



# Annual Inspection Report Jeffrey Energy Center Flue Gas Desulfurization (FGD) Landfill

Prepared for:

Westar Energy

Jeffrey Energy Center

St. Marys, Kansas

Prepared by:

CB&I Environmental & Infrastructure, Inc.

January 2017



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## CCR Regulatory Requirements

USEPA CCR Rule Criteria 40 CFR §257.84	Jeffrey Energy Center (JEC) Annual Inspection Report
<p>§257.84(b)(1)(i) stipulates:</p> <p><i>“(b) Annual inspections by a qualified professional engineer. (1) Existing and new CCR landfills and any lateral expansion of a CCR landfill must 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></p> <p style="padding-left: 40px;"><i>(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., the results of inspections by a qualified person, and results of previous annual inspections)”</i></p>	<p>Section 3.0</p>
<p>§257.84(b)(1)(ii) stipulates:</p> <p><i>“(b) Annual inspections by a qualified professional engineer. (1) Existing and new CCR landfills and any lateral expansion of a CCR landfill must 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></p> <p style="padding-left: 40px;"><i>(ii) A visual inspection of the CCR unit to identify signs of distress or malfunction of the CCR unit.”</i></p>	<p>Section 4.0</p>



USEPA CCR Rule Criteria 40 CFR §257.84	Jeffrey Energy Center (JEC) Annual Inspection Report
<p>§257.84(b)(2)(i) stipulates:</p> <p><i>“(2) Inspection report. The qualified professional engineer must prepare a report following each inspection that addresses the following:</i></p> <p style="padding-left: 40px;"><i>(i) Any changes in geometry of the structure since the previous annual inspection;”</i></p>	Section 5.1
<p>§257.84(b)(2)(ii) stipulates:</p> <p><i>“(ii) The approximate volume of CCR contained in the unit at the time of the inspection;”</i></p>	Section 5.2
<p>§257.84(b)(2)(iii) stipulates:</p> <p><i>“(iii) Any appearances of an actual or potential structural weakness of the CCR unit, in addition to any existing conditions that are disrupting or have the potential to disrupt the operation and safety of the CCR unit;”</i></p>	Section 5.3
<p>§257.84(b)(2)(iv) stipulates:</p> <p><i>“(iv) Any other change(s) which may have affected the stability or operation of the CCR unit since the previous annual inspection.”</i></p>	Section 5.4



USEPA CCR Rule Criteria 40 CFR §257.84	Jeffrey Energy Center (JEC) Annual Inspection Report
<p>§257.84(b)(4) stipulates:</p> <p><i>(4) Frequency of inspections. 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)(9).</i></p>	<p>Section 1.0</p>
<p>§257.84(b)(5) stipulates:</p> <p><i>"(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."</i></p>	<p>Section 6.0</p>
<p>§257.84(c) stipulates:</p> <p><i>"(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)."</i></p>	<p>Sections 7.0</p>



## 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 Flue Gas Desulfurization (FGD) Landfill located at the Jeffrey Energy Center (JEC) in St. Mary's, Kansas. JEC is a coal-fired and natural gas fired power plant that has been in operation since 1980. The FGD Landfill has been deemed to be a regulated coal combustion residual (CCR) unit by the United States Environmental Protection Agency (USEPA), through the Disposal of Coal Combustion Residuals from Electric Utilities Final Rule (CCR Rule) Title 40 Code of Federal Regulations (CFR) Part §257 and §261.

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 FGD Landfill on November 29<sup>th</sup>, 2016. Prior to inspection, CB&I personnel reviewed the relevant portions of the facility's operating record and first annual inspection report in relation to this Report, under the direct supervision of Mr. Southorn. This Report meets the requirements set forth within 40 CFR §257.84(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 Landfill is consistent with good engineering standards. The annual landfill inspection has been conducted and completed in compliance with the frequency of inspection timeframe set forth in §257.84(b)(4).

## 2.0 JEC LANDFILL OVERVIEW

Westar owns and operates an industrial landfill at JEC near St. Marys, Pottawatomie County, Kansas. JEC is located approximately 4.5 miles north of Belvue, Kansas and approximately 4.5 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 FGD Landfill is depicted in **Figure 1**.

The FGD Landfill has four permitted phases totaling to 148 acres. Phases I through III extend laterally and Phase IV extends vertically on top of Phases I through III. Phase I is currently being filled and has an area of approximately 56 acres. Phase II and Phase III are not yet operational, and have an approximate area of 44.5 acres and 47.5 acres, respectively. Infilling of Phase IV will be required to achieve permitted final elevations. The existing site topography is depicted in **Figure 2**.

FGD by-product is transported to the active portion of the FGD Landfill, where it is discharged and graded by dozers and compacted. Periodic dozing of the FGD by-product material will occur as needed, within the active area to maintain a relatively uniform grade. The FGD by-product will be wetted prior to the final cover placement and will form a hardened surface as it dries.



### **3.0 REVIEW OF AVAILABLE INFORMATION**

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

- ❑ Kansas Department of Health and Environment – Bureau of Waste Management (KDHE-BWM) Industrial Landfill Permit No. 0359, October 15, 2015.
- ❑ Jeffrey Energy Center Weekly Inspection Reports, October 2015 through November 2016.
- ❑ Jeffrey Energy Center Annual Landfill Inspection – 2015, Blackstone Environmental, January 15, 2016.

Mr. Southorn verified the available information during the on-site inspection on November 29<sup>th</sup> 2016.

#### **3.1 Summary of Weekly Inspection Reports**

All weekly inspections at the FGD Landfill were reviewed. The site inspection confirmed the active landfilling area has been maintained to prevent erosion and airborne dust. All temporary and permanent stormwater conveyance features are in good working condition. No evidence of erosion or sloughing has been observed throughout the year. No deficiencies or malfunctions were noted.

#### **3.2 Summary of Previous Annual Inspection Report**

Based on a review of the 2015 annual inspection report concluded that the FGD Landfill was in good working order. The active landfilling area was properly graded and all stormwater conveyance features were functioning as designed. It was concluded, that the landfill procedures have not deviated from the operational plan for the landfill and that the layout and grading processes for FGD Landfill are consistent with the design.





## **4.0 INSPECTION SUMMARY**

During the on-site inspection, Mr. Southorn focused on standard geotechnical signs of distress or malfunction such as slumping at the toe of slopes, tensile cracking, abnormal or excessive erosion on the side slopes or stormwater management facilities slope bulging, and groundwater/surface water seepage or ponding. These visual signs are potential indicators of structural weakness of the CCR Landfill.

### **4.1 Visual Signs of Distress or Malfunction**

During the on-site inspection, no erosion or sloughing was observed along the landfill side slopes or perimeter berms. Slope appearance, slope stability, and overall site conditions were assessed. There are no visual signs of distress or malfunction that may contribute to the instability of the landfill.

### **4.2 Review of Environmental Control Systems**

With no evidence to the contrary, the environmental control systems at the FGD Landfill are believed to be in good operating condition and functioning as intended. At the time of inspection, stormwater conveyance systems such as the stormwater drainage channels and culverts were operating as designed. The contact management systems is operating as designed and appears to be in good working condition.

## **5.0 CONCLUSIONS**

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

### **5.1 Changes in Geometry**

As of the date of this inspection, the FGD Landfill is actively accepting CCR material. Changes in geometry were evaluated by comparing topographic information from the 2015 Annual Landfill Inspection Report and the latest survey conducted in April 2016. Changes in geometry of the FGD Landfill since the previous annual inspection consist of CCR placement within the active landfilling area within Phase I, along the southwestern portion of the landfill. Minor grading has occurred in this area to promote positive drainage of stormwater.

### **5.2 CCR Volume**

The total permitted disposal capacity for the FGD Landfill is 17,870,000 cubic yards (cy), as stated in the 2015 Annual Landfill Inspection Report. Based on the most recent survey, the remaining capacity was estimated at approximately 17,353,071 cy. The volume of CCR material contained within the FGD Landfill is approximately 516,929 cy. As detailed in the 2015 Annual Report, the average fill rate for the FGD Landfill is approximately 70,408 tons per year (tons/yr) of CCR material. Based on the fill rate, it is estimated that the FGD Landfill has a remaining operational life of approximately 311 years.

### **5.3 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 FGD Landfill.



## 5.4 Changes Affecting Stability and Operations

There have been no changes to the Landfill that pose a threat or concern to the stability of the landform. Landfill operations and maintenance have not deviated from the original designed plan.

## 6.0 RECOMMENDATIONS

Based on the on-site inspection performed on November 29<sup>th</sup> 2016, CB&I recommend the following actions:

- Remove vegetation in riprap lined letdown channels to prevent flow obstructions (see Photograph 7).
- Place riprap at drainage ditch inlet to pipes under perimeter road to prevent scour (see Photograph 11).
- Continue to monitor erosion controls and vegetative cover in line with weekly inspections.
- Continue proper management of the active landfill areas.
- Continue to monitor all stormwater conveyance features for signs of erosion or malfunction in line with weekly inspections.



## **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 Plan 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: (9) The periodic inspection report as required by §257.84(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: (7) Provide notification of the availability of the periodic inspection reports specified under §257.105(g)(9)."*

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

§257.107(g) of 40 CFR Part §257 provides publicly accessible Internet site requirements to ensure that this Plan 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: (7) The periodic inspection reports specified under §257.105(g)(9)."*

This Plan 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 FGD Disposal Site does not exhibit any appearances of actual/potential structural weakness that would be disruptive to the normal operations of the Jeffrey 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 §257.84(b).

Name of Professional Engineer: Richard Southorn

Company: CB&I

Signature: 

Date: Jan 12, 2017

PE Registration State: Kansas

PE Registration Number: PE25201

Professional Engineer Seal:



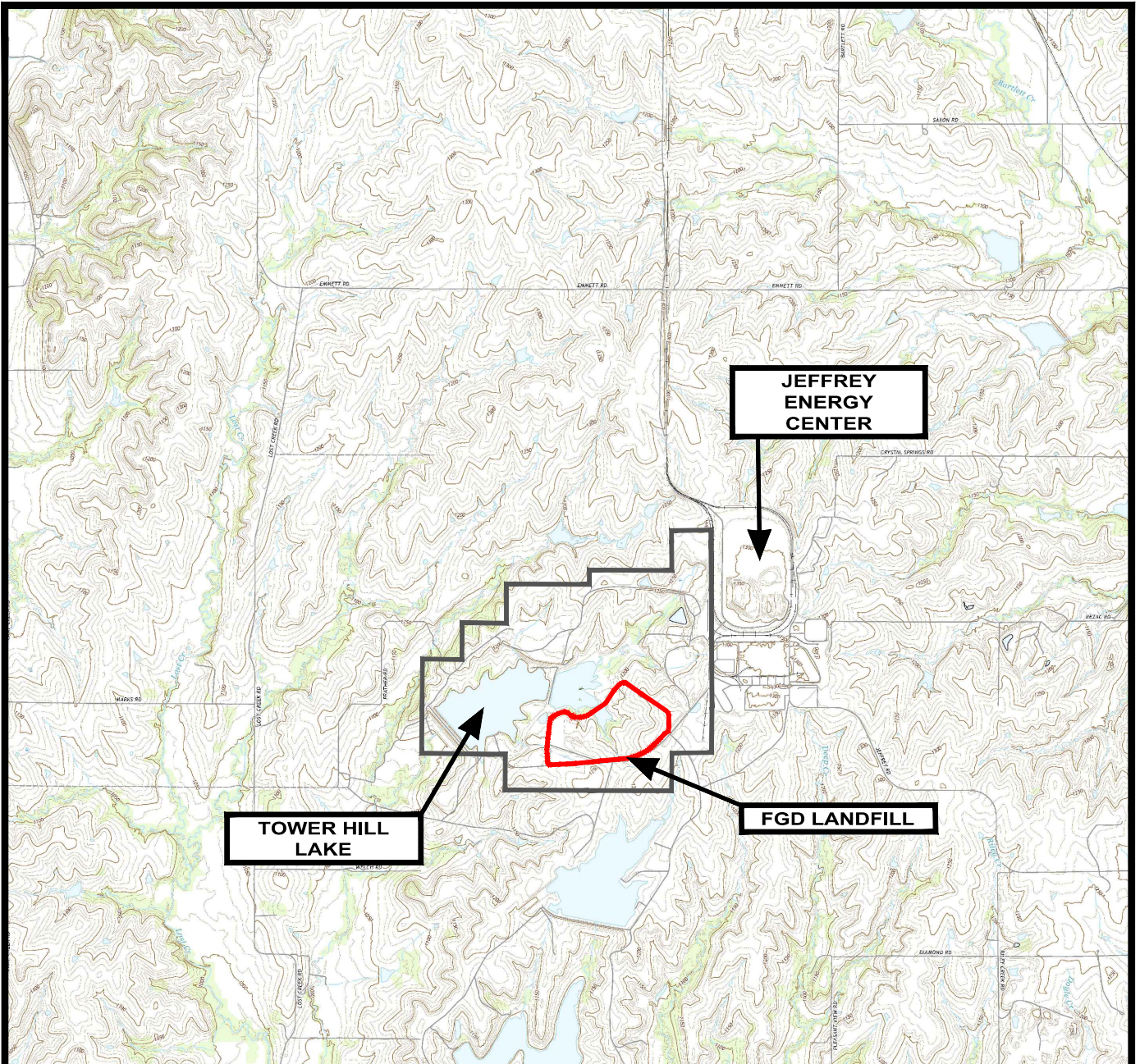
# FIGURES

Figure 1 - FGD Landfill, Site Location Plan

Figure 2 - FGD Landfill, Existing Site Topography

Figure 3 - FGD Landfill, Photo Log Plan View







**TOWER HILL  
LAKE**

**JEFFREY  
ENERGY  
CENTER**

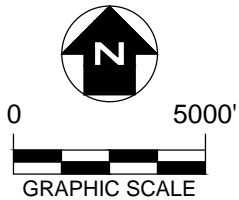
**FGD LANDFILL**

**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.



**CB&I Environmental & Infrastructure, Inc.**

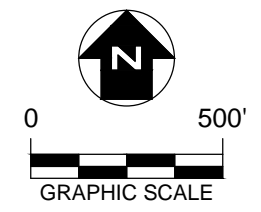
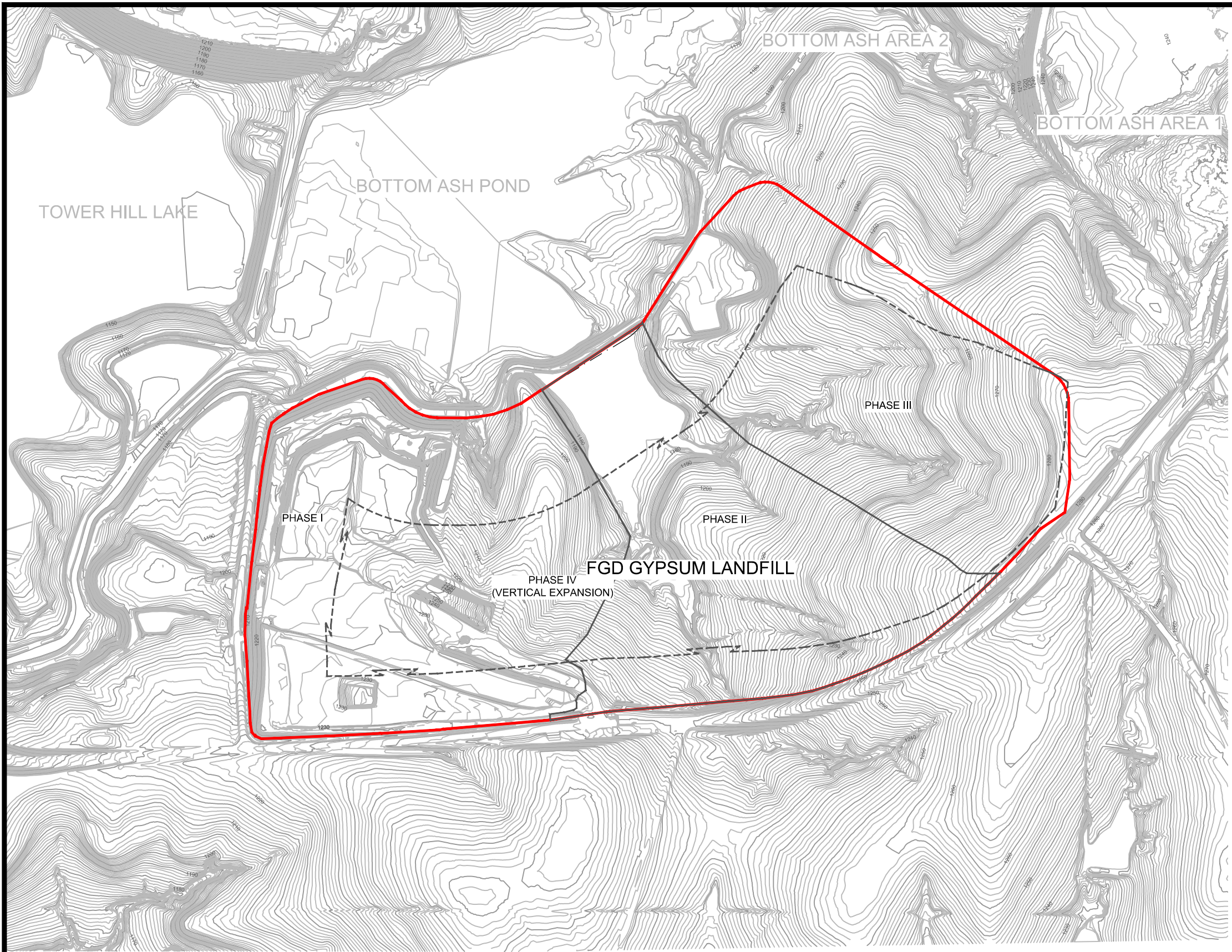
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25905 JEFFREY RD., ST. MARYS, KS**

**FIGURE 1  
FGD LANDFILL  
SITE LOCATION PLAN**

APPROVED BY: RDS	PROJ. NO.: 631214397	DATE: JANUARY 2017
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**LEGEND**

- CCR UNIT BOUNDARY
- PHASE BOUNDARY
- - - - - VERTICAL EXPANSION PHASE BOUNDARY

**NOTES**

1. EXISTING CONTOURS DEVELOPED BY PROFESSIONAL ENGINEERING CONSULTANTS IN APRIL 2016.
2. FOR CLARITY, NOT ALL SITE FEATURES MAY BE SHOWN.
3. CCR UNIT BOUNDARY IS APPROX. 148.0 ACRES.
4. ALL BOUNDARIES ARE APPROXIMATE.
5. REFER TO APPENDIX A FOR PHOTOGRAPHIC DOCUMENTATION.

REV. NO.	DATE	DESCRIPTION



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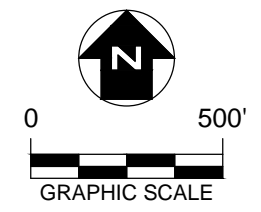
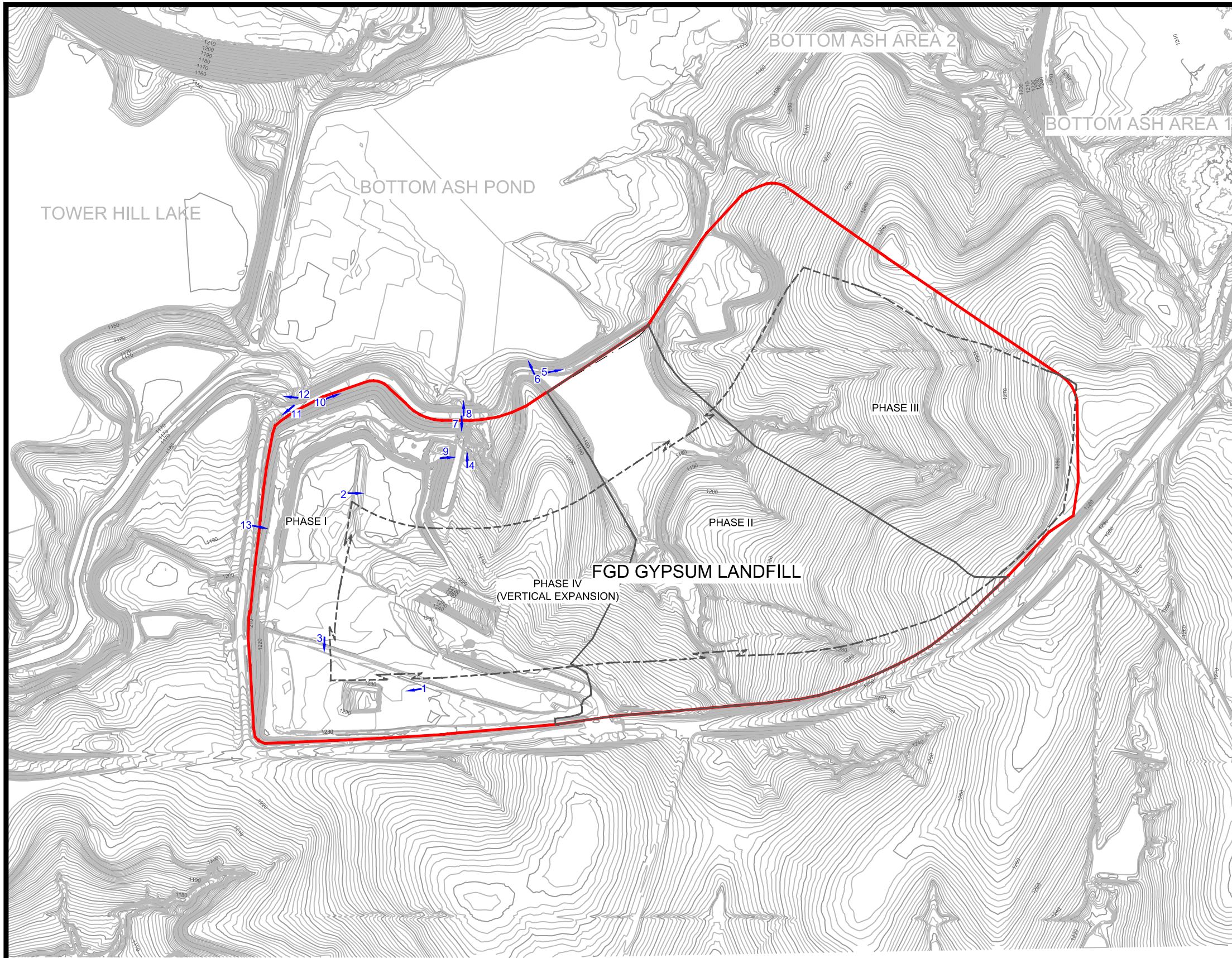
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**FIGURE 2**  
**FGD LANDFILL**  
**EXISTING SITE TOPOGRAPHY**

DRAWN BY:	SJL	APPROVED BY:	RDS	PROJ. NO.:	631214397	DATE:	JANUARY 2017
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**LEGEND**

- CCR UNIT BOUNDARY
- PHASE BOUNDARY
- - - VERTICAL EXPANSION PHASE BOUNDARY

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**FIGURE 3**  
**FGD LANDFILL**  
**PHOTO LOG PLAN VIEW**

DRAWN BY:	SJL	APPROVED BY:	RDS	PROJ. NO.:	631214397	DATE:	JANUARY 2017
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# APPENDIX A

## Annual Inspection Photo Log







<p><b>Photograph No. 1</b></p> <p><b>Date:</b> November 29, 2016</p> <p><b>Direction:</b> Northwest</p>	
<p><b>Description:</b> Observing the FGD beneficial use pile. No evidence of erosion or sloughing. No dust is being generated, despite windy conditions.</p>	

<p><b>Photograph No. 2</b></p> <p><b>Date:</b> November 29, 2016</p> <p><b>Direction:</b> Northwest</p>	
<p><b>Description:</b> Observing the recently graded FGD active area and wick drain pipe. No dust is being generated, despite windy conditions.</p>	



<p><b>Photograph No. 3</b></p> <p><b>Date:</b> November 29, 2016</p> <p><b>Direction:</b> South</p>	
<p><b>Description:</b> Observing the FGD beneficial use pile. No evidence of erosion or sloughing. No dust is being generated, despite windy conditions.</p>	

<p><b>Photograph No. 4</b></p> <p><b>Date:</b> November 29, 2016</p> <p><b>Direction:</b> North</p>	
<p><b>Description:</b> Observing check dams in non-contact stormwater ditch. No evidence of erosion or instability.</p>	




<p><b>Photograph No. 5</b></p> <p><b>Date:</b> November 29, 2016</p> <p><b>Direction:</b> Northeast</p>	
<p><b>Description:</b> Observing the non-contact stormwater basin within the FGD Landfill.</p>	

<p><b>Photograph No. 6</b></p> <p><b>Date:</b> November 29, 2016</p> <p><b>Direction:</b> Northwest</p>	
<p><b>Description:</b> Overview of the Bottom Ash Pond that collects stormwater from the FGD Landfill.</p>	







<p><b>Photograph No. 7</b></p> <p><b>Date:</b> November 29, 2016</p> <p><b>Direction:</b> South</p>	
<p><b>Description:</b> Observing a letdown ditch and concrete road crossing. No evidence of erosion or malfunction. Vegetation should be removed to prevent flow obstructions.</p>	

<p><b>Photograph No. 8</b></p> <p><b>Date:</b> November 29, 2016</p> <p><b>Direction:</b> North</p>	
<p><b>Description:</b> Observing stabilized slope, opposite of the letdown ditch section.</p>	



<p><b>Photograph No. 9</b></p> <p><b>Date:</b> November 29, 2016</p> <p><b>Direction:</b> Northeast</p>	
<p><b>Description:</b> Observing a gravel check dam along non-contact water stormwater ditch. No evidence of erosion or sloughing along drainage way.</p>	

<p><b>Photograph No. 10</b></p> <p><b>Date:</b> November 29, 2016</p> <p><b>Direction:</b> Northeast</p>	
<p><b>Description:</b> Observing stabilized non-contact stormwater ditch. Vegetation is well-established and maintained. No evidence of erosion or malfunction.</p>	



<p><b>Photograph No. 11</b></p> <p><b>Date:</b> November 29, 2016</p> <p><b>Direction:</b> Southwest</p>	 A photograph showing a stormwater ditch with a riprap lining. Several concrete culverts are visible, some of which are partially buried or damaged. The ditch is situated on a grassy slope under a clear blue sky.
<p><b>Description:</b> Observing perimeter stormwater ditch and road culverts. No evidence of erosion. Additional riprap should be placed at inlet location to prevent scour.</p>	

<p><b>Photograph No. 12</b></p> <p><b>Date:</b> November 29, 2016</p> <p><b>Direction:</b> West</p>	 A photograph showing the outlet of a road culvert. The outlet is stabilized with riprap and is situated on a grassy slope. In the background, there is a large body of water under a clear blue sky.
<p><b>Description:</b> Observing the outlets of the road culverts. Outlets are stabilized and protected by riprap.</p>	





**Photograph No. 13**

**Date:**

November 29, 2016

**Direction:**

East

**Description:**

Perimeter stormwater ditch lined with riprap and final cover area of Phase I. Vegetation is well-established and maintained. No evidence of erosion or malfunction.

