



Post-Closure Plan 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



TABLE OF CONTENTS

1.0 INTRODUCTION.....	1
2.0 REGULATORY OVERVIEW OF CCR POST-CLOSURE PLAN REQUIREMENTS.....	2
3.0 JEC INACTIVE BOTTOM ASH POND OVERVIEW.....	3
3.1 DESIGN AND CONSTRUCTION HISTORY.....	3
3.1.1 Original Design.....	3
3.1.2 Design Modifications.....	3
3.1.3 Pond Closure.....	3
3.2 CURRENT DIMENSIONS AND CAPACITIES.....	3
4.0 POST-CLOSURE OVERVIEW AND PLANNED USE (§257.104(D)(1)(III)).....	5
5.0 INSPECTION ACTIVITIES.....	5
6.0 GROUNDWATER MONITORING ACTIVITIES.....	5
7.0 MAINTENANCE ACTIVITIES (§257.104(D)(1)(I) AND §257.104(B)).....	6
7.1 FINAL COVER SYSTEM MAINTENANCE AND REPAIR PLAN (§257.104(B)(1)).....	6
8.0 NOTICE OF COMPLETION OF POST-CLOSURE CARE (§257.104(E)).....	6
9.0 RECORDKEEPING, NOTIFICATION AND INTERNET REQUIREMENTS	
(§257.104(F)).....	7
10.0 KEY CONTACT INFORMATION (§257.104(D)(1)(II)).....	8
11.0 PROCEDURES FOR PLAN ASSESSMENTS AND AMENDMENTS (§257.104(D)(3))	
.....	9
12.0 PROFESSIONAL ENGINEER CERTIFICATION (§257.104(D)(4)).....	10

LIST OF FIGURES AND APPENDICES

FIGURES

Figure 1 – Inactive Bottom Ash Pond, Site Location

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

Plan Review/Amendment Log §257.104(d)(3)

Date of Review	Reviewer Name	Amendment Required (YES/NO)	Sections Amended and Reason

CCR Regulatory Requirements

USEPA CCR Criteria 40 CFR §257.104	Jeffrey Energy Center (JEC) Inactive Bottom Ash Pond Post-Closure Plan
<p>§257.104(a)(1) stipulates:</p> <p><i>(a) Applicability. (1) Except as provided by either paragraph (a)(2) or (3) of this section, §257.104 applies to the owners or operators of CCR landfills, CCR surface impoundments, and all lateral expansions of CCR units that are subject to the closure criteria under §257.102.</i></p>	Section 1.0
<p>§257.104(b)(1) stipulates:</p> <p><i>(b) Post-closure care maintenance requirements. Following closure of the CCR unit, the owner or operator must conduct post-closure care for the CCR unit, which must consist of at least the following:(1) Maintaining the integrity and effectiveness of the final cover system, including making repairs to the final cover as necessary to correct the effects of settlement, subsidence, erosion, or other events, and preventing run-on and run-off from eroding or otherwise damaging the final cover;</i></p>	Section 7.1
<p>§257.104(b)(2) stipulates:</p> <p><i>(2) If the CCR unit is subject to the design criteria under §257.70, maintaining the integrity and effectiveness of the leachate collection and removal system and operating the leachate collection and removal system in accordance with the requirements of §257.70; and</i></p>	Section 7.2

USEPA CCR Criteria 40 CFR §257.104	Jeffrey Energy Center (JEC) Inactive Bottom Ash Pond Post-Closure Plan
<p>§257.104(b)(3) stipulates:</p> <p><i>(3) Maintaining the groundwater monitoring system and monitoring the groundwater in accordance with the requirements of §257.90 through §257.98.</i></p>	<p>Section 7.3</p>
<p>§257.104(c)(1) stipulates:</p> <p><i>(c) Post-closure care period: (1) Except as provided by paragraph (c)(2) of this section, the owner or operator of the CCR unit must conduct post-closure care for 30 years.</i></p>	<p>Section 4.0</p>
<p>§257.104(d)(1)(i) stipulates:</p> <p><i>(d) Written post-closure plan—(1) Content of the plan. The owner or operator of a CCR unit must prepare a written post-closure plan that includes, at a minimum, the information specified in paragraphs (d)(1)(i) through (iii) of this section. (i) A description of the monitoring and maintenance activities required in paragraph (b) of this section for the CCR unit, and the frequency at which these activities will be performed;</i></p>	<p>Section 7.0</p>
<p>§257.104(d)(1)(ii) stipulates:</p> <p><i>(ii) The name, address, telephone number, and email address of the person or office to contact about the facility during the post-closure care period; and.</i></p>	<p>Section 10.0</p>

USEPA CCR Criteria 40 CFR §257.104	Jeffrey Energy Center (JEC) Inactive Bottom Ash Pond Post-Closure Plan
<p>§257.104(d)(1)(iii) stipulates:</p> <p><i>(iii) A description of the planned uses of the property during the post-closure period. Post-closure use of the property shall not disturb the integrity of the final cover, liner(s), or any other component of the containment system, or the function of the monitoring systems unless necessary to comply with the requirements in this subpart. Any other disturbance is allowed if the owner or operator of the CCR unit demonstrates that disturbance of the final cover, liner, or other component of the containment system, including any removal of CCR, will not increase the potential threat to human health or the environment. The demonstration must be certified by a qualified professional engineer, and notification shall be provided to the State Director that the demonstration has been placed in the operating record and on the owners or operator's publicly accessible Internet site.</i></p>	<p>Section 4.0</p>
<p>§257.104(d)(2)(i) stipulates:</p> <p><i>(2) Deadline to prepare the initial written post-closure plan: (i) Existing CCR landfills and existing CCR surface impoundments. No later than October 17, 2016, the owner or operator of the CCR unit must prepare an initial written post-closure plan consistent with the requirements specified in paragraph (d)(1) of this section.</i></p>	<p>Report submitted prior to October 17, 2016.</p>
<p>§257.104(d)(2)(ii) stipulates:</p> <p><i>(ii) The owner or operator has completed the written post-closure plan when the plan, including the certification required by paragraph (d)(4) of this section, has been placed in the facility's operating record as required by §257.105(i)(4).</i></p>	<p>Will be completed after approval</p>



USEPA CCR Criteria 40 CFR §257.104	Jeffrey Energy Center (JEC) Inactive Bottom Ash Pond Post-Closure Plan
<p>§257.104(d)(3) stipulates:</p> <p><i>(3) Amendment of a written post-closure plan. (i) The owner or operator may amend the initial or any subsequent written post-closure plan developed pursuant to paragraph (d)(1) of this section at any time.</i></p> <p><i>(ii) The owner or operator must amend the written closure plan whenever:</i></p> <p><i>(A) There is a change in the operation of the CCR unit that would substantially affect the written post-closure plan in effect; or</i></p> <p><i>(B) After post-closure activities have commenced, unanticipated events necessitate a revision of the written post-closure plan.</i></p> <p><i>(iii) The owner or operator must amend the written post-closure plan at least 60 days prior to a planned change in the operation of the facility or CCR unit, or no later than 60 days after an unanticipated event requires the need to revise an existing written post-closure plan. If a written post-closure plan is revised after post-closure activities have commenced for a CCR unit, the owner or operator must amend the written post-closure plan no later than 30 days following the triggering event.</i></p>	<p>Section 11.0</p>
<p>§257.104(d)(4) stipulates:</p> <p><i>(4) The owner or operator of the CCR unit must obtain a written certification from a qualified professional engineer that the initial and any amendment of the written post-closure plan meets the requirements of this section.</i></p>	<p>Section 12.0</p>



USEPA CCR Criteria 40 CFR §257.104	Jeffrey Energy Center (JEC) Inactive Bottom Ash Pond Post-Closure Plan
<p>§257.104(e) stipulates:</p> <p><i>(e) Notification of completion of post-closure care period. No later than 60 days following the completion of the post-closure care period, the owner or operator of the CCR unit must prepare a notification verifying that post-closure care has been completed. The notification must include the certification by a qualified professional engineer verifying that post-closure care has been completed in accordance with the closure plan specified in paragraph (d) of this section and the requirements of this section. The owner or operator has completed the notification when it has been placed in the facility's operating record as required by §257.105(i)(13).</i></p>	<p>Section 8.0</p>
<p>§257.104(f) stipulates:</p> <p><i>(f) The owner or operator of the CCR unit must comply with the recordkeeping requirements specified in §257.105(i), the notification requirements specified in §257.106(i), and the Internet requirements specified in §257.107(i).</i></p>	<p>Section 9.0</p>

1.0 INTRODUCTION

APTIM Environmental and Infrastructure, Inc. (Aptim) has prepared the following Closure Plan (Plan) at the request of Westar Energy (Westar) for the inactive Bottom Ash Pond (Pond) located at the 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.

This Plan details the post-closure requirements outlined in §257.104, for CCR units closed in place. The criteria for conducting the post-closure care of the Landfill are detailed in Section 2.0. All post-closure care processes have been established to control, minimize, and eliminate infiltration of liquids into waste and the release of leachate.

2.0 REGULATORY OVERVIEW OF CCR POST-CLOSURE PLAN REQUIREMENTS

On April 17, 2015, USEPA published the CCR Rule under Subtitle D of the Resource Conservation and Recovery Act (RCRA) as 40 CFR Part §257 and §261. The purpose of the CCR Rule is to regulate the management of CCR in regulated CCR units for landfill and surface impoundments.

Section 257.104(d) of the CCR Rule requires owners or operators of CCR landfills and surface impoundments to prepare a written Plan describing the monitoring and maintenance activities, contact personnel during the post-closure care period, the planned use of the unit during the post-closure care period, and the schedule for implementation of the Plan. The following citations from the CCR Rule are applicable for the Pond as discussed in this Plan:

§257.104(d)(1) stipulates:

“The owner or operator of a CCR unit must prepare a written post-closure plan that includes, at a minimum, the information specified in paragraphs (d)(1)(i) through (iii) of this section

- (i) A description of the monitoring and maintenance activities required in paragraph (b) of this section for the CCR unit, and the frequency at which these activities will be performed;*
- (ii) The name, address, telephone number, and email address of the person or office to contact about the facility during the post-closure care period; and*
- (iii) A description of the planned uses of the property during the post-closure period. Post-closure use of the property shall not disturb the integrity of the final cover, liner(s), or any other component of the containment system, or the function of the monitoring systems unless necessary to comply with the requirements in this subpart...”*

3.0 JEC INACTIVE BOTTOM ASH 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**.

3.1 Design and Construction History

3.1.1 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-in., 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.

3.1.2 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.

3.1.3 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, plant process water, storm water, decant water from Bottom Ash Area 1, and runoff. The final cover design and construction of the Pond has been designed to meet 40 CFR §257.100(b)(3)(i) and (ii).

3.2 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-feet 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-feet 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**.

4.0 POST-CLOSURE OVERVIEW AND PLANNED USE (§257.104(d)(1)(iii))

This Plan applies to the proposed site conditions of the Pond, as construction will be completed in the time frames required by the CCR Rule. The total area requiring post-closure care consists of approximately 65 acres of final cover cap.

The currently proposed end use of the Pond is a natural area of passive open space that will not disturb the integrity of the final cover cap. Permanent cap ditch segment and diversion ditches will convey stormwater and process water around the final cover cap to Tower Hill Lake.

5.0 INSPECTION ACTIVITIES

As part of the post-closure care period for the Pond, it is anticipated that the current routine inspections will revert to quarterly inspections; annual reporting will continue for the duration of the post-closure care period. The annual report will provide any recommendations for inspections and monitoring which will be undertaken as part of the post-closure period for the Pond. State inspections will occur as required by federal regulations and/or as deemed necessary by KDHE-BWM.

The inspection of the Pond will be conducted by JEC personnel or their designee(s). The purpose of the visual inspections during the post-closure care period will be to detect any damage, distress, or malfunctions to the Pond final cover cap, cover soils, vegetation, and stormwater management systems for the Pond. Any detection will be repaired to maintain the erosion control measures and prevent a breach of the containment structures.

6.0 GROUNDWATER MONITORING ACTIVITIES

In accordance with §257.102(c), closure will be complete when the groundwater constituent concentrations and any area affected by releases from the CCR unit do not exceed the groundwater protection standard established for constituents listed in Appendix IV in §257.95(h). The groundwater monitoring network established to complete certified closure will be utilized during the post-closure care period to maintain groundwater monitoring in accordance with §257.90 through §257.98.

7.0 MAINTENANCE ACTIVITIES (§257.104(d)(1)(i) and §257.104(b))

Per §257.104(d)(1)(i) *Written post-closure plan* and §257.104(b) *Post-closure care maintenance requirements*: “Following the closure of the CCR unit, the owner or operator must conduct post-closure care for the CCR unit, which must consist of at least the following:

1. *Maintaining the integrity and effectiveness of the final cover system including making repairs to the final cover as necessary to correct the effects of settlement, subsidence, erosion, or other events, and preventing run-on and run-off from eroding or otherwise damaging the final cover*
2. *If the CCR unit is subject to the design criteria under §257.70, maintaining the integrity and effectiveness of the leachate collection and removal system and operating the leachate collection and removal system in accordance with the requirements of §257.70; and*
3. *Maintaining the groundwater monitoring system and monitoring groundwater in accordance with the requirements of §257.90 through §257.98”*

7.1 Final Cover System Maintenance and Repair Plan (§257.104(b)(1))

The final cover system may experience settlement over time due to fill material consolidation/settlement. The CCR material has been dewatered and most of the settlement will occur shortly after capping. Regrading and repair of the soil component above the topsoil layer may be required in the event that future non-uniform settlement is observed to be impacting the functional design and/or operation of the Pond and surrounding areas.

Maintenance of the final cover will include periodic mowing of the vegetative cover and reseeding as necessary. The grass will be maintained at such a level as to facilitate inspection. This will help to discourage the inhabitation of burrowing animals. Mowing activities will be conducted on an as-need basis. The topsoil layer on the final cover system will be inspected, filled with appropriate soil, regraded, and seeded if erosion occurs.

Routine maintenance of the cap and diversion ditches include cleaning sediment. Repair of these structures will typically be performed by bringing in heavy equipment such as backhoes, dump trucks, dozers, and scrapers. Materials such as silt fence, straw bales, and soil will be kept on-site to implement short-term repairs while waiting for permanent repairs. By maintaining the system of stormwater controls, erosion and damage to the final cover system will be prevented.

8.0 NOTICE OF COMPLETION OF POST-CLOSURE CARE (§257.104(e))

Westar will complete a Notice of Completion of post-closure care period within 60 (sixty) days of completion of post-closure of the Pond. The notification will include the certification by a registered professional engineer as required by §257.104(e).

9.0 RECORDKEEPING, NOTIFICATION AND INTERNET REQUIREMENTS (§257.104(f))

Per §257.104(f), Westar maintains an operating record consisting of the documents specified in §257.105(i).

Additionally per §257.104(f), Westar will comply with the notification requirements specified in §257.106(i).

Internet requirements specified in §257.107(i) will be placed on owner and operators publicly accessible website, per §257.104(f).

All records that are relevant within the past five years will be maintained at JEC and/or by Westar. The records are available to KDHE representatives for review upon request.

10.0 KEY CONTACT INFORMATION (§257.104(d)(1)(ii))

Name: Brandon Griffin
Environmental Services, Environmental Compliance Analyst

Address: Westar Energy
818 South Kansas Avenue
Topeka, Kansas 66601

E-mail Address: westarccr@westarenergy.com

Phone Number: (800) 383-1183



11.0 PROCEDURES FOR PLAN ASSESSMENTS AND AMENDMENTS (§257.104(d)(3))

This Plan will continue to undergo review as needed if the pond design or construction plans are modified throughout the construction process. The Plan will be amended if there is a situation stated in §257.104(d)(3)(i-iii), which includes any change in operation of the CCR unit that would affect the Plan. The Plan would also be amended 60 days prior to a planned change of the JEC facility or Pond, or no later than 60 days after an unanticipated event that would necessitate a revision and no later than 30 days after an unanticipated event after post-closure care activities have commenced.

Any amended Plan will be reviewed and recertified by a registered professional engineer and will be placed in JEC's facility operating record as required per §257.105(i)(4). Amended Plans will supersede and replace any prior versions. Availability of an amended Plan will be noticed to the State Director per §257.106(i) and posted to the publicly accessible internet site per §257.107(i).

12.0 PROFESSIONAL ENGINEER CERTIFICATION (§257.104(d)(4))

The undersigned registered professional engineer is familiar with the requirements of §257.104 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 CCR Plan has been prepared in accordance with good engineering practice, including consideration of applicable industry standards and meets the requirements of §257.104, and that this Plan is adequate for JEC's facility. This certification was prepared as required by §257.104(d)(4).

Name of Professional Engineer: Richard Southorn

Company: APTIM

Signature: 

Date: 04/16/18

PE Registration State: Kansas

PE Registration Number: PE25201

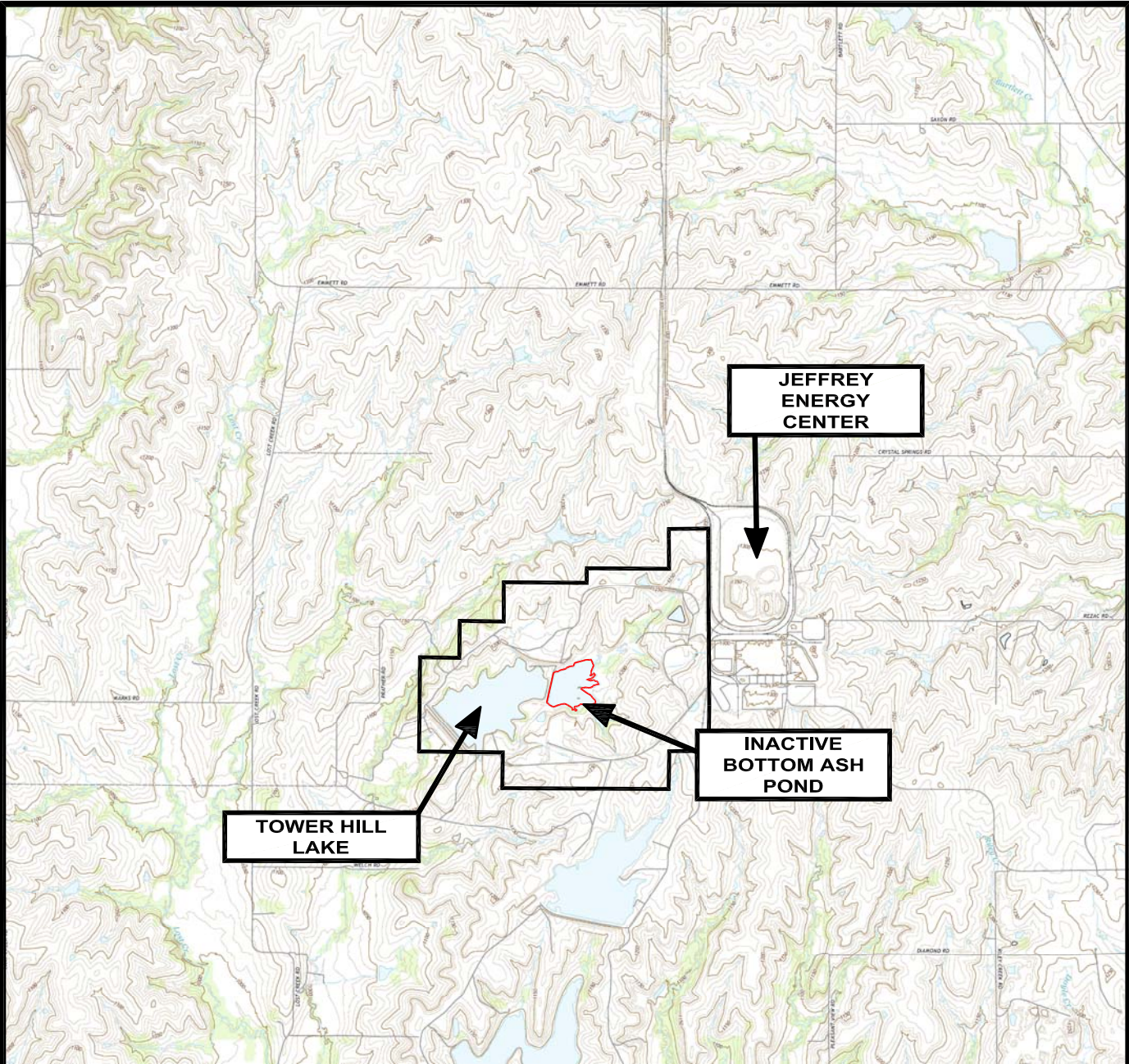
Professional Engineer Seal:



FIGURES

Figure 1 - Inactive Bottom Ash Pond, Site Location Plan

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

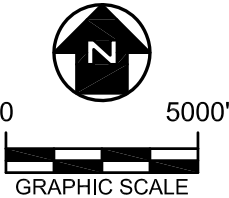


LEGEND

- 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.



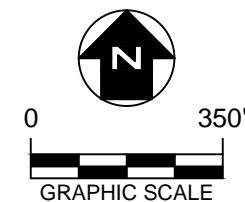
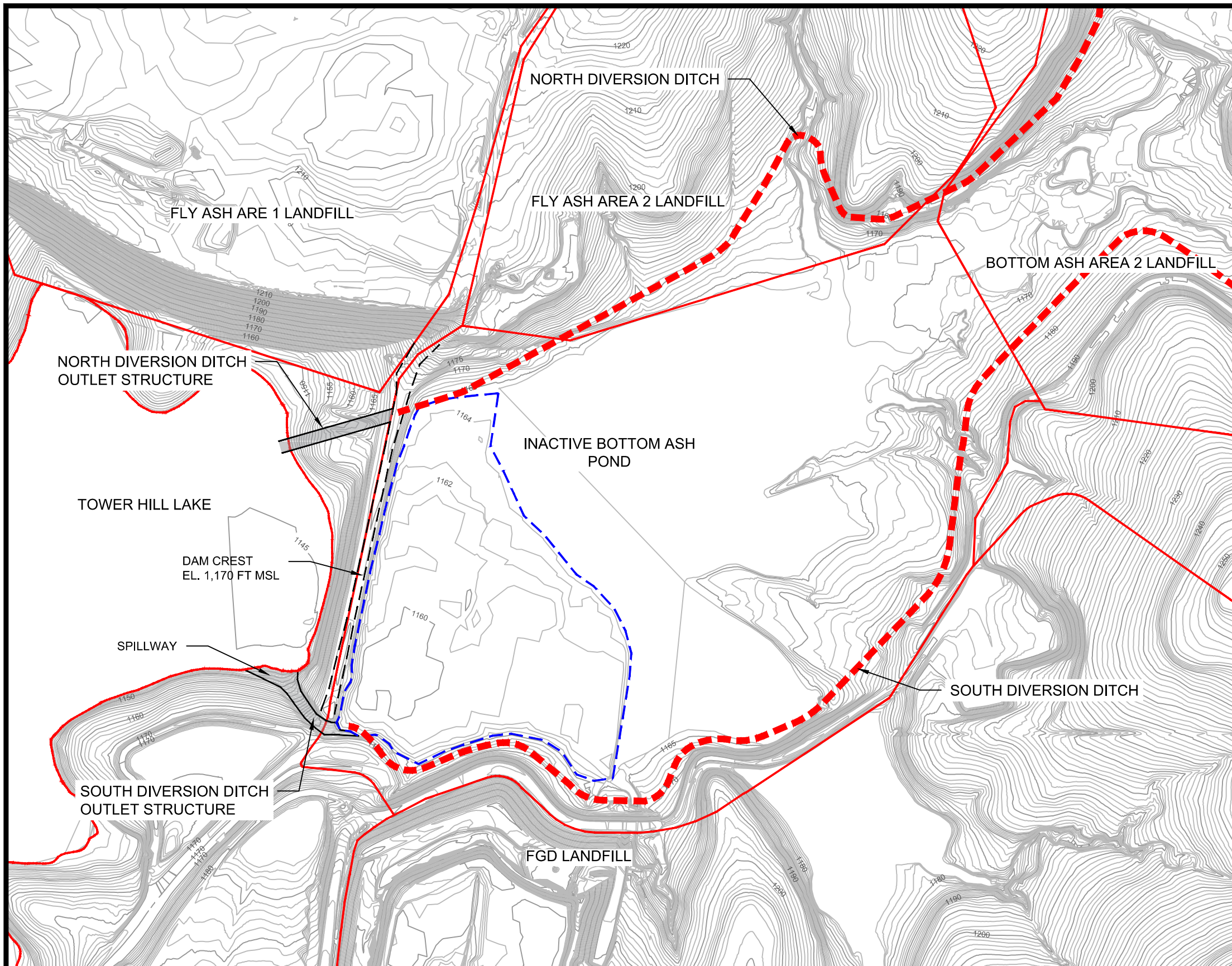
APTIM Environmental & Infrastructure, Inc.

APTIM Environmental & Infrastructure, Inc. has prepared this document for a specific project or purpose. All information contained within this document is copyrighted and remains intellectual property of APTIM Environmental & Infrastructure, Inc. This document may not be used or copied, in part or in whole, for any reason without expressed written consent by APTIM Environmental & Infrastructure, Inc.

**WESTAR ENERGY
25905 JEFFREY RD., ST. MARYS, KS**

**FIGURE 1
FGD LANDFILL
SITE LOCATION PLAN**

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



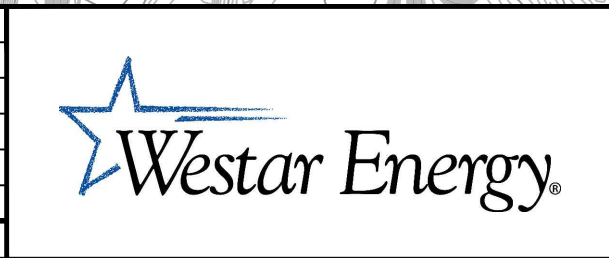

LEGEND

- 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

APTIM Environmental & Infrastructure, Inc.
APTIM Environmental & Infrastructure, Inc. has prepared this document for a specific project or purpose. All information contained within this document is copyrighted and remains intellectual property of APTIM Environmental & Infrastructure, Inc. This document may not be used or copied, in part or in whole, for any reason without expressed written consent by APTIM Environmental & Infrastructure, Inc.

WESTAR ENERGY
25905 JEFFREY RD., ST. MARYS, KS

FIGURE 2
INACTIVE BOTTOM ASH POND
SITE TOPOGRAPHY PRIOR TO CLOSURE

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

T:\AutoCAD\Projects\Westar Energy\Jeffrey\Compliance Reports\Inactive Bottom Ash Pond\Figures 2 and 3.dwg, DWG To PDF.pc3