Annual Inspection Report
Jeffrey Energy Center
Inactive Bottom Ash Pond

Prepared for:

Westar Energy

Jeffrey Energy Center

St. Marys, Kansas

Prepared by:

CB&I Environmental & Infrastructure, Inc.

June 2017

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USEPA CCR Rule Criteria 40 CFR §257.83	Jeffrey Energy Center (JEC) Annual Inspection Report
§257.83(b)(1)(i) stipulates: *"(b) Annual inspections by a qualified professional engineer. (1) If the existing or new CCR surface impoundment or any lateral expansion of the CCR surface impoundment is subject to the periodic structural stability assessment requirements under §257.73(d) or §257.74(d), the CCR unit must additionally be inspected on a periodic basis by a qualified professional engineer to ensure that the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering standards. The inspection must, at a minimum, include:* *(i) A review of available information regarding the status and condition of the CCR unit, including, but not limited to, files available in the operating record (e.g., CCR unit design and construction information required by §§257.73(c)(1) and 257.74(c)(1), previous periodic structural stability assessments required under §§257.73(d) and 257.74(d), the results of inspections by a qualified person, and results of previous annual inspections);"*	Section 3.0
§257.83(b)(1)(ii) stipulates: *"(ii) A visual inspection of the CCR unit to identify signs of distress or malfunction of the CCR unit and appurtenant structures;"*	Section 4.1

USEPA CCR Rule Criteria 40 CFR §257.83	Jeffrey Energy Center (JEC) Annual Inspection Report
§257.83(b)(1)(iii) stipulates: *"(iii) A visual inspection of any hydraulic structures underlying the base of the CCR unit or passing through the dike of the CCR unit for structural integrity and continued safe and reliable operation."*	Section 4.2
§257.83(b)(2)(i) stipulates: *"(2) Inspection report. The qualified professional engineer must prepare a report following each inspection that addresses the following:* *(i) Any changes in geometry of the impounding structure since the previous annual inspection;"*	Section 5.1
§257.83(b)(2)(ii) stipulates: *"(ii) The location and type of existing instrumentation and the maximum recorded readings of each instrument since the previous annual inspection;"*	Section 5.2
§257.83(b)(2)(iii) stipulates: *"(iii) The approximate minimum, maximum, and present depth and elevation of the impounded water and CCR since the previous annual inspection;"*	Section 5.3

USEPA CCR Rule Criteria 40 CFR §257.83	Jeffrey Energy Center (JEC) Annual Inspection Report
§257.83(b)(2)(iv) stipulates: *"(iv) The storage capacity of the impounding structure at the time of the inspection;"*	Section 5.4
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USEPA CCR Rule Criteria 40 CFR §257.83	Jeffrey Energy Center (JEC) Annual Inspection Report
§257.83(b)(4) stipulates: *"(4) Frequency of inspections. (i) Except as provided for in paragraph (b)(4)(ii) of this section, the owner or operator of the CCR unit must conduct the inspection required by paragraphs (b)(1) and (2) of this section on an annual basis. The date of completing the initial inspection report is the basis for establishing the deadline to complete the first subsequent inspection. Any required inspection may be conducted prior to the required deadline provided the owner or operator places the completed inspection report into the facility's operating record within a reasonable amount of time. In all cases, the deadline for completing subsequent inspection reports is based on the date of completing the previous inspection report. For purposes of this section, the owner or operator has completed an inspection when the inspection report has been placed in the facility's operating record as required by §257.105(g)(6)."*	Section 1.0
§257.83(b)(5) stipulates: *"(5) If a deficiency or release is identified during an inspection, the owner or operator must remedy the deficiency or release as soon as feasible and prepare documentation detailing the corrective measures taken."*	Section 6.0
§257.83(c) stipulates: *"(c) The owner or operator of the CCR unit must comply with the recordkeeping requirements specified in §257.105(g), the notification requirements specified in §257.106(g), and the internet requirements specified in §257.107(g)."*	Section 7.0

1.0 INTRODUCTION

CB&I Environmental and Infrastructure, Inc. (CB&I) has prepared the following Annual Inspection Report (Report) 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 operations 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 to the CCR Rule, Mr. Richard Southorn (a qualified professional engineer with CB&I) conducted an on-site inspection of the Pond on May 16, 2017. Prior to inspection, CB&I personnel reviewed the relevant portions of the facility's operating record and permit application in relation to this Report, under the direct supervision of Mr. Southorn. This Report meets the requirements set forth within 40 CFR §257.83(b)(1) and (b)(2) based on the review of available information and visual observation, to evaluate if the design, construction, operation, and maintenance of the Pond is consistent with good engineering standards. The annual impoundment inspection has been conducted and completed in compliance with the frequency of inspection timeframe set forth in §257.83(b)(4).

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. The location of the Pond is depicted in **Figure 1**.

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. It was estimated in the Coal Ash Impoundment – Specific Site Assessment Report conducted in September 2009 by GEI Consultants, Inc. (GEI), that the Pond has a surface area of 72.1 acres and a normal operating pool of 1,164 feet mean seal level (ft MSL). Existing site topography is depicted in **Figure 2**.

A Type C fly ash berm and overflow was constructed in the 1990's to separate the Pond and Tower Hill Lake. In 2000 the berm was expanded by raising the embankment and adding an auxiliary spillway, and it was permitted (DPT-0160) as a dam (Pond Dam). According to GEI, the Pond Dam is approximately 25-feet high, 1,050-feet long, with a 30-foot wide crest, approximate 3H:1V side slopes, and a crest elevation of 1,170 ft MSL. The open flow spillway serves as the outlet from the Pond to Tower Hill Lake and is approximately 450-feet long, 40-feet wide, with 3H:1V side slopes. It has a rock control crest at 1,165 ft MSL. The upstream side of the spillway is lined with a minimum of 1.5-foot thick layer of limestone riprap.

The Pond receives decant water from Bottom Ash Area 1, plant process water, and stormwater before discharging the water to Tower Hill Lake. The Pond has not received CCR material since October 2015.

3.0 REVIEW OF AVAILABLE INFORMATION

Prior to the on-site inspection, Mr. Southorn reviewed the available information for the Pond as provided by Westar:

- Coal Ash Impoundment – Specific Site Assessment Report, GEI Consultants, Inc., September 2009.
- 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.

Mr. Southorn verified the available information during the on-site inspection on May 16, 2017.

3.1 Summary of Previous Visual Inspection Reports

A visual field assessment of the Pond Dam was conducted by GEI on May 19, 2009. This included walking the Pond Dam crest, upstream slope, downstream slope, and spillway. There were no recorded signs of settlement, displacement, or adverse seepage that would adversely affect the safety of the Pond Dam. The only recorded issues during the field assessment were:

- Several locations on the downstream slope of the Pond Dam that showed signs of surface erosion (i.e. small erosion rills).

It was determined this was a dam safety concern and slope should be repaired or rip-rap should be installed for slope protection.

4.0 INSPECTION SUMMARY

The on-site inspection focused on standard geotechnical signs of distress or malfunction of the Pond and Pond Dam. The condition and design of the hydraulic and appurtenant structures passing through the Pond Dam were also assessed. Slumping at the toe of the Pond or Pond Dam slopes, tensile cracking, abnormal or excessive erosion on the side slopes and spillway, groundwater/surface water seepage, and conveyance structure function and design were inspected. Any visual signs are potential indicators of structural weakness or malfunction at the Pond or Pond Dam.

4.1 Visual Signs of Distress or Malfunction

During the on-site inspection the Pond Dam slope appearance, slope stability, and overall Pond conditions were assessed. During the inspection, the only location that may provide slope stability concerns is the Pond Dam's western side (downstream slope), which separates the Pond from Tower Hill Lake. Erosion rills were observed on the downstream slope of Pond Dam. Photographs 12 through 15 in **Appendix A** depict the observed erosion rills on the downstream slope of the Pond Dam.

The Pond will begin to be dewatered at the end of June 2017 and clean closure will commence once the Pond is fully dewatered. It is anticipated that the rills will be repaired as part of the final stages of construction of the cap. The Pond Dam should remain sufficiently stable until capping has been completed based on current conditions. Once capping commences, the rills should be filled and regraded to remove preferential pathways for stormwater. After grading, rip-rap may be placed to minimize the potential for future erosion. Photographs 7 through 10 in **Appendix A** depict the rip-rap that has been placed on the eastern (upstream) slope of the Pond Dam.

4.2 Review of Hydraulic Structures

At the time of inspection, stormwater conveyance systems such as the Pond stormwater drainage channels and the Pond Dam spillway were operating as designed. Photographs 3 through 5 in **Appendix A**, depict the spillway's location with discharge appropriately moving from the Pond to Tower Hill Lake. No signs of erosion or malfunction were detected in these features.

5.0 EVALUATION OF GEOMETRY, STABILITY AND OPERATIONS

Based on a review of the available facility information and on-site inspection, the following geometric conclusions were developed.

5.1 Changes in Geometry

The most recent survey of JEC was conducted in April 2016 by PEC. The Pond in the most recent survey was compared to a bathymetric survey of the Pond which was conducted in June 2011 by PEC. These surveys exhibited the same geometry for the Pond.

5.2 Instrumentation Readings

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.

5.3 Impounded Water Elevation

The typical impounded water elevation at the Pond is approximately 1,164 ft MSL with a minimum water elevation of approximately 1,163 ft MSL. The Pond discharges into Tower Hill Lake through the spillway. The maximum water elevation of the Pond is approximately 1,165 ft MSL, based on the spillway design. Using the April 2016 survey, the lowest point in the Pond is approximately 1,160 ft MSL, resulting in a maximum water depth of approximately 5 feet at the deepest portion of the impoundment at maximum water elevations. Maximum and minimum depths of impounded water do not deviate greatly from year to year due to the spillway maintaining a constant water elevation in the Pond.

The CCR depths vary within the Pond 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). Maximum and minimum depths of CCR in the Pond have not deviated greatly in the recent years.

5.4 Remaining Storage Capacity

The remaining CCR material storage capacity within the Pond was calculated by determining the volume between the most recent survey, conducted in April 2016, and the discharge weir elevation of 1,165 ft MSL. The remaining storage capacity within the Pond is approximately 138,232 cubic yards (cy).

5.5 Impounded Water and CCR Volumes

The impounded water volume within the Pond was calculated by determining the volume between the most recent survey and the average impounded water elevation of 1,164 ft MSL. The impounded water volume within the Pond is approximately 62,680 cy.

The total CCR volume is unknown due to a range of ash material sources historically being routed to the Pond. However, in 2000 Black & Veatch determined the sediment capacity of the Pond at 1,164 ft MSL to be 932,700 cy (578.15 acre-ft). Using the impounded water volume determined from recent surveys, the CCR volume since 2000 is estimated to be 770,020 cy.

5.6 Structural Weakness and Disrupting Conditions

At the time of this inspection, there were no signs of distress or malfunction that would indicate actual or potential structural weakness at the Pond or Pond Dam. There was no indication that existing conditions at the Pond Dam have disrupted or have the potential to disrupt safety or operations.

5.7 Changes Affecting Stability and Operations

There have been no changes to the Pond that pose a threat or concern to the stability of the Pond Dam or operations at LEC. Operations and maintenance have not deviated from the original designed plan.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the on-site inspection performed on May 16, 2017, CB&I recommend the following actions:

- ❑ Fill in and regrade the erosion rills on downstream slope of the Pond Dam as part of clean closure capping construction. Placement of rip-rap may be considered after filling and regrading to provide additional erosion protection;
- ❑ Continue to monitor and maintain rip-rap on the upstream slope;
- ❑ Continue proper management of the inflow control system and gradient flowing to the outlet structure; and
- ❑ Continue to monitor all conveyance features for signs of erosion, damage, obstructions, or malfunction.

7.0 RECORDS RETENTION AND MAINTENANCE

7.1 Incorporation of Plan into Operating Record

§257.105(g) of 40 CFR Part §257 provides record keeping requirements to ensure that this Report will be placed in the Facility's Operating Record. Specifically, §257.105(g) stipulates:

> §257.105(g)*: "(g) Operating 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: (6) The periodic inspection report as required by §257.83(b)(2)."*

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

7.2 Notification Requirements

§257.106(g) of 40 CFR Part §257 provides guidelines for the notification of the availability of the initial and periodic plan. Specifically, §257.106(g) stipulates:

> §257.106(g): *(g) Operating 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: (5) Provide notification of the availability of the periodic inspection reports specified under §257.105(g)(6)."*

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

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

> §257.107(g): *(g) Operating 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: (5) The periodic inspection reports specified under §257.105(g)(6)."*

This Report will be uploaded to Westar Energy's CCR Compliance reporting Website upon Westar's review and approval.

8.0 PROFESSIONAL ENGINEER CERTIFICATION

The undersigned registered professional engineer is familiar with the requirements of the CCR Rule and has visited and examined the Jeffrey Energy Center or has supervised examination of the Jeffrey Energy Center by appropriately qualified personnel. I hereby certify based on a review of available information within the facility's operating records and observations from my personal on-site inspection (including the photographs contained in **Appendix A**), that the Bottom Ash Pond does not exhibit any appearances of actual/potential structural weakness that would be disruptive to the normal operations of the Jeffery Energy Center CCR Unit. The unit is being operated and maintained consistent with recognized and generally accepted good engineering standards and practices. This certification was prepared as required by 40 CFR Part §257.83(b).

Name of Professional Engineer: Richard Southorn

Company: CB&I

Signature:

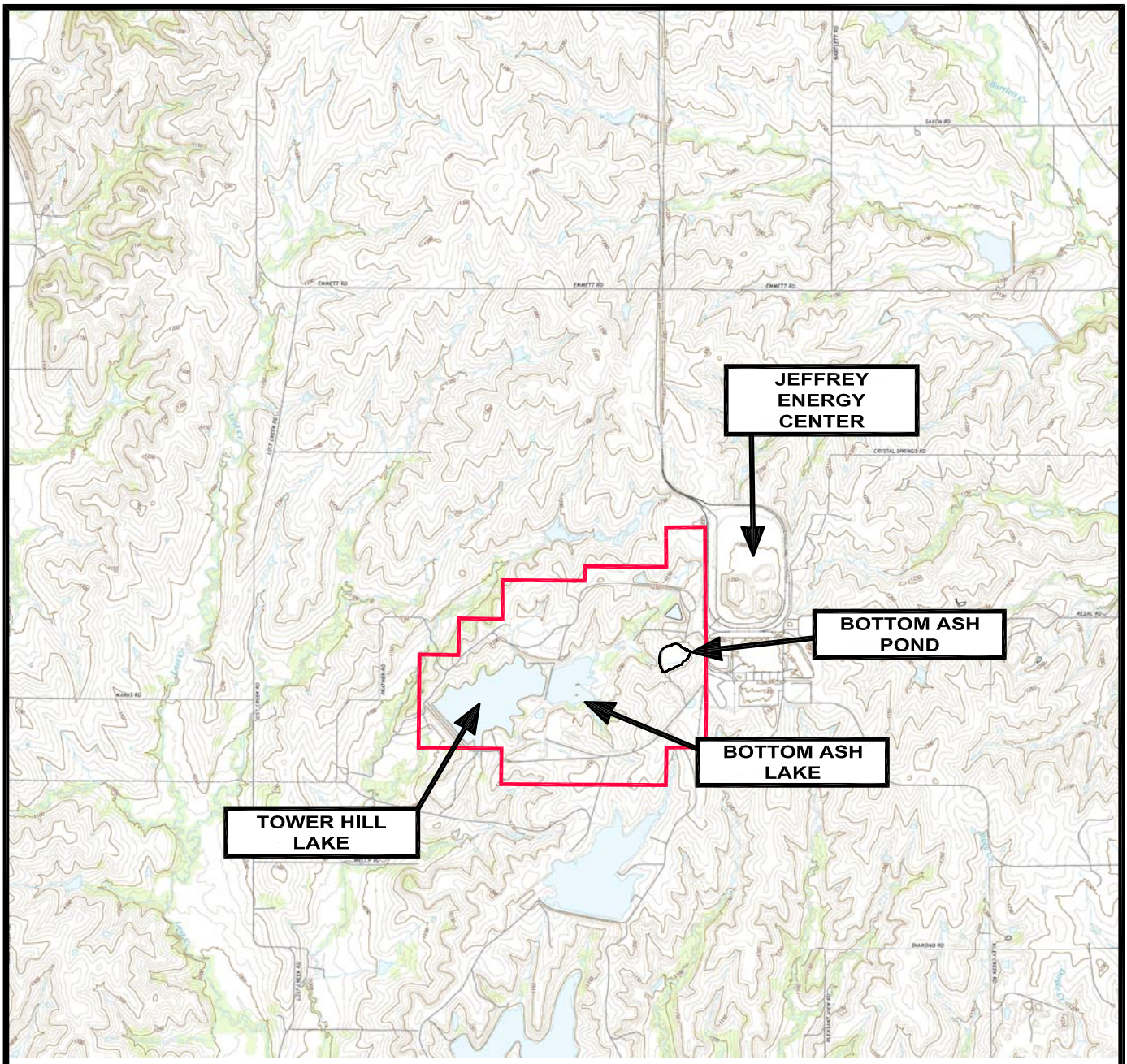
Date: 6/21/2017

PE Registration State: Kansas

PE Registration Number: PE25201

Professional Engineer Seal:

FIGURES



LEGEND

KDHE-BWM INDUSTRIAL LANDFILL PERMIT NO. 0359 BOUNDARY

N

0 5000'

GRAPHIC SCALE

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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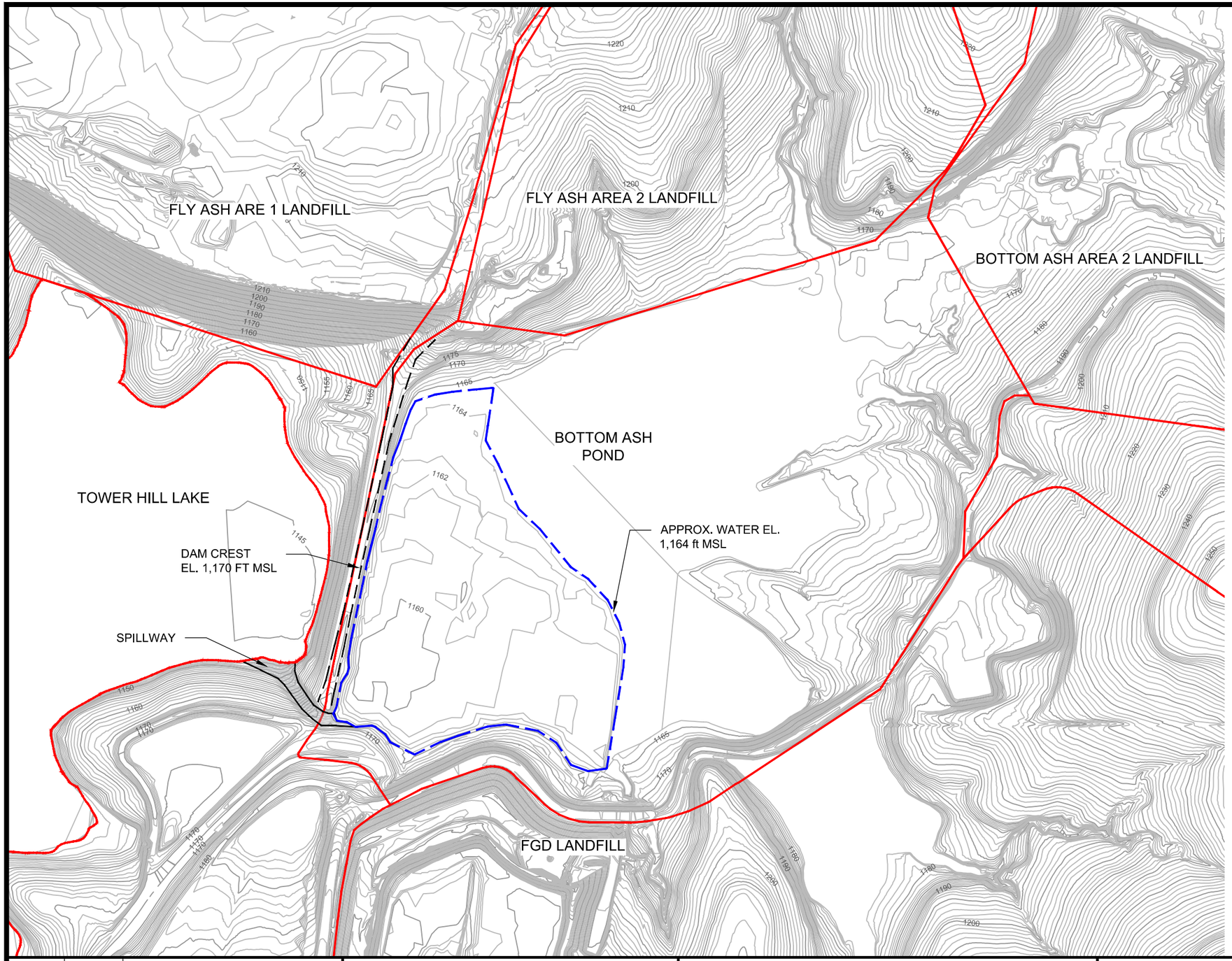
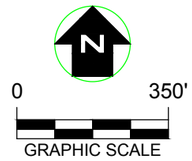
25905 JEFFREY RD., ST. MARYS, KS

FIGURE 1
INACTIVE BOTTOM ASH POND
SITE LOCATION PLAN

APPROVED BY:	RDS	PROJ. NO.:	631224603	DATE:	JUNE 2017





LEGEND

- APPROXIMATE CCR UNIT BOUNDARY
- APPROXIMATE WATER ELEVATION
- APPROXIMATE POND DAM BOUNDARY
- APPROXIMATE SPILLWAY BOUNDARY

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.

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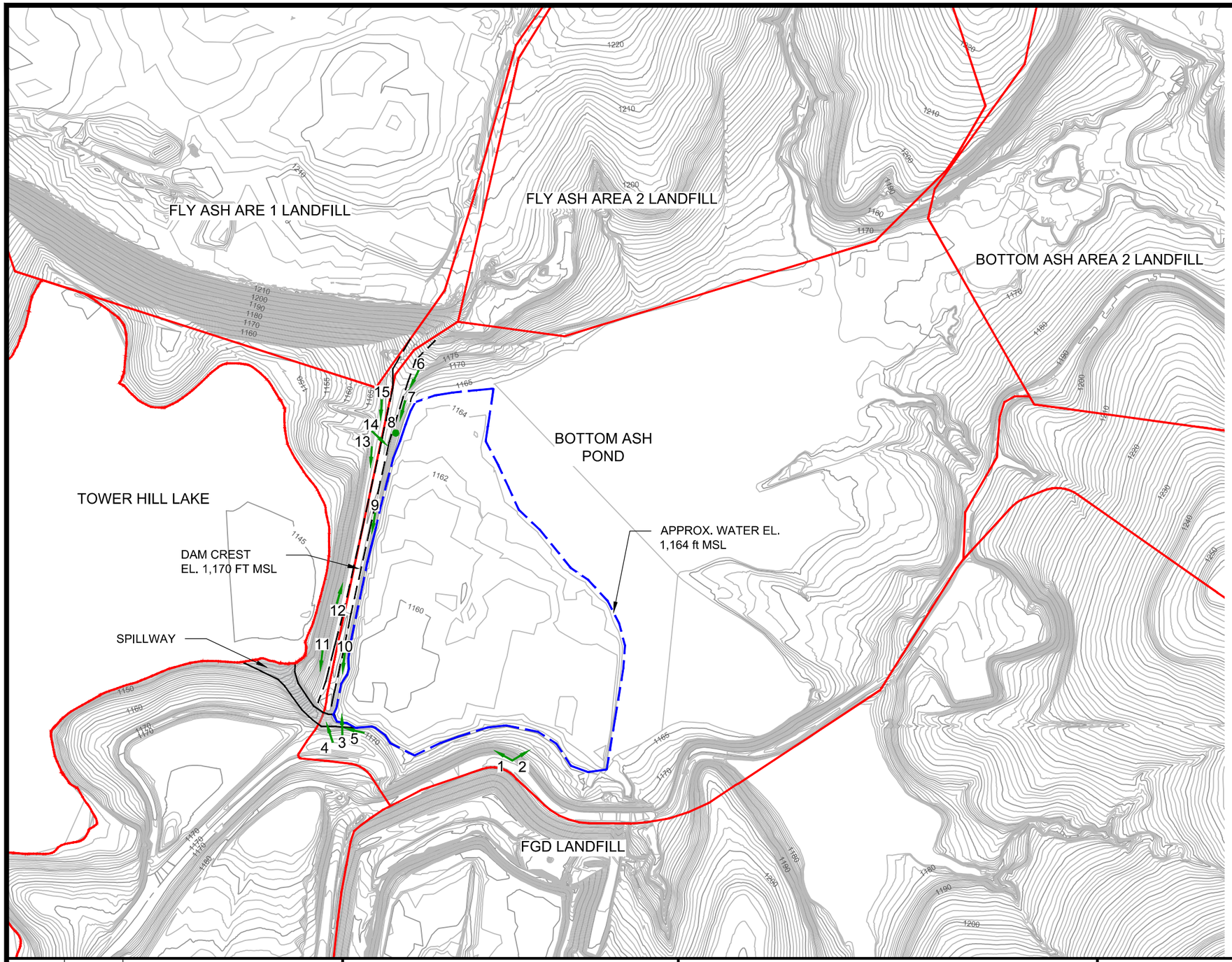
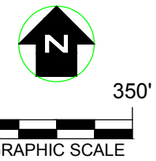
FIGURE 2
INACTIVE BOTTOM ASH POND
EXISTING SITE TOPOGRAPHY

DRAWN BY:	ORC	APPROVED BY:	MMS	PROJ. NO.:	631224603	DATE:	JUNE 2017





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- APPROXIMATE CCR UNIT BOUNDARY
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FIGURE 3
INACTIVE BOTTOM ASH POND
PHOTO LOG

DRAWN BY:	ORC	APPROVED BY:	MMS	PROJ. NO.:	631224603	DATE:	JUNE 2017

APPENDIX A

Annual Inspection Photo Log

Photograph No. 1 **Date:** May 16, 2017 **Direction:** Northwest	
Description: Observing Bottom Ash Pond and the surrounding vegetation on the south slope.	

Photograph No. 2 **Date:** May 16, 2017 **Direction:** Northeast	
Description: Observing the eastern edge of the Bottom Ash Pond. Vegetation is well established.	

Photograph No. 3 **Date:** May 16, 2017 **Direction:** North	
Description: Looking at spillway and dam between both the Bottom Ash Pond and Tower Hill Lake. Slopes are rip-rap lined. Some vegetation. No noticeable erosion.	

Photograph No. 4 **Date:** May 16, 2017 **Direction:** Northwest	
Description: Looking at spillway from Bottom Ash Pond to Tower Hill Lake. No evidence of erosion or malfunction.	

Photograph No. 5 **Date:** May 16, 2017 **Direction:** Northwest	
Description: Looking at spillway from Bottom Ash Pond to Tower Hill Lake. No evidence of erosion or malfunction. Some vegetation present	

Photograph No. 6 **Date:** May 16, 2017 **Direction:** Southwest	
Description: Looking at the dam from the access road crossing. No evidence of erosion or distress. Established vegetation present.	

Photograph No. 7 **Date:** May 16, 2017 **Direction:** Southwest	
Description: Observing the upstream side of the dam separating the Bottom Ash Pond and Tower Hill Lake. No significant erosion. present. Established vegetation present.	

Photograph No. 8 **Date:** May 16, 2017 **Direction:** -	
Description: Observing rip-rap present on the upstream slope of the dam.	

Photograph No. 9 **Date:** May 16, 2017 **Direction:** Southwest	
Description: Observing the dam separating the Bottom Ash Pond and Tower Hill Lake on the downstream slope. No significant erosion present. Established vegetation present.	

Photograph No. 10 **Date:** May 16, 2017 **Direction:** Southwest	
Description: Observing the berm separating the Bottom Ash Pond and Tower Hill Pond on the upstream slope. No significant erosion present. Established vegetation present.	

Photograph No. 11 **Date:** May 16, 2017 **Direction:** Southwest	
Description: Observing the downstream slope of the dam separating the Bottom Ash Pond and Tower Hill Lake. No erosion in this location.	

Photograph No. 12 **Date:** May 16, 2017 **Direction:** Northeast	
Description: Observing minor erosion of the dam separating the Bottom Ash Pond and Tower Hill Lake on the downstream slope. Established vegetation present.	

Photograph No. 13 **Date:** May 16, 2017 **Direction:** South	
Description: Observing erosion rills on the dam separating the Bottom Ash Pond and Tower Hill Lake on the downstream slope.	

Photograph No. 14 **Date:** May 16, 2017 **Direction:** Southeast	
Description: Observing the erosion rills on the dam separating the Bottom Ash Pond and Tower Hill Lake on the downstream slope.	

Photograph No. 15 **Date:** May 16, 2017 **Direction:** Southwest	
Description: Observing the dam that separates the Bottom Ash Pond from Tower Hill Lake. Erosion rills on downstream slope.	