



# Hazard Potential Classification Assessment Jeffrey Energy Center Inactive Bottom Ash Pond

Prepared for:  
Westar Energy  
Jeffrey Energy Center  
St. Marys, Kansas

Prepared by:  
APTIM Environmental & Infrastructure, Inc.

April 2018



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## Plan Review/Amendment Log §257.73(a)(2)

Date of Review	Reviewer Name	Sections Amended and Reason	Version



## CCR Regulatory Requirements

<p style="text-align: center;"><b>USEPA CCR Rule Criteria 40 CFR §257.73</b></p>	<p style="text-align: center;"><b>Jeffrey Energy Center (JEC) Hazard Potential Classification Assessment – Inactive Bottom Ash Pond</b></p>
<p>§257.73(a)(2)(i) stipulates:</p> <p><i>(2) Periodic hazard potential classification assessments.</i></p> <p><i>(i) The owner or operator of the CCR unit must conduct initial and periodic hazard potential classification assessments of the CCR unit according to the timeframes specified in paragraph (f) of this section. The owner or operator must document the hazard potential classification of each CCR unit as either a high hazard potential CCR surface impoundment, a significant hazard potential CCR surface impoundment, or a low hazard potential CCR surface impoundment. The owner or operator must also document the basis for each hazard potential classification.</i></p>	<p style="text-align: center;">Section 3.3</p>
<p>§257.73(a)(2)(ii) stipulates:</p> <p><i>(ii) The owner or operator of the CCR unit must obtain a certification from a qualified professional engineer stating that the initial hazard potential classification and each subsequent periodic classification specified in paragraph (a)(2)(i) of this section was conducted in accordance with the requirements of this section.</i></p>	<p style="text-align: center;">Section 5.0</p>

<p align="center"><b>USEPA CCR Rule Criteria 40 CFR §257.73</b></p>	<p align="center"><b>Jeffrey Energy Center (JEC) Hazard Potential Classification Assessment – Inactive Bottom Ash Pond</b></p>
<p>§257.73(f)(1) stipulates:</p> <p><i>(f) Timeframes for periodic assessments –</i></p> <p><i>(1) Initial Assessments. Except as provided by paragraph (f)(2) of this section, the owner or operator of the CCR unit must complete the initial assessments required by paragraphs (a)(2), (d), and (e) of this section no later than October 17, 2016*. The owner or operator has completed an initial assessment when the owner or operator has placed the assessment required by paragraphs (a)(2), (d), and (e) of this section in the facility's operating record as required by §257.105(f)(5), (10), (12).</i></p> <p><i>*However due to the Bottom Ash Pond meets the requirements of 257.100(e)(1) and therefore the timeframe in §257.100(e)(3)(v) is applied, which states:</i></p> <p><i>(v) No later than April 17, 2018, complete the initial hazard potential classification, structural stability, and safety factor assessments as set forth by §257.73(a)(2), (b), (d), (e), and (f).</i></p>	<p align="center">Section 3.1</p>



<p align="center"><b>USEPA CCR Rule Criteria 40 CFR §257.73</b></p>	<p align="center"><b>Jeffrey Energy Center (JEC) Hazard Potential Classification Assessment – Inactive Bottom Ash Pond</b></p>
<p>§257.73(f)(2) stipulates:</p> <p><i>(2) Use of a previously completed assessment(s) in lieu of the initial assessment(s). The owner or operator of the CCR unit may elect to use a previously completed assessment to serve as the initial assessment required by paragraphs (a)(2), (d), and (e) of this section provided that the previously completed assessments(s):</i></p> <p><i>(i) Was completed no earlier than 42 months prior to October 17, 2016; and</i></p> <p><i>(ii) Meets the applicable requirements of paragraphs (a)(2), (d) and (e) of this section.</i></p>	<p align="center">Not Applicable</p>



<p align="center"><b>USEPA CCR Rule Criteria 40 CFR §257.73</b></p>	<p align="center"><b>Jeffrey Energy Center (JEC) Hazard Potential Classification Assessment – Inactive Bottom Ash Pond</b></p>
<p>§257.73(f)(3) stipulates:</p> <p><i>(3) Frequency for conducting periodic assessments. The owner or operator of the CCR unit must conduct and complete the assessments required by paragraphs (a)(2), (d), (e) of this section every five years. The date of completing the initial assessment is the basis for establishing the deadline to complete the first subsequent assessment. If the owner or operator elects to use a previously completed assessment(s) in lieu of the initial assessment as provided by paragraph (f)(2) of this section, the date of the report for the previously completed assessment is the basis for establishing the deadline to complete the first subsequent assessment. The owner or operator may complete any required assessment prior to the deadline provided the owner or operator places the completed assessment(s) into the facility's operating record within a reasonable amount of time. In all cases, the deadline for completing subsequent assessments is based on the date of completing the previous assessment. For purposes of this paragraph (f)(3), the owner or operator has completed an assessment when the relevant assessment(s) required by paragraphs (a)(2), (d), and (e) of this section has been placed in the facility's operating record as required by §257.105(f)(5), (10), and (12).</i></p>	<p align="center">Section 4.3</p>
<p>§257.73(g) stipulates:</p> <p><i>(g) The owner or operator of the CCR unit must comply with the recordkeeping requirements specified in §257.105(f), the notification requirements specified in §257.106(f), and the internet requirements specified in §257.107(f).</i></p>	<p align="center">Section 4.1 and 4.2</p>



## 1.0 INTRODUCTION

APTIM Environmental and Infrastructure, Inc. (APTIM, f/k/a CB&I Environmental & Infrastructure, Inc., CB&I) has prepared the following Hazard Potential Classification Assessment (Assessment) at the request of Westar Energy (Westar) for the inactive Bottom Ash Pond (Pond) located at Jeffrey Energy Center (JEC) in St. Marys, Kansas. JEC is a coal-fired power plant that has been in operation since 1980.

On July 26, 2016 the United States Environmental Protection Agency (USEPA) extended the requirements of the Disposal of Coal Combustion Residuals from Electric Utilities Final Rule (CCR Rule) 40 CFR §257 and §261, for certain inactive CCR surface impoundments. The Pond has been determined to be inactive by 40 CFR §257.53 and therefore has been deemed to be a regulated, inactive CCR unit by the USEPA through the CCR Rule. Westar is currently in the process of closing the Pond in-place in accordance with §257.100(d) of the CCR Rule and intends to complete closure of the Pond in 2018.

In support of compliance with the CCR Rule, APTIM has reviewed the most recent annual inspection, relevant portions of the facility's operating record, permit application, and construction reports in updates in relation to this Assessment. This Assessment evaluates the hazard potential classification of the Pond and meets the requirements set forth within 40 CFR §257.73(a)(2).

## 2.0 POND OVERVIEW

Westar owns and operates all waste management units at JEC in St. Marys, Pottawatomie County, Kansas. JEC is located approximately 4.5 miles north of Belvue, Kansas and approximately 4.3 miles west of Highway 63 and resides in Sections 1, 2, 11, and 12, Township 9 South, Range 11 East and Sections 6 and 7, Township 9 South, Range 12 East. At JEC the Pond is located southeast of Fly Ash Area 1, north of the FGD Landfill, west of Bottom Ash Area 1, and east of the Tower Hill Lake. The location of the Pond is depicted in **Figure 1**.

### 2.1 Design and Construction History

#### 2.1.1 Original Design

A Type C fly ash berm and overflow was constructed in the early 1980's by plant staff to separate the Pond and Tower Hill Lake. The fly ash was deposited in lifts of approximately 9 to 15-inches, processed to a desired moisture content, and compacted. The Pond foundation and abutment materials primarily consists of the native underlying geologic materials. The Pond was not constructed with an engineered liner system. There are no drawings or documents available for review for the original design/construction of the berm.

#### 2.1.2 Design Modifications

In 2000 the berm was expanded by raising the embankment to its current elevation to provide additional CCR material storage volume and to add an emergency spillway and instrumentation devices. These modifications were designed by Black & Veatch and were approved and stamped by the Kansas Department of Agriculture, Department of Water Resources (KSDWR) Chief Engineer on June 29, 2000. With the modifications, the berm became a permitted dam (Pond Dam) under Permit DPT-0160.

#### 2.1.3 Pond Closure

The Pond has not received CCR material prior to October 2015 and is in the process of being dewatered for closure. Historically the Pond received CCR material from the plant, stormwater, decant water from Bottom Ash Area 1, and site runoff. The final cover design and construction of the Pond will meet 40 CFR §257.100(b)(3)(i) and (ii).

### 2.2 Current Dimensions and Capacities

The following dimensions of the Pond, Pond Dam, and spillway structures were determined based on the most recent survey of the Pond, estimates from the Coal Ash Impoundment – Specific Site Assessment Report conducted in September 2009 by GEI Consultants, Inc. (GEI), and the Jeffrey Energy Center - CCR Impoundment Closure Design 100% Design submitted in February 2017:

- Pond
  - Surface area of 72.1 acres
  - Normal operating pool water level of 1,164 feet mean seal level (ft MSL)
  - Maximum water level elevation of 1,165 ft MSL, based on the spillway crest design elevation

- Minimum elevation in Pond is 1,160 ft MSL based on 2016 survey
- Maximum water depth of approximately 5 feet (at the deepest portion of the Pond at maximum water elevations)
- Pond Dam
  - 1,050-feet long
  - 30-foot wide crest
  - 3H:1V sideslopes
  - Crest elevation of 1,170 ft MSL
- Spillway Structures
  - South Outlet Structure
    - Open-channel spillway
    - 450-feet long
    - 40-foot wide
    - 3H:1V sideslopes
    - Rock control crest at 1,165 ft MSL
    - Upstream side lined with 1.5-foot thick layer of limestone riprap
  - North Outlet Structure
    - Concrete-lined box culvert
    - 271-feet long
    - 12-foot wide
    - 6-feet tall
    - Downstream side lined with riprap

The Pond is currently undergoing closure and has been dewatered. Historically, the typical impounded water volume within the Pond was determined to be approximately 62,680 cubic yards (cy), as described in the 2017 Annual Inspection Report. The CCR depths within the Pond have varied through time due to the continual deposit and discharge of water and CCR materials, and whether the fines have settled out in the alluvial fan/ravine (elevation higher than 1,164 ft MSL). The remaining CCR material storage capacity within the Pond was calculated in the 2017 Annual Inspection Report and was determined to be approximately 138,232 cy. The total CCR volume is unknown due to a range of ash material sources historically being routed to the Pond. Site topography prior to closure is depicted in **Figure 2**.

### 2.3 Instrumentation

As part of the 1999 Pond Dam Study, five borings (WR-1 through WR-5) were drilled along the crest of the Pond Dam and three piezometers (at WR-2, -3, -4) were installed.

Currently the Pond Dam has a standpipe piezometer (WR-3) which is located on the eastern edge of the spillway. This is used to monitor the water level within the Pond Dam and is sampled every 30 days per the CCR Rule. Potentiometric elevations within this piezometer generally shows the upper water surface to be located near the water elevation of the pond.

### 3.0 HAZARD POTENTIAL CLASSIFICATION ASSESSMENT

The available information for the Pond was provided to and reviewed by APTIM for this Assessment:

- Annual Inspection Report Jeffrey Energy Center Inactive Bottom Ash Pond, CB&I Environmental & Infrastructure, Inc., June 2017.
- Coal Ash Impoundment – Specific Site Assessment Report, GEI Consultants, Inc., September 2009.
- Fines Containment Dam-Stability Report, Black & Veatch, April 14, 1999.
- JEC Survey, Professional Engineering Consultants (PEC), April 2016.
- NPDES Permit No. I-KS67-PO06.
- Volume I and II of the Industrial Landfill Permit No. 0359, August 2009.

Based on the available information and the site visit conducted May 16, 2017 by Richard Southorn, a professional engineer with APTIM, the following Assessment has been conducted to determine the hazard potential classification of the Pond in accordance with 40 CFR §257.73(a)(2).

#### 3.1 Hazard Potential Classification Standards (§257.73(f)(1))

Per §257.53, a hazard potential classification is defined based on possible adverse incremental consequences that result from the release of water or stored contents due to failure of the diked CCR surface impoundment or mis-operation of the diked CCR surface impoundment or its appurtenances. It is required by §257.73(a)(2) that the owner or operator of a CCR surface impoundment determine which of the following three hazard potential classifications characterizes their CCR unit:

- High Hazard Potential – A diked surface impoundment where failure or mis-operation will probably cause loss of human life;
- Significant Hazard Potential – 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; or
- Low Hazard Potential – A dikes surface impoundment where failure mis-operation results in no probable loss of life, and low economic and/or environmental losses. Losses are principally limited to the surface impoundment owner’s property.

#### 3.2 Previous Hazard Potential Classification

The hazard classification of the Pond Dam has not been previously determined under the CCR Rule hazard potential classification standards. However, the Pond Dam was designated as a Class “A” Low Hazard Structure by the Kansas Department of Agriculture, Division of Water Resources (KSDWR) after an inspection conducted on November 8, 2002. Based on analyses in a 2009 report, GEI recommended that the Pond Dam be upgraded to a significant hazard structure. However in a letter to the USEPA from KDHE, KDHE



recommended that the Pond Dam not be upgraded to a significant hazard structure due to the Pond containing de minimis quantities of CCR material. The letter states that if the Pond Dam failed contamination of soil and surface water from CCR material would not occur.

### **3.3 CCR Rule Initial Hazard Potential Classification (§257.73(a)(2)(i))**

Based on the hazard potential classification standards within §257.73(a)(2), it has been determined that the Pond meets the standards of a Low Hazard Potential Classification. The low hazard potential classification is deemed to be appropriate for the Pond due to there being little to no potential of failure as it is inactive, undergoing closure, and dewatered.

## **4.0 RECORDS RETENTION AND MAINTENANCE**

### **4.1 Incorporation of Assessment into Operating Record (§257.73(f)(1) & (g))**

§257.105(f)(1) and (g) of 40 CFR Part 257 provides record keeping requirements to ensure that the Assessment must be placed in the Facility's Operating Record. Specifically, §257.105(f) stipulates:

*§257.105(f) stipulates: "(f) Design Criteria. The owner or operator of a CCR unit subject to this subpart must place the following information, as it becomes available, in the facility's operating record: (5) The initial and periodic hazard potential classification assessments as required by §§257.73(a)(2) and 257.74(a)(2)."*

This Report will be placed within the Facility Operating Record upon Westar's review and approval.

### **4.2 Notification Requirements (§257.73(g))**

§257.106(f) of 40 CFR Part 257 provides guidelines for the notification of the availability of the Assessment. Specifically, §257.106(f) stipulates:

*§257.106(f) stipulates: "(f) Design criteria. The owner or operator of a CCR unit subject to this subpart must notify the State Director and/or appropriate Tribal authority when information has been placed in the operating record and on the owner or operator's publicly accessible internet site. The owner or operator must: (4) Provide notification of the availability of the initial and periodic hazard potential classification assessments specified under §257.05(f)(5)"*

The State Director and appropriate Tribal Authority will be notified upon placement of this Assessment in the Facility Operating Record.

§257.107(f) of 40 CFR Part 257 provides publicly accessible Internet site requirements to ensure that the Assessment is accessible through the Westar webpage. Specifically, §257.107(f) stipulates:

*§257.107(f) stipulates: "(f) Design criteria. The owner or operator of a CCR unit subject to this subpart must place the following information on the owner or operator's CCR Web site: (4) The initial and periodic hazard potential classification assessments specified under §257.105(f)(5)."*

This Assessment will be uploaded to Westar's CCR compliance reporting website upon Westar's review and approval.

### **4.3 Periodic Assessment Frequency (§257.73(f)(3))**

A periodic assessment will be conducted every five years in accordance with 40 CFR 257.73(f)(3). The deadline for completing the assessment is based on the date of the previously completed assessment. Each periodic assessment will be placed in the Facility's Operating Record as required by §257.105(f)(5).

**5.0 PROFESSIONAL ENGINEER CERTIFICATION (§257.73(a)(2)(ii))**

The undersigned registered professional engineer is familiar with the requirements of the CCR Rule and has visited and examined JEC or has supervised examination of JEC by appropriately qualified personnel. The undersigned registered professional engineer attests that this Assessment has been prepared in accordance with good engineering practice, including consideration of applicable industry standards and meets the requirements of §257.73. This certification was prepared as required by §257.73(a)(2).

Name of Professional Engineer: Richard Southorn

Company: APTIM

Signature: 

Date: 04/13/18

PE Registration State: Kansas

PE Registration Number: PE25201

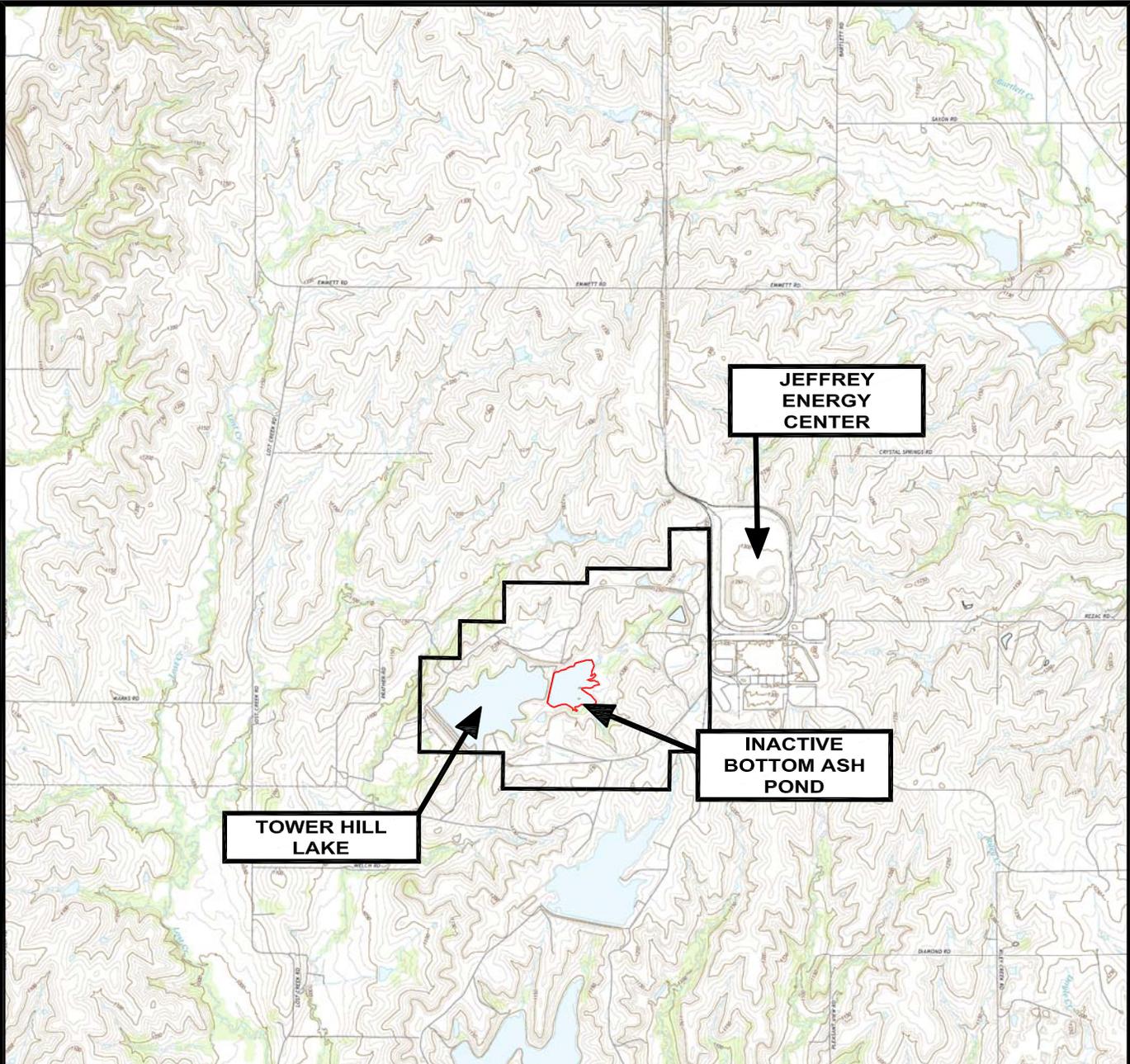
Professional Engineer Seal:



# FIGURES

Figure 1 - Inactive Bottom Ash Pond, Site Location Plan

Figure 2 - Inactive Bottom Ash Pond, Site Topography Prior to Closure

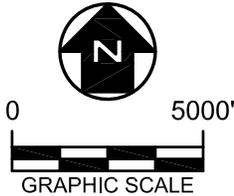


**LEGEND**

- CCR UNIT BOUNDARY
- KDHE-BWM INDUSTRIAL LANDFILL PERMIT NO. 0359 BOUNDARY

**NOTES**

1. AERIAL TOPO OBTAINED FROM USGS 7.5-MINUTE SERIES, EMMETT AND LACLEDE QUADRANGLE, KANSAS, 2014.
2. ALL BOUNDARIES ARE APPROXIMATE.



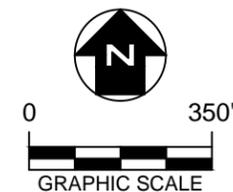
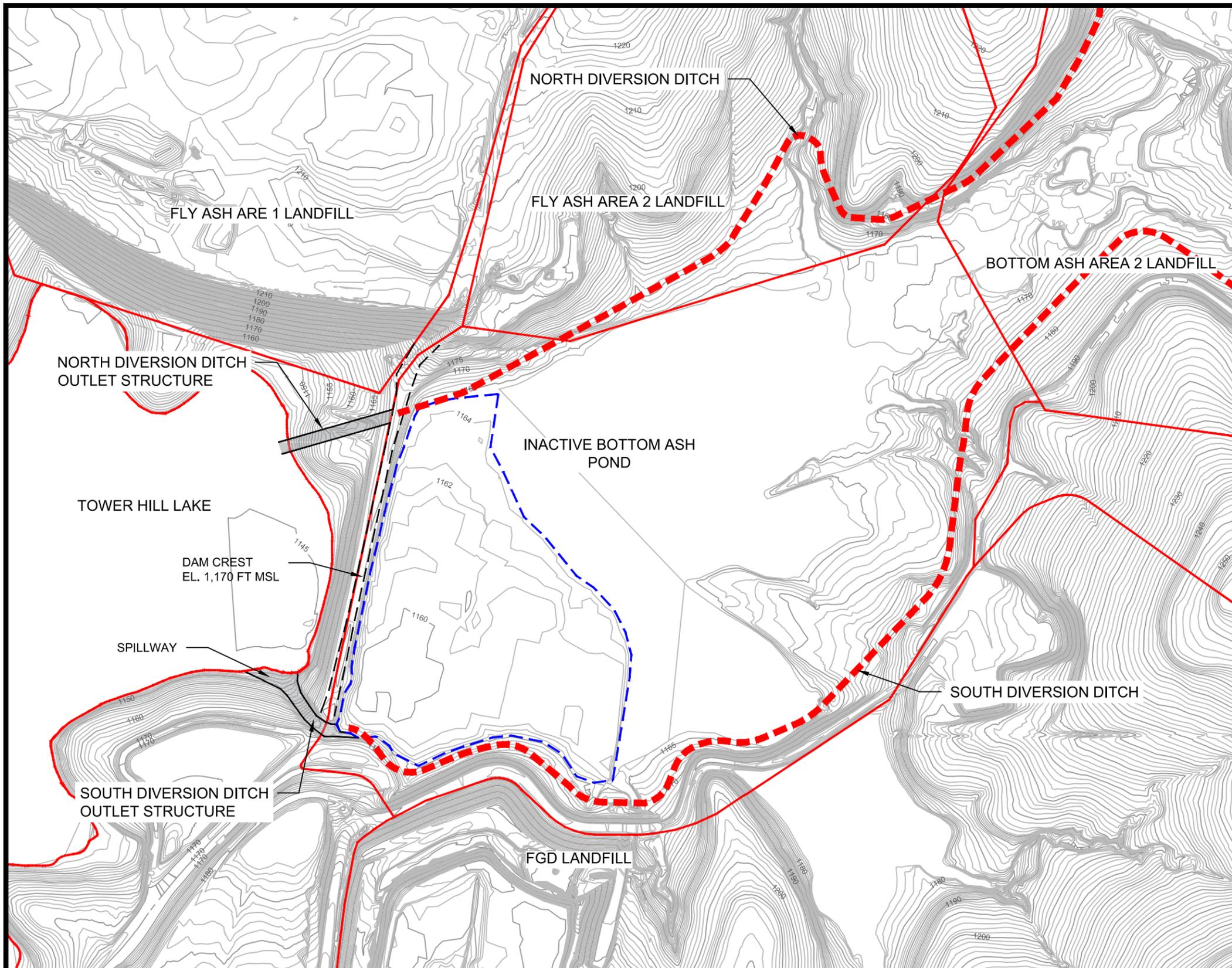
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**FIGURE 1  
FGD LANDFILL  
SITE LOCATION PLAN**

APPROVED BY: RDS | PROJ. NO.: 631232565 | DATE: APRIL 2018



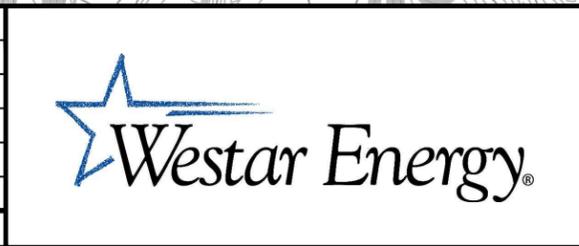
**LEGEND**

- APPROXIMATE CCR UNIT BOUNDARY
- - - APPROXIMATE WATER ELEVATION
- - - - - APPROXIMATE POND DAM BOUNDARY
- APPROXIMATE SPILLWAY BOUNDARY
- - - - - APPROXIMATE DIVERSION DITCH DELINEATION

**NOTES**

1. EXISTING CONTOURS DEVELOPED BY PROFESSIONAL ENGINEERING CONSULTANTS IN APRIL 2016.
2. FOR CLARITY, NOT ALL SITE FEATURES MAY BE SHOWN.
3. ALL BOUNDARY AND FEATURE LOCATIONS ARE APPROXIMATE.

REV. NO.	DATE	DESCRIPTION



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**FIGURE 2**  
**INACTIVE BOTTOM ASH POND**  
**SITE TOPOGRAPHY PRIOR TO CLOSURE**

DRAWN BY:	ORC	APPROVED BY:	MMS	PROJ. NO.:	631232565	DATE:	APRIL 2018
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