



Documentation of Initial  
Hazard Potential  
Classification  
Assessment

Ash Pond  
Edwards Power Station  
Peoria County, Illinois

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## Executive Summary

This report documents the hazard potential classification assessment for the Ash Pond at the Edwards Power Station as required per the CCR Rule in 40 C.F.R. § 257.73(a)(2). The applicable hazard potential classifications are defined in 40 C.F.R. § 257.53 as follows:

- (1) High hazard potential CCR surface impoundment means a diked surface impoundment where failure or mis-operation will probably cause loss of human life.
- (2) Significant hazard potential CCR surface impoundment means a diked surface impoundment where failure or mis-operation results in no probable loss of human life, but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns.
- (3) Low hazard potential CCR surface impoundment means a diked surface impoundment where failure or mis-operation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the surface impoundment owner's property.

Based on these definitions and the analysis herein, the Ash Pond is classified as a High hazard potential CCR surface impoundment.

This report contains supporting documentation for the hazard potential classification assessment. The hazard potential classification for this CCR unit was determined by a volume transfer analysis conducted by Stantec in July, 2016.

# 1. Introduction

## 1.1. Background

The CCR Rule was published in the Federal Register on April 17, 2015. The Rule requires that a hazard potential classification assessment be performed for existing CCR surface impoundments that are not incised. A previously completed assessment may be used in lieu of the initial assessment provided the previous hazard assessment was completed no earlier than April 17, 2013. The applicable hazard potential classifications are defined in the CCR Rule, 40 C.F.R. § 257.53 as follows:

*High Hazard Potential CCR surface impoundment means a diked surface impoundment where failure or mis-operation will probably cause loss of human life.*

*Significant Hazard Potential CCR surface impoundment means a diked surface impoundment where failure or mis-operation results in no probable loss of human life, but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns.*

*Low Hazard Potential CCR surface impoundment means a diked surface impoundment where failure or mis-operation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the surface impoundment owner's property.*

Dynergy has contracted Stantec Consulting Services Inc. (Stantec) to prepare hazard potential classification assessments for selected impoundments<sup>1</sup>.

It was determined that there was no existing available hazard potential classification assessment documentation for the Ash Pond.

## 1.2. Location

The Edwards Power Station is located in Peoria County, Illinois approximately one half mile east of the intersection of U.S. Highway 24 and Illinois Route 9. The plant is located on the west bank of the Illinois River, just over one mile northwest of downtown Pekin, Illinois. The Ash Pond is located west of the power plant and Switch Yard and east of the Toledo Peoria & Western Railroad. A site overview figure is included in Appendix B.

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<sup>1</sup> Dynergy Administrative Services Company (Dynergy) contracted Stantec on behalf of the Edwards Power Station owner, Illinois Power Resources Generating, LLC. Thus, Dynergy is referenced in this report.

## **2. Source Data**

The following information was used to perform the hazard assessment of the Ash Pond:

- Site Aerial Imagery (dated August 21, 2015) (Reference 16)
- Illinois Aerial Imagery (dated 2015) (Reference 12)
- Digital Terrain Model (DTM) (dated 2012) (Reference 17)
- Construction Plans for E.D. Edwards Station (various dates) (References 5-7)
- Coal Ash Impoundment Site Assessment Final Report prepared by Kleinfelder (dated May 10, 2011) (Reference 9)
- Letter from US Environmental Protection Agency regarding Coal Ash Impoundment Site Assessment Final Report prepared by Kleinfelder (dated June 27, 2011) (Reference 10)

## **3. Potential Failure Scenarios**

### **3.1. Facility Description**

The Ash Pond, shown on Figure 1 in Appendix A, contains a north and south wet bottom ash storage area measuring approximately 5 acres and 23 acres, respectively, and a settling channel. The total surface area is approximately 87 acres. The Ash Pond is a perched pond with watershed area beyond the extent of the pond limited to small areas of the switchyard and Edwards Power Station. An insignificant amount of runoff from the surrounding areas will occur during storm events. According to the drainage construction plans for the Ash Pond primary spillway (References 5-7), flow from the Ash Pond discharges east to the Illinois River through a 36 inch diameter Corrugated Metal Pipe (CMP) located parallel to the property boundary, south of the Coal Yard. The primary spillway is equipped with a flapgate and has a sluice gate located at the embankment along the Illinois River. The Ash Pond does not have a dedicated emergency spillway and the earthen impoundment also services a railroad line.

According to the DTM (Reference 17), the height of the earthen impoundment from the crest to the toe ranges from approximately elevation 461 feet to 432 feet (29 feet) and has approximately 4H:1V side slopes.

The normal pool elevation from the DTM was estimated to be approximately 449 and 446.5 feet, respectively, for the north and south wet bottom ash storage areas within the impoundment.

## **3.2. Failure Scenarios**

The northeast side of the Ash Pond is located adjacent to the high ground of the power plant, switchyard, and railroad north of the Coal Yard; therefore, a breach of the impoundment to the northeast was not considered. To the south of the Ash Pond is a vegetated area that is high ground extending approximately 150 feet to the south of the Ash Pond. The area of the impoundment adjacent to that area is also unlikely to breach and was not further evaluated.

The impoundment could potentially fail westward towards the swale along the Toledo Peoria & Western Railroad or to the east near the Coal Yard and the open space west of the Mosaic Crop Nutrition property. These failure scenarios were evaluated as summarized below.

### **3.2.1. West**

A failure of the Ash Pond impoundment to the west would impact the railroad track at the breach location and discharge flow into the existing swale adjacent to the east side of the Toledo Peoria & Western Railroad. The swale, which has a bottom width of approximately 25 feet per the DTM (Reference 17), conveys flow to the south along the east side of the railroad until it reaches a crossing under the railroad when the tracks turn to the east. The tracks continue east and then turn to the north about 90 degrees to intersect with the Mosaic Crop Nutrition warehouse. Flow that was not conveyed through the railroad crossing could pond on the north side of the railroad tracks and in the open space area west of Mosaic Crop Nutrition or in primarily agricultural areas located north of Illinois Route 9.

### **3.2.2. East**

Failure of the Ash Pond impoundment to the east would impact the railroad tracks at the breach location and could discharge flow into a swale around the south end of the Coal Yard. Flow could also discharge into the existing swale adjacent to the east side of the Toledo Peoria & Western Railroad and to the open space west of Mosaic Crop Nutrition or to primarily agricultural areas located north of Illinois Route 9.

## **3.3. Impoundment Failure and Inundation Analysis**

Based on a review of available data for the impoundment geometry and surrounding area, a breach of the impoundment would flow into a contained area; therefore, a volume transfer analysis was performed.

The volume transfer method includes calculating the volume of water within the impoundment and transferring the volume to a contained area to estimate the potential inundation extents.

The contained area is roughly bounded by Illinois Route 9, U.S. Highway 24, and the Pekin – LaMarsh Drainage and Levee District Local Flood Protection Project (levee) adjacent to the west bank of the Illinois River and east of Cargill Road.

Should the impoundment breach to the east or west, flow would be conveyed to the area south of the vegetated area south of the Ash Pond prior to being conveyed, via a culvert under the Toledo Peoria & Western Railroad or by overtopping the railroad, to the southeast. Flow would then be conveyed southeast overland or in an existing drainage swale along a railroad embankment to a point near the railroad and Illinois Route 9 where the swale makes two 90 degree bends and flow is conveyed northwest between the existing railroad embankments to the larger west contained area. The larger west contained area downstream of the Edwards Plant is approximately bounded by U.S. Highway 24, Illinois Route 9, and the railroad embankment.

The volume transfer analyses detailed below were applied to evaluate the potential inundation areas to the south of the Edwards Power Station and to identify potential hazards of both east and west breach failure scenarios.

### **3.3.1. Probable Maximum Flood (PMF) Volume Transfer Analysis**

This breach scenario assumes that the larger south wet bottom ash storage area within the Ash Pond is at a normal pool elevation and the Probable Maximum Flood (PMF) volume would breach the impoundment to the east or west. A volume transfer analysis was completed to estimate the associated inundation area.

Based on Figure 20 of the Hydrometeorological Report No. 51 (Reference 14), the values for the 24-hour Probable Maximum Precipitation (PMP) storm event is approximately 33 inches (2.75 feet). This precipitation depth was multiplied by the total area of the Ash Pond to estimate the total runoff volume which yielded approximately 245 acre-feet of total runoff volume for the 24-hour PMF.

The volume of water in the south wet bottom ash storage areas was estimated based on the open water area times the difference in elevation between the normal pool elevation and the toe of the impoundment at elevation 432 feet. This yielded a volume of approximately 330 acre-feet. The PMF volume, plus the volume of water below the normal pool elevation in the south wet bottom ash storage area, would equal approximately 575 acre-feet. This volume was transferred to the open space area located to the south and west of the impoundment to estimate the potential inundation area within the contained area. This resulted in inundation of area to an approximate elevation of 437.9 feet in the downstream contained areas.

### **3.3.2. Crest Volume Transfer Analysis**

For this analysis, the storage volume from the normal pool to the impoundment crest was conservatively estimated utilizing the DTM and added to the estimated storage below the normal pool for both the south and north wet bottom ash storage areas, yielding a total storage volume of approximately 1,020 acre-feet. This volume was transferred to the contained areas downstream of the impoundment to estimate the inundation area. The resulting approximate inundation elevation was 439.1 feet in the downstream contained areas.

### 3.4. Volume Transfer Analysis Results

Inundation limits for each of the volume transfer analyses were mapped to determine the potential impacts on property and structures and the potential risk to human life. The results of the volume transfer analyses yield a level pool elevation to estimate downstream risk; however, inundation extents and depths near the impoundment may be underestimated by the volume transfer analysis as it does not account for the initial breach wave. For areas further downstream, where the initial breach wave impacts are anticipated to be negligible, the conservatively estimated storage volumes used for the Ash Pond may cause the resultant inundation extents and depths produced by the volume transfer analysis to be conservative.

The resultant maximum inundation depths and potential impacts from both volume transfer scenarios are summarized below.

#### 1. PMF Volume Transfer Analysis

- a. Maximum approximate flood depth in existing swale east of the Toledo Peoria & Western Railroad is approximately 9 feet
- b. Approximate flood depth range in Mosaic Crop Nutrition open space area is approximately 0 to 3 feet
- c. Inundation area is approximately 300 acres
- d. Inundation elevation is approximately 437.9 feet
- e. Potential impact to Edwards Power Station property
- f. Potential impact to Mosaic Crop Nutrition property
- g. Potential impact to Espy Motocross and ATV Park property and structure
- h. Potential impact to trailer west of the railroad track by riding trails
- i. Potential impact to trailer west of Cargill Road, north of Illinois Route 9

#### 2. Crest Volume Transfer Analysis

- a. Maximum approximate flood depth in existing swale east of the Toledo Peoria & Western Railroad is approximately 11 feet
- b. Approximate flood depth range in Mosaic Crop Nutrition and Espy Motocross & ATV Park open space area is approximately 0 to 4 feet
- c. Inundation area is approximately 353 acres
- d. Inundation elevation is approximately 439.1 feet

- e. Potential impact to Edwards Power Station property
- f. Potential impact to Mosaic Crop Nutrition property
- g. Potential impact to Espy Motocross and ATV Park property and structure
- h. Potential impact to trailer west of the railroad track by riding trails
- i. Potential impact to trailer west of Cargill Road, north of Illinois Route 9

#### **4. Hazard Classification**

Areas of potential impact were identified with results discussed in Section 3.4 of this report. The Edwards Power Station property could be impacted in the channel around the Coal Yard. Flooding would primarily occur in the channel area away from the Coal Yard.

The Mosaic Crop Nutrition property contains a warehouse that is estimated to be elevated above elevation 441 feet, a railyard above elevation 439 feet, and an access road above elevation 439 feet.

The Espy Motocross and ATV Park contains trails and tracks and is intermittently used and the at-risk populations are considered transient.

A trailer, located west of the railroad track by the riding trails, could be inundated to a depth of approximately 3.5 feet. Another trailer located on the west side of Cargill Road, north of the intersection with Illinois Route 9, could be inundated to a depth of approximately 3.5 feet. It is assumed that probable loss of life could occur in these areas during a breach scenario.

In accordance with Federal guidelines, probable loss of life does not exist for scenarios where persons are only temporarily in the potential inundation area (Reference 4); however, due to the inclusion of probable loss of life associated with the trailers, the impoundment fits the definition for a High hazard potential CCR surface impoundment (as defined in the CCR Rule §257.53) (Reference 1).

#### **5. References**

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16. Weaver Consultants Group. (2015). *Edwards 2015 Aerial Photograph Existing Site Conditions*.
17. Aerometric, Inc., Illinois State Geological Survey, Illinois Department of Transportation Digital Terrain Model Peoria County. (2012).

Appendix A

Site Overview Figures



- Notes
1. Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
  2. Aerial Source: 2015 NAIP Imagery
  3. Impoundment Boundaries Provided by Client (Dated 9/9/2015)



Project Location 175605019  
 Latitude: 40.595484 Prepared by WSW on 2016-10-06  
 Longitude: -89.663301 Technical Review by MH on 2016-10-06  
 Peoria County, Illinois Independent Review by TR on 2016-10-06

Client/Project  
 Dynegy  
 Edwards Power Station  
 Hazard Potential Classification Assessment

Figure No.  
 1

Title  
 Site Overview Figure 1  
 Ash Pond  
 Edwards Power Station



Figure No. 2  
 Title Downstream Containment Areas  
 Ash Pond  
 Edwards Power Station  
 Client/Project Dynegy  
 Edwards Power Station  
 Hazard Potential Classification Assessment  
 Project Location Peoria County, Illinois  
 Prepared by SAN on 2016-10-06  
 Technical Review by RD on 2016-10-06  
 Independent Review by MH on 2016-10-06



Notes  
 1. Coordinate System: NAD 1983 StatePlane Tennessee FIPS 4100 Feet  
 2. Aerial Imagery provided by client (Dated 2015)



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