

US EPA ARCHIVE DOCUMENT

NOTE

Subject: EPA Comments on “Draft Coal Combustion Residue Impoundment: Round 12 – Dam Assessment Report – First Energy - Hatfields Ferry Power Station”

To: File

Date: June 5, 2013

1. On the cover page of the report, please include company name in addition to the utility name in the Title.
2. On page 3, section 2.1.1 “Waste Water Treatment (WWT) Lagoons,” on the fifth line, following “40” add “feet”? in order to characterize the 40.
3. In section 2.1 “Management Unit Identification,” the first sentence of the second paragraph should read “ash *settling* basin.”
4. In section 3.1.1 “Stormwater Inflows,” the report states that the available volume provided by the lagoon is sufficient to contain the design storm. Although it is a simple calculation, it may be advantageous for the report to state that this assessment is based on OBG’s simple informal calculation based on design storm expected rainfall depth and volume. In addition, please attach a memo to this report that describes OBG’s analysis and conclusions.
5. On page 13, section 6.5 “Certification Statement,” on the first line, following “Waste Water Treatment (WWT) Lagoons” add “Hillside Lagoon and Riverside Lagoon.”
6. On page 7, section 3.1 “Engineering Documents, third bullet, the report states that “one foot thick layer of bottom ash lines the lagoon bottoms.” However, on the fourth page in Appendix A, under “Liner” the report states “clay.” Please reconcile.
7. Report did not indicate if any critical facilities were located with a 1-5 mile zone. Please include in the report.

From: [Adams, Roger](#)
To: [Englander, Jana](#); [Cox, Ken](#); [rogers, rick](#); [Conover, Clark](#)
Cc: [Hoffman, Stephen](#); [Dufficy, Craig](#); [Kelly, PatrickM](#); [Caylor, Douglas](#); [Knarr, Ryan](#)
Subject: RE: Comment Request on Coal Ash Site Assessment Round 12 Draft Report - First Energy - Hatfields Ferry Power Station
Date: Tuesday, October 29, 2013 4:23:55 PM

Dear All,

Pennsylvania DEP Dam Safety has reviewed the draft report for Hatfield's Ferry Power Station. The Department concurs with the findings of the O'Brien & Gere report and offers the following additional comment:

Section 2.2 of the report states that "PADEP Division of Dam Safety currently does not regulate the WWT Lagoons." Upon review of the information presented in the report, the Department has determined that the dams are jurisdictional under 25 PA Code §105.3(a)(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.* The Department will regulate the ring dam that contains the two wastewater lagoons and the appurtenant structures of the dam. The Department has preliminarily assigned the structure as class "C-4" dam based on the size and hazard potential and will regulate the dam until it is no longer used for ash disposal. The dam is now identified by the Department as D30-085 – Hatfield Ferry WWT Lagoon Dam. The dam will be periodically inspected by the Department and any deficiencies will be reported to the owner.

Please let me know if you need additional information.

Roger

Roger P. Adams, P.E. | Chief, Division of Dam Safety
Department of Environmental Protection | Bureau of Waterways Engineering and Wetlands
Rachel Carson State Office Building
400 Market Street | Hbg PA 17101
Phone: 717.772.5951 | Fax: 717.772.0409
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From: Englander, Jana [mailto:Englander.Jana@epa.gov]
Sent: Monday, September 30, 2013 3:31 PM
To: Cox, Ken; rogers, rick; Conover, Clark; Adams, Roger; Reisinger, Richard; Berger, James; Maines, Heath; Kreider, Kirk; Hannigan, Lisa
Cc: Hoffman, Stephen; Dufficy, Craig; Kelly, PatrickM; Englander, Jana
Subject: FW: Comment Request on Coal Ash Site Assessment Round 12 Draft Report - First Energy - Hatfields Ferry Power Station

Dear All,

We would like to offer Pennsylvania and EPA Region 3 an opportunity to comment on the Draft Assessment Report on the Coal Combustion Residual Impoundment(s) located at the facility below. You can access the report by following the link below. Please let me know if

you intend to comment or have any questions. Comments would be appreciated within 30 calendar days of receipt of this email. Thank you!
Regards,

Jana

Jana Englander

Office of Resource Conservation and Recovery,
Materials Recovery Waste Management Division
Energy Recovery and Waste Disposal Branch
U.S. Environmental Protection Agency
703-308-8711

From: Englander, Jana
Sent: Monday, September 30, 2013 3:10 PM
To: 'ghaag@firstenergy.com'
Cc: Hoffman, Stephen; Dufficy, Craig; Kelly, PatrickM; Englander, Jana
Subject: Comment Request on Coal Ash Site Assessment Round 12 Draft Report - First Energy - Hatfields Ferry Power Station

Dear Mr. McIntire,

The draft assessment report for First Energy - Hatfields Ferry Power Station is ready for review. EPA would appreciate it if you would review and submit your comments on this report to us within 30 calendar days of receipt of this email. **Please confirm receipt of this email and send your comments to:**

Mr. Stephen Hoffman
US Environmental Protection Agency (5304P)
1200 Pennsylvania Avenue, NW
Washington, DC 20460

If you are using overnight or hand delivery mail, please use the following address:

Mr. Stephen Hoffman
US Environmental Protection Agency
Two Potomac Yard
2733 South Crystal Drive
5th Floor, N-5237
Arlington, VA 22202-2733

You may also provide your comments by e-mail to hoffman.stephen@epa.gov and englander.jana@epa.gov.

You may assert a business confidentiality claim covering all or part of the information requested, in the manner described by 40 C. F. R. Part 2, Subpart B. Information covered by

such a claim will be disclosed by EPA only to the extent and only by means of the procedures set forth in 40 C.F.R. Part 2, Subpart B. If no such claim accompanies the information when EPA receives it, the information may be made available to the public by EPA without further notice to you. If you wish EPA to treat any of your response as "confidential" you must so advise EPA when you submit your response.

The draft report can be accessed at the secured link below. The secured link will expire on November 15, 2013.

Here is the link for the report:

<http://www.hightail.com/download/OGhkeFVIK3g3N0FsYzIVag>

Please let me know if you have trouble accessing the reports or have any questions/requests.

Respectfully,

Jana Englander

Jana Englander

*Office of Resource Conservation and Recovery,
Materials Recovery Waste Management Division
Energy Recovery and Waste Disposal Branch
U.S. Environmental Protection Agency
703-308-8711*

From: jlapcev@firstenergycorp.com
To: [Englander, Jana](mailto:Englander_Jana)
Cc: [Dufficy, Craig](mailto:Dufficy_Craig); [Hoffman, Stephen](mailto:Hoffman_Stephen); [Kelly, PatrickM](mailto:Kelly_PatrickM); wcannon@firstenergycorp.com; jmcclos@firstenergycorp.com; dhoone@firstenergycorp.com; rborsa2@firstenergycorp.com
Subject: Re: FW: Comment Request on Coal Ash Site Assessment Round 12 Draft Report - First Energy - Hatfields Ferry Power Station
Date: Tuesday, January 14, 2014 10:51:31 AM
Attachments: [Hatfield's Ferry Power Station-DamSafetyAssessment of CCR Impoundments by O'brien&Gere+Comments.pdf](#)
[Hatfield's Ferry Power Station-DamSafetyAssessment of CCR Impoundments by O'brien&Gere+PrintedComments.pdf](#)

Jana,

Attached is a pdf file with comments inserted (strikeouts, edits, & additions) that were done in Adobe Professional. I'm not sure whether these can be viewed in the Adobe Reader version, so I included a second pdf with the comments printed out on the page following the page that the comments reference.

The following bullet points provide further clarification on Hatfield's circumstance and emphasize particular areas of concern:

- In late 2013 Hatfield ceased commercial generation of electricity and is currently being decommissioned.
- The WWT lagoons assessed did not receive sluiced CCR's and only served to act as final settling of wastewater prior to discharge. The wastewater effluent from these lagoons was considered "Low Volume Wastewater."
- Bottom ash was sluiced to hydrobins where it was dewatered and loaded into trucks. The sluice water was recycled back into the sluice system for reuse. Overflows from the hydrobin system were collected in Hatfield's "Low Volume Wastewater" system and directed to the lagoons in question.
- FirstEnergy and its representatives **do not** agree with the determination that these are appropriately classified as CCW Impoundments.
- FirstEnergy and its representatives **do not** agree with rating of POOR selected.

Thanks,
Joe Lapcevic

Senior Scientist
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(234) 678 - 2385 fax
FirstEnergyCorp.
800 Cabin Hill Drive
Greensburg, PA 15601-1689

From: "Englander, Jana" <Englander.Jana@epa.gov>
To: "jlapcev@firstenergycorp.com" <jlapcev@firstenergycorp.com>
Cc: "Hoffman, Stephen" <Hoffman.Stephen@epa.gov>, "Dufficy, Craig" <Dufficy.Craig@epa.gov>, "Kelly, PatrickM" <Kelly.PatrickM@epa.gov>, "Englander, Jana" <Englander.Jana@epa.gov>, "wcannon@firstenergycorp.com"

<wcannon@firstenergycorp.com>

Date: 01/02/2014 09:17 AM

Subject: FW: Comment Request on Coal Ash Site Assessment Round 12 Draft Report - First Energy - Hatfields Ferry Power Station

Hello Joe,

Would you please advise me as to whether First Energy will be providing comments to EPA regarding the Hatfields Ferry Coal Ash Site Assessment DRAFT report, and if so, when should we expect to see them?

Thank you very much.

Regards,

Jana Englander

Jana Englander

Office of Resource Conservation and Recovery,
Materials Recovery Waste Management Division
Energy Recovery and Waste Disposal Branch
U.S. Environmental Protection Agency
703-308-8711

From: Englander, Jana

Sent: Thursday, November 21, 2013 10:59 AM

To: 'jlapcev@firstenergycorp.com'; 'wcannon@firstenergycorp.com'

Cc: Hoffman, Stephen; Dufficy, Craig; Kelly, PatrickM; Englander, Jana

Subject: FW: Comment Request on Coal Ash Site Assessment Round 12 Draft Report - First Energy - Hatfields Ferry Power Station

Hello Joe,

After speaking to Mr. Bill Cannon this morning, I was advised that Mr. McIntire has left the company (quite a while ago) and that you are in fact the appropriate point of contact for the Hatfields Ferry Power Station Coal Ash Site report. I would very much appreciate if you could review and comment on the DRAFT report for this site within the next 30 calendar days.

The link in the email below has expired. I am attaching the draft report.

Please contact me if you have any concerns or issues.

Thank you very much.

Regards,

Jana Englander

Jana Englander

Office of Resource Conservation and Recovery,
Materials Recovery Waste Management Division
Energy Recovery and Waste Disposal Branch
U.S. Environmental Protection Agency
703-308-8711

From: Englander, Jana

Sent: Monday, September 30, 2013 3:10 PM

To: 'ghaag@firstenergy.com'

Cc: Hoffman, Stephen; Dufficy, Craig; Kelly, PatrickM; Englander, Jana

Subject: Comment Request on Coal Ash Site Assessment Round 12 Draft Report - First Energy - Hatfields Ferry Power Station

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Mr. Stephen Hoffman
US Environmental Protection Agency (5304P)
1200 Pennsylvania Avenue, NW
Washington, DC 20460

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Mr. Stephen Hoffman
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Arlington, VA 22202-2733

You may also provide your comments by e-mail to hoffman.stephen@epa.gov and englander.jana@epa.gov.

You may assert a business confidentiality claim covering all or part of the information requested, in the manner described by 40 C. F. R. Part 2, Subpart B. Information covered by such a claim will be disclosed by EPA only to the extent and only by means of the procedures set forth in 40 C.F.R. Part 2, Subpart B. If no such claim accompanies the information when EPA receives it, the information may be made available to the public by EPA without further notice to you. If you wish EPA to treat any of your response as "confidential" you must so advise EPA when you submit your response.

The draft report can be accessed at the secured link below. The secured link will expire on November 15, 2013.

Here is the link for the report:

<http://www.hightail.com/download/OGhkeFVIK3g3N0FsYzIVag>

Please let me know if you have trouble accessing the reports or have any questions/requests.

Respectfully,

Jana Englander

Jana Englander
Office of Resource Conservation and Recovery,
Materials Recovery Waste Management Division
Energy Recovery and Waste Disposal Branch
U.S. Environmental Protection Agency
703-308-8711

[attachment "Hatfields Ferry Dam Safety Assessment of CCR Impoundments.pdf" deleted by Joseph P Lapcevic/FirstEnergy]

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DRAFT REPORT

Dam Safety Assessment of CCR Impoundments

HATFIELD'S FERRY POWER STATION

United States Environmental Protection Agency
Washington, DC

March 4, 2013



O'BRIEN & GERE
www.obg.com

Dam Safety Assessment of CCR Impoundments

Hatfield's Ferry Power Station

Prepared for:
US Environmental Protection Agency
Washington, DC

ROBERT R. BOWERS, P.E. – VICE PRESIDENT
O'BRIEN & GERE ENGINEERS, INC.

US EPA ARCHIVE DOCUMENT

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Figure 2 – Facility Layout Plan

Figure 3 – Photo Location Map—Waste Water Treatment (WWT) Lagoons

Figure 4 – Typical Lagoon Cross-Section

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Appendix A – Visual Inspection Checklist

Appendix B – Photographs

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 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 Waste Water Treatment (WWT) Lagoons at the Hatfield's Ferry Power Station in Masontown, Greene County, Pennsylvania. The above impoundments are owned and operated by First Energy. In the course of this assessment, we obtained information from representatives of First Energy and the Pennsylvania Department of Environmental Protection (PADEP).

2. PROJECT/FACILITY DESCRIPTION

The Hatfield's Ferry Power Station is located along the west side of the Monongahela River along East Roy Furman Highway in Masontown, Pennsylvania. The center of the Hatfield's Ferry Power Station is situated at approximate latitude 39.8556 degrees, and longitude -79.9288 degrees. A Site Location Map is included as Figure 1. The coal-fired power plant began commercial operation in 1969 and has three 576-megawatt units producing a total of 1,728 megawatts of electricity. Coal combustion residual waste that is produced during power generation consists of fly ash, bottom ash, and flue-gas scrubber sludge. Flue-gas scrubber sludge is dry handled and trucked to a landfill about 25 miles away in West Virginia. Fly ash is dry handled in silos and trucked for beneficial reuse or to the on-site landfill south of East Roy Furman Highway. Coal combustion residual bottom ash waste that is produced during power generation is managed in hydrobins which decant to ash settling basins, then pumped to the following CCW impoundments:

- Waste Water Treatment (WWT) Lagoons—Bottom ash impoundment composed of two cells: the Hillside Lagoon and the Riverside Lagoon.

This dam safety assessment report summarizes the September 25, 2012 inspection of the above management units at the Hatfield's Ferry Power Station.

2.1. MANAGEMENT UNIT IDENTIFICATION

The locations of impoundments visited during this safety assessment are identified on Figure 2 – Facility Layout Plan. Three separate pond facilities are located at the on-site landfill and are identified on Figure 2. Closed Landfill Pond 007 handles surface runoff from landfill phases 1 and 2 which are closed. It is regulated by the Pennsylvania Department of Environmental Protection (PADEP) Division of Dam Safety. Wetland Treatment Ponds handle water from landfill underdrains. A Leachate Storage Impoundment (LSI) constructed in 2009 handles surface runoff from phase 3 of the landfill still in operation. It is regulated by the PADEP Bureau of Waste Management. These impoundments are closely regulated by the PADEP and were not assessed for this safety assessment report. The only CCW managed in impoundments at the Hatfield's Ferry Power Station is bottom ash from decant of hydrobins.

Bottom Ash is handled in hydrobins which decant to ash setting basins. The ash settling basins also receive all of the plant's "low volume wastewater" (except for Flue Gas Desulfurization (FGD) wastewater). The ash settling basins are located within the main plant area and are below ground reinforced concrete tank structures, which were not assessed. Decant water from the ash settling basins is pumped to one of two Waste Water Treatment (WWT) Lagoons, which are separated by a divider dike. Both lagoon impoundments were assessed. The majority of bottom ash is distributed for beneficial use, or used as landfill or pond liner. Remaining bottom ash enters the ash settling basins, then the WWT Lagoons. Twice per week, a bottom ash decant of the hydrobins is conducted, which produces more inflow.

2.1.1. Waste Water Treatment (WWT) Lagoons

The WWT Lagoons are located within the north corner of the Hatfield's Ferry Plant, as shown on Figure 2. Each lagoon consists of an approximately 1.6 acre impoundment. The Hillside Lagoon (southwest or plant south lagoon) is bordered on the north, west, and south by constructed embankments; and, on the east by a divider dike separating the two lagoons. Little Whitely Creek runs about 100 feet from the south corner of the Hillside Lagoon, approximately 40 below the embankment crest. The Riverside Lagoon (northeast or plant north lagoon) is bordered on the west by the divider dike; and, on the north, east and south by constructed embankments. The eastern embankment was constructed near the top of the Monongahela River's natural slope. The access road to the lagoons runs alongside and over Little Whitely Creek. Both lagoons were assessed.

One lagoon remains out of operation for dredging and relining at all times. In September 2012, the Hillside Lagoon was in service and the Riverside Lagoon was drained. Interior features of the two lagoons are identical. Both lagoons are about 13 feet deep. Inflow is through three (3) 12-inch pipes at the south end (Photo 11).

Decant water flows over a long metal weir trough (Photos 5 and 10). In the middle of the weir trough, each lagoon is drained ~~for ash removal~~ through a concrete outlet tower with an adjustable stop plate. From the weir trough and concrete outlet tower, decant water flows into a buried 24-inch outlet pipe, then into a concrete weir box open channel which transitions into a riprap-lined channel before entering the Monongahela River (Photo 20). Prior to discharge, decant water is automatically sampled with sampling equipment in the Monitoring Building on the north side of the Hillside Lagoon (Photo 16). The discharge is authorized by Pennsylvania National Pollutant Discharge Elimination System (PA NPDES) Permit No. PA0002941.

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 the WWT Lagoons; therefore, no PADEP hazard classification has been assigned. In the absence of a State Hazard Potential Classification, the FEMA guidelines, *Hazard Potential Classification System for Dams* (2004) have been applied in this assessment to recommend a

hazard potential classification for the impoundments.

2.2.1. Waste Water Treatment (WWT) Lagoons

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 WWT Lagoons is **SIGNIFICANT**. A failure of the embankments impounding the WWT Lagoons 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 primarily due to the potential for release of CCW into Little Whitely Creek or the Monongahela River and the environmental impacts associated with such a potential release. Loss of human life and/or damage to critical infrastructure or lifeline facilities in the event of a dike breach is unlikely. However, environmental impacts to waters of the U.S. are likely due to the proximity of the impoundments to Little Whitely Creek and the Monongahela River which is a public drinking water supply.

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. A typical cross section of the WWT Lagoons is shown on Figure 4.

2.3.1. Embankment Configuration

Each lagoon impounds a surface area of approximately 1.6 acre. The Riverside Lagoon is diked on all sides; however, the Hillside Lagoon is partially incised on the west side. Based on the drawings provided by First Energy, maximum constructed embankment heights and slopes are shown in the table below.

Lagoon	Embankment	Maximum constructed height	Inboard Slope	Outboard Slope
Hillside Lagoon	Southern	Up to 20 ft	3H:1V	2H:1V
	Northern	Up to 15 ft	2.5H:1V	2.5H:1V
	Eastern (divider dike)	Up to 25 ft	3H:1V	2.5H:1V
	Western (hillside)	Up to 25 ft (and partially incised)	3H:1V	2.5H:1V
Riverside Lagoon	Southern	Up to 20 ft	3H:1V	2H:1V
	Northern	Up to 15 ft	2.5H:1V	2.5H:1V
	Eastern (riverside)	Up to 25 ft	3H:1V	2.5H:1V
	Western (divider dike)	Up to 25 ft	3H:1V	2.5H:1V

The western embankment of the Hillside Lagoon ties into relatively flat ground for 50-100 feet which is then bordered by a natural hillside. The south corner of the Hillside Lagoon ties into ground sloping down for about 100 feet at about 4H:1V toward Little Whitely Creek. The eastern embankment of the Riverside Lagoon ties into a relatively flat segment for about 10-25 feet before sloping down at about 3H:1V to the Monongahela River.

The crest is at approximately elevation (EL) 806 feet above mean sea level. The lagoon bottom (as indicated by plant record drawings) is at approximately EL 793. The typical water surface elevation maintained in the operating lagoon is approximately EL 803. As described in the table above, the northern inboard embankment slope has an inclination of approximately 2.5H:1V. Remaining inboard embankment slopes, including the divider dike slopes, have an inclination of approximately 3H:1V. The southern outboard embankment slope has an inclination of approximately 2H:1V. Remaining outboard embankment slopes have an inclination of approximately 2.5H:1V.

Hand placed riprap embankment protection was constructed on the southern embankment inboard slope and bottom of the Hillside Lagoon's western embankment outboard slope where not incised.

2.3.2. Type of Materials Impounded

~~Suspended particulate bottom ash that is not removed in the hydrobins or ash settling basins is stored in the WWT Lagoons. Ash is dewatered in hydrobins so that it may be distributed for beneficial use, or used as landfill or pond liner. Remaining ash settles out in the ash settling basins or WWT Lagoons.~~

2.3.3. Outlet Works

The WWT Lagoons have identical outlet works. A temporary boom is placed near the center of the operating WWT Lagoon to trap floating debris and encourage ash settling in the upstream half of the lagoon. Water is decanted through a 72-ft long, 2.5-ft wide metal weir trough which drains toward the center. A concrete outlet tower contains an adjustable stop plate which is used to drain the lagoon through orifices located on the side of the outlet tower. At the bottom of the outlet tower, a 24-inch diameter pipe directs outflow to the Monitoring Building. Outflow exits the Monitoring Building over a flume in a concrete weir box, then discharges into a rip rap-lined channel and outfalls at the Monongahela River. The discharge is authorized by Pennsylvania National Pollutant Discharge Elimination System (PA NPDES) Permit No. PA0002941.

3. RECORDS REVIEW

A review of the available records related to design, construction, operation and inspection of the WWT Lagoons was performed as part of this assessment. The documents provided by First Energy are listed below:

Table 3.1 Summary of Documents Reviewed

Document	Dates	By	Description
West Penn Power Company Hatfield Power Station Wastewater Treatment Facilities Construction Drawings	1976-1977	First Energy	Sheet C-2411: Lagoons Plan C-2412: Lagoons Section and Details Sheet 1 C-2418: Lagoons Section and Details Sheet 3 C-2419: Lagoons Section and Details Sheet 4 C-2424: Lagoons Section and Details Sheet 5 C-4426: Lagoon & Settling Camber Piping

3.1. ENGINEERING DOCUMENTS

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

- Waste Water Treatment (WWT) Lagoons were constructed and put into operation in 1977.
- All embankment sides were constructed between 15 to 25 feet high except for a section of the Hillside Lagoon that was incised.
- A one-foot (1-ft) thick layer of bottom ash lines the lagoon bottoms.
- Foundation subsurface drains surround the embankment perimeter and a subsurface drainage system was constructed within the lagoon bottoms. Outflow from the subsurface system is directed to a manhole on the riverside slope which outlets to a 12-inch diameter RCP (reinforced concrete pipe) that connects to the lagoon outfall to the Monongahela River.
- 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 have been conducted to evaluate stormwater inflow into the WWT Lagoons. The impounding structures are surrounded by 15 to 25-ft high diked embankments on nearly all sides except for a portion of the western embankment. This portion of the western embankment was constructed with an approximately 5-ft high outboard slope draining to a 3H:1V V-shaped perimeter surface drain. Therefore, stormwater inflows to the WWT Lagoons are limited to direct precipitation with negligible runoff based on observations of the topography around the lagoons. Available volume provided by the lagoon freeboard of three (3) feet is sufficient to contain the precipitation of a 24-hour 100-year storm (5 inches) or a PMP (Probable Maximum Precipitation) event (approximately 34 inches) without overtopping the lagoon.

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 First Energy. 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 inspection of both lagoons.

3.1.3. Modifications from Original Construction

Based on records review and discussions with plant personnel, no modifications from original lagoon construction have occurred.

3.1.4. Instrumentation

No geotechnical or dam safety related instrumentation has been installed. The Monitoring Building and groundwater monitoring pits were part of original lagoon construction.

3.2. PREVIOUS INSPECTIONS

Informal operational inspections are conducted. No inspections are performed to check for seepage, cracks, holes, and freeboard.

3.3. OPERATOR INTERVIEWS

Plant personnel took part in the inspection proceedings. The following table lists participants for the September 2012 inspection of the WWT Lagoons:

Name	Affiliation	Title
Joe Lapcevic	First Energy	Senior Environmental Scientist
Randy Jones	First Energy	Senior Environmental Scientist
Dreher Whetstone, PE	O'Brien & Gere	Technical Associate - Geotechnical Engineer
Carrie Lohrmann, PE	O'Brien & Gere	Design Engineer

Dave Hoone of First Energy was unable to attend the September 2012 inspection; however, he provided construction drawings and additional information following the inspection. PADEP desired to attend the inspection, but also was not present. Facility personnel provided a good working knowledge of the CCW impoundments, provided general plant operation background and provided requested historical documentation. The personnel listed in the table above accompanied O'Brien & Gere throughout the visual inspection to answer questions and to provide additional information as needed in the field.

4. VISUAL INSPECTION

The following sections summarize the inspection of the Waste Water Treatment (WWT) Lagoons which occurred on September 25, 2012. At the time of the inspection, O'Brien & Gere filled out EPA inspection checklists for the facilities. Additional information on the checklists was identified from drawings provided by First Energy following the inspection. Checklists were submitted electronically to EPA on November 12, 2012. Copies of the completed inspection checklists are included as Appendix A.

4.1. GENERAL

The weather on the date of the inspection was approximately 55 degrees and mostly clear. The visual inspection 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 inspection were taken by O'Brien & Gere and are provided in Appendix B. An aerial photograph depicting the layout and locations and orientation of the photographs is included as Figure 3.

4.2. SUMMARY OF FINDINGS

The following observations were made during the inspection:

- The Hillside Lagoon was operating at the time of inspection. The Riverside Lagoon was drained at the time of inspection. Otherwise, lagoon features and condition are nearly identical so they are documented as one complete unit.
- Lagoon access was restricted with a security fence topped with barbed wire.
- ~~Sluiced bottom ash~~ enters the south end of the lagoons through three (3) 12-inch inflow pipes. Inflow control valves for both lagoons are located near the top of the southern outboard slope.
- No depressions or ponding along the crest were noted.
- The access road to the lagoons and lagoon crest roadway surfaces were mainly bare earth with some gravel. The access road down to the river was mainly gravel and grass. Access roads were maintained adequately for vehicular traffic.
- The freeboard portion of the Hillside Lagoon and Riverside Lagoon inboard slopes and inboard slopes were mainly vegetated with tall grasses and wildflowers.
- The bottom of the Riverside Lagoon had been relined with bottom ash except for at the north end where water ponded in the bottom. Lower inboard slopes were a combination of bottom ash and earth. No significantly eroded areas were observed.
- The divider dike crest and slopes were identical in material and condition to other portions of the crest roads and inboard slopes.
- The boom in the Hillside Lagoon as well as inflow and outflow structures appeared to be in good condition and functioning normally.
- Plant personnel stated that the adjustable stop plates for draining the lagoons are operational.
- Metal outflow weir troughs and other metal components were rusted, but the outlet works showed no other significant signs of wear.

- The southern embankment outboard slope was heavily vegetated with tall grasses, wildflowers, brush, saplings, and small trees. Remaining outboard slopes were vegetated with tall grasses, wildflowers, and a few small trees.
- The eastern embankment, natural slope down to the Monongahela River, and streamside of the access road to the lagoons are a protected mitigation area that was intentionally planted as mitigation for another on-site project.
- No seepage was evident.
- A Monitoring Building is positioned northwest of the Riverside Lagoon, below the toe of the outboard slope.
- The WWT Lagoons' outfall to the Monongahela River was observed and operating.

5. CONCLUSIONS

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 the Waste Water Treatment (WWT) Lagoons is considered to be **POOR**. Acceptable performance is expected; however, some deficiencies exist that require additional studies or investigations and/or repair.

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

Minor deficiencies include the following:

- Heavy vegetation on southern outboard slope, tall grass and some trees on remaining outboard slopes.
- Tall grass vegetation on inboard slopes.

Though no hydrologic & hydraulic analyses have been conducted to evaluate stormwater inflow into the WWT Lagoons, the impounding structures are diked on all sides. Based on a visual review of the topography surrounding the WWT Lagoons, stormwater inflow would be limited to direct precipitation. Available volume provided by the lagoon freeboard of three (3) feet is sufficient to contain the precipitation of a 24-hour 100-year storm (5 inches) or a PMP (Probable Maximum Precipitation) event (approximately 34 inches) without overtopping the lagoon. Maintenance and improvement measures that should be addressed include the following:

- Cutting tall grass on the inboard slopes and maintaining a mowed condition so the slopes can be inspected.
- Clearing trees and shrubs on the outboard slopes, cutting tall grass and maintaining a mowed condition.

Limits of embankment outboard slopes can be identified from the lagoon construction drawings and should be noted with field markers. Slopes around the lagoon access road and natural slopes beyond the lagoon embankment slopes do not need to be cleared or mowed. First Energy should implement regular visual inspections for perimeter embankment seeps, cracks, holes, and freeboard with the goal of identifying, documenting, and repairing any deficiencies early so that they do not develop into more serious problems. Plant staff should maintain design and construction documents and inspection reports in a well organized manner for future reference.

6. RECOMMENDATIONS

Based on the findings of our visual inspection and review of the available records for the Waste Water Treatment (WWT) Lagoons, O'Brien & Gere recommends that additional maintenance of the embankments be performed to correct the vegetation issues 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 dikes 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:

- Cutting tall grass on the inboard slopes and maintaining a mowed condition so the slopes can be inspected.
- Clearing trees and shrubs on the southern embankment outboard slope, cutting tall grass and maintaining a mowed condition.
- Clearing any trees and shrubs on the remaining constructed portions of the outboard slopes, cutting tall grass and maintaining a mowed condition. Limits of constructed outboard slopes can be identified from the lagoon construction drawings and should be noted with field markers. Slopes around the lagoon access road, outside the lagoon outboard slopes, do not need to be cleared or mowed.
- A geotechnical investigation and slope stability analysis should be performed to assess embankment stability in accordance with applicable dam safety criteria.

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 periodic inspections by independent licensed dam safety engineers on at least a biennial basis. First Energy should implement regular visual inspections for perimeter embankment seeps, cracks, holes, and freeboard with the goal of identifying, documenting, and repairing any deficiencies early so that they do not develop into more serious problems. Plant staff should maintain design and construction documents and inspection reports in a well organized manner for future reference.

6.4. TIME FRAME FOR COMPLETION OF REPAIRS/IMPROVEMENTS

Based on the findings of this assessment, O'Brien & Gere recommends that First Energy begin clearing and mowing in the next growing season and implement regular visual inspections at that time. Clearing should be completed by the end of the next growing season prior to mowing. A geotechnical investigation and slope stability analysis should be performed within the next year to ensure that the embankment meets standard dam safety stability criteria.

6.5. CERTIFICATION STATEMENT

I acknowledge that the Waste Water Treatment (WWT) Lagoons, CCW management units, referenced herein were personally inspected by me on September 25, 2012 and were found to be in the following condition:

SATISFACTORY

FAIR

POOR

UNSATISFACTORY

Signature: _____

D. Dreher Whetstone, PE
PA PE License PE060840

Date: _____

DRAFT REPORT

Dam Safety Assessment of CCR Impoundments

HATFIELD'S FERRY POWER STATION

United States Environmental Protection Agency
Washington, DC

March 4, 2013



O'BRIEN & GERE
www.obg.com

13498/46122

Dam Safety Assessment of CCR Impoundments

Hatfield's Ferry Power Station

Prepared for:
US Environmental Protection Agency
Washington, DC

ROBERT R. BOWERS, P.E. – VICE PRESIDENT
O'BRIEN & GERE ENGINEERS, INC.

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Figure 1 – Site Location Map

Figure 2 – Facility Layout Plan

Figure 3 – Photo Location Map—Waste Water Treatment (WWT) Lagoons

Figure 4 – Typical Lagoon Cross-Section

Appendices

Appendix A – Visual Inspection Checklist

Appendix B – Photographs

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 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 Waste Water Treatment (WWT) Lagoons at the Hatfield's Ferry Power Station in Masontown, Greene County, Pennsylvania. The above impoundments are owned and operated by First Energy. In the course of this assessment, we obtained information from representatives of First Energy and the Pennsylvania Department of Environmental Protection (PADEP).

Summary of Comments on ~9164032.pdf

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Allegheny Energy Supply Company, LLC who's ultimate parent company is FirstEnergy Corp.

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2. PROJECT/FACILITY DESCRIPTION

The Hatfield's Ferry Power Station is located along the west side of the Monongahela River along East Roy Furman Highway in Masontown, Pennsylvania. The center of the Hatfield's Ferry Power Station is situated at approximate latitude 39.8556 degrees, and longitude -79.9288 degrees. A Site Location Map is included as Figure 1. The coal-fired power plant began commercial operation in 1969 and has three 576-megawatt units producing a total of 1,728 megawatts of electricity. Coal combustion residual waste that is produced during power generation consists of fly ash, bottom ash, and flue-gas scrubber sludge. Flue-gas scrubber sludge is dry handled and trucked to landfill about 25 miles away in West Virginia. Fly ash is dry handled in silos and trucked for beneficial reuse or to the on-site landfill south of East Roy Furman Highway. Coal combustion residual bottom ash waste that is produced during power generation is managed in hydrobins which decant to ash settling basins then pumped to the following CCW impoundments:

- 12 Waste Water Treatment (WWT) Lagoons
- 13 14 Bottom ash impoundment
- 15 composed of two cells: the Hillside Lagoon and the Riverside Lagoon.

This dam safety assessment report summarizes the September 25, 2012 inspection of the above management units at the Hatfield's Ferry Power Station.

2.1. MANAGEMENT UNIT IDENTIFICATION

The locations of impoundments visited during this safety assessment are identified on Figure 2 – Facility Layout Plan. Three separate pond facilities are located at the on-site landfill and are identified on Figure 2. Closed Landfill Pond 007 handles surface runoff from landfill phases 1 and 2 which is closed. It is regulated by the Pennsylvania Department of Environmental Protection (PADEP) Division of Dam Safety. Wetland Treatment Ponds handle water from landfill underdrains. A Leachate Storage Impoundment (LSI) constructed in 2009 handles surface runoff from phase 3 of the landfill still in operation. It is regulated by the PADEP Bureau of Waste Management. These impoundments are closely regulated by the PADEP and were not assessed for this safety assessment report. The only CCW managed in impoundments at the Hatfield's Ferry Power Station is bottom ash from decant of hydrobins.

Bottom Ash is handled in hydrobins which decant to ash setting basins. The ash settling basins also receive all of the plant's "low volume wastewater" (except for Flue Gas Desulfurization (FGD) wastewater). The ash settling basins are located within the main plant area and are below ground reinforced concrete tank structures, which were not assessed. Decant water from the ash settling basins is pumped to one of two Waste Water Treatment (WWT) Lagoons, which are separated by a divider dike. Both lagoon impoundments were assessed. The majority of bottom ash is distributed for beneficial use, or used as landfill or pond liner. Remaining bottom ash enters the ash settling basins, then the WWT Lagoons. Twice per week, a bottom ash decant of the hydrobins is conducted, which produces more inflow.

2.1.1. Waste Water Treatment (WWT) Lagoons

The WWT Lagoons are located within the north corner of the Hatfield's Ferry plant shown on Figure 2. Each lagoon consists of an approximately 1.6 acre impoundment. The Hillside Lagoon (southwest or plant south lagoon) is bordered on the north, west, and south by constructed embankments; and, on the east by a divider dike separating the two lagoons. Little Whitely Creek runs about 100 feet from the south corner of the Hillside Lagoon, approximately 40 feet below the embankment crest. The Riverside Lagoon (northeast or plant north lagoon) is bordered on the west by the divider dike; and, on the north, east and south by constructed embankments. The eastern embankment was constructed near the top of the Monongahela River's natural slope. The access road to the lagoons runs alongside and over Little Whitely Creek. Both lagoons were assessed.

One lagoon remains out of operation for dredging and relining at all times. In September 2012, the Hillside Lagoon was in service and the Riverside Lagoon was drained. Interior features of the two lagoons are identical. Both lagoons are about 13 feet deep. Inflow is through three (3) 12-inch pipes at the south end (Photo 11).

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	. The decanted bottom ash is removed from the hydrobins and either trucked for beneficial use or to the on-site landfill.			
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	receive a variety of wastewater from the station including the effluent water from the ash settling basins. The WWT lagoons are			
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	have been covered with soil and vegetated.			
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	a component of the on-site landfill leachate collection/drainage systems as authorized by PADEP. A very small quantity is used as a protective cover layer over the clay lining in each WWT lagoon following the cleaning of each lagoon.			
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- Waste Water Treatment (WWT) Lagoons—Bottom ash impoundment composed of two cells: the Hillside Lagoon and the Riverside Lagoon.

This dam safety assessment report summarizes the September 25, 2012 inspection of the above management units at the Hatfield's Ferry Power Station.

2.1. MANAGEMENT UNIT IDENTIFICATION

The locations of impoundments visited during this safety assessment are identified on Figure 2 – Facility Layout Plan. Three separate pond facilities are located at the on-site landfill and are identified on Figure 2. Closed Landfill Pond 007 handles surface runoff from landfill phases 1 and 2 which are closed. It is regulated by the Pennsylvania Department of Environmental Protection (PADEP) Division of Dam Safety. Wetland Treatment Ponds handle water from landfill underdrains. A Leachate Storage Impoundment (LSI) constructed in 2009 handles surface runoff from phase 3 of the landfill still in operation. It is regulated by the PADEP Bureau of Waste Management. These impoundments are closely regulated by the PADEP and were not assessed for this safety assessment report. The only CCW managed in impoundments at the Hatfield's Ferry Power Station is bottom ash from decant of hydrobins.

Bottom Ash is handled in hydrobins which decant to ash setting basins. The ash settling basins also receive all of the plant's "low volume wastewater" (except for Flue Gas Desulfurization (FGD) wastewater). The ash settling basins are located within the main plant area and are below ground reinforced concrete tank structures, which were not assessed. Decant water from the ash settling basins is pumped to one of two Waste Water Treatment (WWT) Lagoons, which are separated by a divider dike. Both lagoon impoundments were assessed. The majority of bottom ash is distributed for beneficial use, or used as landfill or pond liner. Remaining bottom ash enters the ash settling basins, then the WWT Lagoons. Twice per week, a bottom ash decant of the hydrobins is conducted, which produces more inflow.

2.1.1. Waste Water Treatment (WWT) Lagoons

The WWT Lagoons are located within the north corner of the Hatfield's Ferry Plant, as shown on Figure 2. Each lagoon consists of an approximately 1.6 acre impoundment. The Hillside Lagoon (southwest or plant south lagoon) is bordered on the north, west, and south by constructed embankments; and, on the east by a divider dike separating the two lagoons. Little Whitely Creek runs about 100 feet from the south corner of the Hillside Lagoon, approximately 40 below the embankment crest. The Riverside Lagoon (northeast or plant north lagoon) is bordered on the west by the divider dike; and, on the north, east and south by constructed embankments. The eastern embankment was constructed near the top of the Monongahela River's natural slope. The access road to the lagoons runs alongside and over Little Whitely Creek. Both lagoons were assessed.

One lagoon ²⁸remains out of ²⁹operation for dredging and relining at all times. In September 2012, the Hillside Lagoon was in service and the Riverside Lagoon was ³¹maintained. Interior features of the two lagoons are identical. Both lagoons are about 13 feet deep. Inflow is through three (3) 12-inch pipes at the south end (Photo 11).

feet

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service and in stand by condition while the other lagoon is actively receiving wastewater.

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in stand by status.

Decant water flows over a long metal weir trough (Photos 5 and 10). In the middle of the weir trough, each lagoon is drained for ash removal through a concrete outlet tower with an adjustable stop plate. From the weir trough and concrete outlet tower, decant water flows into a buried 24-inch outlet pipe, then into a concrete weir box open channel which transitions into a riprap-lined channel before entering the Monongahela River (Photo 20). Prior to discharge, decant water is automatically sampled with sampling equipment in the Monitoring Building on the north side of the Hillside Lagoon (Photo 16). The discharge is authorized by Pennsylvania National Pollutant Discharge Elimination System (PA NPDES) Permit No. PA0002941.

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 the WWT Lagoons; therefore, no PADEP hazard classification has been assigned. In the absence of a State Hazard Potential Classification, the FEMA guidelines, *Hazard Potential Classification System for Dams* (2004) have been applied in this assessment to recommend a

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Each lagoon is drained prior to sediment removal activities.

hazard potential classification for the impoundments.

2.2.1. Waste Water Treatment (WWT) Lagoons

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 WWT Lagoons is **SIGNIFICANT**. A failure of the embankments impounding the WWT Lagoons 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 primarily due to the potential for release of CCW into Little Whitely Creek or the Monongahela River and the environmental impacts associated with such a potential release. Loss of human life and/or damage to critical infrastructure or lifeline facilities in the event of a dike breach is unlikely. However, environmental impacts to waters of the U.S. are likely due to the proximity of the impoundments to Little Whitely Creek and the Monongahela River which is a public drinking water supply.

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. A typical cross section of the WWT Lagoons is shown on Figure 4.

2.3.1. Embankment Configuration

Each lagoon impounds a surface area of approximately 1.6 acre. The Riverside Lagoon is diked on all sides; however, the Hillside Lagoon is partially incised on the west side. Based on the drawings provided by First Energy, maximum constructed embankment heights and slopes are shown in the table below.

Lagoon	Embankment	Maximum constructed height	Inboard Slope	Outboard Slope
	Southern	Up to 20 ft	3H:1V	2H:1V
Hillside	Northern	Up to 15 ft	2.5H:1V	2.5H:1V
Lagoon	Eastern (divider dike)	Up to 25 ft	3H:1V	2.5H:1V
	Western (hillside)	Up to 25 ft (and partially incised)	3H:1V	2.5H:1V
	Southern	Up to 20 ft	3H:1V	2H:1V
Riverside	Northern	Up to 15 ft	2.5H:1V	2.5H:1V
Lagoon	Eastern (riverside)	Up to 25 ft	3H:1V	2.5H:1V
	Western (divider dike)	Up to 25 ft	3H:1V	2.5H:1V

The western embankment of the Hillside Lagoon ties into relatively flat ground for 50-100 feet which is then bordered by a natural hillside. The south corner of the Hillside Lagoon ties into ground sloping down for about 100 feet at about 4H:1V toward Little Whitely Creek. The eastern embankment of the Riverside Lagoon ties into a relatively flat segment for about 10-25 feet before sloping down at about 3H:1V to the Monongahela River.

The crest is at approximately elevation (EL) 806 feet above mean sea level. The lagoon bottom (as indicated by plant record drawings) is at approximately EL 793. The typical water surface elevation maintained in the operating lagoon is approximately EL 803. As described in the table above, the northern inboard embankment slope has an inclination of approximately 2.5H:1V. Remaining inboard embankment slopes, including the divider dike slopes, have an inclination of approximately 3H:1V. The southern outboard embankment slope has an inclination of approximately 2H:1V. Remaining outboard embankment slopes have an inclination of approximately 2.5H:1V.

Hand placed riprap embankment protection was constructed on the southern embankment inboard slope and bottom of the Hillside Lagoon's western embankment outboard slope where not incised.

2.3.2. Type of Materials Impounded

~~4] suspended particulate~~ bottom ash that is not removed in the hydrobins or ash settling basins ~~3] is stored in the~~ WWT Lagoons. ~~5] Ash is dewatered in hydrobins so that it may be distributed for beneficial use, or used as landfill or pond liner. Remaining ash settles out in the ash settling basins or WWT Lagoons.~~

2.3.3. Outlet Works

The WWT Lagoons have identical outlet works. A temporary boom is placed near the center of the operating WWT Lagoon to trap floating debris and encourage ~~7] ash settling in the upstream half of the lagoon.~~ Water is decanted through a 72-ft long, 2.5-ft wide metal weir trough which drains toward the center. A concrete outlet tower contains an adjustable stop plate which is used to drain the lagoon through orifices located on the side of the outlet tower. At the bottom of the outlet tower, a 24-inch diameter pipe directs outflow to the Monitoring Building. Outflow exits the Monitoring Building over a flume in a concrete weir box, then discharges into a rip rap-lined channel and outfalls at the Monongahela River. The discharge is authorized by Pennsylvania National Pollutant Discharge Elimination System (PA NPDES) Permit No. PA0002941.

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The WWT Lagoons are designed to settle out fine particulates in the wastewater prior to discharge. This includes but is not limited to suspended
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particulate

3. RECORDS REVIEW

A review of the available records related to design, construction, operation and inspection of the WWT Lagoons was performed as part of this assessment. The documents provided by First Energy are listed below:

Table 3.1 Summary of Documents Reviewed

Document	Dates	By	Description
West Penn Power Company Hatfield Power Station Wastewater Treatment Facilities Construction Drawings	1976-1977	First Energy	Sheet C-2411: Lagoons Plan C-2412: Lagoons Section and Details Sheet 1 C-2418: Lagoons Section and Details Sheet 3 C-2419: Lagoons Section and Details Sheet 4 C-2424: Lagoons Section and Details Sheet 5 C-4426: Lagoon & Settling Camber Piping

3.1. ENGINEERING DOCUMENTS

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

- Waste Water Treatment (WWT) Lagoons were constructed and put into operation in 1977.
- All embankment sides were constructed between 15 to 25 feet high except for a section of the Hillside Lagoon that was incised.
- A one-foot (1-ft) thick layer of bottom ash lines the lagoon bottoms.
- Foundation subsurface drains surround the embankment perimeter and a subsurface drainage system was constructed within the lagoon bottoms. Outflow from the subsurface system is directed to a manhole on the riverside slope which outlets to a 12-inch diameter RCP (reinforced concrete pipe) that connects to the lagoon outfall to the Monongahela River.
- 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 have been conducted to evaluate stormwater inflow into the WWT Lagoons. The impounding structures are surrounded by 15 to 25-ft high diked embankments on nearly all sides except for a portion of the western embankment. This portion of the western embankment was constructed with an approximately 5-ft high outboard slope draining to a 3H:1V V-shaped perimeter surface drain. Therefore, stormwater inflows to the WWT Lagoons are limited to direct precipitation with negligible runoff based on observations of the topography around the lagoons. Available volume provided by the lagoon freeboard of three (3) feet is sufficient to contain the precipitation of a 24-hour 100-year storm (5 inches) or a PMP (Probable Maximum Precipitation) event (approximately 34 inches) without overtopping the lagoon.

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 First Energy. 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 inspection of both lagoons.

3.1.3. Modifications from Original Construction

Based on records review and discussions with plant personnel, no modifications from original lagoon construction have occurred.

3.1.4. Instrumentation

No geotechnical or dam safety related instrumentation has been installed. The Monitoring Building and groundwater monitoring pits were part of original lagoon construction.

3.2. PREVIOUS INSPECTIONS

Informal operational inspections are conducted. No inspections are performed to check for seepage, cracks, holes, and freeboard.

3.3. OPERATOR INTERVIEWS

Plant personnel took part in the inspection proceedings. The following table lists participants for the September 2012 inspection of the WWT Lagoons:

Name	Affiliation	Title
Joe Lapcevic	First Energy	Senior Environmental Scientist
Randy Jones	First Energy	Senior Environmental Scientist
Dreher Whetstone, PE	O'Brien & Gere	Technical Associate - Geotechnical Engineer
Carrie Lohrmann, PE	O'Brien & Gere	Design Engineer

Dave Hoone of First Energy was unable to attend the September 2012 inspection; however, he provided construction drawings and additional information following the inspection. PADEP desired to attend the inspection, but also was not present. Facility personnel provided a good working knowledge of the CCW impoundments, provided general plant operation background and provided requested historical documentation. The personnel listed in the table above accompanied O'Brien & Gere throughout the visual inspection to answer questions and to provide additional information as needed in the field.

4. VISUAL INSPECTION

The following sections summarize the inspection of the Waste Water Treatment (WWT) Lagoons which occurred on September 25, 2012. At the time of the inspection, O'Brien & Gere filled out EPA inspection checklists for the facilities. Additional information on the checklists was identified from drawings provided by First Energy following the inspection. Checklists were submitted electronically to EPA on November 12, 2012. Copies of the completed inspection checklists are included as Appendix A.

4.1. GENERAL

The weather on the date of the inspection was approximately 55 degrees and mostly clear. The visual inspection 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 inspection were taken by O'Brien & Gere and are provided in Appendix B. An aerial photograph depicting the layout and locations and orientation of the photographs is included as Figure 3.

4.2. SUMMARY OF FINDINGS

The following observations were made during the inspection:

- The Hillside Lagoon was operating at the time of inspection. The Riverside Lagoon was drained at the time of inspection. Otherwise, lagoon features and condition are nearly identical so they are documented as one complete unit.
- Lagoon access was restricted with a security fence topped with barbed wire.
- ~~Sluiced bottom ash~~ filters the south end of the lagoons through three (3) 12-inch inflow pipes. Inflow control valves for both lagoons are located near the top of the southern outboard slope.
- No depressions or ponding along the crest were noted.
- The access road to the lagoons and lagoon crest roadway surfaces were mainly bare earth with some gravel. The access road down to the river was mainly gravel and grass. Access roads were maintained adequately for vehicular traffic.
- The freeboard portion of the Hillside Lagoon and Riverside Lagoon inboard slopes and inboard slopes were mainly vegetated with tall grasses and wildflowers.
- The bottom of the Riverside Lagoon had been relined with bottom ash except for at the north end where water ponded in the bottom. Lower inboard slopes were a combination of bottom ash and earth. No significantly eroded areas were observed.
- The divider dike crest and slopes were identical in material and condition to other portions of the crest roads and inboard slopes.
- The boom in the Hillside Lagoon as well as inflow and outflow structures appeared to be in good condition and functioning normally.
- Plant personnel stated that the adjustable stop plates for draining the lagoons are operational.
- Metal outflow weir troughs and other metal components were rusted, but the outlet works showed no other significant signs of wear.

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Influent wastewater

5. CONCLUSIONS

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 the Waste Water Treatment (WWT) Lagoons is considered to be **POOR**. Acceptable performance is expected; however, some deficiencies exist that require additional studies or investigations and/or repair.

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

Minor deficiencies include the following:

- Heavy vegetation on southern outboard slope, tall grass and some trees on remaining outboard slopes.
- Tall grass vegetation on inboard slopes.

Though no hydrologic & hydraulic analyses have been conducted to evaluate stormwater inflow into the WWT Lagoons, the impounding structures are diked on all sides. Based on a visual review of the topography surrounding the WWT Lagoons, stormwater inflow would be limited to direct precipitation. Available volume provided by the lagoon freeboard of three (3) feet is sufficient to contain the precipitation of a 24-hour 100-year storm (5 inches) or a PMP (Probable Maximum Precipitation) event (approximately 34 inches) without overtopping the lagoon. Maintenance and improvement measures that should be addressed include the following:

- Cutting tall grass on the inboard slopes and maintaining a mowed condition so the slopes can be inspected.
- Clearing trees and shrubs on the outboard slopes, cutting tall grass and maintaining a mowed condition.

Limits of embankment outboard slopes can be identified from the lagoon construction drawings and should be noted with field markers. Slopes around the lagoon access road and natural slopes beyond the lagoon embankment slopes do not need to be cleared or mowed. First Energy should implement regular visual inspections for perimeter embankment seeps, cracks, holes, and freeboard with the goal of identifying, documenting, and repairing any deficiencies early so that they do not develop into more serious problems. Plant staff should maintain design and construction documents and inspection reports in a well organized manner for future reference.

6. RECOMMENDATIONS

Based on the findings of our visual inspection and review of the available records for the Waste Water Treatment (WWT) Lagoons, O'Brien & Gere recommends that additional maintenance of the embankments be performed to correct the vegetation issues 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 dikes 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:

- Cutting tall grass on the inboard slopes and maintaining a mowed condition so the slopes can be inspected.
- Clearing trees and shrubs on the southern embankment outboard slope, cutting tall grass and maintaining a mowed condition.
- Clearing any trees and shrubs on the remaining constructed portions of the outboard slopes, cutting tall grass and maintaining a mowed condition. Limits of constructed outboard slopes can be identified from the lagoon construction drawings and should be noted with field markers. Slopes around the lagoon access road, outside the lagoon outboard slopes, do not need to be cleared or mowed.
- A geotechnical investigation and slope stability analysis should be performed to assess embankment stability in accordance with applicable dam safety criteria.

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 periodic inspections by independent licensed dam safety engineers on at least a biennial basis. First Energy should implement regular visual inspections for perimeter embankment seeps, cracks, holes, and freeboard with the goal of identifying, documenting, and repairing any deficiencies early so that they do not develop into more serious problems. Plant staff should maintain design and construction documents and inspection reports in a well organized manner for future reference.

6.4. TIME FRAME FOR COMPLETION OF REPAIRS/IMPROVEMENTS

Based on the findings of this assessment, O'Brien & Gere recommends that First Energy begin clearing and mowing in the next growing season and implement regular visual inspections at that time. Clearing should be completed by the end of the next growing season prior to mowing. A geotechnical investigation and slope stability analysis should be performed within the next year to ensure that the embankment meets standard dam safety stability criteria.

6.5. CERTIFICATION STATEMENT

I acknowledge that the Waste Water Treatment (WWT) Lagoons, CCW management units, referenced herein were personally inspected by me on September 25, 2012 and were found to be in the following condition:

SATISFACTORY

FAIR

POOR

UNSATISFACTORY

Signature: _____

D. Dreher Whetstone, PE
PA PE License PE060840

Date: _____

- The southern embankment outboard slope was heavily vegetated with tall grasses, wildflowers, brush, saplings, and small trees. Remaining outboard slopes were vegetated with tall grasses, wildflowers, and a few small trees.
- The eastern embankment, natural slope down to the Monongahela River, and streamside of the access road to the lagoons are a protected mitigation area that was intentionally planted as mitigation for another on-site project.
- No seepage was evident.
- A Monitoring Building is positioned northwest of the Riverside Lagoon, below the toe of the outboard slope.
- The WWT Lagoons' outfall to the Monongahela River was observed and operating.