DRAFT REPORT

Dam Safety Assessment of CCW Impoundments

GenOn/NRG ELRAMA POWER STATION

United States Environmental Protection Agency
Washington, DC

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Dam Safety Assessment of CCW Impoundments

GenOn/NRG Elrama Power 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 (USEPA) has initiated a nationwide program of structural integrity and safety assessments of coal combustion residuals 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 U.S. EPA 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 (or shortly thereafter) 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 assessment of each CCW management unit and complete the visual assessment 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 Bottom Ash Settling Ponds SPD-1 and SPD-2 and Emergency Pond SPD-5 at the Elrama Power Station near Elrama, Pennsylvania. Other impoundments at the power station include Coal Yard Runoff Pond SPD-3 and Polishing Pond SPD-4, which were not assessed as these units do not fall within the scope of this assessment program. The Elrama Power Station and ash impoundments are partially located immediately outside of Elrama in Union Township, Washington County, Pennsylvania and partially located in the Borough of Jefferson Hills, Allegheny County, Pennsylvania. The county border passes through the northeast corner of Bottom Ash Settling Pond SPD-2. The above impoundments are owned and operated by GenOn Power Midwest, LP (GenOn). Effective December 14, 2012, NRG Energy, Inc. (NRG) and GenOn Energy, Inc. merged. All GenOn entities are wholly owned subsidiaries of NRG; therefore, throughout this report the owner is referred to as GenOn/NRG. In the course of this assessment, we obtained information from representatives of GenOn/NRG and the Pennsylvania Department of Environmental Protection (PADEP).

2. PROJECT/FACILITY DESCRIPTION

The Elrama Power Station is located along the northwest side of the Monongahela River along Elrama Avenue near Elrama, Pennsylvania. The center of the Elrama plant is situated at approximate latitude 40.2522 degrees, and longitude -79.9178 degrees. A Site Location Map is included as Figure 1. The coal-fired power plant began commercial operation in 1952 and includes 4 generating units (100 MW/1952, 100 MW/1953, 125 MW/1954, 185 MW/1960) producing a total of about 510 megawatts of electricity. Coal combustion residual waste that is produced during power generation is managed on-site in the following CCW impoundments:

- Bottom Ash Settling Ponds SPD-1 and SPD-2 — composed of two cells.
- Polishing Pond SPD-4 — composed of one cell.
- Emergency Pond SPD-5 — composed of one cell.

This dam safety assessment report summarizes the September 26, 2012 assessment of the above management units at the Elrama Power Station. GenOn/NRG deactivated the Elrama Power Station in October 2012. No CCW has reportedly been sluiced to the impoundments since October 2012. The impoundments still contain CCW residuals, are not completely drained, and continue to collect rainwater and runoff. Therefore, the impoundments continue to pose a dam safety and environmental risk until they are closed.

2.1. MANAGEMENT UNIT IDENTIFICATION

The location of the CCW impoundments inspected during this safety assessment is identified on Figure 2 – Facility Layout Plan. Elrama Power Station's fly ash is handled in a vacuum system, stored in silos and trucked off-site. Recycled processed wastewater from the vacuum system is sent to Ponds SPD-1 and SPD-2, overflow is sent to the bottom ash sump. Bottom Ash is sluiced to one of two adjoining ponds — Bottom Ash Settling Ponds SPD-1 and SPD-2—separated by a dividing dike. Decant water from the Bottom Ash Settling Ponds enters Polishing Pond SPD-4 which is completely incised below surrounding grades, and therefore, was not assessed a hazard class or condition rating . Two additional ponds are located in the pond complex. Coal Pile Runoff Pond SPD-3 is also completely incised and does not handle CCW residuals; therefore, was not assessed a hazard class or condition rating. Emergency Pond SPD-5 is adjacent to Pond SPD-4, incised on three (3) sides and diked on one (1) side, and handles water from thickeners and flue gas desulphurization (FGD) residuals (scrubber sludge) as a backup pond when other ponds are out of service or during emergencies. Three impoundments were assessed for this safety assessment report: Bottom Ash Settling Ponds SPD-1 and SPD-2 and Emergency Pond SPD-5.

2.1.1. Bottom Ash Settling Ponds SPD-1 and SPD-2

Bottom Ash Settling Ponds SPD-1 and SPD-2 are located between Elrama Avenue and PA Route 837 (PA-837)/5th Street near Duquense Light Drive, as shown on Figure 2. Ponds SPD-1 and SPD-2 commenced operations in 1952. Each settling pond impounds a surface area of a little over 2 acres. The ponds are diked on all sides and separated by a dividing dike. Both ponds were assessed. A plan view and photo locations are shown on Figure 3A.

Ponds SPD-1 and SPD-2 receive sluiced bottom ash flows that enter the ponds at the east end of the dividing dike through inflow pipes located above the water line. Decant water flows through two metal effluent weir boxes on the west end of the ponds. It is then pumped into Polishing Pond SPD-4.

2.1.2. Polishing Pond SPD-4

Polishing Pond SPD-4 is located to the north of the Bottom Ash Ponds and Coal Pile Runoff Pond SPD-3, adjacent to PA-837/5th Street, as shown in Figure 2. It impounds a surface area of 0.4 acres and is completely incised on all sides. A plan view and photo locations are shown on Figure 3B.

Pond SPD-4 receives pumped decant water from Bottom Ash Settling Ponds SPD-1 and SPD-2. Decant water flows through a metal effluent weir, then through a Parshall Flume to a 21-inch concrete pipe that discharges to

the Monongahela River. The discharge is authorized by Pennsylvania National Pollutant Discharge Elimination System (PA NPDES) Permit No. PA0001571 at Outfall No. 101.

2.1.3. Emergency Pond SPD-5

Emergency Pond SPD-5 is located across a plant access road from Polishing Pond SPD-4, adjacent to PA-837/5th Street and Duquense Light Drive, as shown in Figure 2. It impounds a surface area of 0.3 acres and is incised on three (3) sides. The southeast side is impounded by an approximately six (6) feet high embankment. It receives water from thickeners and FGD residuals (scrubber sludge) only when normal operations are nonfunctional. A plan view and photo locations are shown on Figure 3C.

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.*

The PADEP Division of Dam Safety currently does not regulate Bottom Ash Settling Ponds SPD-1 and SPD-2, Polishing Pond SPD-4, or Emergency Pond SPD-5, therefore no PADEP hazard classification has been assigned. In the absence of a state-assigned classification, the FEMA guidelines, *Hazard Potential Classification System for*

Dams (2004) have been applied in this assessment to recommend a hazard potential classification for each of the following impoundments. 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.

2.2.1. Bottom Ash Settling Ponds SPD-1 and SPD-2

Based on the checklist definitions and as a result of this assessment, the hazard potential rating recommended for Bottom Ash Settling Ponds SPD-1 and SPD-2 is **SIGNIFICANT**. A failure of the embankments impounding Bottom Ash Settling Ponds SPD-1 or SPD-2 would result in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns.

The SIGNIFICANT hazard potential is recommended for two reasons. Firstly, a breach has the potential to interrupt the railroad that runs through the plant and disrupt plant operations. Secondly, a CCW release would ultimately flow into the Monongahela River causing environmental impacts associated with the release. Loss of human life in the event of a breach is unlikely. Environmental impacts to waters of the U.S. are likely, due to the proximity of the impoundments to the Monongahela River.

2.2.2. Emergency Pond SPD-5

Based on the checklist definitions and as a result of this assessment, the hazard potential rating recommended for Emergency Pond SPD-5 is **SIGNIFICANT**. A failure of the embankments impounding Emergency Pond SPD-5 would result in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns.

The SIGNIFICANT hazard potential is recommended for two reasons. Firstly, a breach has the potential to interrupt the railroad that runs through the plant and disrupt plant operations. Secondly, a CCW release would ultimately flow into the Monongahela River causing environmental impacts associated with such a potential release. Loss of human life in the event of a breach is unlikely. Environmental impacts to waters of the U.S. are likely due to the proximity of the impoundment to the Monongahela River.

2.3. IMPOUNDING STRUCTURE DETAILS

The following sections summarize the structural components and basic operations of the subject impoundments. The location of the impoundments on the plant grounds is shown on Figure 2.

2.3.1. Embankment Configuration

Bottom Ash Settling Ponds SPD-1 and SPD-2

Each settling pond impounds a surface area of a little over 2 acres. The ponds are diked on all sides and separated by a dividing dike. Pond bottoms were cut a few feet below original grades. The typical water surface maintained in the operating pond is EL 773.5 which provides a freeboard of 1.5 feet. The southeast corner of Pond SPD-1 has a constructed embankment height of only 5 feet above surrounding grades and ties into upward sloping natural ground. Remaining sides have an outboard slope and constructed embankment height between 8 and 25 feet, based on the drawings provided by GenOn/NRG, as shown in the table below.

Pond	Embankment	Description	Maximum Constructed Height
SPD-1	Southern		20 feet
	Western	Outlet side	8 feet
	Eastern	Inflow side	25 feet
	Northern	Dividing dike	25 feet
SPD-2	Southern	Dividing dike	25 feet
	Western	Outlet side	10 feet
	Eastern	Inflow side	15 feet
	Northern		12 feet

As depicted in typical sections shown on Figures 4A through 4C, the granulated slag-covered crest is at approximately elevation (EL) 775 feet above mean sea level. The pond bottoms (as indicated by plant record drawings) are at approximately EL 750. All embankment slopes have an inclination of approximately 2H:1V. Each embankment was constructed with an "impervious" core (as shown on the design drawings) at 1H:2V to natural ground. Below natural ground, a 10-foot wide vertical "impervious" core was constructed to rock.

The toe of inboard slopes were constructed with a 7-foot wedge of gravel in front of a 7-foot wedge of granulated slag or sand with a 2H:1V slope against pervious material forming the embankment outer shells. The toe of outboard slope is surrounded with a toe drain at the bottom of which sits a 12-inch terra cotta drain pipe. The toe drain discharges into 16-inch sand infiltration wells 60-foot on center around the ponds.

Polishing Pond SPD-4

Polishing Pond SPD-4 impounds a surface area of 0.4 acres and is completely incised below surrounding grades on all sides. The crest is at approximately elevation (EL) 780 feet above mean sea level. The pond bottom (as indicated by plant record drawings) varies from EL 759 on the outlet (southeast) side to EL 760 on the inlet (northwest) side along PA-837. The typical operational water surface elevation maintained in Pond SPD-4 is approximately EL 777.

Emergency Pond SPD-5

Emergency Pond SPD-5 is a combined incised/diked earthen embankment structure that impounds an area of 0.3 acres. Pond SPD-5 is incised on three (3) sides which are bordered by roads at a higher elevation than the pond crest. The crest is at approximately elevation (EL) 780 feet above mean sea level. The pond bottom (as indicated by plant record drawings) varies from EL 759 on the northwest side along PA-837 to EL 760 on the southeast side along the diked embankment. The diked embankment is approximately six (6) feet high and covered with woody vegetation. The operational water surface elevation in Pond SPD-5 is approximately EL 777; however, it is only used occasionally.

2.3.2. Type of Materials Impounded

Bottom Ash Settling Ponds SPD-1 and SPD-2

Bottom Ash is wet sluiced to the bottom ash settling ponds. One pond remains in service while the other pond is drained for dredging/ash removal which occurred about annually when the plant was in full operation. As plant operations slowed, GenOn/NRG received approval from PADEP to dredge/remove ash in the ponds once every five (5) years. The ash ponds are considered residual waste impoundments by the PADEP Bureau of Waste Management and permitted by rule since the early 1990s. An annual average of about 22,000 tons of bottom ash material was removed from each pond between 2005 and 2010.

Polishing Pond SPD-4

Decant water from Bottom Ash Settling Ponds SPD-1 and SPD-2 discharges to a pump building, then flows into Polishing Pond SPD-4. There is a 12 hour residence time in SPD-4.

Emergency Pond SPD-5

Emergency Pond SPD-5 is an emergency pond only used when thickeners for FGD residuals (scrubber sludge) are taken out of operation for cleaning.

2.3.3. Outlet Works

Bottom Ash Settling Ponds SPD-1 and SPD-2

Each Bottom Ash Settling Pond, SPD-1 and SPD-2, discharges through two metal effluent weir boxes with outer skimmers to minimize discharge or floatables. The weir boxes drain to 16-inch and 20-inch diameter Schedule 30 steel outlet pipes which flow into Polishing Pond SPD-4. Additionally, each pond has a concrete outlet tower

with an adjustable steel plate, two (2) rectangular orifices, and a 12-inch drain pipe at the base, which are used to regulate the pond level and drain the pond as necessary.

Polishing Pond SPD-4

Polishing Pond SPD-4 discharges through a metal effluent weir then flows into a 20-inch diameter Schedule 30 steel pipe. This flows through to a Parshall Flume to a 21-inch concrete pipe then to the Monongahela River. The discharge is authorized by Pennsylvania National Pollutant Discharge Elimination System (PA NPDES) Permit No. PA0001571 at Outfall No. 101.

Emergency Pond SPD-5

Emergency Pond SPD-5 has no operational outlet structure. On the rare occasions the Emergency Pond is used, a pump is used to regulate the pond level while in use, and evacuate the water when it is not in use.

3. RECORDS REVIEW

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

Table 3.1 *Summary of Documents Reviewed*

Document	Dates	By	Description
Steam Electric Questionnaire Parts A, C, and D	5/20/2010	GenOn/NRG	US EPA Questionnaire Part A – Steam Electric Power Plant Operations Part C – Ash Handling Part D – Pond/Impoundment Systems and Other Wastewater Treatment Operations
Elrama Power Station Ash Ponds Construction Drawings	9/20/1951	Duquesne Light Company	Sheet No. 3593-B72: Plan of Ash Ponds (Ponds 1 and 2) 3593-B73, B74, B75: Typical Cross Sections of Dike Ash Pond Area 3593-BP-95: Ash Disposal System Detail of Settling Pond Dewatering Weir Structure
Elrama Power Station Air Pollution Control Project Construction Drawings	7/27/1973	Duquesne Light Company	Sheet No. 9953-B-67: Ash Settling Ponds Plot Plan & Contours (Ponds 3, 4, and 5) 9953-B-69: Ash Settling Ponds Sheet 1 (Ponds 3, 4, and 5)
Elrama Power Station Control and Process of Misc. Waste Water Construction Drawings	10/4/1977	Duquesne Light Company	Sheet No. 11445-B3: Plan of Existing Ponds 1, 2, 3, and 4 11445-B7: Structural Design and Details of Effluent Weir for Polishing Pond (Pond 4) 11445-M4: Plan & Sections – Dirty Water Sump Piping to Bottom Ash Sump
Elrama Power Station Control Storage Area Drain Control Construction Drawings	10/4/1977	Duquesne Light Company	Sheet No. 10389-M4: Coal Pile Runoff Pond General Layout and Misc. Piping (Pond 3)

3.1. ENGINEERING DOCUMENTS

Review of the above documents revealed information on the design details and construction of the Elrama CCW impoundments, which are summarized below.

Bottom Ash Settling Ponds SPD-1 and SPD-2

- Bottom Ash Settling Ponds SPD-1 and SPD-2 were constructed and put into operation in 1952.
- The dikes were constructed above natural ground and constructed with an "impervious" clay core to rock surrounded by pervious material.
- Inboard toe of slopes were constructed with a gravel toe.
- Outboard toe of slopes contain a granulated slag toe drain.
- No hydrology and hydraulics (H&H) analyses were available for review.
- No geotechnical information or slope stability analyses were available for review.
- No embankment failures or releases of impounded materials have occurred.

Polishing Pond SPD-4

- Polishing Pond SPD-4 was constructed and put into operation in 1952.
- The pond is completely incised.
- No releases of materials have occurred.

Emergency Pond SPD-5

- Emergency Pond SPD-5 was constructed and put into operation in 1952.
- Three sides are incised and one side is a constructed embankment.
- No hydrology and hydraulics (H&H) analyses were available for review.
- No geotechnical information or slope stability analyses were available for review.
- No embankment failures or releases of impounded materials have occurred.

3.1.1. Stormwater Inflows

No hydrologic & hydraulic analyses were provided evaluating stormwater inflow into Bottom Ash Settling Ponds SPD-1 or SPD-2 or Emergency Pond SPD-5 or the capacity of the pond storage and discharge to manage design storm events.

Though no hydrologic & hydraulic analyses have been conducted to evaluate stormwater inflow into Bottom Ash Settling Ponds SPD-1 and SPD-2, the impounding structures are diked on all sides except for the southwest corner. Based on impoundment construction information available and a visual review of the topography surrounding the ponds, it appears that a swale created by the toe drain and the access road would intercept stormwater inflow at the southwest corner before entering Pond SPD-1. Stormwater inflow would be mainly limited to direct precipitation. Available volume provided by the normal operating freeboard of 3.3 feet is sufficient to contain a 24-hour 100-year storm or a PMP (Probable Maximum Precipitation) event without overtopping the ponds.

3.1.2. Stability Analyses

As mentioned above, no geotechnical records of design or as-built slope stability analyses were provided in the records made available by GenOn/NRG. Based on our discussions with plant personnel, geotechnical design and slope stability records are either non-existent or could not be located in preparation for our visit. No indications of slope distress were observed during the visual assessment of the ponds.

3.1.3. Modifications from Original Construction

Based on records review, the original design drawings note that modifications were made to the Ash Settling Pond roadways in 1986. Coal Ash Runoff Pond SPD-3 and Polishing Pond SPD-4 were originally constructed for a lime addition system that was never put into operation. Piping installed for the system was abandoned in place. Ponds SPD-3 and SPD-4 were retrofitted for current operations shortly after their construction. Based on our discussions with plant personnel, no modifications to the ponds have been made since they were set up for current operations.

3.1.4. Instrumentation

No geotechnical or dam safety related instrumentation has been installed. Groundwater monitoring wells were installed in the 1990s when the ash ponds were first considered residual waste impoundments by the PADEP Bureau of Waste and permitted by rule.

3.2. PREVIOUS INSPECTIONS

Daily visual inspections of the ponds are made by the Elrama Environmental Safety & Health (ES&H) Coordinator. However, no written formal inspection reports were provided. Vegetation on the embankments of SPD-1 and SPD-2 is cut one time during the growing season and one time before winter.

3.3. OPERATOR INTERVIEWS

Numerous plant personnel took part in the assessment proceedings along with a representative of the Pennsylvania Department of Environmental Protection (PADEP) Division of Dam Safety. The following is a list of participants for the September 2012 assessment of the Bottom Ash Settling Ponds SPD-1 and SPD-2 and Emergency Pond SPD-5:

Name	Affiliation	Title
Stephen Frank	GenOn/NRG Cannonsburg	Senior Environmental Specialist
Ethan Russell	GenOn/NRG Elrama	Plant Manager – Elrama Power Plant
Zane Snyder	GenOn/NRG Elrama	ES&H Coordinator – Elrama Power Plant
Sara Marie Baldi	GenOn/NRG Cannonsburg	Senior Environmental Specialist Environmental Operations & Compliance
Keith Schmidt	GenOn/NRG Cannonsburg	Director, Environmental Policy
Ryan Knarr	PADEP	Dam Safety Engineer
Dreher Whetstone, PE	O'Brien & Gere	Technical Associate – Geotechnical Engineer
Carrie Lohrmann, PE	O'Brien & Gere	Design Engineer

Facility personnel provided a good working knowledge of the CCW impoundments, provided general plant operation background and provided requested historical documentation. These personnel also accompanied O'Brien & Gere and the PADEP representative throughout the visual assessments to answer questions and to provide additional information as needed in the field.

4. VISUAL ASSESSMENT

The following sections summarize the assessment of Bottom Ash Settling Ponds SPD-1 and SPD-2, Polishing Pond SPD-4, and Emergency Pond SPD-5 which occurred on September 26, 2012. At the time of the assessment, O'Brien & Gere completed an EPA assessment checklist for each of the above facilities, which was submitted electronically to EPA on October 17, 2012. Copies of the completed assessment checklists are included as Appendix A.

4.1. GENERAL

The weather on the date of the assessment was approximately 60 degrees and cloudy with minor precipitation. The visual assessment consisted of a thorough site walk along the perimeter of the impoundment dikes and other portions of the impoundments to observe outlet structures and general facility operations. O'Brien & Gere team members made observations along the toe, outboard slope, and crest of the dikes, 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 assessment were taken by O'Brien & Gere and are provided in Appendix B. Aerial photographs depicting the layout and locations and orientation of the photographs are included as Figures 3A, 3B, and 3C.

4.2. SUMMARY OF FINDINGS

Bottom Ash Settling Ponds SPD-1 and SPD-2

The following observations were made during the assessment:

- Pond SPD-1 was operating at the time of assessment.
- Pond SPD-2 was drained and out of service at the time of assessment.
- Sluiced bottom ash enters the ponds at the east end of the dividing dike through inflow pipes located above the water line.
- Rainwater from rainfall the previous day and on the date of the assessment was ponded in areas along the crest and toe. Significant ponding was evident at the southeast corner toe of slope of Pond SPD-1.
- Crest roadway surfaces were mainly slag and bottom ash. They were otherwise maintained adequately for vehicular traffic.
- The majority of inboard slope above the water line was covered with tall grasses and some shrubs. Some areas lacked adequate vegetation and exhibited erosion.
- The northwest corner inboard slope of Pond SPD-2 was severely eroded.
- Erosion was evident under the effluent weir boxes in Pond SPD-2 and along the dividing dike between the 2 ponds.
- Outboard slopes were covered with tall grasses and eroded near the crest in a few areas along the southern and eastern embankments of Pond SPD-1 near the southeast corner.
- No seepage was evident along the outboard slopes or toe of slope.
- The outflow weirs appeared to be in fair condition and functioning normally. Vegetation was observed to encroach on the weirs.
- Inflow pipes were operational and appeared in good condition.

Polishing Pond SPD-4

- Pond SPD-4 was operating at the time of assessment.
- Decant water from the Ash Settling Basins entered Pond SPD-4 through the metal inflow pipe.

- Inboard slopes were adequately vegetated with cut grass.
- Tall grasses were growing in the outflow structure which appeared to be functioning normally otherwise.
- The Parshall Flume appeared in good condition and functioning normally.

Emergency Pond SPD-5

- Pond SPD-5 contained only ponded rainwater and was not operating at the time of assessment.
- Ponded rainwater covered the pond bottom.
- Tall grasses grew in some areas near the pond bottom near the inboard toe of slope.
- Crest surfaces were adequately vegetated with cut grass.
- Inboard slopes were covered with a combination of short and tall grasses, and shrubs.
- The southeast embankment outboard slope was densely covered with small trees and shrubs.

5. CONCLUSIONS

Bottom Ash Settling Ponds SPD-1 and SPD-2

Based on the ratings defined in the USEPA Task Order Performance Work Statement (Satisfactory, Fair, Poor and Unsatisfactory), the information reviewed and the visual assessment, the overall condition of Bottom Ash Settling Ponds SPD-1 and SPD-2 is considered to be **POOR**. Acceptable performance is expected; however, some deficiencies exist that require repair and/or additional studies or investigations.

While the visual condition of this management unit is fair, this rating must be given since no stability analyses are on file. Stability analysis requirements should be verified prior to conducting required investigations.

Minor deficiencies include the following:

- Erosion on the northwest corner inboard slope of Pond SPD-2.
- Erosion on the southern and eastern embankments outboard slopes of Pond SPD-1.
- Ponding along the toe of slope, especially at the southeast corner of Pond SPD-1.
- Ponding along the crest roadway.
- Erosion along the dividing dike slopes and narrowing of the crest.
- Erosion under the effluent weir boxes.
- Areas along the dividing dike, inboard and outboard slopes that either lacked adequate vegetation or contained undesirable vegetation such as tall grasses and shrubs.

Though no hydrologic & hydraulic analyses have been conducted to evaluate stormwater inflow into Bottom Ash Settling Ponds SPD-1 and SPD-2, the impounding structures are diked on all sides except for the southwest corner. Available volume provided by the normal operating freeboard of 3.3 feet is sufficient to contain a 24-hour 100-year storm or a PMP (Probable Maximum Precipitation) event without overtopping the ponds.

Emergency Pond SPD-5

Based on the ratings defined in the USEPA Task Order Performance Work Statement (Satisfactory, Fair, Poor and Unsatisfactory), the information reviewed and the visual assessment, the overall condition of Emergency Pond SPD-5 is considered to be **POOR**. Acceptable performance is expected; however, some deficiencies exist that require repair and/or additional studies or investigations.

While the visual condition of this management unit is fair, this rating must be given since no stability analyses are on file. Stability analysis requirements should be verified prior to conducting required investigations.

Minor deficiencies include the following:

- The southeast embankment outboard slope was covered with woody vegetation.
- No outlet structures exist to drain the impoundment.
- No hydrologic & hydraulic analyses have been conducted to evaluate stormwater inflow into Emergency Pond SPD-5.

O'Brien & Gere understands that GenOn/NRG deactivated the Elrama Power Station in October 2012. No CCW has reportedly been sluiced to the impoundments since October 2012. The CCW impoundments no longer being used should be inspected regularly until they are formally closed. Weekly inspections with additional inspections after rainfall events should be made as described below in the Recommendations section. The Elrama plant's staff maintains design and construction documents and inspection reports in a well organized manner for future reference. These documents should be maintained until and following impoundment closures.

6. RECOMMENDATIONS

Based on the findings of our visual assessment and review of the available records for Bottom Ash Settling Ponds SPD-1 and SPD-2 and Emergency Pond SPD-5, O'Brien & Gere recommends that additional maintenance of the embankments be performed to correct the erosion, vegetation, drainage, and other miscellaneous deficiencies cited above until such time as the impoundments are closed or all CCW is removed.

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 dikes in the near term as long as the impoundments continue to be monitored regularly and adequately maintained in a drained condition.

6.2. LONG TERM IMPROVEMENT

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

Bottom Ash Settling Ponds SPD-1 and SPD-2

- Inspect and maintain operable low level outlet structures to maintain a drained condition in the ponds.
- Repair severely eroded areas on the inboard and outboard slopes.
- Fill low areas along the outboard toe of slope and maintain cut vegetation along outboard slopes so they can be inspected for seepage.
- Establish better surface drainage along the outboard toe to eliminate or reduce stormwater ponding.
- A geotechnical investigation and slope stability analysis should be performed, potentially in conjunction with a decommissioning study and closure plan if embankments remain impounding CCW. The analysis should include static and seismic loading conditions along with liquefaction potential analysis.

Emergency Pond SPD-5

- Inspect the pond for adequate freeboard.
- Remove woody vegetation, including trees and shrubs, maintain cut vegetation along the southeastern embankment outboard slopes so it can be inspected for seepage.
- A geotechnical investigation and slope stability analysis should be performed, potentially in conjunction with a decommissioning study and closure plan. The analysis should include static and seismic loading conditions along with liquefaction potential analysis.

Mowing equipment that may cause ruts or rills on the embankments should not be used. String trimmers or specialized arm-mounted slope mowers are a preferred option for cutting embankment vegetation.

6.3. MONITORING AND FUTURE INSPECTION

O'Brien & Gere recommends continued internal inspections by personnel trained in dam safety and periodic inspections by independent licensed dam safety engineers on at least a biennial basis until the ponds are formally closed. Regular visual inspections of the entire impoundment perimeter should include inspections for seeps, cracks, holes, and freeboard. Inspections should continue to be performed with the goal of identifying, documenting, and repairing deficiencies early so that they do not develop into more serious problems. The utility should document all internal inspections in a report to serve as a record of conditions observed and the recommended action items.

6.4. TIME FRAME FOR COMPLETION OF REPAIRS/IMPROVEMENTS

Based on the findings of this assessment, O'Brien & Gere believes that GenOn/NRG should implement and follow a post-operational inspection plan. It is recommended that a geotechnical investigation and slope stability analyses be completed in conjunction with a closure plan if embankments remain impounding CCW.

6.5. CERTIFICATION STATEMENT

I acknowledge that Bottom Ash Settling Ponds SPD-1 and SPD-2, referenced herein, were personally inspected by me on September 26, 2012 and were found to be in the following condition:

POOR

I acknowledge that Emergency Pond SPD-5, a CCW management unit, referenced herein was personally inspected by me on September 26, 2012 and was found to be in the following condition:

POOR

Signature: _____ Date: _____

D. Dreher Whetstone, PE
PA PE License # PE060840

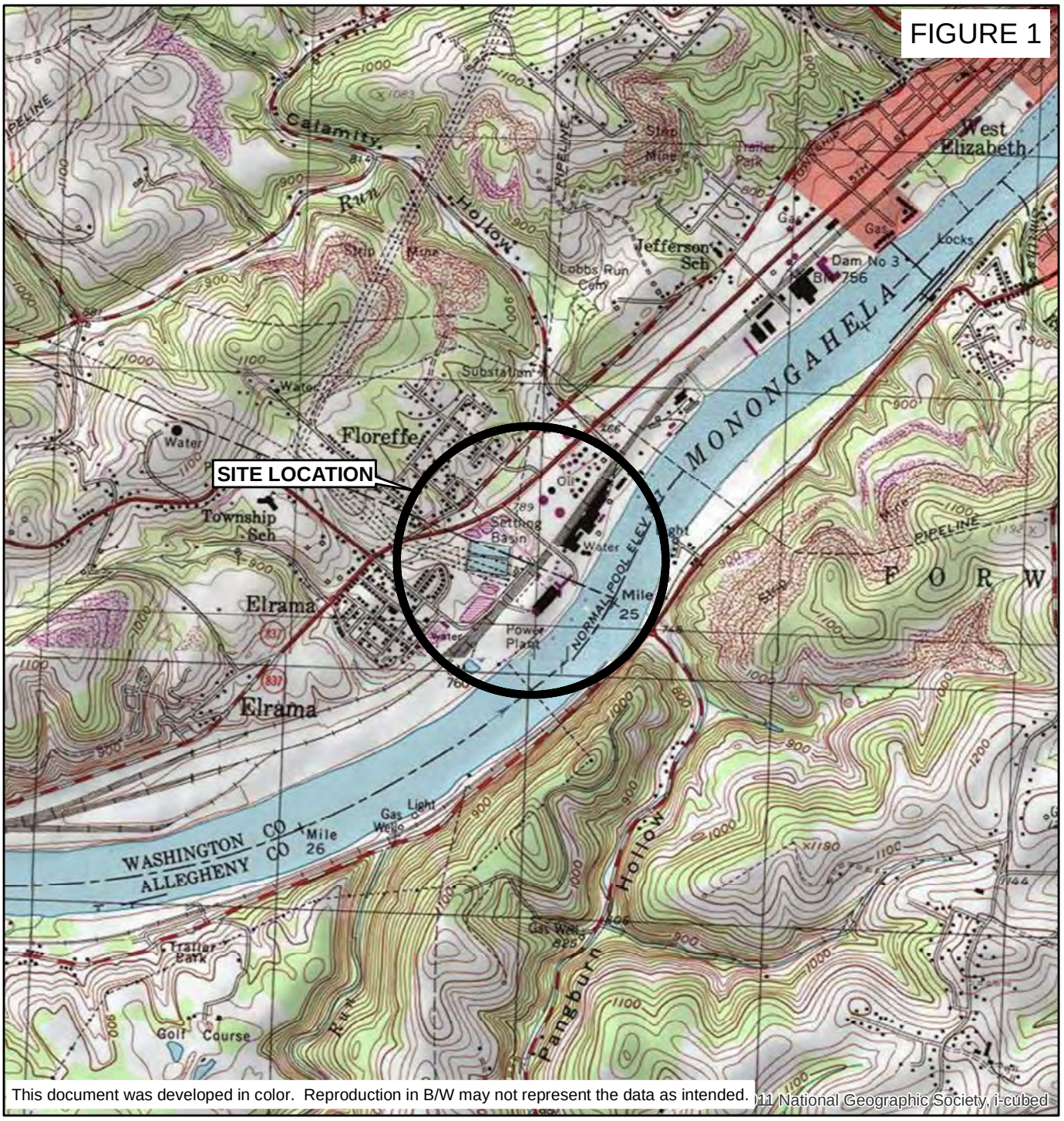
FIGURES

US EPA ARCHIVE DOCUMENT

I:\US-EPA.13498\STDS\GIS\Coal_Impoundments\Figures\Elrama\Elrama_Figure1_SiteLocation.mxd

PLOTDATE: 4/8/2013 DRK

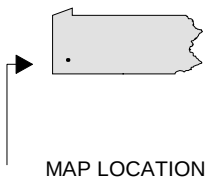
FIGURE 1



This document was developed in color. Reproduction in B/W may not represent the data as intended. 11 National Geographic Society, i-cubed

ADAPTED FROM: GLASSPORT AND MONONGAHELA, PENNSYLVANIA USGS QUADRANGLES

US EPA - DAM SAFETY ASSESSMENT OF CCW IMPOUNDMENTS
ELRAMA POWER PLANT
ELRAMA, PENNSYLVANIA



MAP LOCATION

N

SITE LOCATION

0 1,000 2,000 4,000 6,000 8,000

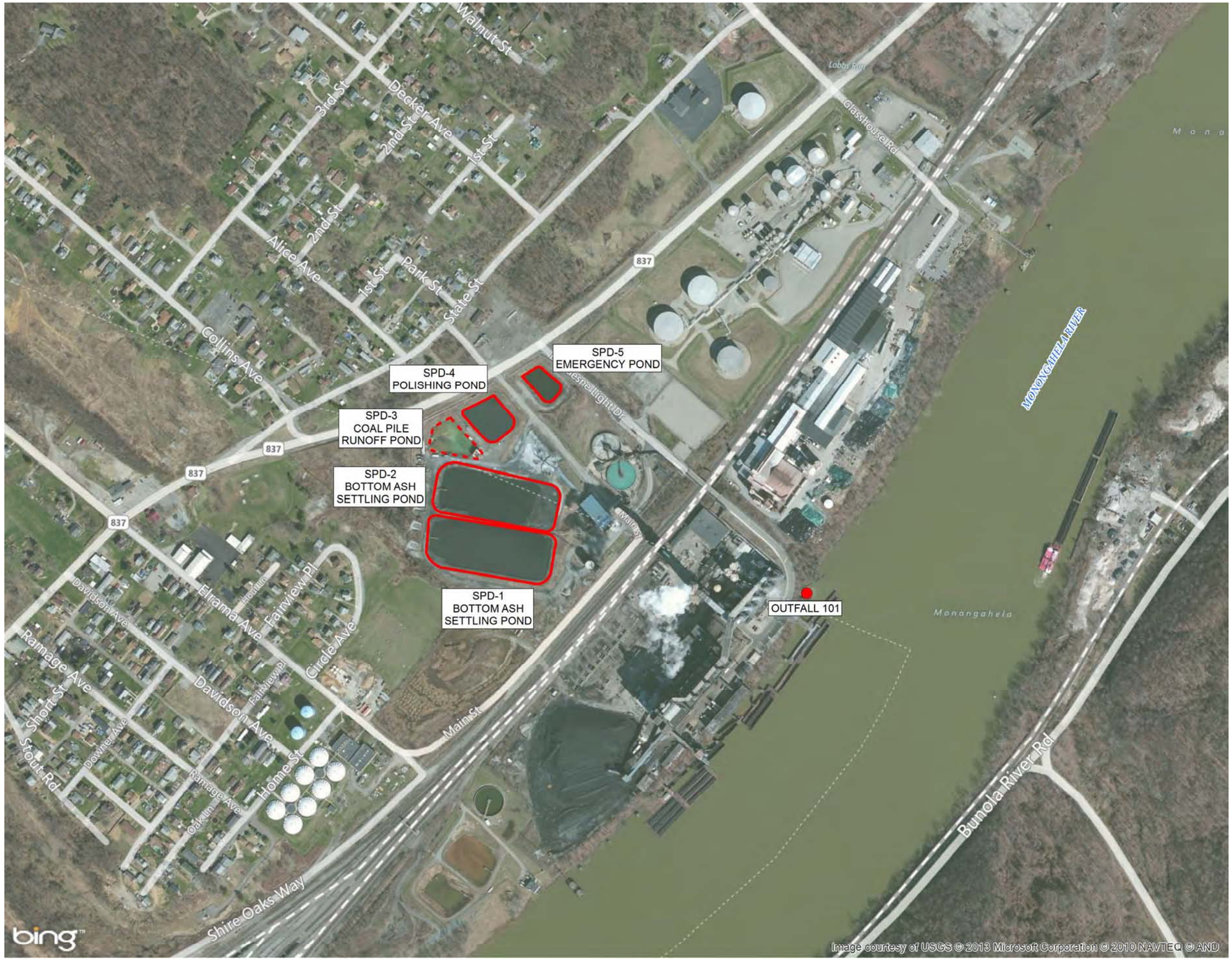
Feet

APRIL 2013
13498/46122

1:24,000

O'BRIEN & GERE

FIGURE 2



LEGEND

- ASH POND/IMPOUNDMENT
- OTHER POND/IMPOUNDMENT
- OUTFALL

DAM SAFETY ASSESSMENT OF
CCW IMPOUNDMENTS
ELRAMA POWER PLANT
ELRAMA, PENNSYLVANIA

FACILITY LAYOUT PLAN

0 200 400 800
Feet

APRIL 2013
13498/46122

O'BRIEN & GERE

PLOTDATE: 4/8/2013 DRK

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FIGURE 3A

LEGEND

- ASH POND/IMPOUNDMENT
- OTHER POND/IMPOUNDMENT
- 1 PHOTO LOCATION/DIRECTION

DAM SAFETY ASSESSMENT OF
CCW IMPOUNDMENTS
ELRAMA POWER PLANT
ELRAMA, PENNSYLVANIA

SPD-1/SPD-2 BOTTOM ASH SETTLING PONDS PHOTO LOCATION MAP

0 30 60 120
Feet

APRIL 2013
13498/46122

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FIGURE 3B

N

LEGEND

- ASH POND/IMPOUNDMENT
- OTHER POND/IMPOUNDMENT
- 1 PHOTO LOCATION/DIRECTION

DAM SAFETY ASSESSMENT OF
CCW IMPOUNDMENTS
ELRAMA POWER PLANT
ELRAMA, PENNSYLVANIA

SPD-4 POLISHING POND PHOTO LOCATION MAP

0 15 30 60
Feet

APRIL 2013
13498/46122

O'BRIEN & GERE

FIGURE 3C

N

LEGEND

ASH POND/IMPOUNDMENT

1 PHOTO LOCATION/DIRECTION

DAM SAFETY ASSESSMENT OF
CCW IMPOUNDMENTS
ELRAMA POWER PLANT
ELRAMA, PENNSYLVANIA

SPD-5
EMERGENCY POND
PHOTO LOCATION MAP

0 15 30 60
Feet

APRIL 2013
13498/46122

O'BRIEN & GERE

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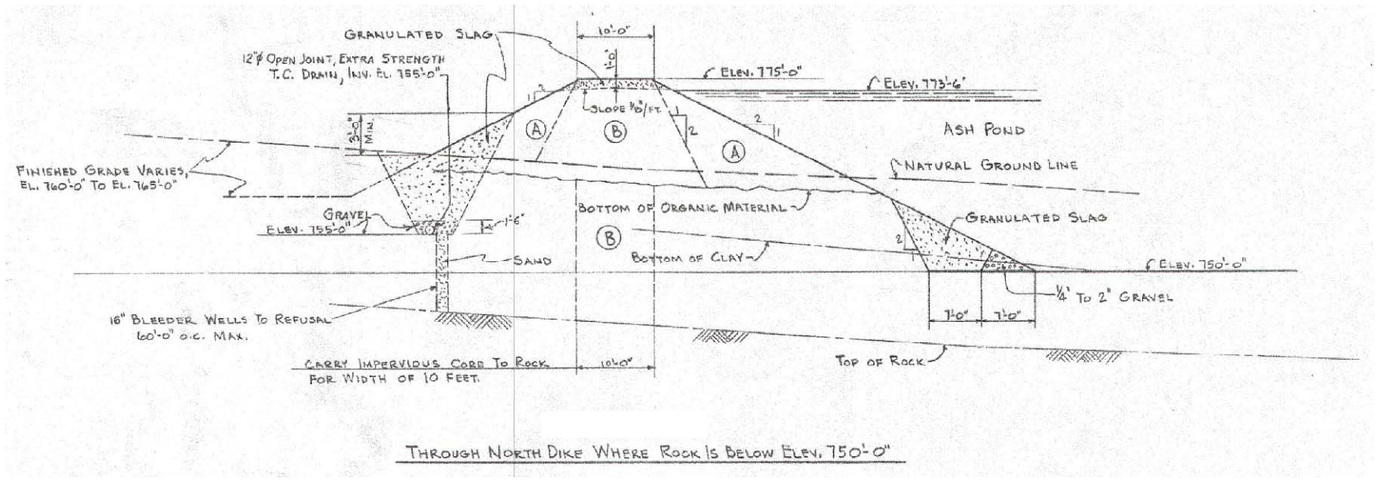
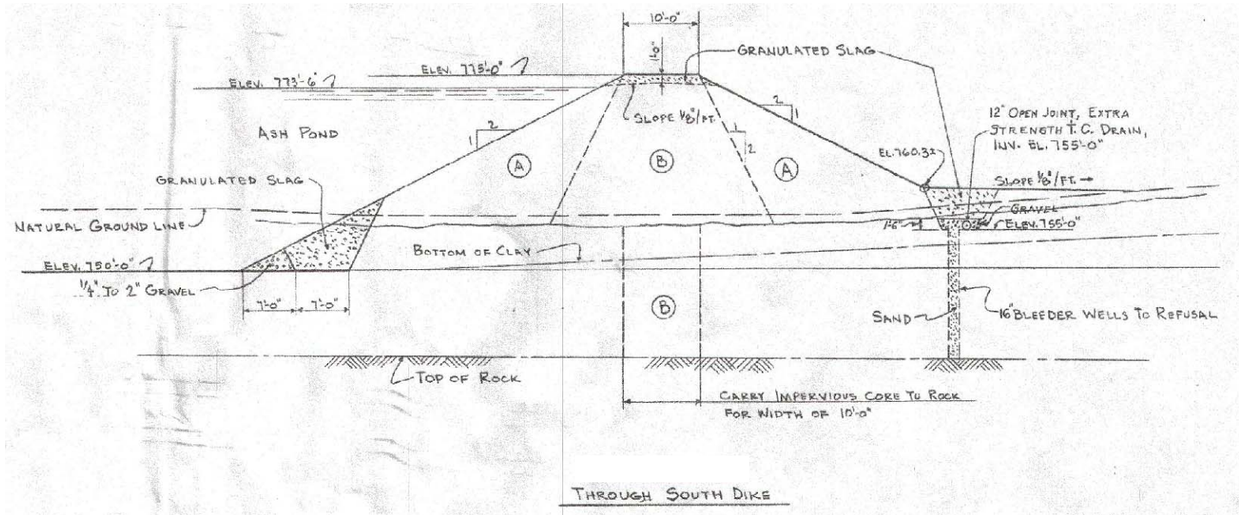


BOTTOM ASH SETTLING POND SPD–2 (NORTHERN EMBANKMENT)

SECTION Y–Y
SCALE: 1" = 20'–0"



BOTTOM ASH SETTLING POND SPD–1 (SOUTHERN EMBANKMENT)

SECTION H–H
SCALE: 1" = 20'–0"

REFERENCE:
TAKEN FROM DRAWING NO. 3593–B73, TITLED "TYPICAL CROSS SECTIONS OF DIKE ASH POND AREA", DATED 9/20/51, BY DUQUESNE LIGHT COMPANY, PITTSBURGH, PA

US EPA
DAM SAFETY ASSESSMENT
OF CCW IMPOUNDMENTS

Gen–On/NRG
ELRAMA POWER STATION
WASHINGTON COUNTY
PENNSYLVANIA

BOTTOM ASH SETTLING POND SPD–1 & BOTTOM ASH SETTLING POND SPD–2

1"=20' 20 0 20

46122–ELRAMA–F04A
FEBRUARY 2013

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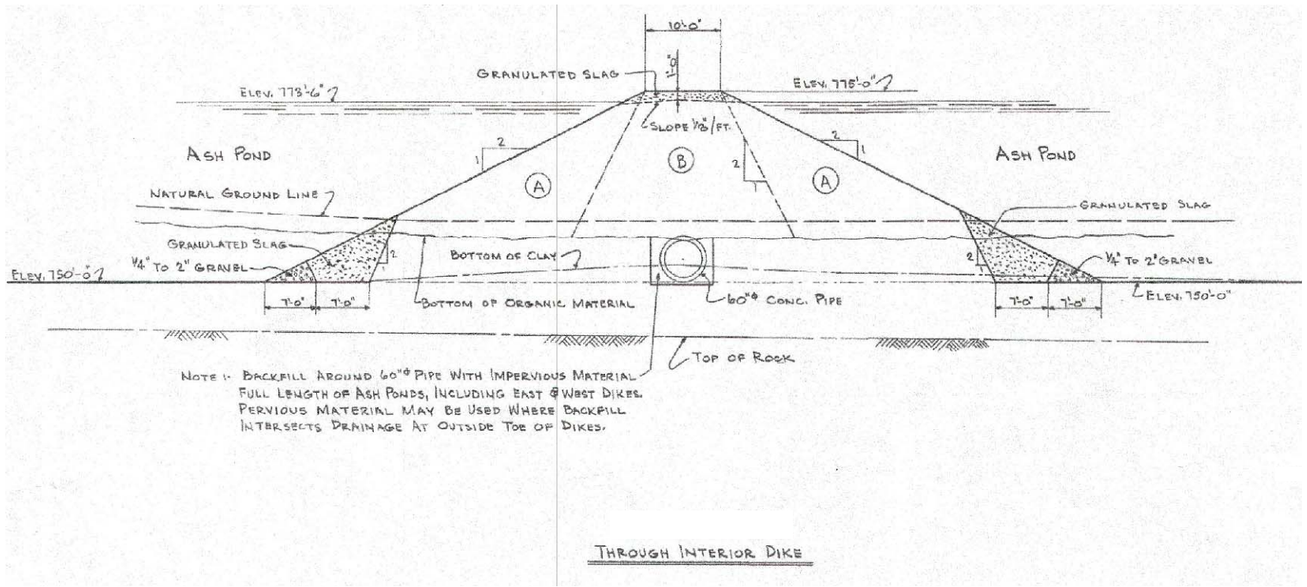


BOTTOM ASH SETTLING PONDS SPD-1 & SPD-2 (DIVIDING DIKE)

SECTION W-W
SCALE: 1" = 20'-0"

REFERENCE:
TAKEN FROM DRAWING NO. 3593-B74, TITLED "TYPICAL CROSS SECTIONS OF DIKE ASH POND AREA", DATED 9/20/51, BY DUQUESNE LIGHT COMPANY, PITTSBURGH, PA

US EPA
DAM SAFETY ASSESSMENT
OF CCW IMPOUNDMENTS

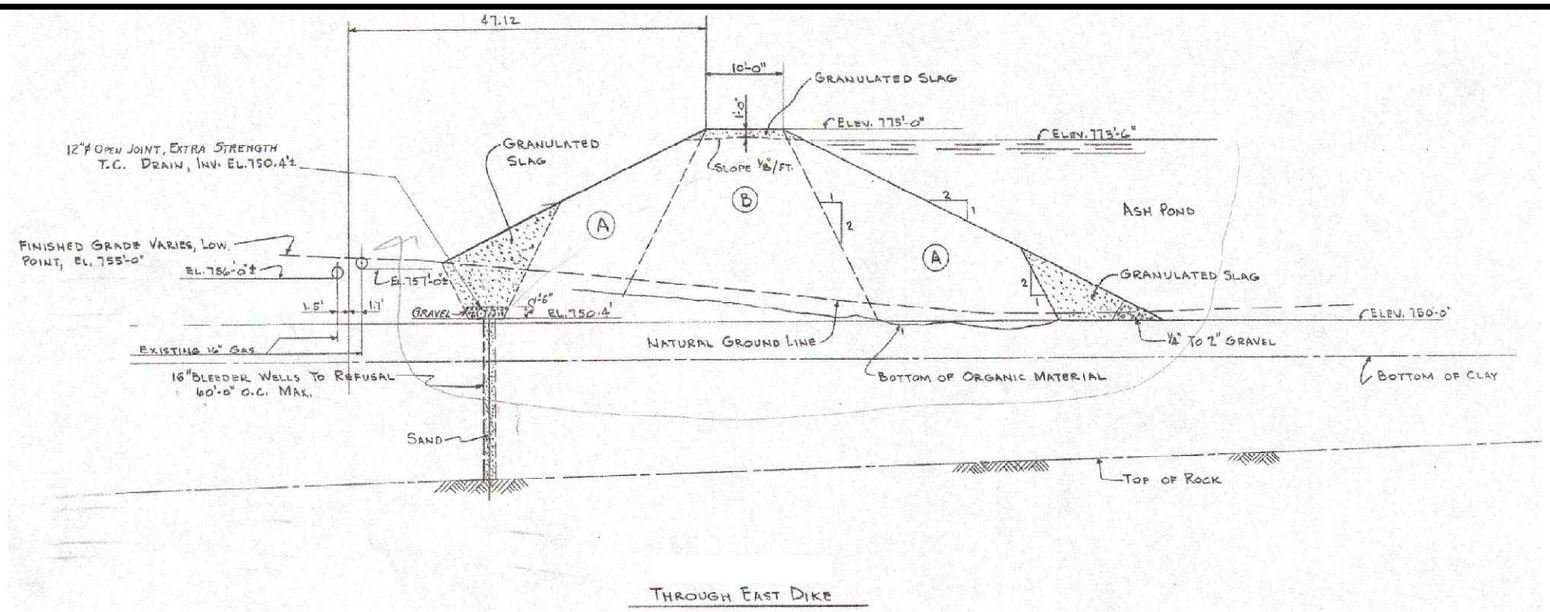
Gen-On/NRG
ELRAMA POWER STATION
WASHINGTON COUNTY
PENNSYLVANIA

BOTTOM ASH SETTLING PONDS SPD-1 AND SPD-2 (DIVIDING DIKE)

1"=20' 20 0 20

46122-ELRAMA-F04B
FEBRUARY 2013

O'BRIEN & GERE

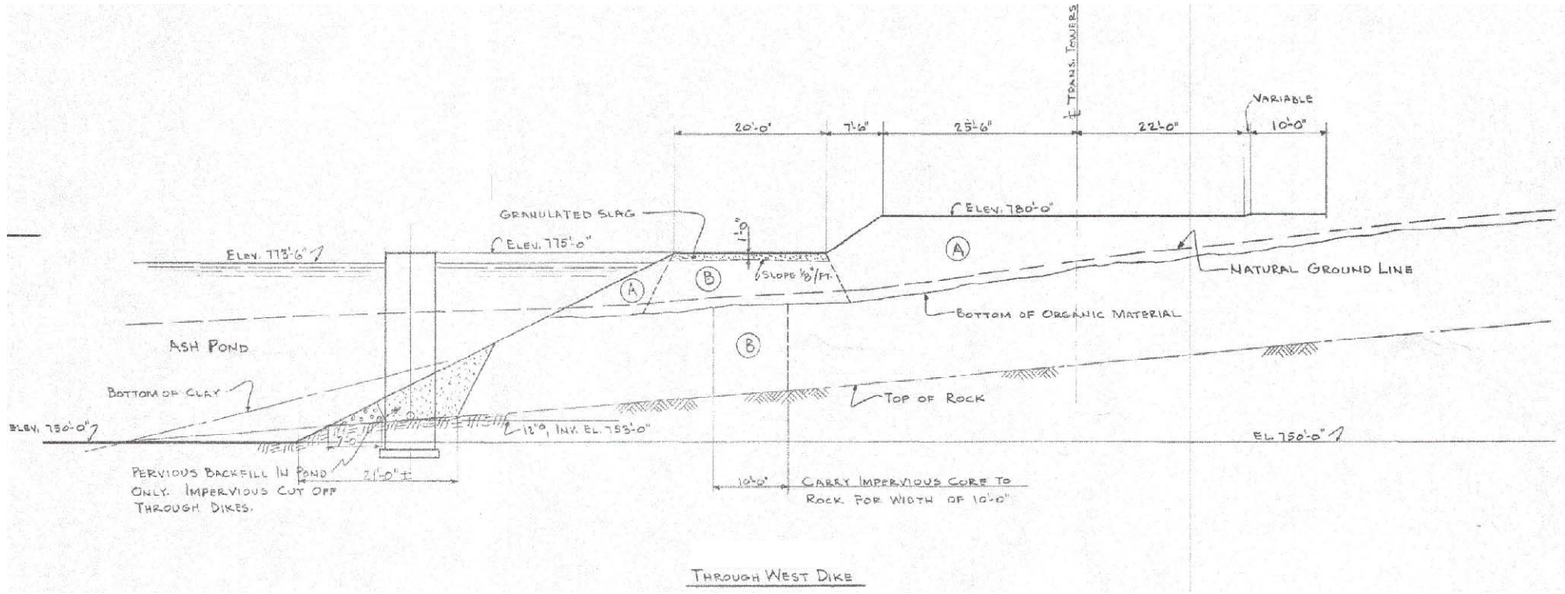


THROUGH EAST DIKE

BOTTOM ASH SETTLING POND SPD-1 (EASTERN EMBANKMENT)

SECTION Z-Z

SCALE: 1" = 20'-0"



THROUGH WEST DIKE

BOTTOM ASH SETTLING POND SPD-1 (WESTERN EMBANKMENT)

SECTION S-S

SCALE: 1" = 20'-0"

REFERENCE:
TAKEN FROM DRAWINGS NO. 3593-B73 AND NO. 3593-B74, TITLED "TYPICAL CROSS SECTIONS OF DIKE ASH POND AREA", DATED 9/20/51, BY DUQUESNE LIGHT COMPANY, PITTSBURGH, PA

US EPA
DAM SAFETY ASSESSMENT
OF CCW IMPOUNDMENTS

Gen-On/NRG
ELRAMA POWER STATION
WASHINGTON COUNTY
PENNSYLVANIA

BOTTOM ASH SETTLING POND SPD-1 & BOTTOM ASH SETTLING POND SPD-2

1"=20' 20 0 20

46122-ELRAMA-F04C
FEBRUARY 2013

O'BRIEN & GERE

APPENDIX A

Visual Inspection Checklists

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	Elrama Power Plant	Date:	September 26, 2012
Unit Name:	Bottom Ash Settling Ponds	Operator's Name:	GenOn Energy Inc.
Unit I.D.:	SPD-1/SPD-2	Hazard Potential Classification:	High (Significant) Low
Inspector's Name:	D. Whetstone, PE & C. Lohrmann, PE		

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 informal		18. Sloughing or bulging on slopes?		✓
2. Pool elevation (operator records)?	771.7		19. Major erosion or slope deterioration?	✓	
3. Decant inlet elevation (operator records)?			20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?	771.7		Is water entering inlet, but not exiting outlet?		✓
5. Lowest dam crest elevation (operator records)?	775.0		Is water exiting outlet, but not entering inlet?		✓
6. If instrumentation is present, are readings recorded (operator records)?	N/A		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 information inspections by Zane Snyder, ES&H Safety Coordinator, Elrama Power Plant.
6.	No instrumentation present.
8.	Unknown.
17.	SPD-2: scarp under north outflow structure inboard slope.
19.	SPD-2: major erosion northwest corner inboard slope. SPD-1: several eroded areas along south and east embankments due to problems with subcontractor clearing equipment.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW)
Impoundment Inspection

Impoundment NPDES Permit # PA 0001571 INSPECTOR D. Whetstone/C. Lohrmann

Date September 26, 2012
Impoundment Name SPD-1/SPD-2: Bottom Ash Settling Ponds
Impoundment Company GenOn Energy Inc.
EPA Region 3
State Agency (Field Office) Address PA Dept. of Environmental Protection
Pittsburgh, PA

Name of Impoundment SPD-1/SPD-2: Bottom Ash Settling Ponds

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

New X Update _____

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

IMPOUNDMENT FUNCTION: **Settling bottom ash solids**

Nearest Downstream Town Name: Elrama, PA
Distance from the impoundment: 300 feet

Impoundment Location:
Latitude 40 Degrees 15 Minutes 13.5 Seconds North
Longitude 79 Degrees 55 Minutes 13.5 Seconds West

State PA County Allegheny

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

If So Which State Agency? PA Department of Environmental Protection
For effluent water quality only.

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

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

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

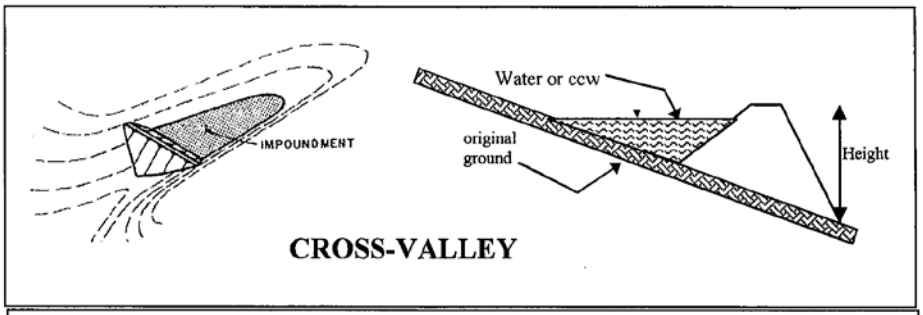
__X__ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns.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

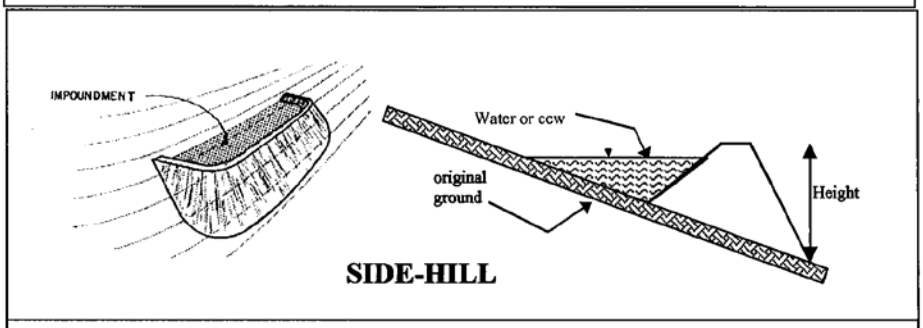
_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

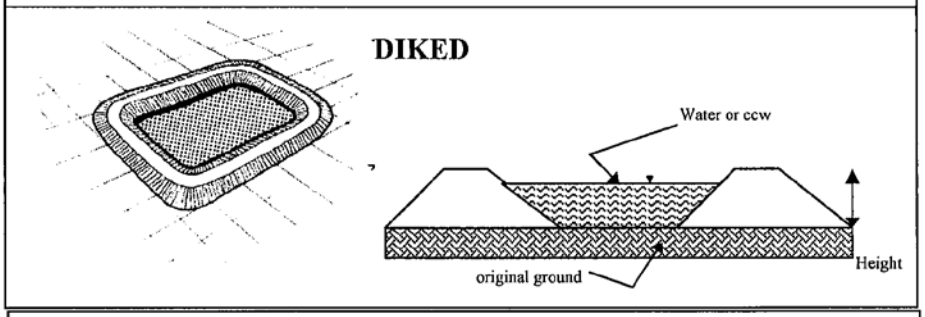
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

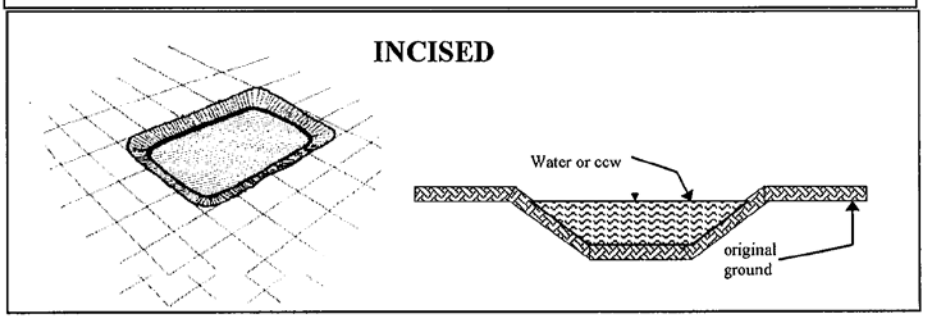
A breach in the embankment will likely disrupt the railroad that runs through the plant and will impact the power plant itself. Ultimately, the release will flow into the Monongahela River, potentially causing environmental damage.

CONFIGURATION:









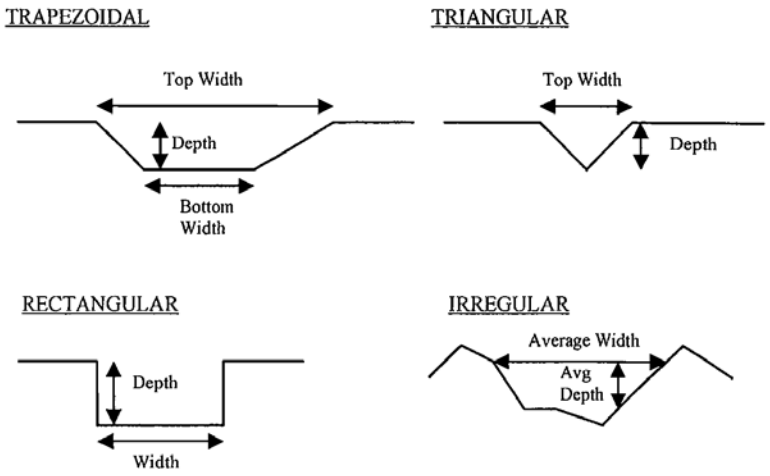
_____ Cross-Valley _____ Side-Hill _____ Diked

_____ Incised (form completion optional) __X__ Combination Incised/Diked

Embankment Height	20-25*	Feet	Embankment Material	Earth – grass covered
Pool Area	2.1-2.2*	Acres	Liner	Compacted clay
Current Freeboard	3.3	Feet	Linear Permeability	unknown

*SPD-1: 25 ft high, 2.1 acres; SPD-2: 20 ft high, 2.2 acres

TYPE OF OUTLET (Mark all that apply)



_____ **Open Channel Spillway**

_____ Trapezoidal

_____ Triangular

_____ Rectangular

_____ Irregular

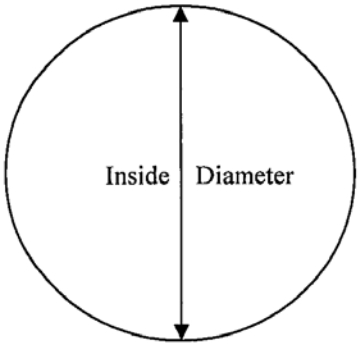
_____ depth (ft)

_____ bottom (or average) width (ft)

_____ top width (ft)

X **Outlet**

_____ Inside diameter



Material

_____ corrugated metal

X welded steel

_____ concrete

_____ plastic (hdpe, pvc, etc.)

X other (specify):

Metal effluent weir boxes to 16" and 20" diameter Schedule 30 steel outlet pipe to polishing pond to river

Is water flowing through the outlet? YES X NO _____

_____ **No Outlet**

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

The Impoundment was Designed By Duquesne Light Company Engineering & Construction Division – Robert J. McAllister, Registered P.E. 5109-E in Commonwealth of PA

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

If So When? _____

If So Please Describe: _____

Have there ever been significant seepages at this site? YES _____ NO___X_____

If So When? _____

IF So Please Describe: _____

Have 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: _____

Additional Inspection Questions

Concerning the embankment foundation, was the embankment construction built over wet ash, slag, or other unsuitable materials? If there is no information just note that.

Based on the construction drawing cross-sections, the embankment was built over rock and clay.

Did the dam assessor meet with, or have documentation from, the design Engineer-of-Record concerning the foundation preparation?

No.

From the site visit or from photographic documentation, was there evidence of prior releases, failure, or patchwork on the dikes?

No.

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	Elrama Power Plant	Date:	September 26, 2012
Unit Name:	Polishing Pond	Operator's Name:	GenOn Energy Inc.
Unit I.D.:	SPD-4	Hazard Potential Classification:	High ~~Significant~~ Low
Inspector's Name:	D. Whetstone, PE & C. Lohrmann, PE		

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 informal		18. Sloughing or bulging on slopes?		✓
2. Pool elevation (operator records)?	777.0		19. Major erosion or slope deterioration?		✓
3. Decant inlet elevation (operator records)?			20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?			Is water entering inlet, but not exiting outlet?		✓
5. Lowest dam crest elevation (operator records)?	780.0		Is water exiting outlet, but not entering inlet?		✓
6. If instrumentation is present, are readings recorded (operator records)?	N/A		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 information inspections by Zane Snyder, ES&H Safety Coordinator, Elrama Power Plant.
6. No instrumentation present.
8. Unknown.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW) Impoundment Inspection

Impoundment NPDES Permit # PA 0001571 INSPECTOR D. Whetstone/C. Lohrmann

Date September 26, 2012
Impoundment Name SPD-4: Polishing Pond
Impoundment Company GenOn Energy Inc.
EPA Region 3
State Agency (Field Office) Address PA Dept. of Environmental Protection
Pittsburgh, PA

Name of Impoundment SPD-4: Polishing Pond

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

New X Update _____

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

IMPOUNDMENT FUNCTION: **Further clarifies outflow from SPD-1 and SPD-2**

Nearest Downstream Town Name: Elrama, PA
Distance from the impoundment: 300 feet

Impoundment Location:
Latitude 40 Degrees 15 Minutes 18 Seconds North
Longitude 79 Degrees 55 Minutes 14 Seconds West

State PA County Allegheny

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

If So Which State Agency? PA Department of Environmental Protection
For effluent water quality only.

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.

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

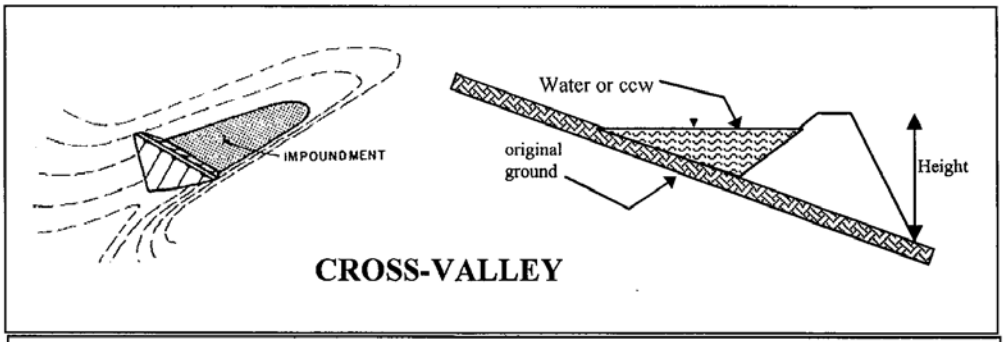
_____ **HIGH HAZARD POTENTIAL:** Dams assigned the high hazard potential classification are those where failure or misoperation will probably cause loss of human life.

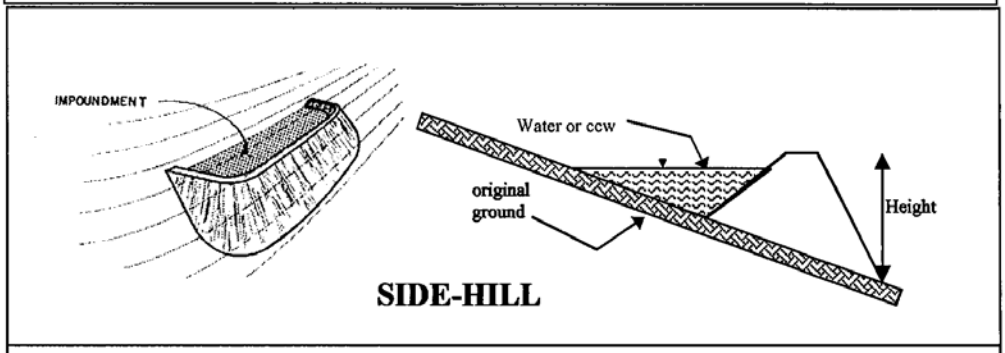
DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

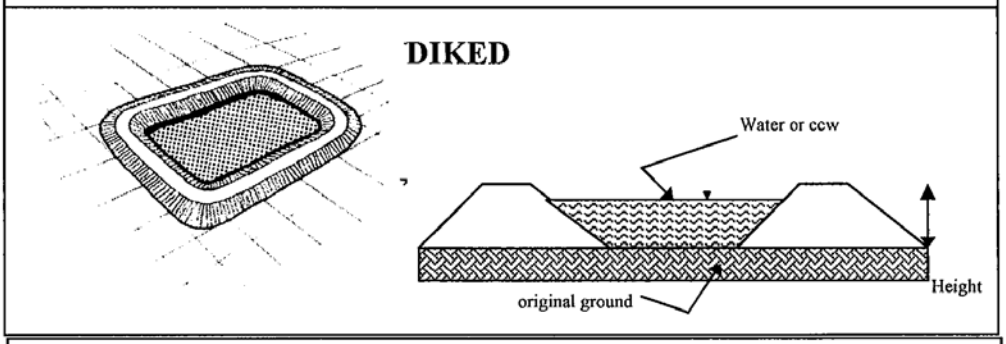
~~A breach in the embankment will likely disrupt the railroad that runs through the plant and will impact the power plant itself. Ultimately, the release will flow into the Monongahela River, potentially causing environmental damage.~~

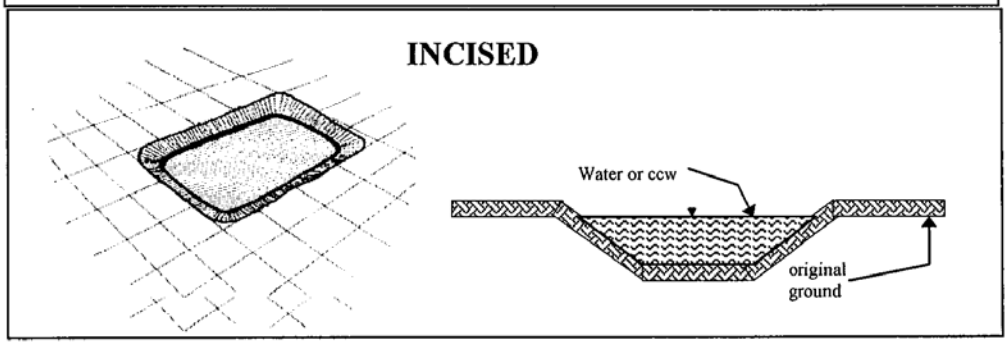
The pond is completely incised so there are no embankments that may potentially fail.

CONFIGURATION:







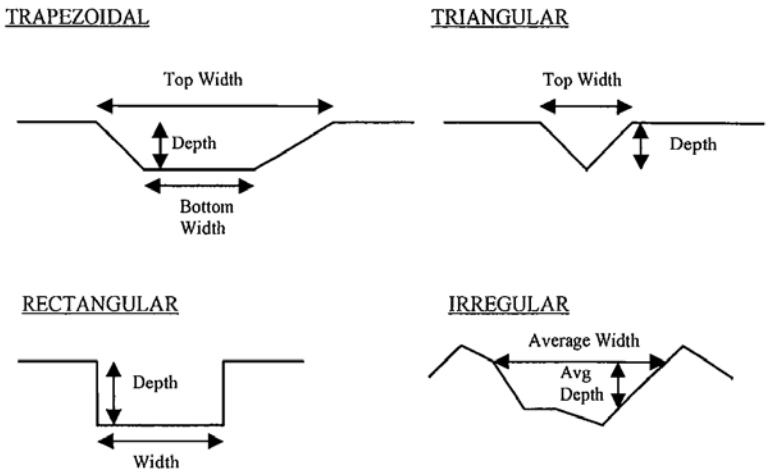


_____ Cross-Valley _____ Side-Hill _____ Diked

__X__ Incised (form completion optional) _____ Combination Incised/Diked

Embankment Height	0	Feet	Embankment Material	Earth – grass covered
Pool Area	0.4	Acres	Liner	Compacted clay
Current Freeboard	3	Feet	Linear Permeability	unknown

TYPE OF OUTLET (Mark all that apply)



_____ **Open Channel Spillway**

_____ Trapezoidal

_____ Triangular

_____ Rectangular

_____ Irregular

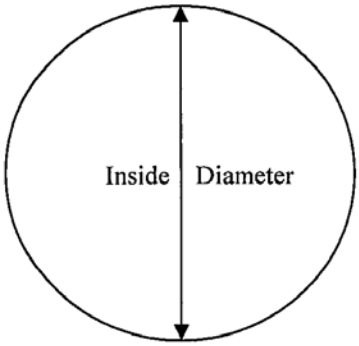
_____ depth (ft)

_____ bottom (or average) width (ft)

_____ top width (ft)

X **Outlet**

20” Inside diameter



Material

_____ corrugated metal

X welded steel

_____ concrete

_____ plastic (hdpe, pvc, etc.)

X other (specify):

Metal effluent weir to 20” Schedule 30 steel pipe to Parshall Flume to 21” concrete pipe to river

Is water flowing through the outlet? YES ___X___ NO _____

_____ **No Outlet**

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

The Impoundment was Designed By Duquesne Light Company Engineering & Construction Division – Robert J. McAllister, Registered P.E. 5109-E in Commonwealth of PA

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

If So When? _____

If So Please Describe: _____

Have there ever been significant seepages at this site? YES _____ NO___X_____

If So When? _____

IF So Please Describe: _____

Have 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: _____

Additional Inspection Questions

Concerning the embankment foundation, was the embankment construction built over wet ash, slag, or other unsuitable materials? If there is no information just note that.

Based on the construction drawing cross-sections, the pond was built over rock and clay.

Did the dam assessor meet with, or have documentation from, the design Engineer-of-Record concerning the foundation preparation?

No.

From the site visit or from photographic documentation, was there evidence of prior releases, failure, or patchwork on the dikes?

No.

Coal Combustion Dam Inspection Checklist Form

US Environmental Protection Agency

Site Name:	Elrama Power Plant	Date:	September 26, 2012
Unit Name:	Emergency Pond	Operator's Name:	GenOn Energy Inc.
Unit I.D.:	SPD-5	Hazard Potential Classification:	High (Significant) Low
Inspector's Name:	D. Whetstone, PE & C. Lohrmann, PE		

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 informal		18. Sloughing or bulging on slopes?		✓
2. Pool elevation (operator records)?	777.0		19. Major erosion or slope deterioration?		✓
3. Decant inlet elevation (operator records)?			20. Decant Pipes:		
4. Open channel spillway elevation (operator records)?			Is water entering inlet, but not exiting outlet?		✓
5. Lowest dam crest elevation (operator records)?	780.0		Is water exiting outlet, but not entering inlet?		✓
6. If instrumentation is present, are readings recorded (operator records)? N/A			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 information inspections by Zane Snyder, ES&H Safety Coordinator, Elrama Power Plant.
6. No instrumentation present.
8. Unknown.
9. Trees growing on south embankment - largest tree diameter about 6".
20. Pond has not been used in long time, no outflow.

U. S. Environmental Protection Agency

Coal Combustion Waste (CCW) Impoundment Inspection

Impoundment NPDES Permit # PA 0001571 INSPECTOR D. Whetstone/C. Lohrmann

Date September 26, 2012
Impoundment Name SPD-5: Emergency Pond
Impoundment Company GenOn Energy Inc.
EPA Region 3
State Agency (Field Office) Address PA Dept. of Environmental Protection
Pittsburgh, PA

Name of Impoundment SPD-5: Emergency Pond

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

New X Update _____

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

IMPOUNDMENT FUNCTION: **Only used as emergency pond if others are out of service**

Nearest Downstream Town Name: Elrama, PA
Distance from the impoundment: 300 feet

Impoundment Location:
Latitude 40 Degrees 15 Minutes 19 Seconds North
Longitude 79 Degrees 55 Minutes 11 Seconds West

State PA County Allegheny

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

If So Which State Agency? PA Department of Environmental Protection
For effluent water quality only.

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

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

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

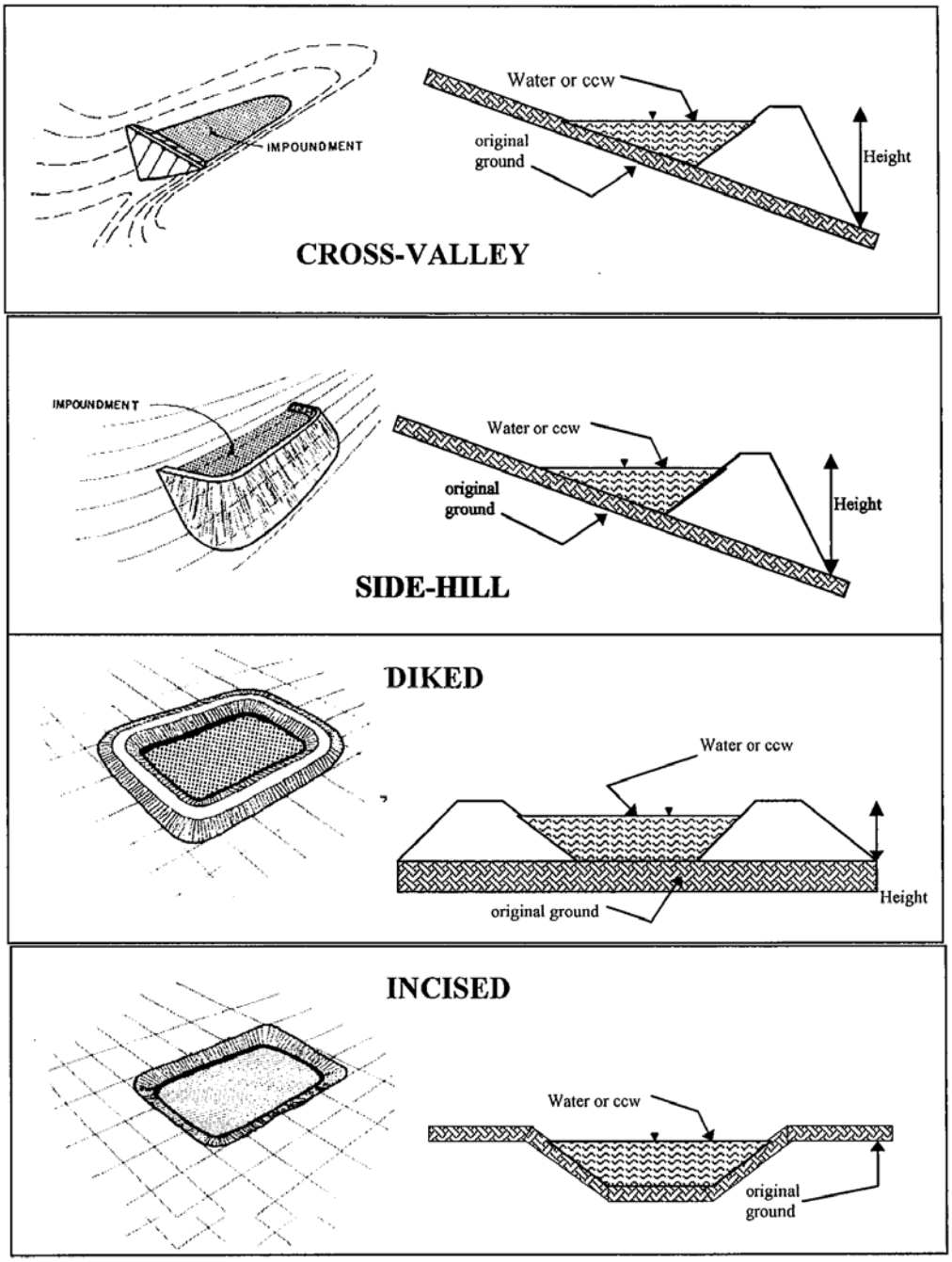
__X__ **SIGNIFICANT HAZARD POTENTIAL:** Dams assigned the significant hazard potential classification are those dams where failure or misoperation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns.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

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

DESCRIBE REASONING FOR HAZARD RATING CHOSEN:

A breach in the embankment will likely disrupt the railroad that runs through the plant and will impact the power plant itself. Ultimately, the release will flow into the Monongahela River, potentially causing environmental damage.

CONFIGURATION:

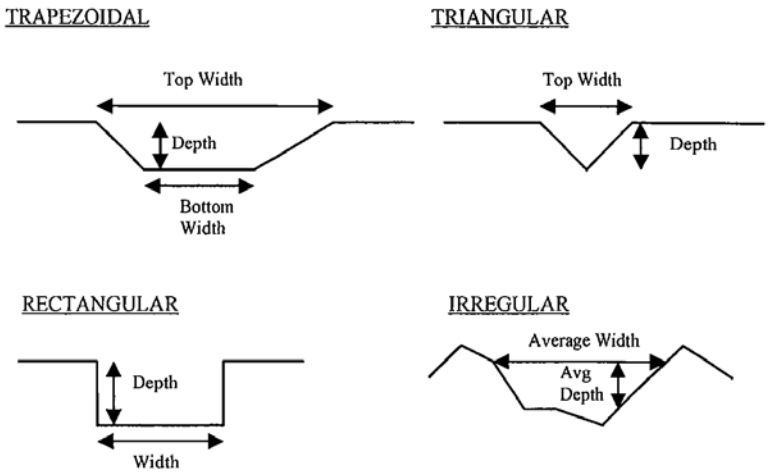


_____ Cross-Valley _____ Side-Hill _____ Diked

_____ Incised (form completion optional) ___X___ Combination Incised/Diked

Embankment Height	6	Feet	Embankment Material	Earth
Pool Area	0.3	Acres	Liner	Compacted clay
Current Freeboard	8+/-	Feet	Linear Permeability	unknown
Design Freeboard	3	Feet		

TYPE OF OUTLET (Mark all that apply)



_____ **Open Channel Spillway**

_____ Trapezoidal

_____ Triangular

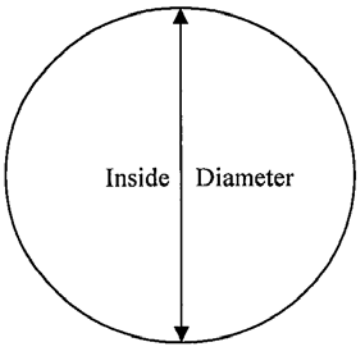
_____ Rectangular

_____ Irregular

_____ depth (ft)

_____ bottom (or average) width (ft)

_____ top width (ft)



_____ **Outlet**

_____ Inside diameter

Material

_____ corrugated metal

_____ welded steel

_____ concrete

_____ plastic (hdpe, pvc, etc.)

__X__ other (specify):

SPD-5 Pond is rarely used. When used, pond is emptied with direct pumping.

Is water flowing through the outlet? YES _____ NO___X___

_____ **No Outlet**

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

The Impoundment was Designed By Duquesne Light Company Engineering & Construction Division – Robert J. McAllister, Registered P.E. 5109-E in Commonwealth of PA

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

If So When? _____

If So Please Describe: _____

Have there ever been significant seepages at this site? YES _____ NO___X_____

If So When? _____

IF So Please Describe: _____

Have 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: _____

Additional Inspection Questions

Concerning the embankment foundation, was the embankment construction built over wet ash, slag, or other unsuitable materials? If there is no information just note that.

Based on the construction drawing cross-sections, the pond was built over rock and clay.

Did the dam assessor meet with, or have documentation from, the design Engineer-of-Record concerning the foundation preparation?

No.

From the site visit or from photographic documentation, was there evidence of prior releases, failure, or patchwork on the dikes?

No.

APPENDIX B

Photographs

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client:	US EPA	Project Number:	46122.230.100
Site Name:	GenOn/NRG – Elrama Plant	Location:	Elrama/Union Township and Borough of Jefferson Hills, PA

Orientation: E Description: Ash Settling Ponds SPD-1 (right) and SPD-2 (left). SPD-1 in operation, SPD-2 drained. SPD-2 dividing dike slope (center). Date: 9/26/12 Photo Number: 1 Photographer: DDW	
Orientation: W Description: Ash Settling Ponds SPD-1 (left) in operation and SPD-2 (right) drained. Dividing dike crest (center). Date: 9/26/12 Photo Number: 2 Photographer: DDW	

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client:	US EPA	Project Number:	46122.230.100
Site Name:	GenOn/NRG – Elrama Plant	Location:	Elrama/Union Township and Borough of Jefferson Hills, PA

Orientation: E

Description: Ash Settling Pond SPD-1 inflow pipes.

Date: 9/26/12

Photo Number: 3

Photographer: DDW

Orientation: E

Description: Ash Settling Pond SPD-2 inflow pipes (not in use while pond drained).

Date: 9/26/12

Photo Number: 4

Photographer: DDW

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client:	US EPA	Project Number:	46122.230.100
Site Name:	GenOn/NRG – Elrama Plant	Location:	Elrama/Union Township and Borough of Jefferson Hills, PA

Orientation: S

Description: Ash Settling Ponds SPD-1 and SPD-2 pipes.

Date: 9/26/12

Photo Number: 5

Photographer: DDW

Orientation: E

Description: Ash Settling Ponds SPD-1 and SPD-2 pipes along eastern embankment of ponds.

Date: 9/26/12

Photo Number: 6

Photographer: DDW

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client:	US EPA	Project Number:	46122.230.100
Site Name:	GenOn/NRG – Elrama Plant	Location:	Elrama/Union Township and Borough of Jefferson Hills, PA

Orientation: SW

Description: Ash Settling Pond SPD-1 outflow structure and western embankment inboard slope (in operating pond).

Date: 9/26/12

Photo Number: 7

Photographer: DDW

Orientation: SW

Description: Ash Settling Pond SPDs outflow structure and western embankment inboard slope (in drained pond).

Date: 9/26/12

Photo Number: 8

Photographer: DDW

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client:	US EPA	Project Number:	46122.230.100
Site Name:	GenOn/NRG – Elrama Plant	Location:	Elrama/Union Township and Borough of Jefferson Hills, PA

Orientation: E

Description: Ash Settling Pond SPD-2 (out of operation) outlet tower and inboard slopes.

Date: 9/26/12

Photo Number: 9

Photographer: DDW

Orientation: SE

Description: Ash Settling Pond SPD-1 (in operation) outlet tower and western embankment inboard slope.

Date: 9/26/12

Photo Number: 10

Photographer: DDW

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client:	US EPA	Project Number:	46122.230.100
Site Name:	GenOn/NRG – Elrama Plant	Location:	Elrama/Union Township and Borough of Jefferson Hills, PA

Orientation: W Description: Ash Settling Pond SPD-2 northern embankment inboard slope. Date: 9/26/12 Photo Number: 11 Photographer: DDW	
Orientation: N Description: Ash Settling Pond SPD-2 western embankment inboard slope, erosion at northwest corner and outflow structure. Date: 9/26/12 Photo Number: 12 Photographer: DDW	

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client:	US EPA	Project Number:	46122.230.100
Site Name:	GenOn/NRG – Elrama Plant	Location:	Elrama/Union Township and Borough of Jefferson Hills, PA

Orientation: S

Description: Ash Settling Pond dividing dike and SPD-2 inboard slope, erosion at dividing dike crest.

Date: 9/26/12

Photo Number: 13

Photographer: DDW

Orientation: SE

Description: Ash Settling Pond dividing dike and SPD-2 inboard slope, sediment from erosion evident on large stone.

Date: 9/26/12

Photo Number: 14

Photographer: DDW

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client:	US EPA	Project Number:	46122.230.100
Site Name:	GenOn/NRG – Elrama Plant	Location:	Elrama/Union Township and Borough of Jefferson Hills, PA

Orientation: N Description: Ash Settling Pond SPD-1 southwest corner, ponding at crest near inboard slope. Date: 9/26/12 Photo Number: 15 Photographer: DDW	
Orientation: SW Description: Ash Settling Pond SPD-1 southeast corner, ponding at toe of slope along access road. Date: 9/26/12 Photo Number: 16 Photographer: DDW	

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client:	US EPA	Project Number:	46122.230.100
Site Name:	GenOn/NRG – Elrama Plant	Location:	Elrama/Union Township and Borough of Jefferson Hills, PA

Orientation: E Description: Ash Settling Pond SPD-1 southern embankment outboard slope and access road. Date: 9/26/12 Photo Number: 17 Photographer: DDW	
Orientation: N Description: Ash Settling Pond SPD-1 eastern embankment outboard slope. Date: 9/26/12 Photo Number: 18 Photographer: DDW	

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client:	US EPA	Project Number:	46122.230.100
Site Name:	GenOn/NRG – Elrama Plant	Location:	Elrama/Union Township and Borough of Jefferson Hills, PA

Orientation: N Description: Ash Settling Pond SPD-1 erosion near top of southern embankment outboard slope and shrub vegetation. Date: 9/26/12 Photo Number: 19 Photographer: DDW	
Orientation: N Description: Ash Settling Pond SPD-1 erosion near top of southern embankment outboard slope and heavy vegetation. Date: 9/26/12 Photo Number: 20 Photographer: DDW	

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client:	US EPA	Project Number:	46122.230.100
Site Name:	GenOn/NRG – Elrama Plant	Location:	Elrama/Union Township and Borough of Jefferson Hills, PA

Orientation: NW

Description: Coal Runoff Pond SPD-3 (incised).

Date: 9/26/12

Photo Number: 21

Photographer: DDW

Orientation: N

Description: Coal Runoff Pond SPD-3 inflow.

Date: 9/26/12

Photo Number: 22

Photographer: DDW

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client:	US EPA	Project Number:	46122.230.100
Site Name:	GenOn/NRG – Elrama Plant	Location:	Elrama/Union Township and Borough of Jefferson Hills, PA

Orientation: N

Description: Polishing Pond SPD-4 (incised).

Date: 9/26/12

Photo Number: 23

Photographer: DDW

Orientation: E

Description: Polishing Pond SPD-4 inflow structure.

Date: 9/26/12

Photo Number: 24

Photographer: DDW

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client:	US EPA	Project Number:	46122.230.100
Site Name:	GenOn/NRG – Elrama Plant	Location:	Elrama/Union Township and Borough of Jefferson Hills, PA

Orientation: SW

Description: Polishing Pond SPD-4 in pond outflow structure with tall grass growing in and around it.

Date: 9/26/12

Photo Number: 25

Photographer: DDW

Orientation: SW

Description: Polishing Pond SPD-4 Parshall Flume outflow structure adjacent to pond.

Date: 9/26/12

Photo Number: 26

Photographer: DDW

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client:	US EPA	Project Number:	46122.230.100
Site Name:	GenOn/NRG – Elrama Plant	Location:	Elrama/Union Township and Borough of Jefferson Hills, PA

Orientation: NW Description: Emergency Pond SPD-5 and inboard slopes. Date: 9/26/12 Photo Number: 27 Photographer: DDW	
Orientation: SE Description: Emergency Pond SPD-5 and inboard slopes. Date: 9/26/12 Photo Number: 28 Photographer: DDW	

O'BRIEN & GERE

PHOTOGRAPHIC LOG

Client:	US EPA	Project Number:	46122.230.100
Site Name:	GenOn/NRG – Elrama Plant	Location:	Elrama/Union Township and Borough of Jefferson Hills, PA

Orientation: N Description: Emergency Pond SPD-5 south corner inboard slope. Date: 9/26/12 Photo Number: 29 Photographer: DDW	
Orientation: NE Description: Emergency Pond SPD-5 southeastern embankment crest bordered by fence and woody vegetation on downstream slope. Date: 9/26/12 Photo Number: 30 Photographer: DDW