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

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

Prepared by:
APTIM Environmental & Infrastructure, Inc.

Janurary 2018

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§257.84(b)(1)(ii) stipulates: *"(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:* *(ii) A visual inspection of the CCR unit to identify signs of distress or malfunction of the CCR unit."*	Section 4.0

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USEPA CCR Rule Criteria 40 CFR §257.84	Jeffrey Energy Center (JEC) Annual Inspection Report
§257.84(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 structure since the previous annual inspection;"*	Section 5.1
§257.84(b)(2)(ii) stipulates: *"(ii) The approximate volume of CCR contained in the unit at the time of the inspection;"*	Section 5.2
§257.84(b)(2)(iii) stipulates: *"(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;"*	Section 5.3
§257.84(b)(2)(iv) stipulates: *"(iv) Any other change(s) which may have affected the stability or operation of the CCR unit since the previous annual inspection."*	Section 5.4

USEPA CCR Rule Criteria 40 CFR §257.84	Jeffrey Energy Center (JEC) Annual Inspection Report
§257.84(b)(4) stipulates: *(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).*	Section 1.0
§257.84(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
§257.84(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)."*	Sections 7.0

1.0 INTRODUCTION

APTIM Environmental and Infrastructure, Inc. (Aptim, f/k/a CB&I Environmental & Infrastructure, Inc.) 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 power plant that has been in operation since 1980. The 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 Aptim) conducted an on-site inspection of the Landfill on November 6th, 2017. Prior to inspection, Aptim 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 Landfill, where it is unloaded 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 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 Routine Inspection Reports, January through September 2017.
- Annual Inspection Report Jeffrey Energy Center Flue Gas Desulfurization (FGD) Landfill, CB&I Environmental & Infrastructure, Inc., January 2017.

Mr. Southorn verified the available information during the on-site inspection on November 6th 2017.

3.1 Summary of Inspection Reports

All routine inspections at the Landfill were reviewed. The site inspection confirmed the active landfilling area has been maintained to prevent erosion and airborne dust. It was noted the berm on the south side of the Landfill was found to be less than 18-inches in a few locations. The berm was built back up to the appropriate level. All temporary and permanent stormwater conveyance features are in good working condition. No evidence of erosion or sloughing was observed throughout the year. No deficiencies or malfunctions were noted.

3.2 Summary of Previous Annual Inspection Report

Based on a review of the 2016 Annual Inspection Report it was concluded that the Landfill was in good working order. The active landfilling area was properly graded and all stormwater conveyance features were functioning as designed. The Landfill procedures have not deviated from the operational plan for the Landfill and that the layout and grading processes for 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 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.

One crack was observed on an internal berm (see Photograph 23). It is recommended that this crack be excavated until it is no longer present and repaired with structural fill, which may include FGD material.

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 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 generally operating as designed. However, one letdown channel (downchute) had thick vegetation growing within it, which should be killed with herbicide (see Photograph 13). Additionally, additional rip-rap is recommended to be installed at the culvert inlets and outlets, as shown in Photographs 7-9. 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 Landfill is actively accepting CCR material. Changes in geometry were evaluated by comparing topographic information from the April 2016 survey and the latest survey conducted in March 2017. Changes in geometry of the Landfill since the previous annual inspection consist of CCR placement within the active landfilling area within Phase I. Minor grading has occurred in this area to promote positive drainage of stormwater.

5.2 CCR Volume

The total permitted disposal capacity for the Landfill is 17,870,000 cubic yards (cy). Based on the most recent survey, the remaining capacity was estimated at approximately 17,216,239 cy. The volume of CCR material contained within the Landfill is approximately 653,761 cy. As detailed in the 2015 Annual Report, the average fill rate for the Landfill is approximately 70,408 tons per year (tons/yr) of CCR material. Based on the fill rate, it is estimated that the Landfill has a remaining operational life of approximately 245 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 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. However, a crack on an internal berm shown in Photograph 23 does pose a stability concern on this berm. This crack is recommended to be removed and repaired with structural fill (which may be FGD material). Landfill operations and maintenance have not deviated from the original designed plan.

6.0 RECOMMENDATIONS

Based on the on-site inspection performed on November 6th 2017, Aptim recommend the following actions:

- ❑ Excavate and remove crack shown in Photograph 23. Repair berm with structural fill (which may be FGD material).
- ❑ Remove vegetation in riprap lined letdown channels to prevent flow obstructions (see Photograph 13).
- ❑ Remove vegetation, which has accumulated in the culvert outlet (see Photograph 8).
- ❑ Additional rip-rap is recommended to be installed at the culvert inlets and outlets, as shown in Photographs 7-9.
- ❑ Continue to monitor erosion controls and vegetative cover in line with routine 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 routine 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 Report will be placed in JEC'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 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 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 Report will be uploaded to Westar's CCR Compliance reporting Website upon Westar's review and approval.

8.0 PROFESSIONAL ENGINEER CERTIFICATION

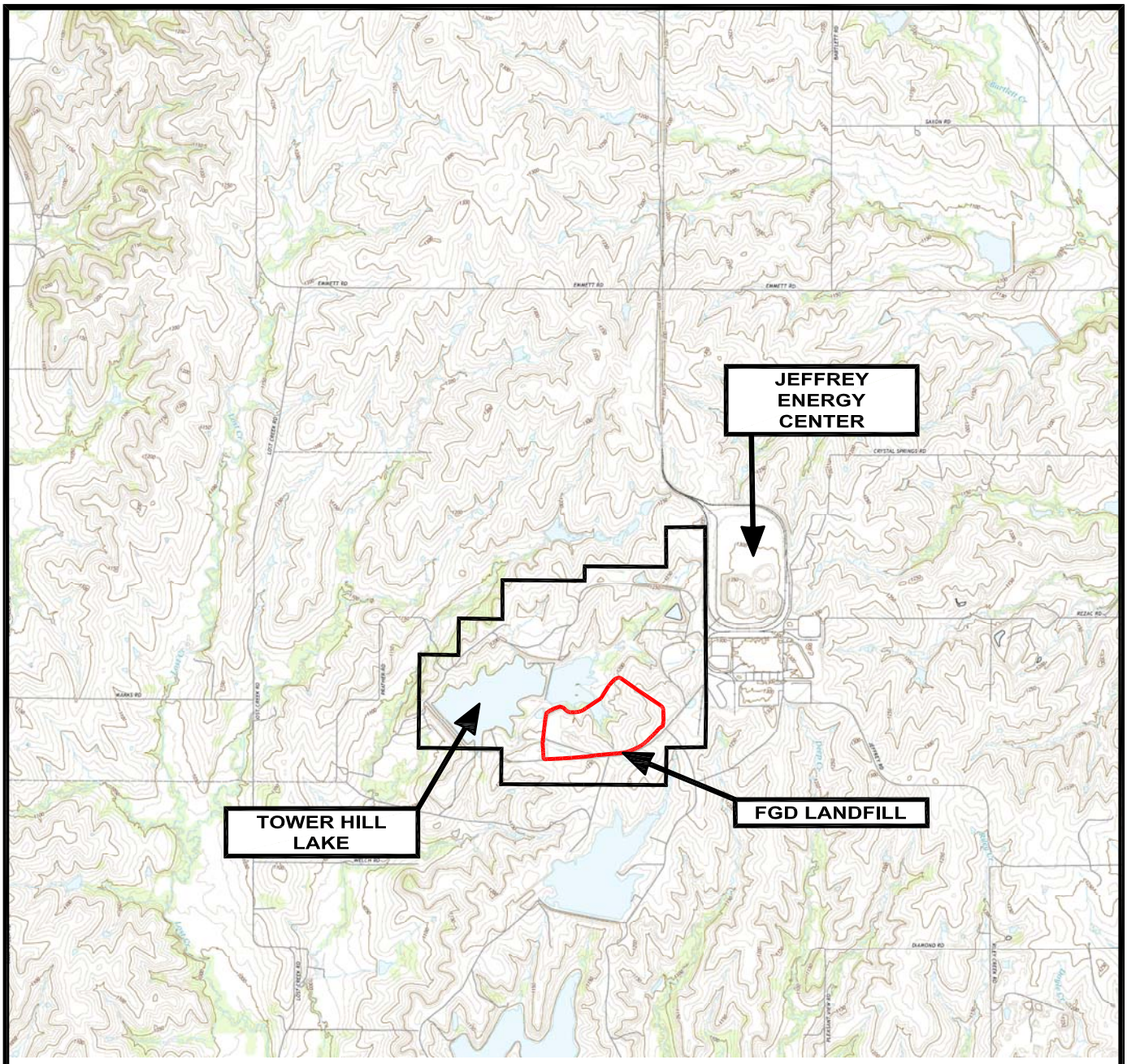
The undersigned registered professional engineer is familiar with the requirements of the CCR Rule and has visited and examined JEC or has supervised examination of the JEC by appropriately qualified personnel. I hereby certify based on a review of available information within JEC's operating records and observations from my personal on-site inspection (including the photographs contained in **Appendix A**), that the FGD Landfill does not exhibit any appearances of actual/potential structural weakness that would be disruptive to the normal operations of the 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:	Aptim
Signature:	
Date:	1/5/2018
PE Registration State:	Kansas
PE Registration Number:	PE25201

Professional Engineer Seal:

APTIM

FIGURES



LEGEND

CCR UNIT BOUNDARY

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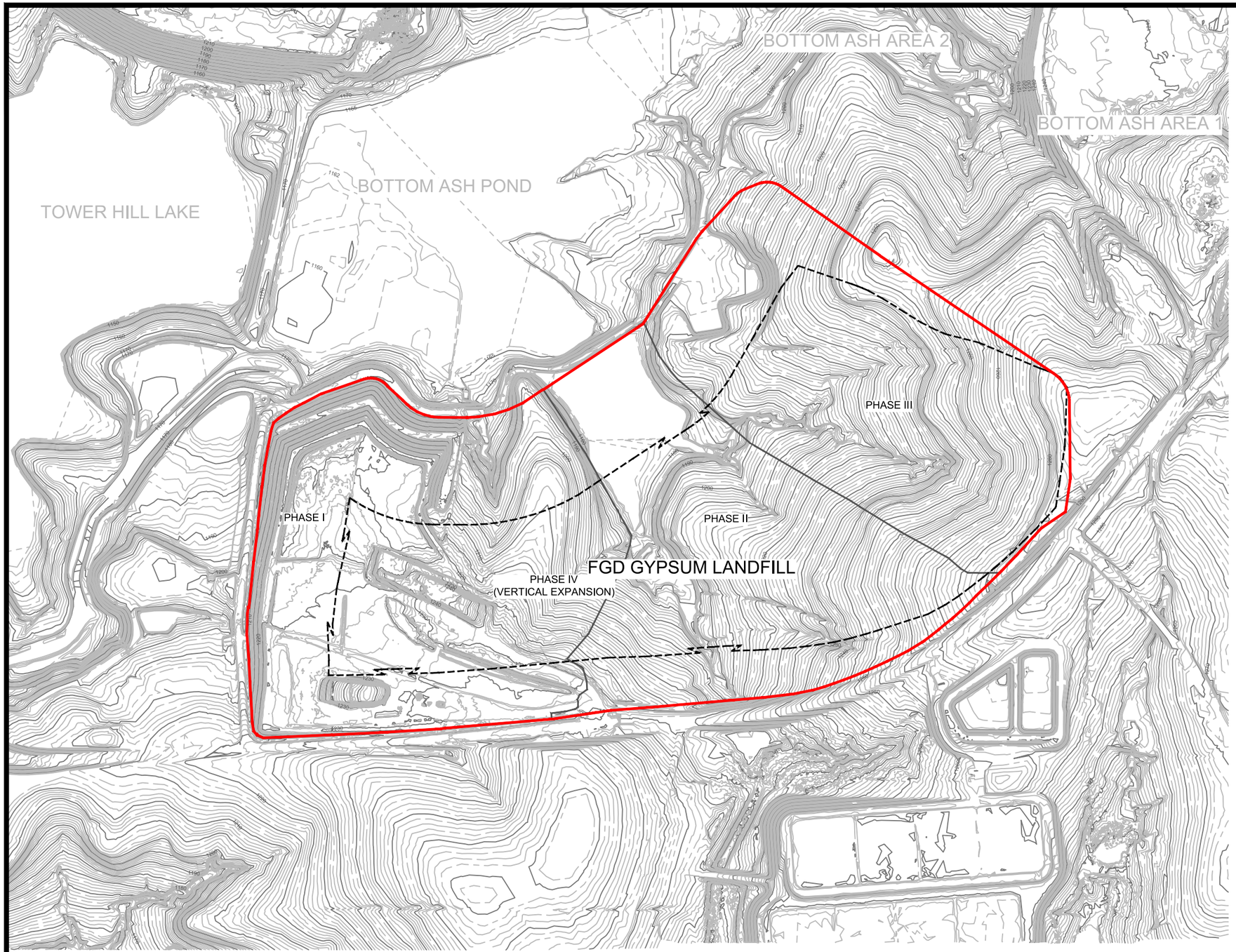
WESTAR ENERGY
25905 JEFFREY RD., ST. MARYS, KS

FIGURE 1
FGD LANDFILL
SITE LOCATION PLAN

APPROVED BY: RDS	PROJ. NO.: –	DATE: JANUARY 2018



N

0 500'

GRAPHIC SCALE

LEGEND

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

NOTES

1. EXISTING CONTOURS DEVELOPED BY PROFESSIONAL ENGINEERING CONSULTANTS IN MARCH 2017.
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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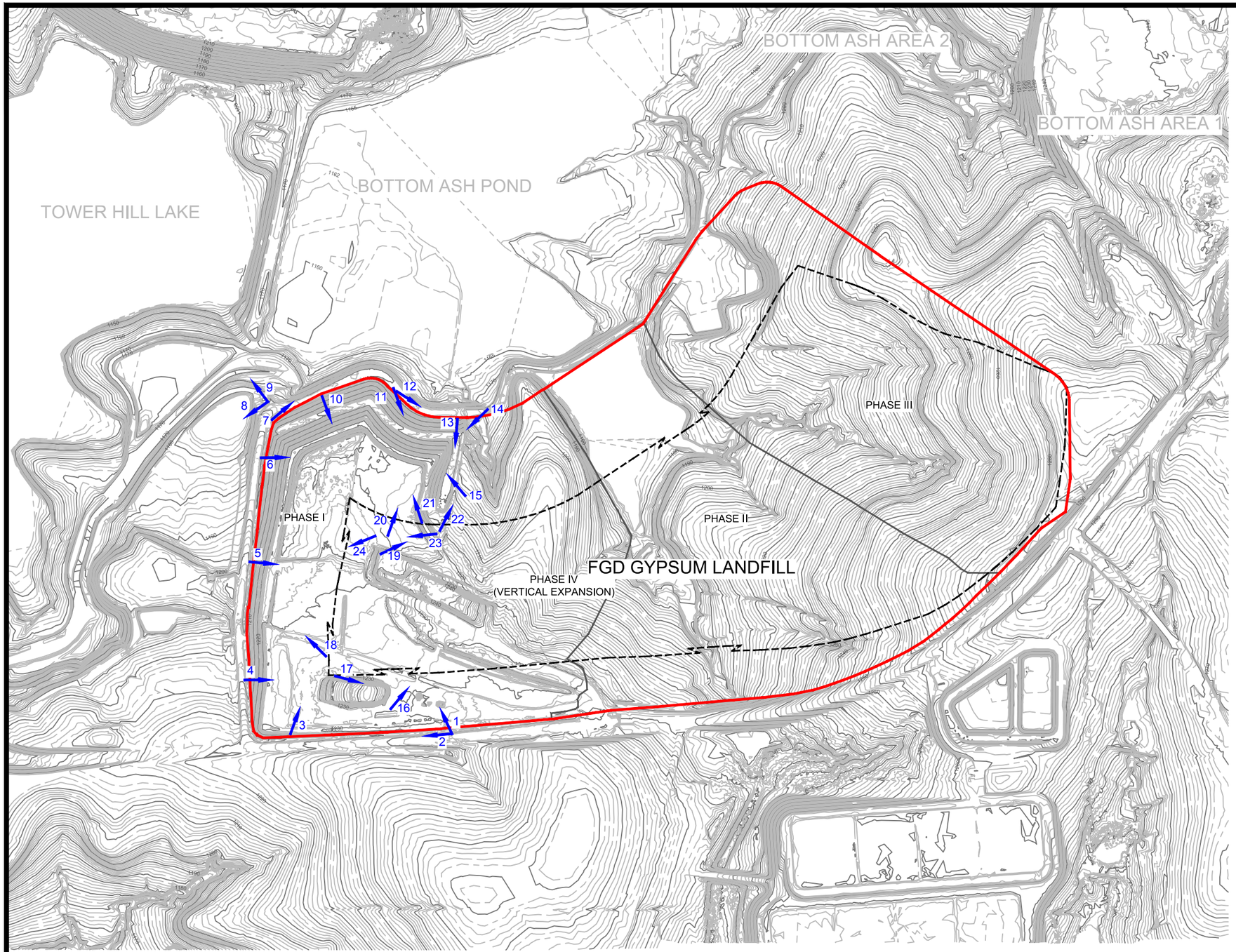
FIGURE 2
FGD LANDFILL
EXISTING SITE TOPOGRAPHY

DRAWN BY:	ORC	APPROVED BY:	RDS	PROJ. NO.:	–	DATE:	JANUARY 2018



0 500'

GRAPHIC SCALE

LEGEND

- CCR UNIT BOUNDARY
- PHASE BOUNDARY
- VERTICAL EXPANSION PHASE BOUNDARY
- 2017 ANNUAL INSPECTION PHOTOGRAPH (ARROW DENOTES DIRECTION OF VIEW)

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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FIGURE 3
FGD LANDFILL
PHOTO LOG PLAN VIEW

DRAWN BY:	ORC	APPROVED BY:	RDS	PROJ. NO.:	–	DATE:	JANUARY 2018

T:\AutoCAD\Projects\Westar Energy\CCR-Annual-Inspections\2017\Jeffrey\Annual Inspection Photo Log Plan.dwg, 1/3/2018 1:53:08 PM, AutoCAD PDF (High Quality Print).pc3

APPENDIX A

Annual Inspection Photo Log

Project: FGD Landfill Inspection
Photographer: Richard Southorn

Photograph No. 1

Date:
November 6, 2017

Direction:
5° N

Description:
View from the perimeter road looking toward the flue gas desulfurization (FGD) landfill with beneficial use pile in center of photograph.

The perimeter stormwater ditch is shown in the foreground. The ditch is lined with rip-rap, which is in good condition. The ditch is free of obstructions and functioning as intended.

Photograph No. 2

Date:
October 6, 2017

Direction:
281° W

Description:
Perimeter stormwater ditch lined with rip-rap and final cover of Phase I (right side of photograph). Perimeter ditch is in good condition. Vegetation within ditch has been sprayed with herbicide. Final cover vegetation is well established and maintained. No evidence of erosion or malfunction.

Project: FGD Landfill Inspection
Photographer: Richard Southorn

Photograph No. 3 **Date:** November 6, 2017 **Direction:** 37° NE **Description:** Observing the vegetative cover. Vegetation is well established and maintained. No evidence of erosion or malfunction.	

Photograph No. 4 **Date:** November 6, 2017 **Direction:** 100° E **Description:** Observing the vegetative cover. Vegetation is well established and maintained. No evidence of erosion or malfunction.	

Project: FGD Landfill Inspection
Photographer: Richard Southorn

Photograph No. 5 **Date:** November 6, 2017 **Direction:** 103° E **Description:** Observing a former contact water pipe that has been plugged to prevent contact water from leaving the Landfill area.	

Photograph No. 6 **Date:** November 6, 2017 **Direction:** 89° E **Description:** Observing a rip-rap lined letdown ditch, stormwater channel, and final cover. No evidence of malfunction or erosion.	

Project: FGD Landfill Inspection
Photographer: Richard Southorn

Photograph No. 7

Date:
November 6, 2017

Direction:
80° NE

Description:
Observing perimeter stormwater ditch and road culverts on inlet (Landfill side). No evidence of erosion. However, additional riprap is recommended to be placed at inlet location to prevent future scour.

Photograph No. 8

Date:
November 6, 2017

Direction:
271° SW

Description:
Observing perimeter stormwater ditch and road culverts. Some vegetation has accumulated at the culvert outlet that should be removed.

Project: FGD Landfill Inspection
Photographer: Richard Southorn

Photograph No. 9 **Date:** November 6, 2017 **Direction:** 323° NW **Description:** Observing perimeter stormwater ditch and road culverts. Some vegetation has accumulated at the culvert outlet that should be removed. Additional rip-rap should be placed to prevent scour as necessary.	
Photograph No. 10 **Date:** November 6, 2017 **Direction:** 133° SE **Description:** Observing the vegetated plateau. Vegetation is well established and maintained. No signs of erosion or sloughing.	

Project: FGD Landfill Inspection
Photographer: Richard Southorn

Photograph No. 11 **Date:** November 6, 2017 **Direction:** 160° S **Description:** Observing the vegetated cover. Vegetation is well established and maintained. No signs of erosion or sloughing.	

Photograph No. 12 **Date:** November 6, 2017 **Direction:** 123° SE **Description:** Observing the perimeter haul road. Well maintained.	

Project: FGD Landfill Inspection
Photographer: Richard Southorn

Photograph No. 13 **Date:** November 6, 2017 **Direction:** 163° S **Description:** Observing a rip-rap lined letdown ditch and concrete road crossing. Vegetation is growing within the rip-rap. This vegetation should be sprayed with herbicide to be removed.	
Photograph No. 14 **Date:** November 6, 2017 **Direction:** 226° SW **Description:** Observing a gravel check dam along the non-contact water stormwater ditch. No evidence of erosion or sloughing along drainage way.	

Project: FGD Landfill Inspection
Photographer: Richard Southorn

Photograph No. 15 **Date:** November 6, 2017 **Direction:** 327° NW **Description:** Observing FGD area where vegetation has become established. No signs of erosion or sloughing.	

Photograph No. 16 **Date:** November 6, 2017 **Direction:** 50° NE **Description:** Observing the FGD beneficial use pile. No evidence of erosion or sloughing. Vegetation has become established on pile.	

Project: FGD Landfill Inspection
Photographer: Richard Southorn

Photograph No. 17 **Date:** November 6, 2017 **Direction:** 121° SE **Description:** Observing the FGD beneficial use pile. No evidence of erosion or sloughing. Vegetation has become established on pile.	

Photograph No. 18 **Date:** November 6, 2017 **Direction:** 303° NW **Description:** Observing the FGD waste disposal face. Vegetation has become established due to minimal disposal quantities.	

Project: FGD Landfill Inspection
Photographer: Richard Southorn

Photograph No. 19 **Date:** November 6, 2017 **Direction:** 50° NE **Description:** Observing the FGD active area and chimney drain pipe. The pipe is installed in low area.	

Photograph No. 20 **Date:** November 6, 2017 **Direction:** 20° N **Description:** Observing the recently graded FGD active area. No dust is being generated. Vegetation is present.	

Project: FGD Landfill Inspection
Photographer: Richard Southorn

Photograph No. 21 **Date:** November 6, 2017 **Direction:** 342° N **Description:** Observing the FGD active area and chimney drain pipe.	
Photograph No. 22 **Date:** November 6, 2017 **Direction:** 27° NE **Description:** Standpipe and rip-rap lined check dam. Vegetation is well established and maintained. No evidence of erosion or malfunction.	

Project: FGD Landfill Inspection
Photographer: Richard Southorn

Photograph No. 23 **Date:** November 6, 2017 **Direction:** 264° W **Description:** Observing a crack on internal berm that is used for contact water containment. Crack will need repair.	

Photograph No. 24 **Date:** November 6, 2017 **Direction:** 248° SW **Description:** Observing the recently graded FGD active area. No ponding water, well maintained.