Closure Plan

Existing CCR Impoundment
40 CFR 257.102(b)

Asbury Power Plant

2133 Uphill Road
Asbury, Missouri 64832

October 17, 2016

Prepared For:

The Empire District Electric Company
602 S. Joplin Avenue
Joplin, Missouri 64801

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1.0 INTRODUCTION

257.102 Criteria for conducting the closure or retrofit of CCR units. (a) Closure of a CCR landfill, CCR surface impoundment, or any lateral expansion of a CCR unit must be completed either by leaving the CCR in place and installing a final cover system or through removal of the CCR and decontamination of the CCR unit, as described in paragraphs (b) through (j) of this section. Retrofit of a CCR surface impoundment must be completed in accordance with the requirements in paragraph (k) of this section.

40 CFR 257.102(b) of the CCR Rule requires the development of written closure plan for CCR surface impoundments. The Empire District Electric Company's Asbury Power Plant has one CCR Impoundment. The site occupies the north half of Section 17, Township 30 North, and Range 33 West on the Asbury 7.5-Minute Quadrangle Map as seen in **Figure 1**. Empire anticipates that a portion of the impoundment will be clean closed while the remaining portion will be closed by leaving CCR in place.

2.0 PLAN CERTIFICATION 257.102(B)(4)

The undersigned Professional Engineer (P.E.) is familiar with the requirements of 40 CFR Part 257. The attached CCR closure plan for the existing CCR Impoundment at the Asbury Power Plant has been prepared in accordance with the requirements of 257.102(b), Initial Written Closure Plan for a CCR Surface Impoundment.

Name: Lindsey R. Henry, P.E.

Signature: _____

Date: October 17, 2016

Registration Number: E-21592

State: Missouri

Seal

3.0 WRITTEN CLOSURE PLAN

257.102(b) Written closure plan—(1) Content of the plan. The owner or operator of a CCR unit must prepare a written closure plan that describes the steps necessary to close the CCR unit at any point during the active life of the CCR unit consistent with recognized and generally accepted good engineering practices. The written closure plan must include, at a minimum, the information specified in paragraphs (b)(1)(i) through (vi) of this section.

This closure plan is being prepared in accordance with 257.102(b) to outline the steps necessary to close the CCR impoundment at the Asbury Power Plant. This plan has been prepared in accordance with generally accepted good engineering practices.

3.1 Narrative

257.102(b)(1)(i) A narrative description of how the CCR unit will be closed in accordance with this section.

The CCR Impoundment that serves the Asbury Power Plant is approximately 116.5 acres. The CCR Impoundment is subdivided into three (3) operational Ponds, identified as the Lower Pond, Upper Pond, and South Pond (**Figure 2**). The Lower Pond, Upper Pond, and South Pond are separated by interior earthen berms, and can be hydraulically separated from one another for operational purposes. At this time it is anticipated that the Upper and South Ponds will be clean closed. This area encompasses approximately 36.5 acres. The Lower Pond area is approximately 80 acres and will be closed by leaving the CCR in place.

Any free liquids contained in the Upper and South Ponds will be pumped to the Lower Pond. Remaining CCR and other CCR contaminated soils will be relocated to the Lower Pond. Upon completion of clean closure the Upper and South Ponds the area will be utilized as stormwater control basins to serve the plant. Additional information is presented in Section 3.2 below.

Free liquids in the Lower Pond will be removed to the extent possible, and the existing CCR materials within the Lower Pond will be sufficiently stabilized to support the placement of the final fill and final cover system. Any discharge will be through a NPDES permitted outfall. This discharge will be in compliance with the current NPDES permit. The CCR materials will be graded to provide positive drainage of stormwater. A final cover system will be installed to minimize infiltration and erosion. Additional information is presented in Section 3.3 below.

3.2 CCR Removal

257.102(b)(1)(ii) If closure of the CCR unit will be accomplished through removal of CCR from the CCR unit, a description of the procedures to remove the CCR and decontaminate the CCR unit in accordance with paragraph (c) of this section.

Prior to beginning closure of the Upper and South Pond areas improvements must be completed at the Asbury Power Plant. This includes the construction of a new bottom ash dewatering system. Other improvements to the stormwater management system will also need to be completed to allow these areas to be clean closed.

Any free liquids contained in the Upper and South Ponds will be pumped to the Lower Pond. Remaining CCR will be relocated by mechanical methods to the Lower Pond. Any CCR

contaminated soils will also be removed and relocated in the Lower Pond of the CCR Impoundment. The underlying soils will be visually observed to determine if any CCR materials are still present. Any residual contamination will be excavated for relocation to the Lower Pond.

Upon completion of clean closure these two areas will be utilized as stormwater control basins to serve the plant.

3.3 CCR Left in Place

> *257.102(b)(1)(iii) If closure of the CCR unit will be accomplished by leaving CCR in place, a description of the final cover system, designed in accordance with paragraph (d) of this section, and the methods and procedures to be used to install the final cover. The closure plan must also discuss how the final cover system will achieve the performance standards specified in paragraph (d) of this section.*

The CCR in the Lower Pond will be placed and graded to provide positive drainage of stormwater. The final cover system will be designed and constructed to meet the criteria in paragraphs 257.102(d)(3)(i). The infiltration layer will have permeability no less than 1×10^{-5} cm/sec. The infiltration layer will have a minimum thickness of 18 inches of earthen material.

The final cover system will be minimized by the use of an erosion layer that contains a minimum of six inches of earthen material. This material will be capable of sustaining vegetative plant growth. The integrity of the final cover system will be designed to accommodate settling and subsidence.

Empire may propose an alternative final cover system to complete closure of the Lower Pond. If an alternative final cover system is proposed this closure plan will be modified as discussed in Section 3.8.

3.4 Maximum CCR Inventory

> *257.102(b)(1)(iv) An estimate of the maximum inventory of CCR ever on-site over the active life of the CCR unit.*

At present Empire can only provide a CCR inventory number estimate based upon the total tons of coal burned at the power plant. Various factors including the type of coal burned, were utilized to determine the percentage of ash per ton of coal. The total amount of CCR that could be on site is estimated to be 2,461,000 cubic yards. This estimate is thought to be very conservative. Over the life of the power plant CCR has been sold to other contractors for beneficial use. During the design process for the closure of the facility additional surveying and volume calculations will be completed.

3.5 Maximum CCR Area

> *257.102(b)(1)(v) An estimate of the largest area of the CCR unit ever requiring a final cover as required by paragraph (d) of this section at any time during the CCR unit's active life.*

The total area of the CCR Impoundment that serves the Asbury Power Plant is approximately 116.5 acres. The area that is anticipated to be clean closed is approximately 36.5 acres. The

Lower Pond will require the placement of a final cover since this area will be closed by leaving the CCR in place. The area requiring a final cover is estimated to be 80 acres.

3.6 Schedule

257.102(b)(1)(vi) A schedule for completing all activities necessary to satisfy the closure criteria in this section, including an estimate of the year in which all closure activities for the CCR unit will be completed. The schedule should provide sufficient information to describe the sequential steps that will be taken to close the CCR unit, including identification of major milestones such as coordinating with and obtaining necessary approvals and permits from other agencies, the dewatering and stabilization phases of CCR surface impoundment closure, or installation of the final cover system, and the estimated timeframes to complete each step or phase of CCR unit closure. When preparing the written closure plan, if the owner or operator of a CCR unit estimates that the time required to complete closure will exceed the timeframes specified in paragraph (f)(1) of this section, the written closure plan must include the site-specific information, factors and considerations that would support any time extension sought under paragraph (f)(2) of this section.

Closure of the existing CCR surface impoundment is anticipated to require approximately 17 months. The schedule provided below assumes a construction initiation date of May 2020 with completion of closure by October 2021. Below is a discussion of the milestones required for the closure of the CCR impoundment. These timeframes are initial estimates and may need to be amended based upon unforeseen circumstances.

Milestone	Date
Written Closure Plan placed on webpage	October 17, 2016
Meet with MDNR to Discuss Specific Closure Requirements	December 2016
Obtain Topographic Mapping for Site	April 2017
Submit Closure Plan to MDNR	October 2017
Completion of Bottom Ash Dewatering System	October 2018
Stormwater Improvements for Impoundments	June 2019
Prepare Bid Documents	January 2020
Award Closure Contract	March 2020
Begin Clean Closure of Upper and South Pond	May 2020
Begin Grading Lower Pond	May 2021
Complete Final Cover Placement	October 2021
Begin Post-Closure Care	November 2021

4.0 NOTIFICATION

257.102(b)(2)(iii) The owner or operator has completed the written closure plan when the plan, including the certification required by paragraph (b)(4) of this section, has been placed in the facility's operating record as required by § 257.105(i)(4).

Empire will post the written closure plan to their website by October 17, 2016. In addition, the State Director will be notified of the completion of this plan and subsequent placement on the website.

5.0 CLOSURE PLAN AMENDMENT

257.102(b)(3) Amendment of a written closure plan.
(i) The owner or operator may amend the initial or any subsequent written closure plan developed pursuant to paragraph (b)(1) of this section at any time.
(ii) The owner or operator must amend the written closure plan whenever: (A) There is a change in the operation of the CCR unit that would substantially affect the written closure plan in effect; or (B) Before or after closure activities have commenced, unanticipated events necessitate a revision of the written closure plan.
(iii) The owner or operator must amend the closure plan at least 60 days prior to a planned change in the operation of the facility or CCR unit, or no later than 60 days after an unanticipated event requires the need to revise an existing written closure plan. If a written closure plan is revised after closure activities have commenced for a CCR unit, the owner or operator must amend the current closure plan no later than 30 days following the triggering event.

The proposed closure plan may be amended as required to provide a revised closure plan or a revised closure schedule. This amended closure plan should be posted to the website and the State Director shall be notified of the placement of the amended closure plan on the website.

6.0 CERTIFICATION

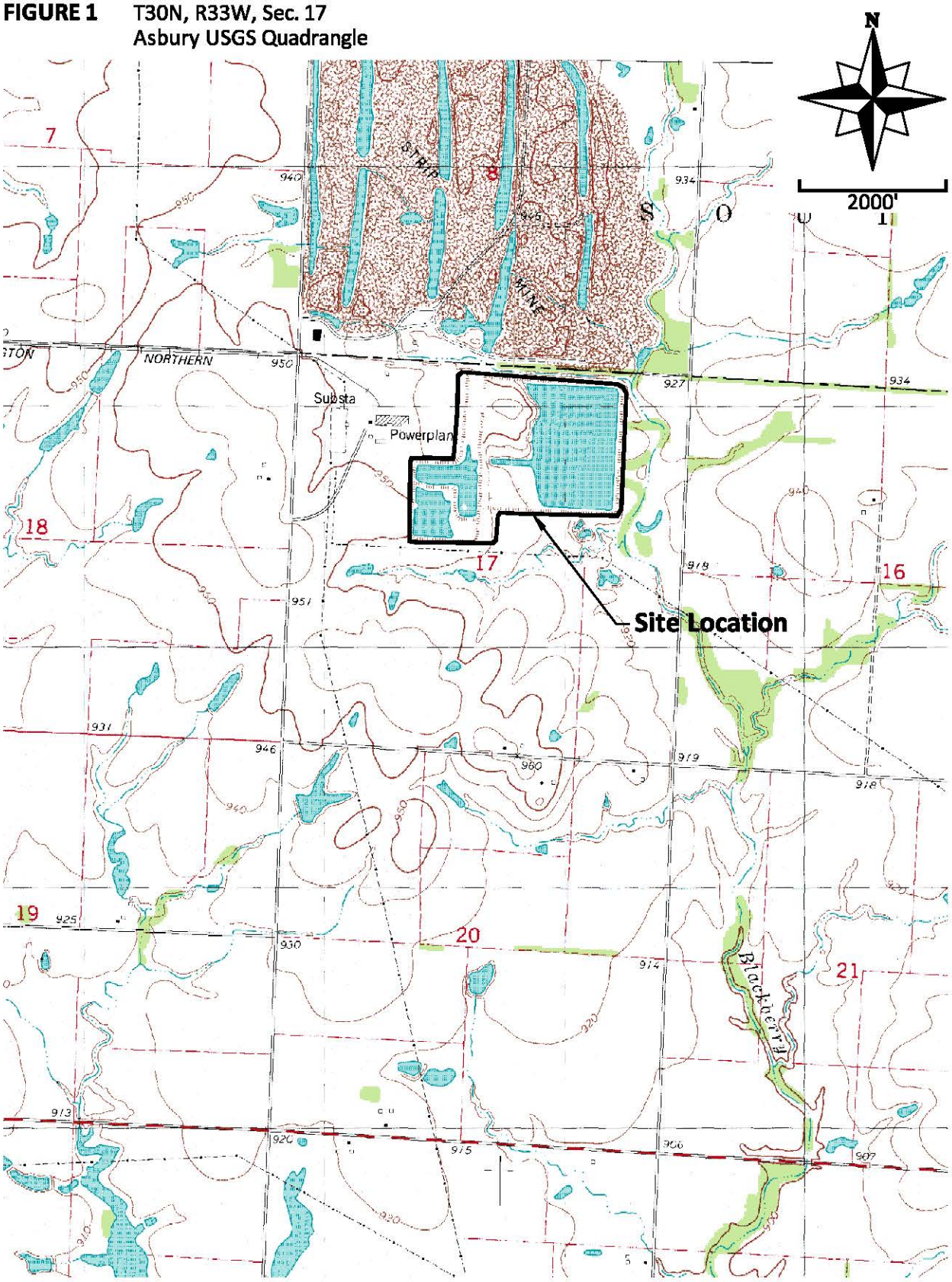
257.102(b)(4) The owner or operator of the CCR unit must obtain a written certification from a qualified professional engineer that the initial and any amendment of the written closure plan meets the requirements of this section.

This closure plan has been certified in Section 2.0 of this report. Any amendments to this original closure plan must also be certified by a qualified professional engineer.

FIGURES

Asbury Power Plant
Closure Plan - Existing CCR Impoundment
Site Location Map

FIGURE 1 T30N, R33W, Sec. 17
Asbury USGS Quadrangle



October 2016

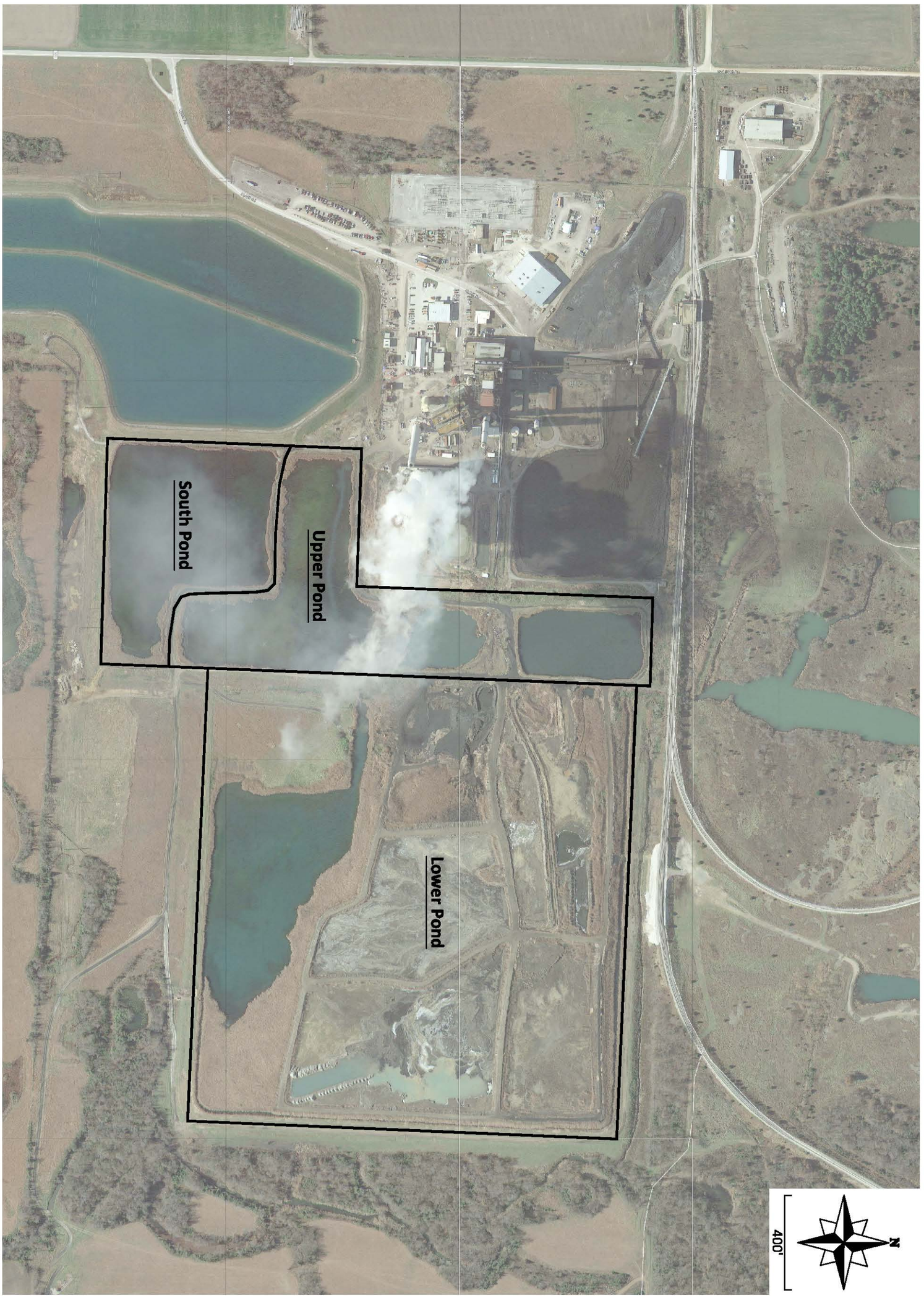


FIGURE 2

October 2016

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Asbury Power Plant
Closure Plan - Existing CCR Impoundment
Impoundment Layout