



Liner Design Criteria Report Lawrence Energy Center Inactive Units - Ash Pond Area 2, Ash Pond Area 3, and Ash Pond 4

Prepared for:
Westar Energy
Lawrence Energy Center
Lawrence, Kansas

Prepared by:
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CCR Regulatory Requirements

USEPA CCR Rule Criteria 40 CFR §257.71	Lawrence Energy Center (LEC) Liner Design Criteria Report – Inactive Units 2,3 & 4
<p>§257.71(a)(1) stipulates:</p> <p><i>“(a)(1) No later than October 17, 2016*, the owner or operator of an existing CCR surface impoundment must document whether or not such unit was constructed with any one of the following:</i></p> <p><i>(i) A liner consisting of a minimum of two feet of compacted soil with a hydraulic conductivity of no more than 1×10^{-7} cm/sec;</i></p> <p><i>(ii) A composite liner that meets the requirements of §257.70(b); or</i></p> <p><i>(iii) An alternative composite liner that meets the requirements of §257.70(c).”</i></p> <p>*Note: §257.100(e)(3)(i) stipulates:</p> <p><i>“No later than April 17, 2018, complete the documentation of liner type as set forth by §257.71(a) and (b).”</i></p>	<p>Section 3.1</p>
<p>§257.71(a)(2) stipulates:</p> <p><i>“(2) The hydraulic conductivity of the compacted soil must be determined using recognized and generally accepted methods.”</i></p>	<p>Section 3.2</p>

USEPA CCR Rule Criteria 40 CFR §257.71	Lawrence Energy Center (LEC) Liner Design Criteria Report – Inactive Units 2,3 & 4
<p>§257.71(a)(3) stipulates:</p> <p><i>“(3) An existing CCR surface impoundment is considered to be an existing unlined CCR surface impoundment if either:</i></p> <p><i>(i) The owner or operator of the CCR unit determines that the CCR unit is not constructed with a liner that meets the requirements of paragraphs (a)(1)(i), (ii), or (iii) of this section; or</i></p> <p><i>(ii) The owner or operator of the CCR unit fails to document whether the CCR unit was constructed with a liner that meets the requirements of paragraphs (a)(1)(i), (ii), or (iii) of this section.”</i></p>	<p>Section 3.3</p>
<p>§257.71(a)(4) stipulates:</p> <p><i>“(4) All existing unlined CCR surface impoundments are subject to the requirements of §257.101(a).”</i></p>	<p>Section 3.4</p>
<p>§257.71(b) stipulates:</p> <p><i>“(b) The owner or operator of the CCR unit must obtain a certification from a qualified professional engineer attesting that the documentation as to whether a CCR unit meets the requirements of paragraph (a) of this section is accurate.”</i></p>	<p>Section 5.0</p>
<p>§257.71(c) stipulates:</p> <p><i>“(c) The owner or operator of the CCR unit must comply with the recordkeeping requirements specified in §257.105(f), the notification requirements specified in §257.106(f), and the Internet requirements specified in §257.107(f).”</i></p>	<p>Section 4.0</p>

1.0 INTRODUCTION

APTIM Environmental and Infrastructure, Inc. (APTIM, f/k/a CB&I Environmental & Infrastructure, Inc., CB&I) has prepared this Liner Design Criteria Report (Report) at the request of Westar Energy (Westar) for the inactive Ash Pond Area 2 (Area 2 Ponds), Ash Pond Area 3 (Area 3 Ponds), and the Scrubber Supply Pond (Area 4 Pond) located at the Lawrence Energy Center (LEC) in Lawrence, Kansas.

The Area 2, 3, and 4 Ponds have been deemed to be regulated, inactive CCR units by the United States Environmental Protection Agency (USEPA), through the Disposal of Coal Combustion Residuals from Electric Utilities Final Rule (CCR Rule) 40 CFR §257 and §261. On July 26, 2016 the USEPA extended the CCR Rule requirements for certain inactive CCR surface impoundments. Westar is currently in the process of conducting closure by removal of CCR (per §257.100(b)) within the inactive Area 2, 3, and 4 Ponds to prepare for construction of a Kansas National Pollutant Discharge Elimination System (NPDES) regulated pond system. All facility water containing CCR material is managed in settling tanks. CCR material from the Area 2, 3, and 4 Ponds is being disposed of in Industrial Landfill No. 847. Westar intends to complete closure of the Area 2, 3, and 4 Ponds in 2018.

In support of compliance with the CCR Rule, APTIM has conducted an on-site inspection of the Area 2, 3, and 4 Ponds and reviewed the relevant portions of the facility's operating record, permit application, and historical documentation in relation to this Report. This Report meets the requirements set forth within 40 CFR §257.73(a), based on the review of available information.

2.0 AREA 2, AREA 3, AND AREA 4 PONDS OVERVIEW

Westar owns and operates a series of clarifying ponds for process water at LEC in Douglas County, Kansas. LEC is located approximately 3 miles northwest of Lawrence, Kansas, is bounded by the Kansas River and resides in Sections 13 and 14, Township 12 South, Range 19 East. The locations of the Area 2, Area 3, and Area 4 Ponds are depicted in **Figure 1**.

The ponds are separated into three “areas”, termed Areas 2, 3, and 4, as noted below:

❑ Area 2 Ponds

- Pond 501 (CCR removed and operating)
- Pond 502 (CCR removed and operating)
- Pond 503 (CCR removed and operating)
- Clear Pond (a.k.a. West Pond, in the process of being dewatered and CCR removed)
- Laydown Area (in the process of being dewatered, CCR removed, and incorporated into the Storm Water Settling Pond)
- Storm Water Settling Pond (in the process of being dewatered and CCR removed)

❑ Area 3 Ponds

- Pond 401 (CCR removed and operating)
- Pond 402 (CCR removed and incorporated into Pond 404)
- Pond 403 (CCR removed and incorporated into Pond 404)
- Pond 404 (CCR removed and operating)

- ❑ **Area 4 Pond** – Scrubber Supply Pond (certified CCR removed in May 2017 and removed from service)

The Area 2, 3, and 4 Ponds are regulated impoundments under the CCR Rule and stopped receiving CCR prior to October 2015. Historically the Area 2, 3, and 4 Ponds received CCR material from the plant. The CCR material was deposited in the Area 2, 3, and 4 Ponds while overflow water was discharged to the Kansas River via Outfall 001BV, in line with Kansas NPDES Permit No. I-KS-31-PO09. As each pond was progressively filled, the ponds were dewatered and the CCR material was excavated and placed in Industrial Landfill No. 847. CCR material was distributed to different ponds within each area depending on the availability of capacity.

A perimeter impoundment dike was constructed to surround the LEC ponds and ties into the natural grades near the southern portion of the Area 2 Pond and the eastern portion of the Area 4 Pond. The crest of the perimeter dike is at approximately 839 feet Mean Sea Level (ft MSL) with side slopes at 3H:1V, providing a maximum height of 15 feet located in the northwest section. The crest width is approximately 30 feet. The perimeter dike was originally constructed of silty clay, which was obtained by excavation of existing grades in the area.

Currently a reconfiguration of the Area 2, 3, and 4 Ponds is being undertaken. With the Area 4 Pond closed, plant process water flows from the Area 2 Ponds (with the exception of Ponds 502 and 503) to the Area 3 Ponds prior to discharge to the Kansas River through Outfall 001BV. Site topography prior to closure of the Area 2, 3, and 4 Ponds is depicted in **Figure 2**.

3.0 LINER DESIGN CRITERIA

In accordance with §257.71, the liner design criteria for the subject inactive CCR units has been compiled from available information sources, evaluated for compliance, and is presented in the following subsections.

3.1 Determination of CCR Unit Liner System(s) (§257.71(a)(1))

The Area 2, Area 3, and Area 4 Ponds have been determined to be inactive CCR units. For inactive CCR units, the type of liner must be documented by April 17, 2018 based on §257.100(e)(3)(i). It has been determined that the Area 2, Area 3, and Area 4 Ponds are unlined primarily due to the lack of documentation supporting the “as built” clay liner materials.

3.2 Information Sources Reviewed

APTIM performed a review of the following documentation sources relative to the Area 2, 3 and 4 Ponds liner design/construction:

- Pond Construction and Outlet Structures Drawings, Black & Veatch, 1969.
- Engineering Investigation of the Earthen Lagoons at the Lawrence Energy Center - Volume 1 of 2, Western Resources, 1999.
- Evaluation of Ash Pond Berm Stability, Westar Energy –Lawrence Energy Center, Golder Associates, 2009.
- Coal Combustion Waste – Impoundment Inspection Form, Lawrence Energy Center, USEPA, 2009.
- Letter Summary Surface Impoundment Sampling, Lawrence Energy Center, Terracon, 2009.
- Coal Combustion Dam Inspection Checklist, Lawrence Energy Center, USEPA, 2010.
- Coal Combustion Waste Impoundment Round 7-Dike Assessment Report, Lawrence Energy Center, Ash Impoundment Dike Westar Energy, Dewberry & Davis , 2011.
- Letter Summary Surface Impoundment Sampling, Lawrence Energy Center, Terracon, 2014.
- Memorandums – Notification of Intent to Initiate Closure of an Inactive CCR Surface Impoundment, Ash Pond Area 2, Ash Pond Area 3, and Ash Pond 4, Lawrence Energy Center, Haley Aldrich, 2015.
- Annual Inspection Report, Lawrence Energy Center, Inactive Units – Ash Pond Area 2, Ash Pond Area 3, and Ash Pond 4, CB&I Environmental & Infrastructure, Inc., 2017.
- History of Construction Report, Lawrence Energy Center, Inactive Units –Ash Pond Area 2, Ash Pond Area 3, and Ash Pond 4, APTIM, 2017.

3.2.1 Area 2 Ponds Liner Information

Based on the review of the available construction history documentation for the inactive CCR Units, within the Area 2 Pond system; Pond 501 and Pond 502 were constructed with a clay liner system, however, supporting documentation for the “as-built” clay liner thickness, compaction specifications, and hydraulic conductivity data was not readily available and therefore, could not be verified by the Certifying Engineer. In 2010, following CCR removal activities, an 18-inch thick clay liner was placed over the bottom and inner slopes of the Pond 503 and Clear Pond however, the extent of the clay liner within these ponds also could not be verified and are therefore considered to be unlined ponds. The remaining Area 2 Ponds (Storm Water Settling Pond and Laydown Area) were not constructed with any type of liner system.

3.2.2 Area 3 Ponds Liner Information

Within the Area 3 Pond system; Ponds 401, 402, and 403 were constructed with clay liners. Pond 404 historically received CCR waters, which Westar previously excavated and removed, and then reportedly placed an 18-inch thick clay liner in that area for continued non-CCR process water management.

Supporting documentation for the “as-built” clay liner thickness, compaction specifications, and hydraulic conductivity data was not available for review, and therefore could not be verified for any of the Area 3 Ash Ponds.

3.2.3 Area 4 Pond Liner Information

Ash Pond 4 (Scrubber Supply Pond) was unlined at construction, however closure of this former CCR unit was undertaken in August 2016, and closure by removal of CCR was completed and certified in May 2017.

3.3 Liner Design Conclusions (§257.71(a)(3))

The Area 2, 3, and 4 Ponds do not meet the requirements of 40 CFR Part §257.71 for the existing, inactive CCR units, primarily due to the lack of documentation supporting the “as built” clay liner materials. The Rule states that existing CCR surface impoundments are considered unlined if “*the owner or operator of the CCR unit fails to document whether the CCR unit was constructed with a liner that meets the requirements of paragraphs (a)(1)(i), (ii) or (iii) of this section.*” The Area 2, 3, and 4 Ponds are considered to be unlined.

3.4 Existing Unlined CCR Surface Impoundment Requirements (§257.71(a)(4))

According to §257.71(a)(4) of the Rule, existing unlined CCR surface impoundments are subject to the requirements in §257.101(a). This requires that if the concentrations of constituents in Appendix IV of the CCR Rule are detected at levels greater than the groundwater protection standard established under §257.95(h), the surface impoundment must cease accepting CCR and non-CCR wastestreams and either be retrofitted or closed in accordance with §257.102. However, the Area 2, 3, and 4 Ponds have not received CCR material prior to October 2015 and are currently dewatered and undergoing closure by removal of CCR, which is anticipated to be completed in 2018.

4.0 RECORDS RETENTION AND MAINTENANCE

4.1 Incorporation of Report into Operating Record

§257.105(f) 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(f) stipulates:

§257.105(f): "(f) Design 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: (2) The documentation of liner type as required by §257.71(a)."

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

4.2 Notification Requirements

§257.106(f) of 40 CFR Part §257 provides guidelines for the notification of the availability of the Report. Specifically, §257.106(f) stipulates:

§257.106(f): "(f) Design 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: (3) Provide notification of the availability of the documentation of liner type specified under §257.105(f)(2)."

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

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

§257.107(f): "(f) Design 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: (3) The documentation of liner type specified under §257.105(f)(2)."

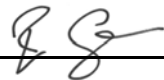
This Report will be uploaded to Westar's CCR Compliance Reporting Website upon Westar's review and approval.

5.0 PROFESSIONAL ENGINEER CERTIFICATION (§257.71(b))

The undersigned registered professional engineer is familiar with the requirements of the CCR Rule and examined LEC or has supervised examination of the LEC by appropriately qualified personnel. I hereby certify based on a review of available information within the facility's operating records, that the Area 2, 3, and 4 Ponds do not meet the Liner Design Criteria. This certification was prepared as required by 40 CFR Part §257.71(b).

Name of Professional Engineer: Richard Southorn

Company: APTIM

Signature: 

Date: 04/16/18

PE Registration State: Kansas

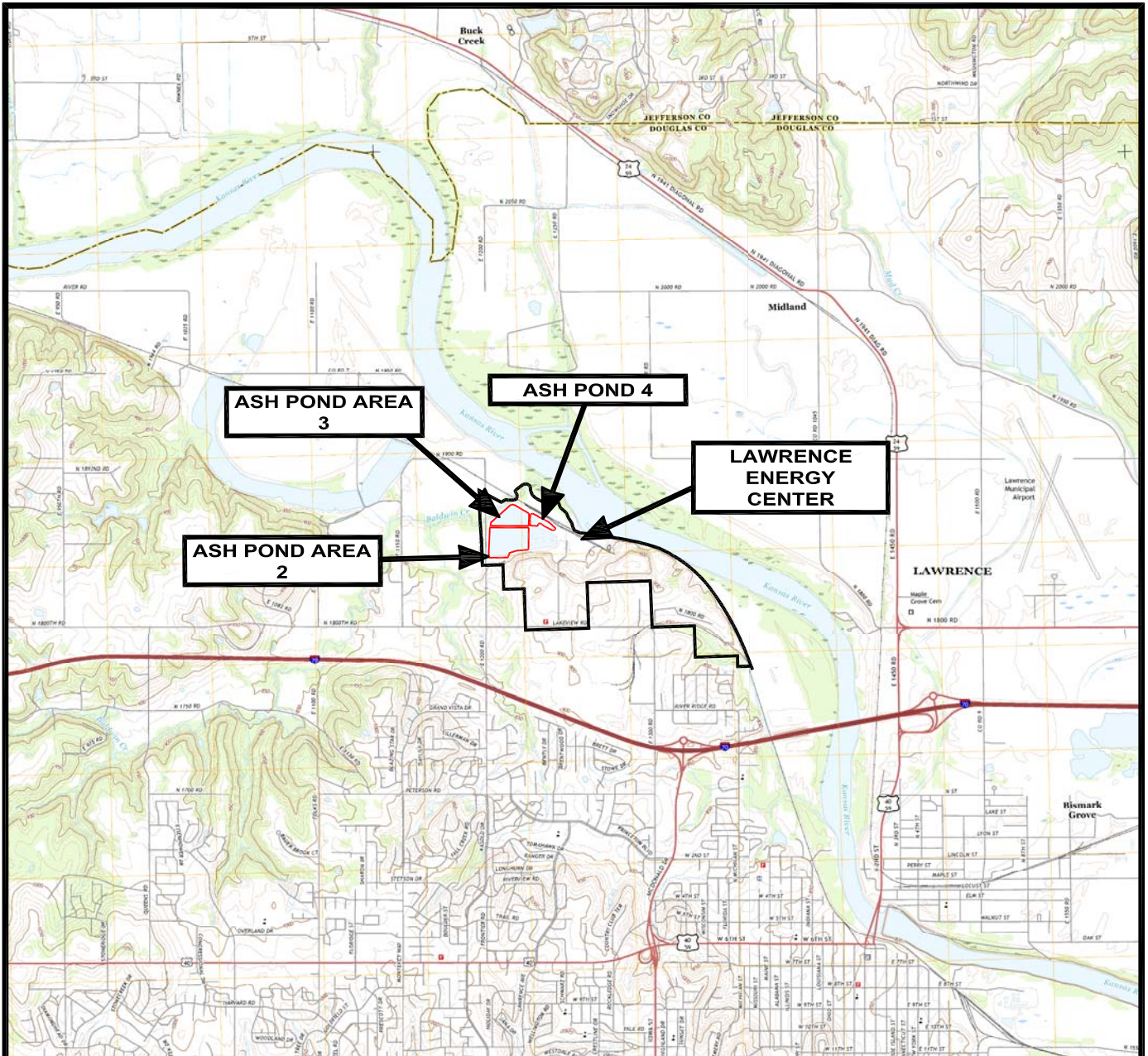
PE Registration Number: PE25201

Professional Engineer Seal:



FIGURES

- Figure 1 - Inactive Units – Ash Pond Area 2, Ash Pond Area 3, Ash Pond 4, Site Location Plan
- Figure 2 - Inactive Units – Ash Pond Area 2, Ash Pond Area 3, Ash Pond 4, Site Topography Prior to Closure



LEGEND

- LAWRENCE ENERGY CENTER FACILITY BOUNDARY
- CCR UNIT BOUNDARY

NOTES

1. AERIAL TOPO OBTAINED FROM USGS 7.5-MINUTE SERIES, LAWRENCE EAST, LAWRENCE WEST, MIDLAND AND WILLIAMSTOWN QUADRANGLE, KANSAS, 2014.
2. ALL BOUNDARIES ARE APPROXIMATE.



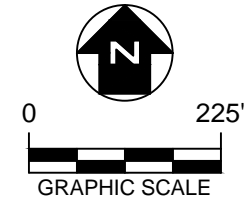
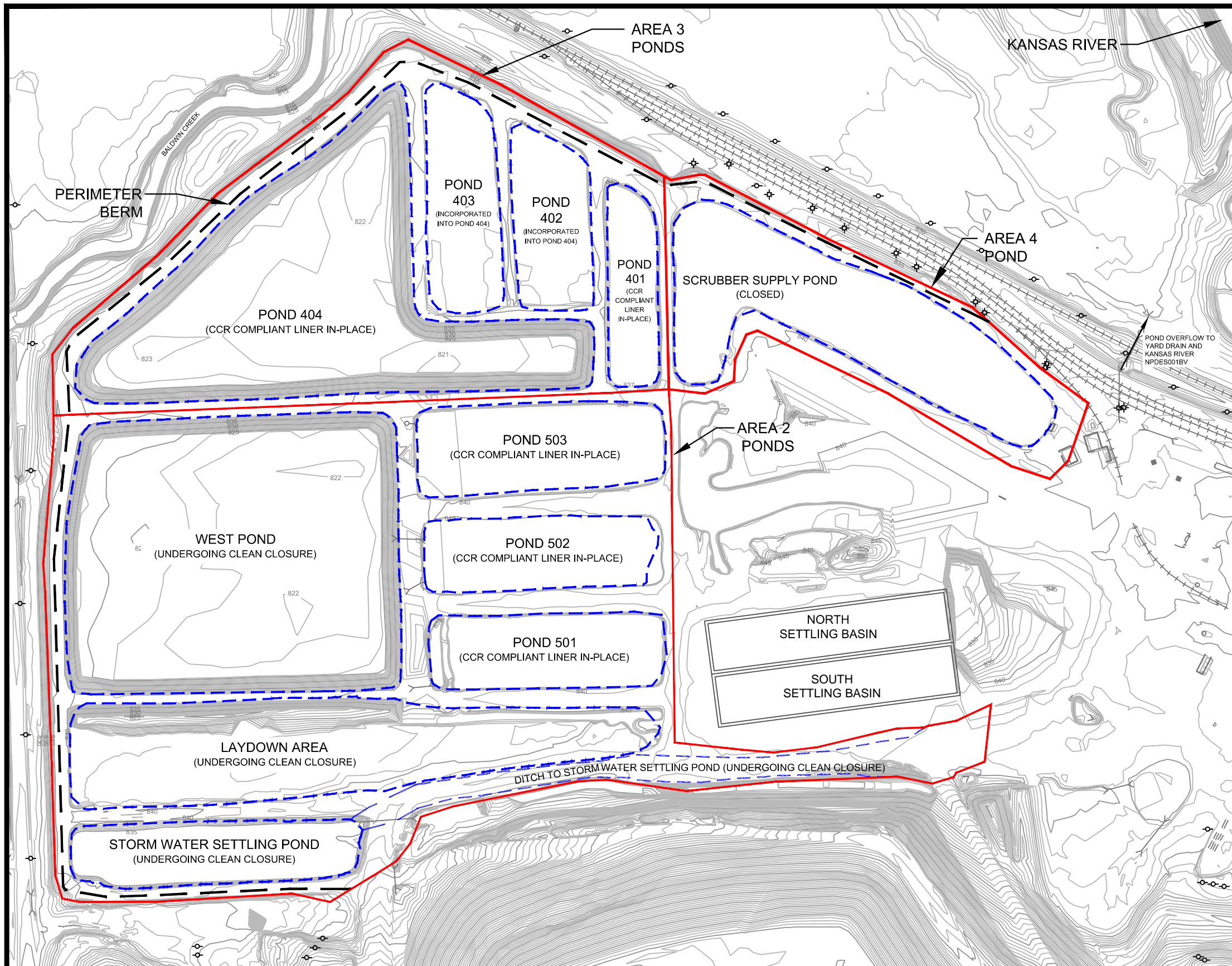
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**LAWRENCE ENERGY CENTER
1250 N. 1800 RD., LAWRENCE, KS.**

**FIGURE 1
INACTIVE UNITS - ASH POND AREA 2, ASH POND AREA 3, ASH POND 4
SITE LOCATION PLAN**

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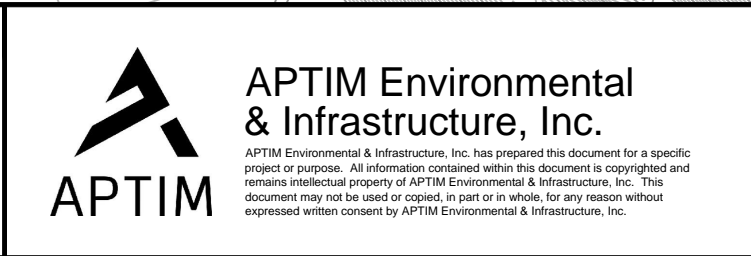
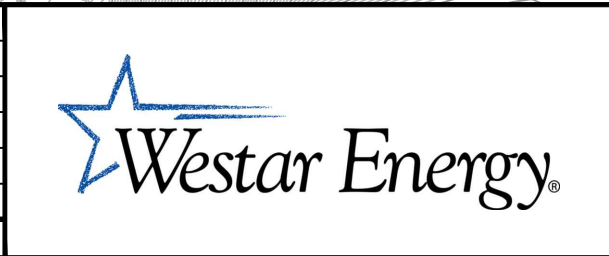
LEGEND

- APPROXIMATE POND AREA BOUNDARY
- - - APPROXIMATE POND BOUNDARY
- - - APPROXIMATE PERIMETER DIKE LOCATION

NOTES

1. EXISTING CONTOURS DEVELOPED FROM SITE AERIAL TOPOGRAPHIC SURVEY BY PEC IN JUNE 2016.
2. FOR CLARITY, NOT ALL SITE FEATURES MAY BE SHOWN.
3. ALL BOUNDARIES AND FEATURE LOCATIONS ARE APPROXIMATE.

REV. NO.	DATE	DESCRIPTION



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**FIGURE 2
INACTIVE UNITS - ASH POND AREA 2, ASH POND AREA 3, ASH POND 4
SITE TOPOGRAPHY PRIOR TO CLOSURE**

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