ponds A and B were constructed and brought online in 1989. Prior to 1989, bottom ash and fly ash were sluiced to two impoundments known as Pond 1 and 2. Pond 1 was decommissioned and remains in place as a stormwater management area. Pond 2 was decommissioned and converted into the new impoundment consisting of Ash Ponds A and B. The new impoundment was constructed with a continuous impermeable liner beneath the full area of the impoundment. The impoundment was then divided into two cells of approximately equal volume known as Ash Ponds A and B by means of a compacted earth embankment running through the center of the impoundment. Ash Ponds A and B have been considered as a single impoundment for the purposes of assigning hazard potential.

The coal combustion waste stored in Ash Ponds A and B consists of bottom ash. Fly ash is managed dry, collected and placed in the on-site landfill. Bottom ash is sluiced to the pond using water from the West Branch of the Susquehanna River. Water that is routed through the impoundment is discharged into an outlet structure and returned to the plant for reuse. When completely dewatered for maintenance operations, water collected by the impoundment underdrain system is conveyed to the facility wastewater treatment plant. There is no direct discharge from the Ash Ponds to the West Branch of the Susquehanna River.

2.2. HAZARD POTENTIAL CLASSIFICATION

The Commonwealth of Pennsylvania classifies dams or embankments in accordance with the Pennsylvania Dam Safety and Encroachments Act and Title 25 of the Pennsylvania Code, Chapter 105. The regulations are administrated by the Pennsylvania Department for Environmental Protection (PADEP), Bureau of Waterways Engineering, Division of Dam Safety. Structures and activities regulated by the PADEP are as follows (25 PA Code § 105.3.a):

1) *Dams on a natural or artificial watercourse, other than those licensed under the Federal Power Act (16 U.S.C.A. § § 791a—825s), where one or more of the following occur:*

(i) The contributory drainage area exceeds 100 acres.
(ii) The greatest depth of water measured by upstream toe of the dam at maximum storage elevation exceeds 15 feet.
(iii) The impounding capacity at maximum storage elevation exceeds 50 acre-feet.

2) *Dams used for the storage of water not located on a watercourse and which have no contributory drainage where the greatest depth of water measured at upstream toe of the dam at maximum storage elevation exceeds 15 feet and the impounding capacity at maximum storage elevation exceeds 50 acre-feet.*
3) *Dams used for the storage of fluids or semifluids other than water, the escape of which may result in air, water or land pollution or in danger to persons or property.*
4) *Water obstructions and encroachments other than dams located in, along or across, or projecting into a watercourse, floodway or body of water, whether temporary or permanent.*
5) *Flood control projects constructed, owned or maintained by a governmental unit.*

Dam and embankment hazard classifications are established by Title 25 PA Code Chapter 105.91 and provide standards regarding impoundment facility structure classification:

A dam or reservoir shall be classified in accordance with Size Category and the Hazard Potential Category which might occur in the event of an operational or structural failure. In approving a classification, the Department will consider, without limitation:

(1) The height of the dam and storage capacity of the reservoir.
(2) The physical characteristics and extent of actual and projected development of the dam site and downstream areas.
(3) The relationship of the site to existing or projected industrial, commercial and residential areas and other land uses downstream which may be affected by a dam failure.

2.2.1. Ash Ponds A and B

The PADEP Division of Dam Safety currently does not regulate the impoundment containing Ash Ponds A and B, therefore no hazard classification has been assigned.

The definitions for the four hazard potentials (Less than Low, Low, Significant and High) to be used in this assessment are included in the EPA CCW checklist found in Appendix A. Based on the checklist definitions and as a result of this assessment, the hazard potential rating recommended for the impoundment containing Ash Ponds A and B is **LOW**. A failure of the embankments impounding Ash Ponds A and B would result in no probable loss of life and only minimal economic and environmental impact. The risk of environmental impact to the adjacent West Branch of the Susquehanna River is minimal. The power station is located in a predominantly rural area and the size of the impoundment is extremely small; therefore, damage to critical infrastructure or lifeline facilities in the event of a dam failure would likely be limited to the power plant facilities only.

2.3. IMPOUNDING STRUCTURE DETAILS

The following sections summarize the structural components and basic operations of Ash Ponds A and B. The location of these ponds on the plant grounds and their relevant features are provided on Figure 2. Typical cross-sections of the ponds are provided as Figure 3. It should be noted that the site plans shown in Figure 2 and the topographic detail shown in Figure 3 are adapted from publicly available data, plant records, and original design drawings and may not depict all current features. Additionally, photos taken during the visual inspection are incorporated in a Photographic Log provided as Appendix B.

2.3.1. Embankment Configuration

Ash Pond A

Ash Pond A is a combined incised/diked earthen embankment structure that impounds an area of approximately 2 acres. Ash Pond A is primarily incised with portions of the perimeter embankments having been diked above the former crest elevation of the previous impoundment. The northwestern embankment slopes to the West Branch of the Susquehanna River and consists primarily of the natural bank of the river. This embankment is approximately 20 feet in height from the river to the crest and includes a diked portion of approximately 2 feet which was built on top of the former impoundment embankment crest to provide additional freeboard and to create a vehicle access drive. The northeastern outer embankment crest is approximately 3 feet above the area surrounding the facility wastewater treatment plant clarifier tank. The top 2 – 3 feet of this embankment were diked to provide additional freeboard and to create a raised vehicle access drive between the impoundment and the clarifier tank. The southwestern embankment consists of an earthen dike constructed to separate the two component cells of the overall impoundment. The southeastern embankment is completely incised into the natural slope, with a compacted gravel access drive along the crest.

The typical water surface is maintained at approximately elevation (EL) 1063 feet above mean sea level, which is within the incised portion of the impoundment. The pond bottom (as indicated by the design drawings) slopes towards the southeast (center) embankment to approximately EL 1051.8. The crest of all embankments is at approximately EL 1067, with no constructed emergency overflow section. The inboard embankment slopes have an inclination of approximately 3H:1V.

Ash Pond A includes a synthetic liner system comprised of a geotextile underlayment, a PVC liner, and a geotextile overlayment covered with approximately 1 to 2 feet of compacted bottom ash. This liner is continuous through Ponds A and B and extends up all side slopes to approximate EL 1065.5 according to the supplied design drawings.

Ash Pond B

Ash Pond B is also a combined incised/diked earthen embankment structure that impounds an area of approximately 1.8 acres. Ash Pond B is primarily incised with portions of the perimeter embankments having been diked above the former crest elevation of the previous impoundment. The northwestern embankment slopes to the West Branch of the Susquehanna River and consists primarily of the natural bank of the river. This embankment is approximately 20 feet in height from the river to the crest and includes a diked portion of approximately 2 feet which was built on top of the former impoundment embankment crest to provide additional freeboard and to create a vehicle access drive. The southwestern outer embankment crest is approximately 6 - 7 feet above a stormwater management area which was previously part of the former ash impoundment at this location. The top 6 feet of this embankment were diked above the former impoundment bottom to separate the new Ash Pond B from the stormwater management area and to create a new raised gravel access drive. The northeastern embankment consists of an earthen dike constructed to separate the two component cells of the overall impoundment. The southeastern embankment is completely incised into the natural slope, with a compacted gravel access drive along the crest.

The typical water surface is maintained at approximately elevation (EL) 1063 feet above mean sea level, which is primarily within the incised portion of the impoundment except in the case of the southwestern embankment. Based on available design drawings, the normal operating water level is approximately 2 – 3 feet above the adjacent stormwater management area. The pond bottom (as indicated by the design drawings) slopes towards the southeast (center) embankment to approximately EL 1051.8. The crest of all embankments is at

approximately EL 1067. There is an emergency overflow section constructed within the southwest embankment consisting of a 50 ft. triangular spillway with a depth of approximately 9 inches. The inboard embankment slopes have an inclination of approximately 3H:1V.

Ash Pond A includes a synthetic liner system comprised of a geotextile underlayment, a PVC liner, and a geotextile overlayment covered with approximately 1 to 2 feet of compacted bottom ash. This liner is continuous through Ponds A and B and extends up all side slopes to approximate EL 1065.5 according to the supplied design drawings.

2.3.2. Type of Materials Impounded

Ash Pond A

Ash Pond A currently serves as the primary bottom ash management impoundment for the facility. Influent into Ash Pond A includes water with solids consisting of bottom ash and lesser quantities of miscellaneous fines composed of coal fines and surface runoff silt.

Ash Pond B

Ash Pond B currently serves as a backup bottom ash management impoundment, and is typically only used during maintenance operations on Ash Pond A. Influent into Ash Pond B includes water with solids consisting of bottom ash and lesser quantities of miscellaneous fines composed of coal fines and surface runoff silt.

2.3.3. Outlet Works

Ash Pond A

The outlet works for Ash Pond A consist of three separate systems capable of controlling the water level in the pond to different ranges. The primary outlet for Ash Pond A consists of a submerged 36" diameter perforated steel pipe running parallel to the northeastern embankment. This pipe is connected to the Ash Sluice Recycle Collection Structure at the eastern corner of Ash Pond A which includes a slide gate for normal operating water level control. Water collected by this system is conveyed from the Ash Sluice Recycle Collection Structure to the plant for recycling and reuse in the sluicing of bottom ash. The secondary outlet for Ash Pond A is the decant structure which consists of a concrete box with a rectangular orifice/weir with a slide gate. The decant structure is connected to a manhole located in the central dividing dike and ultimately to the Underdrain Pump Station located in the eastern corner of Ash Pond B by a solid 12" PVC pipe. From here, the decant water is conveyed back to the plant for treatment in the wastewater treatment plant. This secondary system is typically used to lower the pond water level for maintenance operations. The third outlet system consists of 12" diameter perforated PVC underdrains in an envelope of coarse aggregate running above the pond liner system but below the bottom of the pond. The underdrains connect to the Underdrain Pump Station and the water is conveyed to the plant for treatment. These underdrains are only used when complete dewatering of the pond is required.

Ash Pond B

The outlet works for Ash Pond B are similar to those of Ash Pond A and consist of three separate systems capable of controlling the water level in the pond to different ranges. The primary outlet for Ash Pond B consists of a submerged 36" diameter perforated steel pipe running parallel to the southwestern embankment. This pipe is connected to the Ash Sluice Recycle Blowdown Structure at the southern corner of Ash Pond B which includes a slide gate for normal operating water level control. Water collected by this system is conveyed to the Ash

Sluice Recycle Collection Structure in Ash Pond A and from there back to the plant for recycling and reuse in the sluicing of bottom ash. Isolation valves within the Ash Sluice Recycle Collection Structures allow for the independent control of the water levels in each cell of the impoundment. The secondary outlet for Ash Pond B is the decant structure which consists of a concrete box with a rectangular orifice/weir with a slide gate. The decant structure is connected to a manhole located in the central dividing dike and ultimately to the Underdrain Pump Station located in the eastern corner of Ash Pond B by a solid 12" PVC pipe. From here, the decant water is conveyed back to the plant for treatment in the wastewater treatment plant. This secondary system is typically used to lower the pond water level for maintenance operations. The third outlet system consists of 12" diameter perforated PVC underdrains in an envelope of coarse aggregate running above the pond liner system but below the bottom of the pond. The underdrains connect to the Underdrain Pump Station and the water is conveyed to the plant for treatment. These underdrains are only used when complete dewatering of the pond is required.

3. RECORDS REVIEW

A review of the available records related to design, construction, operation and inspection of Ash Pond A and Ash Pond B was performed as part of this assessment. The documents provided by GenOn are listed below:

Table 3.1 *Summary of Documents Reviewed*

Document	Dates	By	Description
Response to EPA RFI	2010	RRI Energy	Utility's response to EPA questionnaire regarding CCW impoundments
NPDES Permit PA0010031 - Amendment No. 2	2006	GenOn REMA, LLC	Authorization for Discharge of Industrial Wastewater
Partial Plan Set – Bottom Ash Handling System and Final Wastewater Treatment System	1990	Gilbert/ Commonwealth, Inc.	Portion of the original design drawings with as-built notations for the construction of Ash Pond A and B
Locations and Recorded Water Levels in Monitoring Wells MW-7R, MW-8R, MW-9 & MW-10	2012	GenOn REMA, LLC	Sketch indicating the locations of groundwater monitoring wells installed during the closure of the prior impoundment (Pond 2) and the recorded maximum water elevations in the wells for the last 4 quarters

3.1. ENGINEERING DOCUMENTS

As indicated above, design drawings for the impoundment were provided by GenOn. Information on the original design, construction and subsequent modifications provided by GenOn personnel are summarized below.

Ash Pond A

- The impoundment was originally constructed and brought online in 1989.
- Although Ash Pond A was constructed on top of a prior CCW impoundment (Pond 2), the design drawings reviewed indicate that the majority of CCW within prior Pond 2 was removed and landfilled before the construction of Ash Ponds A and B. Ash Ponds A and B were constructed within a smaller footprint than the original Pond 2.
- Ash Pond A is the primary bottom ash impoundment for the generating station.
- Ash Pond A includes an engineered liner system consisting of a PVC liner with geotextile cushion fabric. The liner was originally covered with approximately 2 feet of bottom ash or earth cover and extends to approximate EL 1065.5.
- A subdrain system was installed below the constructed liner to collect groundwater from below the liner above the former bottom elevation of the previous impoundment at this location. This system discharges to a manhole along the northwest side of the impoundment and drains to the plant wastewater treatment plant.
- No slope stability analyses, hydrologic, or hydraulic analyses were provided in the records reviewed.
- No design or as-built geotechnical information was provided in the records reviewed.
- Ash Pond A and its embankments are located within the FEMA 100-year Floodplain for the West Branch of the Susquehanna River (Map #42033C0340D). The Flood Insurance Study does not indicate the 100-year flood elevation at this location.
- No indication or mention of ash, coal slimes, or other CCW by-products within the dike foundations was

noted in our review of the engineering records listed above.
- No indication of former spills or releases of impounded materials from Ash Pond A was noted in the records reviewed.
- Ash Pond A has a total storage volume of approximately 20,400 cubic yards or 12.6 acre-ft.
- Ash Pond A is dredged on an annual basis to restore its impoundment capacity. The bottom ash removed from the impoundment is disposed of in the on-site landfill. GenOn records indicate that approximately 11,000 dry tons of bottom ash is removed during each maintenance cycle.

Ash Pond B

- Ash Pond B was constructed at the same time as Ash Pond A and brought online in 1989.
- Although Ash Pond B was constructed on top of a prior CCW impoundment (Pond 2), the design drawings reviewed indicate that the majority of CCW within prior Pond 2 was removed and landfilled before the construction of Ash Ponds A and B. Ash Ponds A and B were constructed within a smaller footprint than the original Pond 2.
- Ash Pond B currently serves as a back-up bottom ash impoundment and is typically used only when Ash Pond A is under maintenance.
- Ash Pond B includes an engineered liner system consisting of a PVC liner with geotextile cushion fabric. The liner was originally covered with approximately 2 feet of bottom ash or earth cover and extends to approximate EL 1065.5.
- A sub-drain system was installed below the constructed liner to collect groundwater from below the liner above the former bottom elevation of the previous impoundment at this location. This system discharges to a manhole along the northwest side of the impoundment and drains to the plant wastewater treatment plant.
- No slope stability analyses, hydrologic, or hydraulic analyses were provided in the records reviewed.
- Ash Pond B and its embankments are located within the FEMA 100-year Floodplain for the West Branch of the Susquehanna River (Map #42033C0340D). The Flood Insurance Study does not indicate the 100-year flood elevation at this location.
- No indication or mention of ash, coal slimes, or other CCW by-products within the dike foundations was noted in our review of the engineering records listed above.
- No indication of former spills or releases of impounded materials from Ash Pond B was noted in the records reviewed.
- Ash Pond B has a total storage volume of approximately 19,700 cubic yards or 12.2 acre-ft.
- Ash Pond B is dredged once every three years to restore its impoundment capacity. The bottom ash removed from the impoundment is disposed of in the on-site landfill.

Plant personnel indicated that GenOn Energy has publicly announced that operations at the Shawville Generating Station will be terminated in April 2015.

3.1.1. Stormwater Inflows

Stormwater inflows to both Ash Pond A and B are minimal. The impounding structures are surrounded by diked embankments forming vehicle access drives on all sides and a drainage swale along the southeastern side which directs storm water away from the impoundment and limits runoff to that from precipitation which falls directly on the water surface and crest of the dikes.

3.1.2. Stability Analyses

As mentioned above, no geotechnical reports or records of design or as-built slope stability analyses were provided in the records made available by GenOn. Based on our discussion with plant personnel, geotechnical/slope stability records are either non-existent or could not be located in preparation for our visit. We did not observe any indications of slope distress during our visual inspection of both ponds.

3.1.3. Modifications from Original Construction

The center embankment separating Ash Ponds A and B has been enlarged by using compacted bottom ash in order to provide a larger work platform for maintenance and dredging equipment. Other minor modifications include adjustments to the basin bottom elevations and side slopes created as a result of leaving some excess bottom ash in place during maintenance dredging in order to protect the liner.

3.1.4. Instrumentation

Pond water level monitors are present in the decant structures for Ponds A and B for the purposes of plant operations but detailed records of water levels are not available.

Two monitoring wells (MW-9 and MW-10) were installed within the northwestern embankment of the impoundment for the purposes of monitoring groundwater levels in the closed former impoundment below. Two additional monitoring wells (MW-7R and MW-8R) are within fairly close proximity of the impoundment. Recorded water levels for the past 4 quarters were provided by GenOn for these monitoring wells.

3.2. PREVIOUS INSPECTIONS

No formal inspections are performed on the impoundment, and no records of inspection are available.

3.3. OPERATOR INTERVIEWS

Numerous plant and corporate personnel took part in the inspection proceedings. The following is a list of participants for the inspection of the Ash Ponds A and B:

Table 4 *List of Participants*

Name	Affiliation	Title
Stephen Dixon	GenOn Energy	Director, Coal Ash Management
Stephen Frank	GenOn Energy	Senior Environmental Specialist
Murray Kohan	GenOn Energy	General Manager, Shawville Station
Karen McClelland	GenOn Energy	Senior Environmental Specialist
Scott Palian	GenOn Energy	Environmental/Chemical Engineer, Shawville Station
Lawrence Rapski	GenOn Energy	Technical Manager, Shawville Station
Heath Maines	Pennsylvania DEP	Engineer, Division of Dam Safety
Gary Emmanuel	O'Brien & Gere	Senior Managing Engineer
Stephen Szewczak	O'Brien & Gere	Project Engineer

Facility personnel provided a good working knowledge of both Ash Pond A and Ash Pond B, provided general plant operation background and provided requested historical documentation as available. These personnel also accompanied O'Brien & Gere and the PADEP Representative throughout the visual inspections to answer questions and to provide additional information as needed in the field.

4. VISUAL INSPECTION

The following sections summarize the inspection of Ash Pond A and Ash Pond B, which occurred on September 6, 2012. At the time of the inspection, O'Brien & Gere completed an EPA inspection checklist for the overall impoundment, which was submitted electronically to EPA on September 11, 2012. A copy of the completed inspection checklist is included as Appendix A.

4.1. GENERAL

The weather on the dates of the inspection was sunny and approximately 78 degrees. The visual inspection consisted of a thorough site walk along the perimeter of both ash ponds. O'Brien & Gere team members made observations along the toe, outboard slope, and crest of the embankments, and along exposed portions of the inboard slopes. We also observed the inlet/outlet structures and current operation.

Photos of relevant features and conditions observed during the inspection were taken by O'Brien & Gere and are provided in Appendix B. Site Plans of the ponds are presented as Figure 2, which also provides photograph locations and directions.

4.2. SUMMARY OF FINDINGS

Ash Pond A

The following observations were made during the inspection:

- The annual maintenance cycle for Ash Pond A had just been completed at the time of the inspection. The water level was drawn down for this maintenance, so visual inspection of the interior side slopes and outlet structures was possible.
- Sluiced bottom ash discharge enters the pond near the southwest corner and discharges into a small settling forebay constructed of compacted bottom ash. The settling forebay is connected to the main pond by two 24" HDPE pipes.
- The southeast (center) embankment separating Ash Ponds A and B has been enlarged with compacted bottom ash to provide additional area for maintenance equipment.
- The inboard slopes are protected by a combination of rock rip rap and fair vegetative cover above the typical water surface elevation. The rip rap within approximately 150 feet of the southeast (center) embankment is grouted.
- Plant personnel indicated that the annual maintenance and removal of accumulated ash has left approximately 2 feet of material along the side slopes and bottom. Plant personnel report that this is material is intentionally left in place in order to prevent possible damage to the impoundment liner system during dredging. This material was visible on the side slopes beneath the normal operating water level due to the lowered water level at the time of inspection.
- The decant structure appears to be in good condition and functioning normally. The water level was low enough for observation of the main 36" diameter steel perforated pipe which appears in good condition.
- The crest is covered by compacted gravel vehicle access drives around the entire perimeter.
- The drainage diversion swale along the southeastern side of the impoundment is clear of debris and appears to be functioning adequately with no signs of erosion.
- The outboard slope along the northwestern side of the impoundment, above the West Branch of the Susquehanna River, is heavily vegetated with woody shrubs and trees. This vegetation appears limited to the natural embankment section of the river and not within the more recently constructed diked portion at the top of the embankment. The vegetation does not appear to be impacting the stability of the

embankment.

- The outboard slope along the northeastern side of the impoundment above the facility wastewater treatment plant clarifier tank is well vegetated with maintained turf grass. It appears that the typical water surface level within the impoundment is maintained at or below the outer toe of embankment elevation. The slope appears stable with no evidence of seeping, sliding, erosion, or animal burrows.

Ash Pond B

The following observations were made during the inspection:

- Ash Pond B was in use for the impoundment of bottom ash at the time of inspection due to the annual maintenance on Ash Pond A.
- Sluiced bottom ash discharge enters the pond near the southeast corner and discharges into a small settling forebay constructed of compacted bottom ash. The settling forebay is connected to the main pond by two 24" HDPE pipes.
- The northeast (center) embankment separating Ash Ponds A and B has been enlarged with compacted bottom ash to provide additional area for maintenance equipment.
- The inboard slopes are protected by a combination of rock rip rap and fair vegetative cover above the typical water surface elevation. The rip rap within approximately 150 feet of the northeast (center) embankment is grouted.
- Plant personnel indicated that the regular maintenance and removal of accumulated ash has left approximately 2 feet of material along the side slopes and bottom. Plant personnel report that this is material is intentionally left in place in order to prevent possible damage to the impoundment liner system during dredging. This material was not visible above the normal operating water level in Pond B at the time of the inspection.
- The decant structure appears to be in good condition and functioning normally.
- The crest is covered by compacted gravel vehicle access drives around the entire perimeter.
- The drainage diversion swale along the southeastern side of the impoundment is clear of debris and appears to be functioning adequately with no signs of erosion.
- The outboard slope along the northwestern side of the impoundment, above the West Branch of the Susquehanna River, is heavily vegetated with woody shrubs and trees. This vegetation appears limited to the natural embankment section of the river and not within the more recently constructed diked portion at the top of the embankment. The vegetation does not appear to be impacting the stability of the embankment.
- The outboard slope along the southeastern side of the impoundment, above the stormwater management area, is heavily vegetated with shrubs and tall grasses which limits visual inspection of the slope. It appears that the typical water surface level within the impoundment is maintained approximately 2 to 3 feet above the outer toe of embankment elevation. Stormwater runoff from the upstream diversion channel was present in the bottom of the stormwater management area at the time of inspection. The slope appears stable with no evidence of seeping, sliding, or erosion.

5. CONCLUSIONS

Based on the fact that the impoundment was constructed with a single liner system and an interconnected decant system, Ash Ponds A and B have been rated as a single impoundment. Based on the ratings defined in the USEPA Task Order Performance Work Statement (Satisfactory, Fair, Poor and Unsatisfactory), the information reviewed and the visual inspection, the overall condition of Ash Ponds A and B is considered to be **FAIR**. Acceptable performance is expected under all loading conditions; however, some minor deficiencies exist that require repair and/or additional studies or investigations. The deficiencies include the following:

- Heavy vegetation along the outer slope of the southwestern embankment of Ash Pond B limits visual inspection and may encourage animal burrowing.
- Heavy vegetation, including large trees, exists along outer slope of the northwestern embankment of Ash Ponds A and B.

Other than the conditions cited above, the owner has implemented regular visual inspections and performs routine maintenance which appears to be sufficient to keep the impoundment in good working order.

In addition to the physical deficiencies, we also noted that no geotechnical data or associated slope stability analyses are on record for the impoundment. Typical cross-sections of the impoundment are provided in Figures 3 and 4. The embankments are generally broad-crested with typical crest widths varying between 18 and 24 feet with relatively flat side slopes (3:1 or flatter). The presence of a constructed liner significantly reduces the risk of developing a phreatic surface within the diked embankment. The data provided for Monitoring Wells MW-9 and MW-10 indicate that the groundwater elevation within the northwestern embankment adjacent to the West Branch of the Susquehanna River is typically below the bottom elevation of the Ash Ponds, indicative that the liner system is serving to prevent the development of a phreatic surface within this embankment. Given the nature of this impoundment as primarily incised with a constructed impermeable liner system, there do not appear to be any critical slopes requiring a stability analysis in the immediate future. Completion of a slope stability analysis should be considered if modifications to the impoundment structure or significant alterations in the normal water level are proposed in the future.

The Flood Insurance Study for Clearfield County, Pennsylvania shows that Ash Ponds A and B are located within the 100-year floodplain of the West Branch of the Susquehanna River. The Flood Insurance Study did not include a detailed study to predict the 100-year flood elevation of the West Branch of the Susquehanna River at this location. The limits of the floodplain indicated on Map Panel 42033C0340D are based on approximate methods and are interpreted from topographic mapping. Based on this mapping, it appears that the interpreted 100-year flood elevation is relatively close to the crest elevation and normal operating water elevation in Ash Ponds A and B. It appears that floodwaters in the West Branch of the Susquehanna River do not pose a significant risk of scour or erosion to the outer slope of the northwestern embankment of the impoundment and are unlikely to interact with water impounded within the ash ponds.

No hydrologic or hydraulic analyses are on record for the impoundment to determine the likelihood of overtopping due to precipitation during various design storm events. The operating pond water level, however, provides approximately 3 to 4 feet of freeboard that would accommodate the direct runoff from a significant precipitation event including the Probable Maximum Flood. For Ash Pond A, it is unclear where overtopping during a large storm would occur due to the lack of a constructed spillway section. The provided design drawings indicate that the center dividing dike crest was constructed to the same elevation as the perimeter crest. Modifications and normal operations appear to have raised this center dividing dike slightly by the addition of compacted ash driving surfaces and temporary stockpiles of dredged material.

6. RECOMMENDATIONS

Based on the findings of our visual inspection and review of the available records for Ash Ponds A and B, O'Brien & Gere recommends that additional maintenance of the embankments be performed to correct the deficiencies cited above.

6.1. URGENT ACTION ITEMS

None of the recommendations are considered to be urgent, since the issues noted above do not appear to threaten the structural integrity of the dam in the near term.

6.2. LONG TERM IMPROVEMENT

The deficient conditions observed during the inspection do not require immediate attention, but should be implemented in the near future as part of a regular maintenance plan. The recommended maintenance/improvement actions are provided below:

Ash Pond A

- Crest
  - Consider installation of an emergency overflow section on the center dividing dike to control overtopping during large storm events. This overflow section would permit Pond A to overflow into Pond B and ultimately through the emergency overflow section of Pond B's embankment. The construction of an overflow section should be performed in accordance with an engineered design and based on the results of a hydrologic and hydraulic analysis.
- Inboard slopes:
  - Continue to monitor all inboard slopes for signs of erosion. Repair in accordance with an engineered design.
- Outboard slopes:
  - Continue to monitor the outboard slopes of the embankments, primarily the northwestern and northeastern sides, for signs of seepage, sliding, erosion, and animal burrowing.
  - Increase maintenance activities to control the heavy vegetation along the outer slope of the northwestern embankment adjacent to the gravel access drive for improved visual inspection of the diked portion of this embankment.
  - Evaluate the condition of the large trees along the outboard slope of the northwestern embankment, primarily those above the impoundment bottom elevation. Diseased or dead trees should be removed.
- Additional studies:
  - Perform a hydrologic and hydraulic analysis of the impoundment for the 1-year through 100-year, 24-hour duration design storm events to determine the adequacy of the provided freeboard.
  - Perform a hydrologic and hydraulic analysis of the West Branch of the Susquehanna River at this location in order to determine the 100-year flood elevation and anticipated flow velocities.

Ash Pond B

- Inboard slopes:
  - Continue to monitor all inboard slopes for signs of erosion. Repair in accordance with an engineered design.

- Outboard slopes:
    - Continue to monitor the outboard slopes of the embankments, primarily the northwestern and southwestern sides, for signs of seepage, sliding, erosion, and animal burrowing.
    - Increase maintenance activities to control the heavy vegetation along the outer slope of the northwestern embankment adjacent to the gravel access drive for improved visual inspection of the diked portion of this embankment.
    - Evaluate the condition of the large trees along the outboard slope of the northwestern embankment, primarily those above the impoundment bottom elevation. Diseased or dead trees should be removed.
    - Increase maintenance activities to control the heavy vegetation on the outboard slope of the southwestern embankment above the stormwater management area to facilitate visual inspection of the slope for signs of erosion, movement, seepage or animal burrows.
    - Continue to monitor the stormwater management area for signs of erosion due to stormwater runoff from upstream areas. Repair in accordance with an engineered design as needed.
- Additional studies:
    - Perform a hydrologic and hydraulic analysis of the impoundment for the 1-year through 100-year, 24-hour duration design storm events to determine the adequacy of the provided freeboard.
    - Perform a hydrologic and hydraulic analysis of the West Branch of the Susquehanna River at this location in order to determine the 100-year flood elevation and anticipated flow velocities.

6.3. MONITORING AND FUTURE INSPECTION

O'Brien & Gere recommends consideration of independent inspections by licensed dam safety engineers on at least a biennial basis. Future inspections may be required by the Pennsylvania Department of Environmental Protection should they determine that these impoundments will be regulated in the future.

6.4. TIME FRAME FOR COMPLETION OF REPAIRS/IMPROVEMENTS

The improvements, surveys, engineering and repairs recommended in this report may be required or may be rendered moot by an overall closure plan for the impoundments if the anticipated plant decommissioning occurs as scheduled in 2015. Completion of these items may be deferred until that time, unless long-term continued operation of the plant is anticipated.

6.5. CERTIFICATION STATEMENT

I acknowledge that the Ash Pond A and Ash Pond B CCW management units referenced herein were personally inspected by me on September 6, 2012 and were found to be in the following condition:

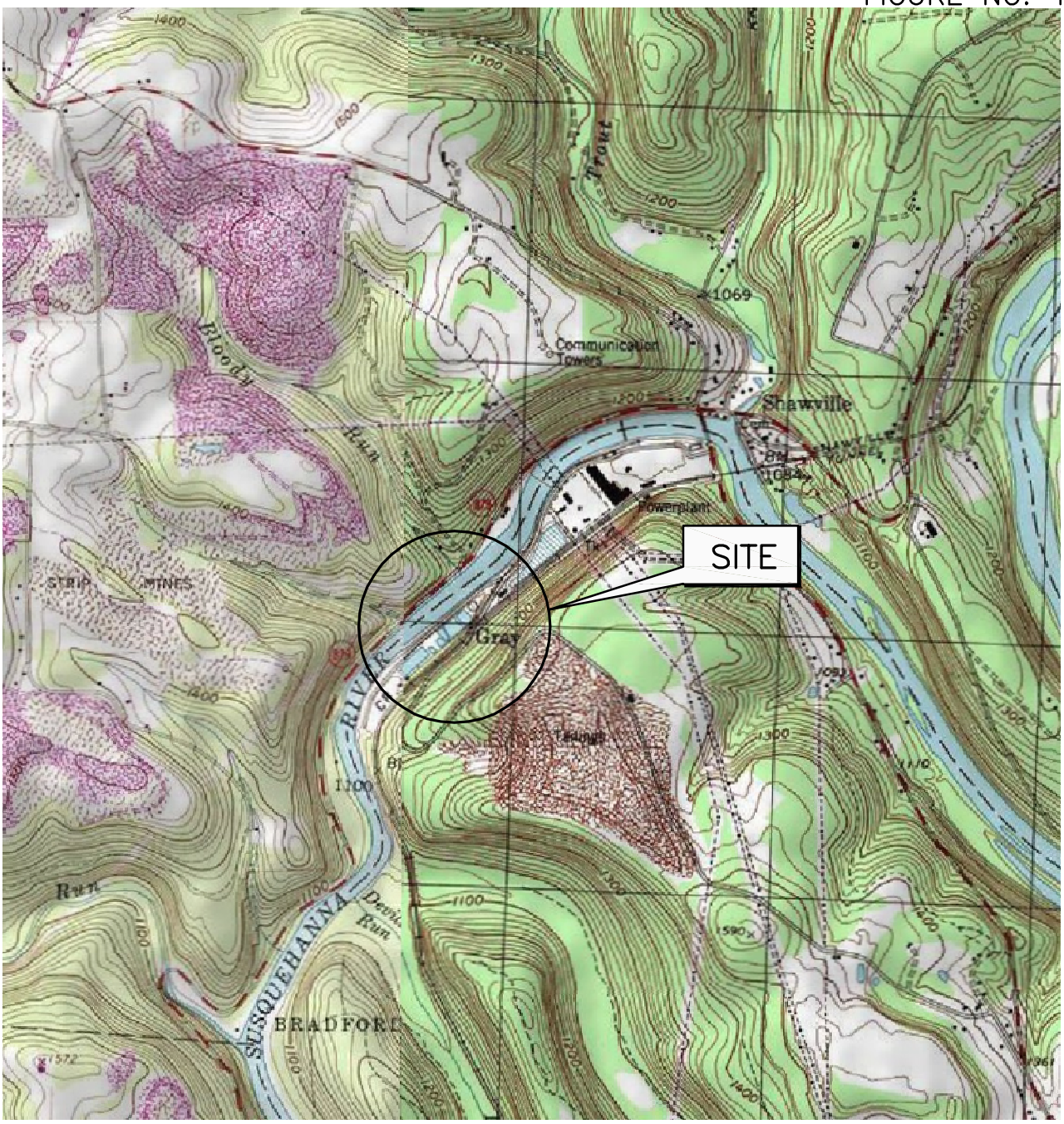
~~SATISFACTORY~~
FAIR
~~POOR~~
~~UNSATISFACTORY~~

Signature: _____ Date: _____

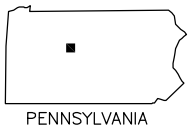
Gary B. Emmanuel, PE
PA PE-030497-E

Figures

FIGURE NO. 1



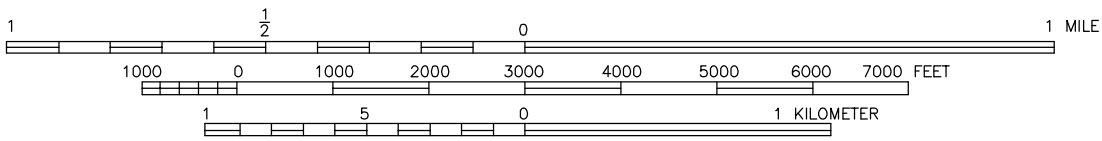
ADAPTED FROM: CLEARFIELD, PA & LECONTES MILLS, PA U.S.G.S. 7.5 MIN. QUADS



US EPA – DAM SAFETY ASSESSMENT OF CCW IMPOUNDMENTS SHAWVILLE GENERATING STATION

SITE LOCATION MAP

QUADRANGLE LOCATION

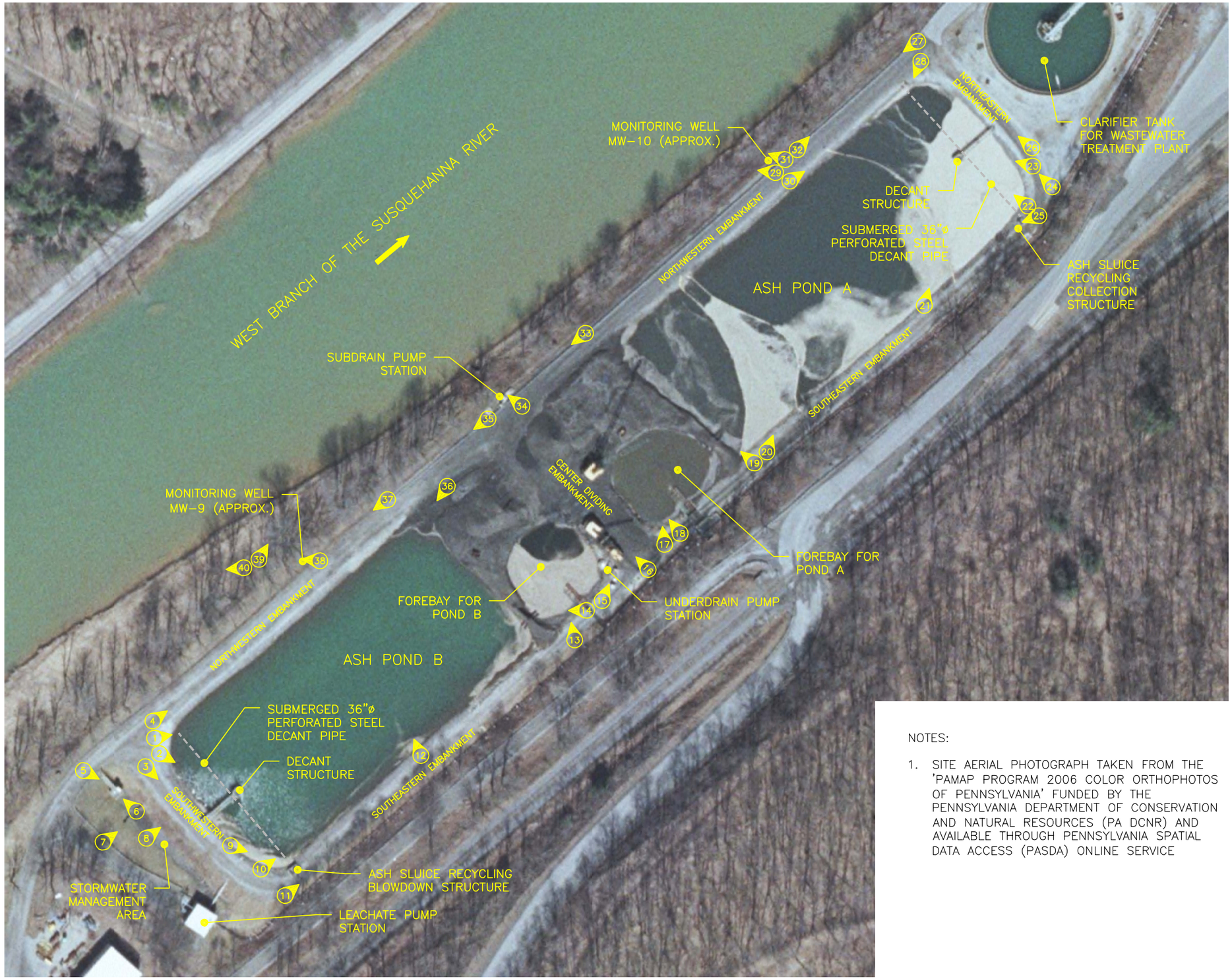


FILE NO. 13498.46122-220
SEPTEMBER 2012

SCALE: 1:24000

O'BRIEN & GERE

FIGURE 2



1 PHOTOGRAPH NUMBER AND ORIENTATION

NOTES:

1. SITE AERIAL PHOTOGRAPH TAKEN FROM THE 'PAMAP PROGRAM 2006 COLOR ORTHOPHOTOS OF PENNSYLVANIA' FUNDED BY THE PENNSYLVANIA DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES (PA DCNR) AND AVAILABLE THROUGH PENNSYLVANIA SPATIAL DATA ACCESS (PASDA) ONLINE SERVICE

US EPA
DAM SAFETY ASSESSMENT
OF CCW IMPOUNDMENTS

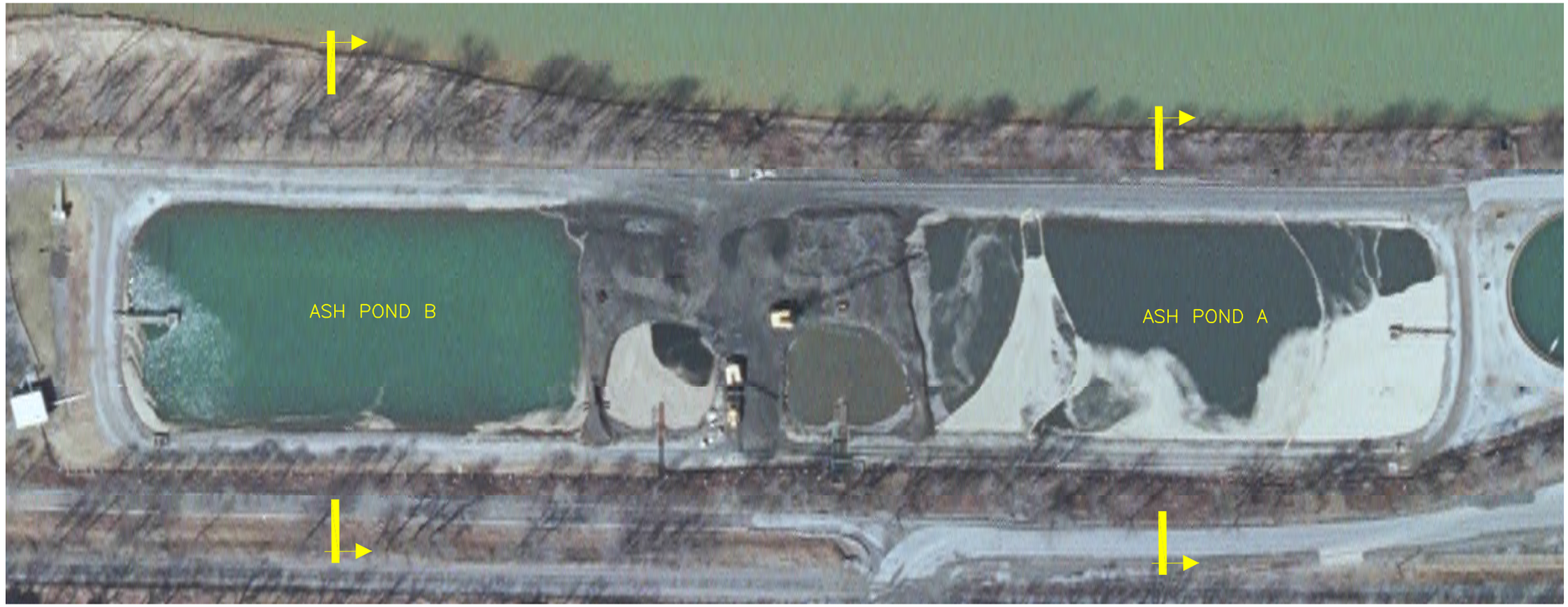
GenOn ENERGY
SHAWVILLE GENERATING STATION

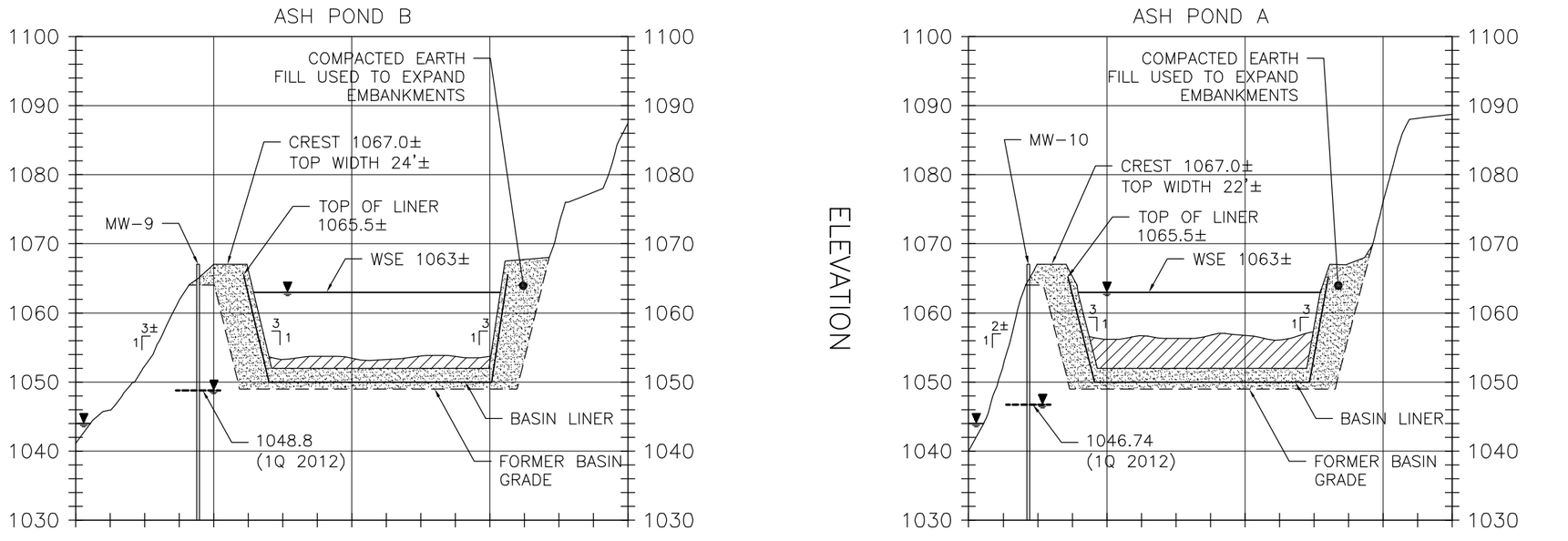
SITE AERIAL PHOTOGRAPH AND PHOTOGRAPH LOCATION MAP

FILE NO. 13498.46122.220
SEPTEMBER 2012

O'BRIEN & GERE

FIGURE 3





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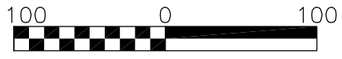
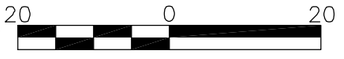


VERTICAL SCALE: 1"=20'



US EPA
DAM SAFETY ASSESSMENT
OF CCW IMPOUNDMENTS

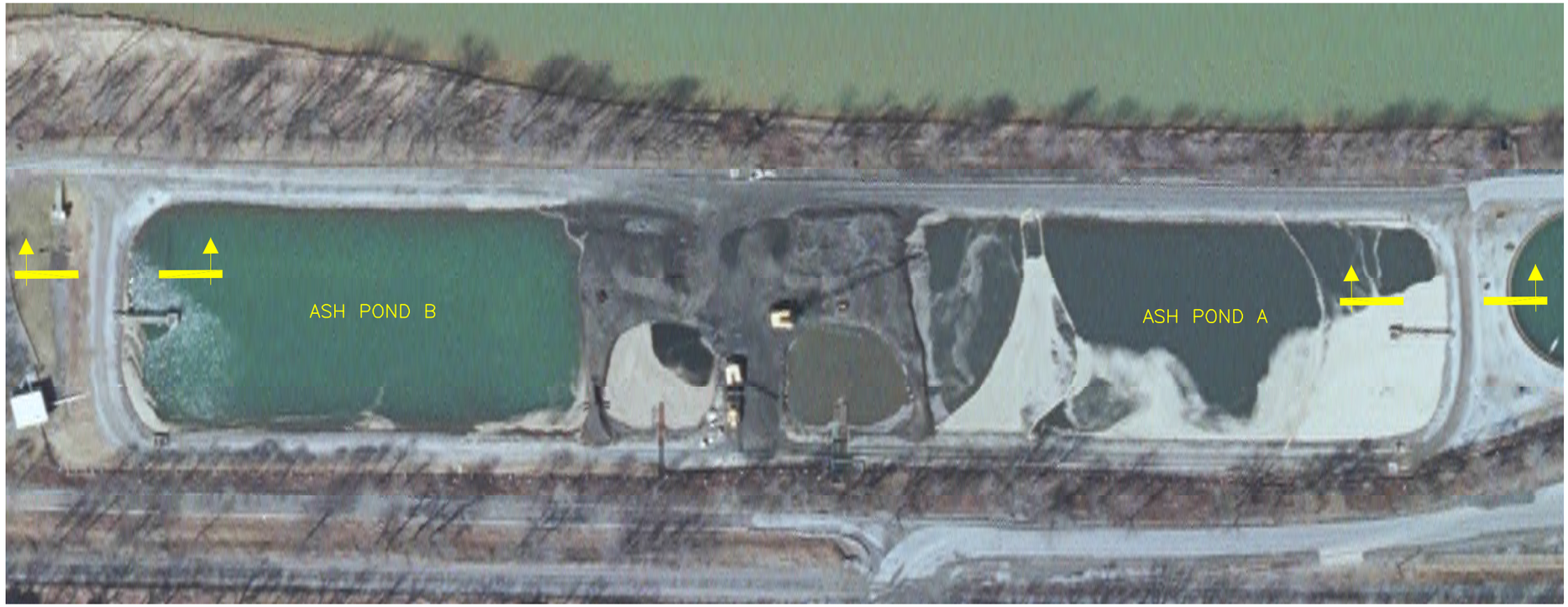
GenOn ENERGY
SHAWVILLE GENERATING STATION

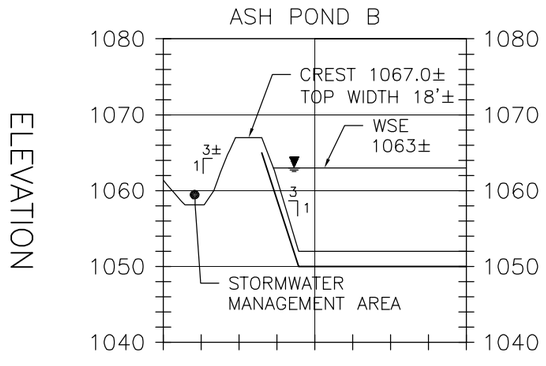
TYPICAL CROSS-SECTIONS

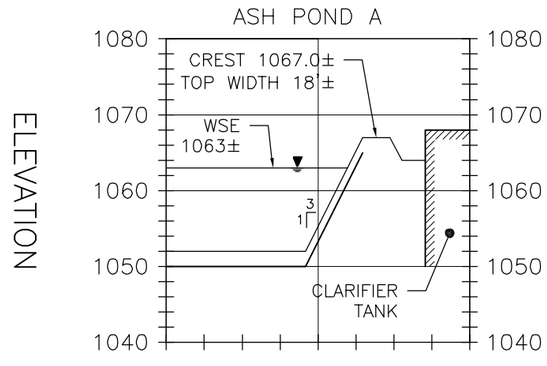
FILE NO. 13498.46122.220
SEPTEMBER 2012

O'BRIEN & GERE

FIGURE 4







HORIZONTAL SCALE: 1"=100' 100 0 100

VERTICAL SCALE: 1"=20' 20 0 20

US EPA
DAM SAFETY ASSESSMENT
OF CCW IMPOUNDMENTS

GenOn ENERGY
SHAWVILLE GENERATING STATION

TYPICAL CROSS–SECTIONS

FILE NO. 13498.46122.220
SEPTEMBER 2012

O'BRIEN & GERE

Appendix A

Visual Inspection Checklists

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	GenOn Shawville Generating Station	Date:	09/06/12
Unit Name:	Ash Ponds A and B	Operator's Name:	GenOn REMA LLC
Unit I.D.:		Hazard Potential Classification:	High Significant Low ✓
Inspector's Name:	Gary B. Emmanuel / Stephen M. Szewczak		

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)?	1,063.0		19. Major erosion or slope deterioration?		✓
3. Decant inlet elevation (operator records)?	N/A		20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	1,066.3		Is water entering inlet, but not exiting outlet? Unknown		
5. Lowest dam crest elevation (operator records)?	1,067.0		Is water exiting outlet, but not entering inlet? Unknown		
6. If instrumentation is present, are readings recorded (operator records)?		✓	Is water exiting outlet flowing clear? Unknown - closed system		
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

See attached for Comments

Site Name: **GenOn Energy – Shawville Generating Station**

Date: **September 6, 2012**

Unit Name: **Ash Ponds A & B**

Unit I.D.:

Inspection Issue #	Comments
GENERAL	Ash Ponds A & B were constructed as one large impoundment with a continuous synthetic liner system divided into two (2) cells by a compacted earth berm in the approximate center which has since been enlarged by the addition of compacted bottom ash.
GENERAL	The current impoundment was constructed in 1989. Copies of original design drawings are available. The impoundment was constructed over the location of former Ash Pond #2 which was closed. There is a sub-drain system beneath the current impoundment liner.
GENERAL	Ash Pond A is the primary settlement and storage impoundment for the facility. Ash Pond B is typically only used for storage of bottom ash during periods of maintenance on Ash Pond A.
GENERAL	At the time of inspection, the regularly scheduled annual maintenance and ash removal had just been completed on Ash Pond A. Ash Pond A was therefore at a drained down water level and Ash Pond B was in service for settlement and storage of bottom ash material.
1	Company personnel perform visual inspection of the impoundment on a daily basis; there is no formal dam inspection program.
3	The invert elevation of the primary 16" decant conveyance line is not indicated on the available design plans. The invert elevation of the primary submerged 36" diameter perforated steel pipes at each Ash Sluice Recycle Collection structure is approximately 1057.5.
9	Trees and heavy brush present on the outer embankment of the original Ash Pond #2 along the West Branch of the Susquehanna River. Trees and brush typically growing below the elevation of the built up embankment section constructed in 1989.
14	Ash Pond B includes a triangular emergency overflow spillway graded into the crest roadway approximately 9" deep. Overflow would enter a small stormwater detention area and outlet structure which drains to the plant wastewater treatment facility.
20	The primary decant system consists of two (2) perforated 36" steel pipes, one within each cell of the impoundment (A and B). The top of pipe elevation is 1060.5. Each of these perforated steel pipes discharges to an Ash Sluice Recycle Collection Structure containing a weir gate for pond level control and valves for independently regulating the water levels in the two cells during maintenance operations. The two Ash Sluice Recycle Collection Structures are connected by a 16" PVC pipe which drains back to the main plant where the decant water is recycled. A 12" underdrain system is connected to the two (2) decant structures located at either end of the impoundment, one in each cell. The decant structures are then connected to a central underdrain pumping station. During maintenance operations, the remaining water below the primary decant system is pumped to the plant wastewater treatment plant for treatment prior to discharge.

21	Impoundment constructed with an impermeable liner with a sub-drain system making seepage unlikely to be observed.
23	West Branch of the Susquehanna River runs along the toe of the outer embankment for the original Ash Pond #2.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # PA0010031 INSPECTOR G. Emmanuel / S. Szewczak

Date September 6, 2012

Impoundment Name GenOn Energy Shawville Generating Station - Ash Ponds A and B

Impoundment Company GenOn REMA LLC

EPA Region 3

State Agency (Field Office) Addresss PA DEP Northcentral Regional Office
208 W. 3rd Street, Suite 101, Williamsport, PA 17701

Name of Impoundment Ash Ponds A and B

(Report each impoundment on a separate form under the same Impoundment NPDES Permit number) (Impoundment built with one exterior embankment and liner system, separated into 2 cells by a compacted earth berm supplemented with compacted coal bottom ash material)

New _____ Update X

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

IMPOUNDMENT FUNCTION: Settlement and storage of coal bottom ash

Nearest Downstream Town : Name Shawville, PA

Distance from the impoundment 0.9 miles

Impoundment Location:
Longitude -78 Degrees 22 Minutes 26.84 Seconds
Latitude 41 Degrees 3 Minutes 39.75 Seconds
State PA County Clearfield

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

If So Which State Agency? PA DEP - Division of 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.

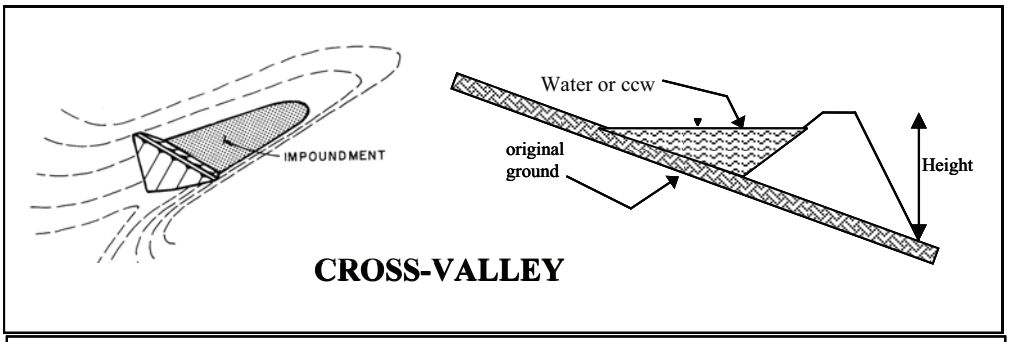
_____ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns.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

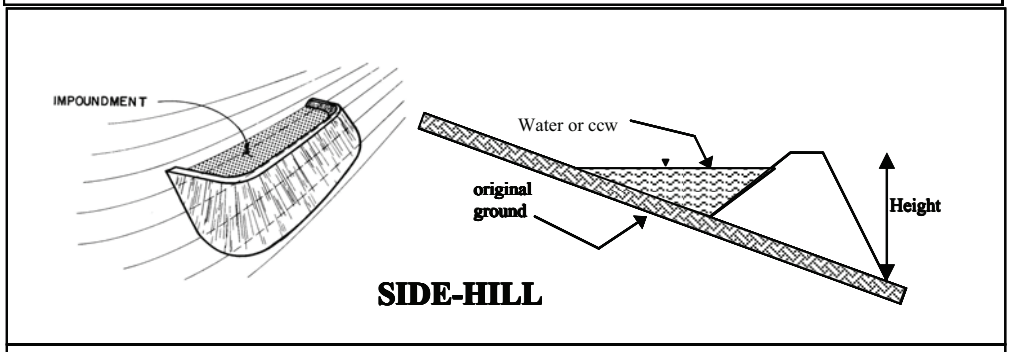
_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

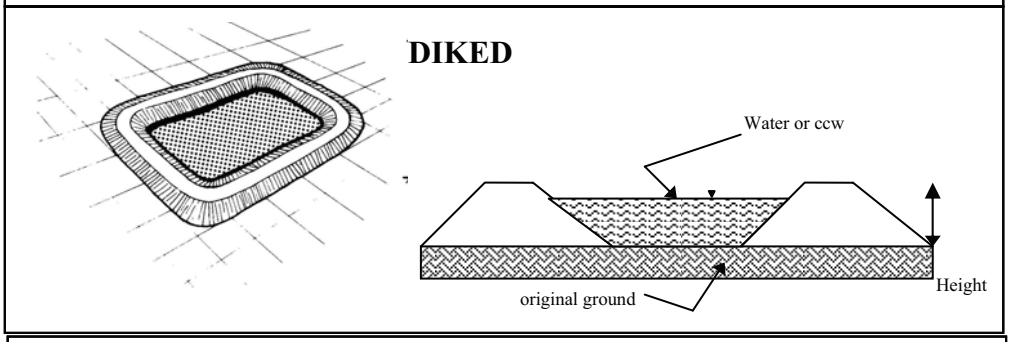
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

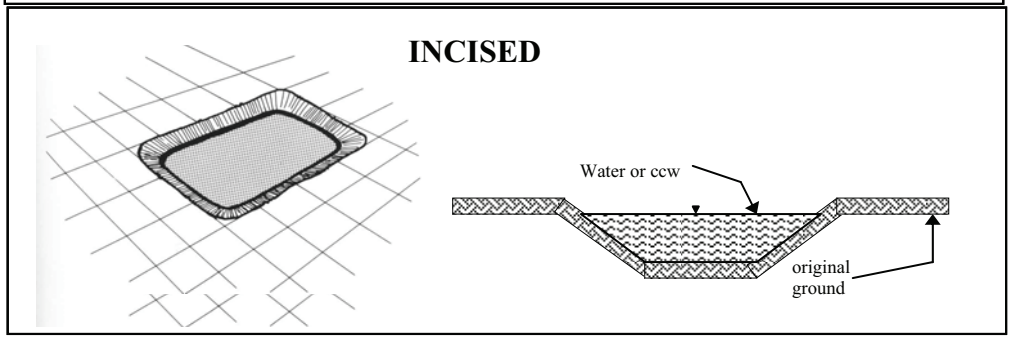
Potential failure of the impoundment would likely result in no loss of life and minimal economic losses. Failure would result in minor environmental impacts to the West Branch of the Susquehanna River.

CONFIGURATION:









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

Embankment Height 7 feet
Pool Area 3.3 acres
Current Freeboard 4 feet

Embankment Material Compacted Earth
Liner Yes - Synthetic Liner System
Liner Permeability Unknown (<< 10^-7 cm/sec)

TYPE OF OUTLET (Mark all that apply)

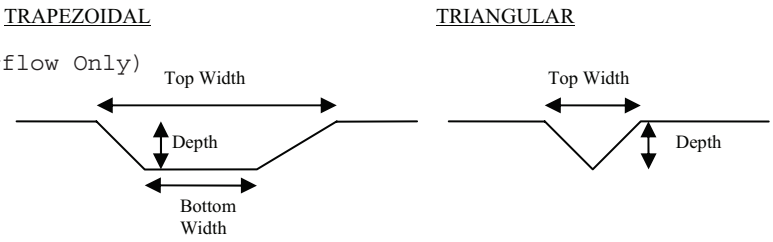
X **Open Channel Spillway** (Emergency Overflow Only)

_____ Trapezoidal

X Triangular

_____ Rectangular

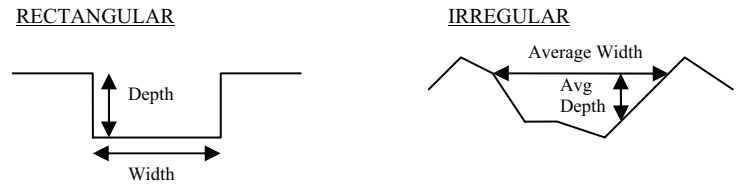
_____ Irregular



9" depth

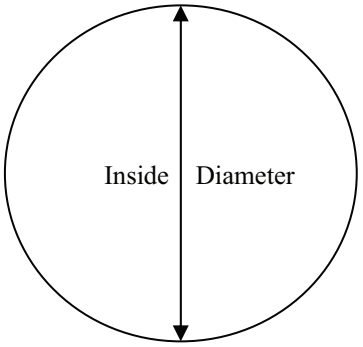
_____ bottom (or average) width

50' top width



X **Outlet**

16" inside diameter



Material

_____ corrugated metal

_____ welded steel

_____ concrete

X plastic (hdpe, pvc, etc.)

_____ other (specify) _____

Is water flowing through the outlet? YES _____ NO _____ Unknown, closed system

N/A **No Outlet**

X **Other Type of Outlet** (specify) 12" PVC Underdrain system connected to decant structures. Decant structures drain via 12" PVC pipe to central underdrain pump station which conveys water to plant wastewater treatment plant. System used only during maintenance.

The Impoundment was Designed By Gilbert / Commonwealth W.O.

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 : _____

Groundwater elevations are monitored at four (4) monitoring wells as part of continued monitoring of the closure of the former Ash Pond #2 at this location. Two (2) wells are located within the embankment of the current impoundment (MW-9 and MW-10)

Appendix B

Photographic Log

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client:	US EPA	Project Number:	46122.220
Site Name:	GenOn Energy – Shawville Generating Station	Location:	Shawville, PA

Orientation: NE Description: Ash Pond B; Overall view. Ash Pond B currently active during maintenance on primary Ash Pond A. Date: 9/6/12 Photo Number: 1 Photographer: S. Szewczak	
Orientation: SE Description: Ash Pond B; View of decant structure. Date: 9/6/12 Photo Number: 2 Photographer: S. Szewczak	

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client: US EPA	Project Number: 46122.220
Site Name: GenOn Energy – Shawville Generating Station	Location: Shawville, PA

Orientation: SE

Description: Ash Pond B; Inboard slope and crest of southwestern embankment. Note triangular emergency overflow section located just past walkway. Building on right is the leachate pump station from facility landfill.

Date: 9/6/12

Photo Number: 3

Photographer: S. Szewczak

Orientation: NE

Description: Ash Pond B; Inboard slope and crest of northwestern embankment.

Date: 9/6/12

Photo Number: 4

Photographer: S. Szewczak

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client: US EPA	Project Number: 46122.220
Site Name: GenOn Energy – Shawville Generating Station	Location: Shawville, PA

Orientation: E Description: Stormwater management area along outer toe of Ash Pond B southwestern embankment. Structure in foreground is the former outlet structure for prior Pond 2 now converted to a stormwater inlet structure. Date: 9/6/12 Photo Number: 5 Photographer: S. Szewczak	
Orientation: NW Description: Former outlet structure for the prior Pond 2, now converted to a stormwater inlet structure. Date: 9/6/12 Photo Number: 6 Photographer: S. Szewczak	

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client: US EPA	Project Number: 46122.220
Site Name: GenOn Energy – Shawville Generating Station	Location: Shawville, PA

Orientation: NE Description: Ash Pond B; Outer slope of southwestern embankment. Water along toe is stormwater runoff from upstream diversion ditches. No evidence of seepage through the embankment. Date: 9/6/12 Photo Number: 7 Photographer: S. Szewczak	
Orientation: NE Description: Typical view of toe of slope of Ash Pond B southwestern embankment. Date: 9/6/12 Photo Number: 8 Photographer: S. Szewczak	

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client: US EPA	Project Number: 46122.220
Site Name: GenOn Energy – Shawville Generating Station	Location: Shawville, PA

Orientation: SE

Description: Ash Pond B; Ash Sluice Recycle Structure. Receives flow from the decant structure & perforated steel pipe; drains to the plant for recycling of sluiced water. Pipe in foreground is a discharge for blowdown of the leachate pump station.

Date: 9/6/12

Photo Number: 9

Photographer: S. Szewczak

Orientation: NE

Description: Ash Pond B; inboard slope of southeastern embankment.

Date: 9/6/12

Photo Number: 10

Photographer: S. Szewczak

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client: US EPA	Project Number: 46122.220
Site Name: GenOn Energy – Shawville Generating Station	Location: Shawville, PA

Orientation: NE Description: Ash Pond B; Crest of southeastern embankment. Note diversion swale above (right) of the crest to collect runoff from the roadway above. Date: 9/6/12 Photo Number: 11 Photographer: S. Szewczak	
Orientation: NW Description: Ash Pond B; view of interior side slope of northwestern embankment. Note grouted rock section for maintenance dredging. Date: 9/6/12 Photo Number: 12 Photographer: S. Szewczak	

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client: US EPA	Project Number: 46122.220
Site Name: GenOn Energy – Shawville Generating Station	Location: Shawville, PA

Orientation: N Description: Ash Pond B; Constructed forebay and ash sluice piping at the southeast corner. Forebay berm constructed of compacted ash. Date: 9/6/12 Photo Number: 13 Photographer: S. Szewczak	
Orientation: W Description: Ash Pond B; (2) 24" HDPE pipes connecting the forebay to the main portion of Pond B through the compacted ash berm. Date: 9/6/12 Photo Number: 14 Photographer: S. Szewczak	

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client: US EPA	Project Number: 46122.220
Site Name: GenOn Energy – Shawville Generating Station	Location: Shawville, PA

Orientation: N Description: Underdrain pump station. Collects water from both Pond A and B underdrains to dewater the ponds during maintenance. Water pumped to the plant wastewater treatment facility. Date: 9/6/12 Photo Number: 15 Photographer: S. Szewczak	
Orientation: NW Description: Center Dividing Embankment separating the impoundment into the two (2) cells: Ash Pond A (right) and Ash Pond B left. Berm primarily compacted earth topped with a compacted ash roadway surface. Date: 9/6/12 Photo Number: 16 Photographer: S. Szewczak	

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client: US EPA	Project Number: 46122.220
Site Name: GenOn Energy – Shawville Generating Station	Location: Shawville, PA

Orientation: N

Description: Ash Pond A; View of constructed forebay and ash sluice discharge piping at the southwest corner. Pond A has just completed annual maintenance cycle so the forebay is dry.

Date: 9/6/12

Photo Number: 17

Photographer: S. Szewczak

Orientation: Down

Description: Close up view of grouted rock armor section, typical of both Pond A and B.

Date: 9/6/12

Photo Number: 18

Photographer: S. Szewczak

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client: US EPA	Project Number: 46122.220
Site Name: GenOn Energy – Shawville Generating Station	Location: Shawville, PA

Orientation: NW

Description: Ash Pond A, interior side slope of constructed forebay berm.

Date: 9/6/12

Photo Number: 19

Photographer: S. Szewczak

Orientation: NE

Description: Ash Pond A; Overall view looking towards the generating station. Note that water level has been lowered for maintenance by approximately 6 feet.

Date: 9/6/12

Photo Number: 20

Photographer: S. Szewczak

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client: US EPA	Project Number: 46122.220
Site Name: GenOn Energy – Shawville Generating Station	Location: Shawville, PA

Orientation: NE

Description: Ash Pond A; decant structure and 36" diameter perforated steel decant pipe.

Date: 9/6/12

Photo Number: 21

Photographer: S. Szewczak

Orientation: NW

Description: Ash Pond A; decant structure and 36" diameter perforated steel decant pipe.

Date: 9/6/12

Photo Number: 22

Photographer: S. Szewczak

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client: US EPA	Project Number: 46122.220
Site Name: GenOn Energy – Shawville Generating Station	Location: Shawville, PA

Orientation: NW

Description: Ash Pond A; close up view of decant structure.

Date: 9/6/12

Photo Number: 23

Photographer: S. Szewczak

Orientation: NW

Description: Ash Pond A; inboard side slope of northeastern embankment.

Date: 9/6/12

Photo Number: 24

Photographer: S. Szewczak

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client: US EPA	Project Number: 46122.220
Site Name: GenOn Energy – Shawville Generating Station	Location: Shawville, PA

Orientation: SW

Description: Ash Pond A; Ash Sluice Recycle Collection Structure. Receives flow from the perforated steel pipe and drains to the plant for recycling of sluiced water. Controls are for pond level control and isolation of Ash Ponds A and B.

Date: 9/6/12

Photo Number: 25

Photographer: S. Szewczak

Orientation: NW

Description: Ash Pond A; crest of northeastern embankment. Wastewater treatment plant clarifier tank visible to the right.

Date: 9/6/12

Photo Number: 26

Photographer: S. Szewczak

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client: US EPA	Project Number: 46122.220
Site Name: GenOn Energy – Shawville Generating Station	Location: Shawville, PA

Orientation: SW Description: Ash Pond A; crest and outboard slope of northwestern embankment looking towards Ash Pond B. Note heavy vegetation on outboard slope. Date: 9/6/12 Photo Number: 27 Photographer: S. Szewczak	
Orientation: SW Description: Ash Pond A; inboard side slope of northwestern embankment. Structure in foreground is Clarifier Bypass Structure (used for overflow only) Date: 9/6/12 Photo Number: 28 Photographer: S.Szewczak	

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client: US EPA	Project Number: 46122.220
Site Name: GenOn Energy – Shawville Generating Station	Location: Shawville, PA

Orientation: W

Description: Monitoring Well MW-10 located in the northwestern embankment of Ash Pond A.

Date: 9/6/12

Photo Number: 29

Photographer: S. Szewczak

Orientation: NE

Description: Ash Pond A; inboard side slope and crest of northwestern embankment looking towards the generating station.

Date: 9/6/12

Photo Number: 30

Photographer: S. Szewczak

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client: US EPA | Project Number: 46122.220

Site Name: GenOn Energy – Shawville Generating Station | Location: Shawville, PA

Orientation: W Description: Ash Pond A; Outer side slope of northwestern embankment looking down at the West Branch of the Susquehanna River. Date: 9/6/12 Photo Number: 31 Photographer: S. Szewczak	
Orientation: NE Description: Ash Pond A; Outer side slope of northwestern embankment heavily vegetated. Date: 9/6/12 Photo Number: 32 Photographer: G. Emmanuel	

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client: US EPA	Project Number: 46122.220
Site Name: GenOn Energy – Shawville Generating Station	Location: Shawville, PA

Orientation: SW

Description: Crest of the northwestern embankment at the central dividing dike. Dredged ash from Pond A temporarily stockpiled prior to landfilling.

Date: 9/6/12

Photo Number: 33

Photographer: S. Szewczak

Orientation: NW

Description: Subdrain pumping station. Collects leachate from beneath pond liners only, not used for decant.

Date: 9/6/12

Photo Number: 34

Photographer: S. Szewczak

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client: US EPA	Project Number: 46122.220
Site Name: GenOn Energy – Shawville Generating Station	Location: Shawville, PA

Orientation: SW

Description: Ash Pond B; Outboard slope of northwestern embankment.

Date: 9/6/12

Photo Number: 35

Photographer: S. Szewczak

Orientation: SW

Description: Ash Pond B; Overall view. Note floating turbidity curtains.

Date: 9/6/12

Photo Number: 36

Photographer: S. Szewczak

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client: US EPA | Project Number: 46122.220

Site Name: GenOn Energy – Shawville Generating Station | Location: Shawville, PA

Orientation: SW Description: Ash Pond B; Crest and outboard slope of northwestern embankment Date: 9/6/12 Photo Number: 37 Photographer: S. Szewczak	
Orientation: W Description: Monitoring Well MW-9 located in the northwestern embankment of Ash Pond B. Date: 9/6/12 Photo Number: 38 Photographer: S. Szewczak	

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client: US EPA	Project Number: 46122.220
Site Name: GenOn Energy – Shawville Generating Station	Location: Shawville, PA

Orientation: NE	
Description: Typical condition of outboard slope of northwestern embankment looking down at the West Branch of the Susquehanna River.	
Date: 9/6/12	
Photo Number: 39	
Photographer: G. Emmanuel	
Orientation: W	
Description: Typical condition of outboard slope of northwestern embankment looking down at the West Branch of the Susquehanna River.	
Date: 9/6/12	
Photo Number: 40	
Photographer: G. Emmanuel	