



Annual Inspection Report Jeffrey Energy Center Bottom Ash Landfill

Prepared for:

Westar Energy

Jeffrey Energy Center

St. Marys, Kansas

Prepared by:

APTIM Environmental & Infrastructure, Inc.

January 2018



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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 5.0</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 6.1
<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 6.2
<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 6.3
<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 6.4

<p align="center">USEPA CCR Rule Criteria 40 CFR §257.84</p>	<p align="center">Jeffrey Energy Center (JEC) Annual Inspection Report</p>
<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 align="center">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 align="center">Section 7.0</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 align="center">Section 8.0</p>

1.0 INTRODUCTION

APTIM Environmental and Infrastructure, Inc. (Aptim, f/k/a CB&I Environmental and Infrastructure, Inc.) has prepared the following Annual Inspection Report (Report) at the request of Westar Energy (Westar) for the Bottom Ash Landfill (Landfill) 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. 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 Landfill is depicted in **Figure 1**.

The Bottom Ash Area is comprised of Bottom Ash Area 1 (Area 1) which is approximately 52.5 acres which includes both a landfill, which is approximately 32.7 acres, and impoundment, which is approximately 19.8 acres. The facility also has a proposed Bottom Ash Area 2 (Area 2) which is approximately 62.0 acres. Area 2 has not yet been constructed. This Report reflects the complete inspection of Area 1. Existing site topography is depicted in **Figure 2**.

Bottom ash is transported to the active portion of the Landfill, where it is discharged and graded by dozers and compacted. Periodic dozing of the bottom ash will occur as needed, within the active area to maintain a relatively uniform grade. The bottom ash 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 Bottom Ash 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. Run on and run off controls including a newly-installed erosion mat lining within a stormwater channel and rock work (rip-rap placement) were completed. Minor repairs to the perimeter berms and areas of erosion were completed as necessary. Seed was planted on some areas of exposed soil to prevent erosion. Herbicides were applied to vegetation growing in rip-rap areas. There were no deficiencies or malfunctions noted throughout the year.

3.2 Summary of Previous Annual Inspection Report

Based on a review of the 2016 Annual Inspection Report, it was determined that the Landfill was in good working order. At the time of inspection, there were no signs of distress or malfunction that would indicate actual or potential structural weakness. The active landfilling area was properly graded and all stormwater conveyance features were functioning as designed. The Landfill procedures do not deviate from the landfill operational plan, in addition, the layout and grading processes for Bottom Ash Area are consistent with the design.

4.0 LANDFILL CONSTRUCTION SUMMARY

In 2017, the flow path of the southern run-on divergence channel was re-graded to better convey stormwater around the Landfill (see Photographs 1-3). The stormwater channels at the toe of slope of the Bottom Ash Area were lined with erosion control mat.

Rip-rap was being installed on the outer slope of Bottom Ash Area 1 at the time of the 2016 Annual Inspection. This work has been completed.

5.0 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.

5.1 Visual Signs of Distress or Malfunction

During the on-site inspection, no erosion or sloughing was observed along the Landfill berm/impoundment. 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. The rip-rap appears stable with no evidence of migration, seeps, or stability concerns. Some vegetation was present within the rip-rap. This vegetation is routinely sprayed with herbicide and appeared mostly dead.

5.2 Review of Environmental Control Systems

With no evidence to the contrary, as observed as part of the annual inspection, the environmental control systems at the Landfill are in good operating condition and functioning as intended. Vegetation is becoming established within the regrading area of the southern divergence channel, but does not yet have full coverage. The stormwater channels at the toe of slope of the Bottom Ash Area appear to be well constructed and functioning as intended. The Bottom Ash Surface Impoundment outlet structure was in free-flow conditions with no obstructions.

See **Appendix A** for photographs depicting the channels and outlet structure during operation.

6.0 CONCLUSIONS

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

6.1 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 2016 Annual Landfill Inspection Report 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, south of the surface impoundment. Minor grading has occurred in this area to promote positive drainage of stormwater.

6.2 CCR Volume

The total permitted disposal capacity for the Bottom Ash Landfill is 1,593,100 cubic yards (cy). Based on the most recent survey the remaining capacity of the Bottom Ash Area, including the Bottom Ash Surface Impoundment and Landfill, was estimated to be approximately 397,209 cy. The volume remaining in the Landfill is estimated to be approximately 360,274 cy. Therefore, the volume of CCR material contained within the Landfill is approximately 1,232,826 cy. The average fill rate for the Bottom Ash Area Landfill is approximately 6,335 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 57 years.

6.3 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.

6.4 Changes Affecting Stability and Operations

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

7.0 RECOMMENDATIONS

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

- Continue to monitor and maintain rip-rap at the base of the outlet pipe of the Bottom Ash Area Surface Impoundment (see Photograph 13 in **Appendix A**).
- Continue to monitor erosion controls and vegetative cover in line with the 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 the routine inspections.

8.0 RECORDS RETENTION AND MAINTENANCE

8.1 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 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.

8.2 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.

9.0 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 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 Bottom Ash Area does not exhibit any appearances of actual/potential structural weakness that would be disruptive to the normal operations of the 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: Aptim

Signature: 

Date: JAN 5, 2018

PE Registration State: Kansas

PE Registration Number: PE25201

Professional Engineer Seal:

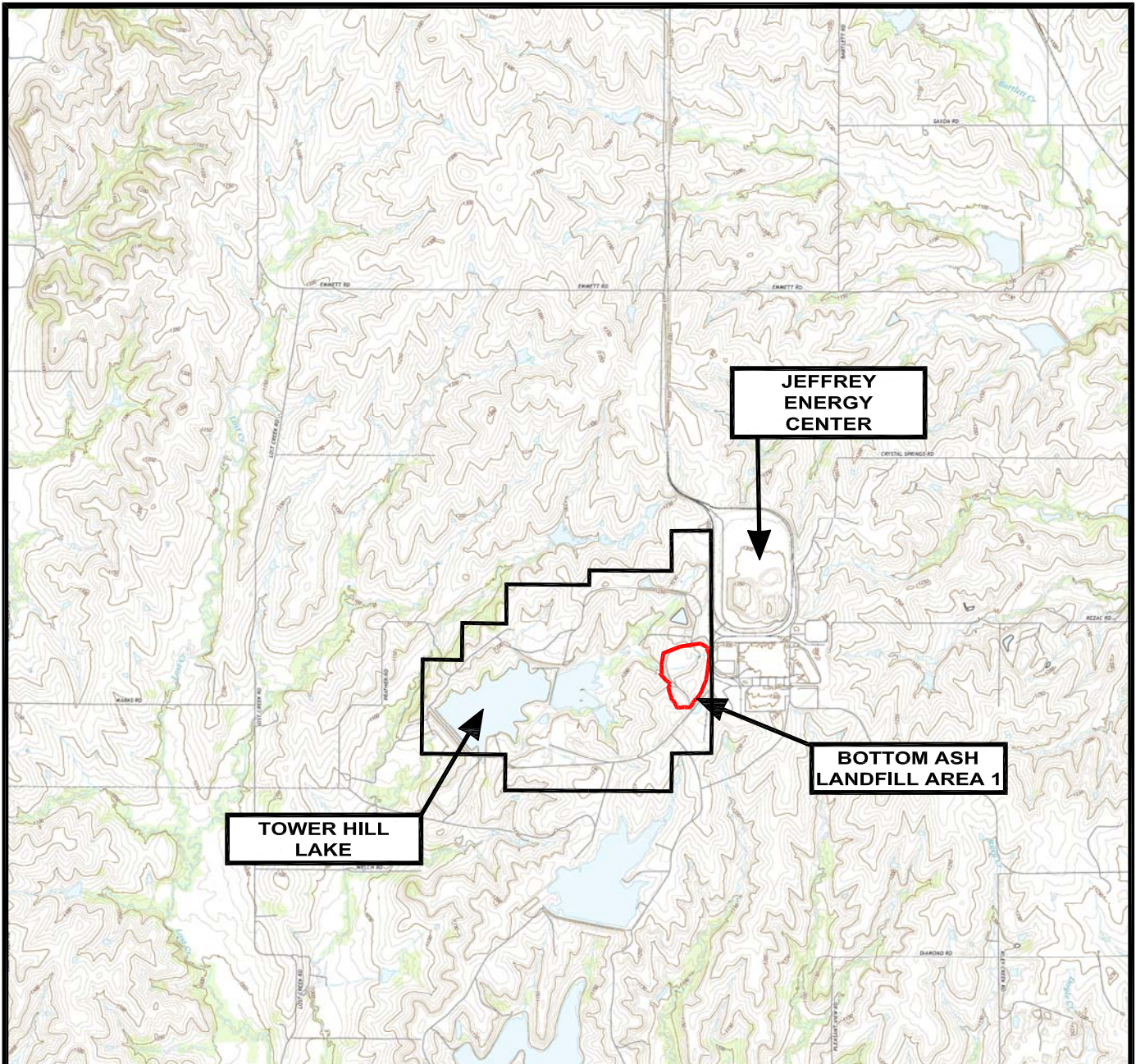


FIGURES

Figure 1 – Bottom Ash Area 1, Site Location Plan

Figure 2 – Bottom Ash Area 1, Existing Site Topography

Figure 3 – Bottom Ash Area 1, Photo Log Plan View

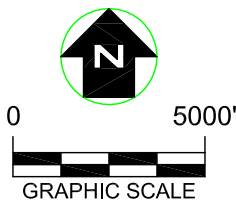


LEGEND

- APPROXIMATE CCR UNIT BOUNDARY
- APPROXIMATE 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.



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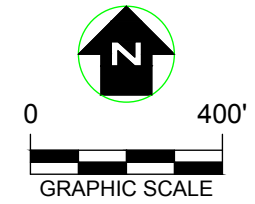
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**FIGURE 1
BOTTOM ASH AREA
SITE LOCATION PLAN**

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

T:\AutoCAD\Projects\Westar Energy\CCR-Annual-Inspections\2017\Jeffrey\Annual Inspection Photo Log Plan.dwg, 1/5/2018 10:40:18 AM, AutoCAD PDF (High Quality Print).pc3



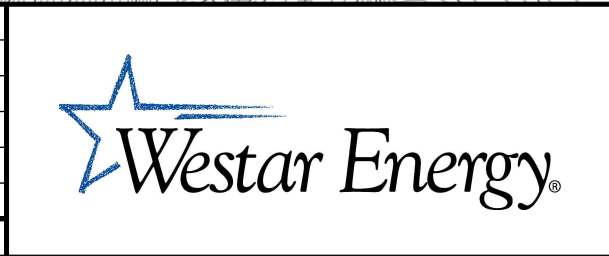

LEGEND

- CCR UNIT BOUNDARY
- - - - - SURFACE IMPOUNDMENT 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 BOUNDARY IS APPROX. 52.5 ACRES.
4. ALL BOUNDARIES AND BORDERS ARE APPROXIMATE.
5. REFER TO APPENDIX A FOR PHOTOGRAPHIC DOCUMENTATION.

REV. NO.	DATE	DESCRIPTION

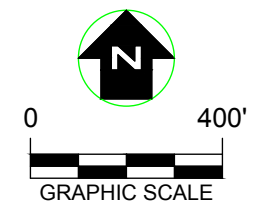
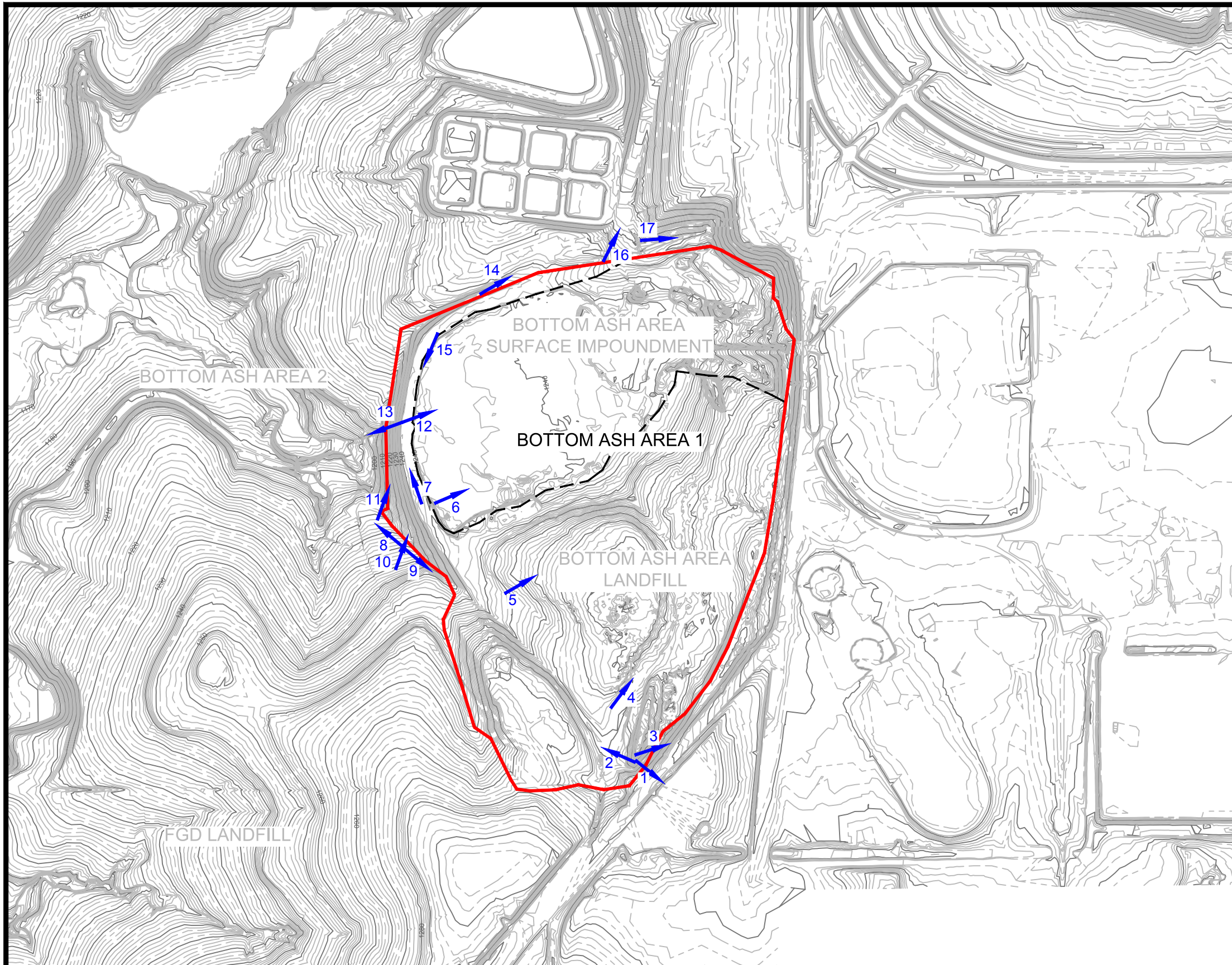



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FIGURE 2
BOTTOM ASH AREA 1
EXISTING SITE TOPOGRAPHY

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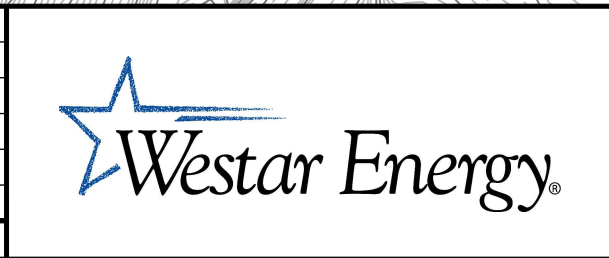
LEGEND

- CCR UNIT BOUNDARY
- - - - - SURFACE IMPOUNDMENT BOUNDARY
- ← 2017 ANNUAL INSPECTION PHOTOGRAPH (ARROW DENOTES DIRECTION OF VIEW)

NOTES

1. EXISTING CONTOURS DEVELOPED BY PROFESSIONAL ENGINEERING CONSULTANTS IN MARCH 2017.
2. FOR CLARITY, NOT ALL SITE FEATURES MAY BE SHOWN.
3. CCR BOUNDARY IS APPROX. 52.5 ACRES.
4. ALL BOUNDARIES AND BORDERS ARE APPROXIMATE.
5. REFER TO APPENDIX A FOR PHOTOGRAPHIC DOCUMENTATION.

REV. NO.	DATE	DESCRIPTION



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FIGURE 3
BOTTOM ASH AREA 1
PHOTO LOG PLAN VIEW

DRAWN BY:	ORC	APPROVED BY:	RDS	PROJ. NO.:	-	DATE:	JANUARY 2018
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APPENDIX A

Annual Inspection Photo Log

Project: Bottom Ash Area 1 Landfill

Photographer: Richard Southorn

Photograph No. 1

Date:

November 6, 2017

Direction:

129° SE

Description:

Observing the run-on divergence channel. This channel was regraded since the previous inspection to improve stormwater flow around the Landfill. Vegetation is becoming established within the regrading area, but does not yet have full coverage.



Photograph No. 2

Date:

November 6, 2017

Direction:

294° NW

Description:

Observing the low water stormwater channel road crossing that conveys water from the run-on divergence channel across the haul road. The channel is lined with concrete at the road crossing location. The recently regraded run-on divergence channel is shown in the foreground. Vegetation has not come fully established yet in the regrading area.



Project: Bottom Ash Area 1 Landfill

Photographer: Richard Southorn

Photograph No. 3

Date:

November 6, 2017

Direction:

72° NE

Description:

Observing the run-on divergence channel. This channel has been regraded since the 2016 Annual Inspection to improve stormwater flow around the Landfill. Vegetation is becoming established within the regrading area, but does not yet have full coverage.



Photograph No. 4

Date:

November 6, 2017

Direction:

37° NE

Description:

Observing bottom ash within the Landfill. No cover soil has been placed. Some vegetation is growing within the bottom ash. It is anticipated that this area will be grubbed and graded before the final cover is added in the future.



Project: Bottom Ash Area 1 Landfill

Photographer: Richard Southorn

Photograph No. 5

Date:

November 6, 2017

Direction:

60° NE

Description:

Observing bottom ash within the Landfill. No cover soils have been placed. Some vegetation is growing within the bottom ash. It is anticipated that this area will be grubbed and graded before the final cover is added in the future.



Photograph No. 6

Date:

November 6, 2017

Direction:

67° NE

Description:

Dried bottom ash is present within the Bottom Ash Surface Impoundment area.



Project: Bottom Ash Area 1 Landfill

Photographer: Richard Southorn

Photograph No. 7

Date:

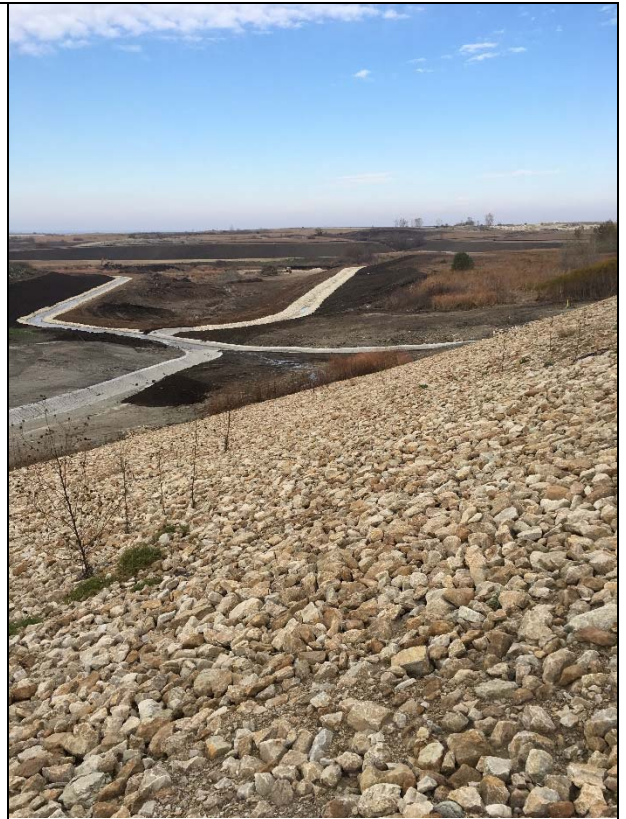
November 6, 2017

Direction:

341° NW

Description:

Photograph shows rip-rap that has been placed on the Bottom Ash Area 1 outer berm/impoundment slope. The rip-rap was installed in 2016 to address seeps that were observed during the 2015 Annual Inspection. Rip-rap placement was ongoing at the time of the 2016 Annual Inspection. The rip-rap appears to be evenly installed with no evidence of migration. No seeps were observed from the wall. Some vegetation is present, but was largely dead due to routine herbicide spraying. The outer slope is in good condition with no stability or erosion issues.



Photograph No. 8

Date:

November 6, 2017

Direction:

310° NW

Description:

Observing a newly lined stormwater channel at the base of the Bottom Ash Area 1. The channel is free of obstructions and appears in good condition.



Project: Bottom Ash Area 1 Landfill

Photographer: Richard Southorn

Photograph No. 9

Date:

November 6, 2017

Direction:

178° SE

Description:

Observing a rip-rap lined stormwater channel at the toe of the bottom ash within Bottom Ash Area 1. The channel is free of obstructions and appears in good condition.



Photograph No. 10

Date:

November 6, 2017

Direction:

20° N

Description:

Observing the ditch base of the Bottom Ash Area 1 berm/impoundment at the location where the ditch lining material changes from rip-rap to erosion control lining. The channels are free of obstructions and functioning as intended.

In the background, the outer slope of Bottom Ash Area 1 is shown. The rip-rap was installed in 2016 to address seeps. No seeps were observed from the wall. Some vegetation is present, but was largely dead due to routine herbicide spraying. The outer slope is in good condition with no stability or erosion issues.



Project: Bottom Ash Area 1 Landfill

Photographer: Richard Southorn

Photograph No. 11

Date:

November 6, 2017

Direction:

4° N

Description:

The perimeter channel and outer slope of Bottom Ash Area 1 is shown. The rip-rap was installed in 2016 to address seeps. No seeps were observed from the wall. Some vegetation is present, but was largely dead due to routine herbicide spraying. The outer slope is in good condition with no stability or erosion issues.



Photograph No. 12

Date:

November 6, 2017

Direction:

53° NE

Description:

Observing the inlet of the outlet standpipe structure of the Bottom Ash Area 1. The structure is working as intended.



Project: Bottom Ash Area 1 Landfill

Photographer: Richard Southorn

Photograph No. 13

Date:

November 6, 2017

Direction:

281° SW

Description:

Observing the bottom ash outlet (center). The outlet structure and channel leading to the outlet are functioning as intended.



Photograph No. 14

Date:

November 6, 2017

Direction:

38° NE

Description:

Observing the stormwater run-on divergence channel. This channel captures stormwater and plant process water that would run onto Bottom Ash Area 1 and directs it around the toe of slope to the west. There are no signs of erosion. The channel is functioning as intended.



Project: Bottom Ash Area 1 Landfill

Photographer: Richard Southorn

Photograph No. 15

Date:

November 6, 2017

Direction:

203° SW

Description:

Observing the Bottom Ash Surface Impoundment within Bottom Ash Area 1. Vegetation is present on the sideslopes.



Photograph No. 16

Date:

November 6, 2017

Direction:

27° NE

Description:

Observing the outlet of an in-line culvert at an access road crossing of the stormwater run-on divergence channel. No evidence of erosion or distress. The culvert showed no signs of buckling or crushing and is functioning as intended. No flow obstructions were observed.



Project: Bottom Ash Area 1 Landfill

Photographer: Richard Southorn

Photograph No. 17

Date:

November 6, 2017

Direction:

86° E

Description:

Observing the inlet of the in-line culvert at an access road crossing of the stormwater run-on divergence channel. Functioning as intended.

