



# Ottumwa Generating Station - Closure Plan for the Surface Impoundments



**Interstate Power and Light Company**

**Revision 0  
October 31, 2022**



# Ottumwa Generating Station - Closure Plan for the Surface Impoundments

Prepared for

**Interstate Power and Light Company**

Ottumwa, Iowa

Revision 0  
October 31, 2022

Prepared by

**Burns & McDonnell Engineering Company, Inc.**  
**Kansas City, Missouri**

# INDEX AND CERTIFICATION

## **Interstate Power and Light Company** **Closure Plan for the Surface Impoundments**

### Report Index

<u>Chapter Number</u>	<u>Chapter Title</u>	<u>Number of Pages</u>
1.0	Introduction	1
2.0	Details of Closure	5
3.0	Final Closure Schedule	2
4.0	Record of Revisions and Updates	1
5.0	Revisions and Amendments	1
6.0	References	1
Appendix A	Site Plan	1

### CERTIFICATION

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.



10/31/2022

---

(signature)

(date)

Typed or Printed Name: Robert N. Owens, P.E.

License number P20609

My License renewal date is December 31, 2022

## TABLE OF CONTENTS

	<u>Page No.</u>
<b>1.0 INTRODUCTION .....</b>	<b>1</b>
<b>2.0 DETAILS OF CLOSURE.....</b>	<b>2-1</b>
2.1 Surface Impoundments Description .....	2-1
2.1.1 CCR Inventory and Extent .....	2-1
2.2 Closure by Removal of CCR - Zero Liquid Discharge (ZLD) Pond.....	2-1
2.3 Closure in Place - CCR Consolidation OGS Bottom Ash Pond .....	2-2
2.4 Closure in Place – Evaluation of Groundwater Levels at the OGS Bottom Ash Pond.....	2-2
2.5 Closure in Place - Final Cover System OGS Bottom Ash Pond .....	2-3
2.5.1 Geometry and Stormwater Management .....	2-4
2.5.2 Integrity of the Final Cover .....	2-5
<b>3.0 FINAL CLOSURE SCHEDULE.....</b>	<b>3-1</b>
<b>4.0 RECORD OF REVISIONS AND UPDATES.....</b>	<b>4-1</b>
<b>5.0 REVISIONS AND AMENDMENTS.....</b>	<b>5-1</b>
<b>6.0 REFERENCES.....</b>	<b>6-1</b>
 <b>APPENDIX A – SITE PLAN</b>	
_Toc118119690	

## LIST OF ABBREVIATIONS

<b><u>Abbreviation</u></b>	<b><u>Term/Phrase/Name</u></b>
BMcD	Burns & McDonnell (IPL's Owner's Engineer)
CCR	Coal Combustion Residual(s)
CCR Rule	Coal Combustion Residuals Rule
CFR	Code of Federal Regulations
IPL	Interstate Power and Light Company
EPA	Environmental Protection Agency
GCL	Geosynthetic Clay Liner
IDNR	Iowa Department of Natural Resources
RCRA	Resource Conservation and Recovery Act
S&L	Sargent & Lundy
OGS	Ottumwa Generating Station
ZLD	Zero Liquid Discharge

## 1.0 INTRODUCTION

On April 17, 2015, the Environmental Protection Agency (EPA) issued the final version of the federal Coal Combustion Residuals (CCR) Rule to regulate the disposal of coal combustion residual materials generated at coal-fired units. The rule is administered as part of the Resource Conservation and Recovery Act (RCRA, 42 United States Code [U.S.C.] §6901 et seq.), using the Subtitle D approach.

The Initial Closure Plan was submitted in September of 2016 by Sargent & Lundy in accordance with 40 CFR 257.100(e)(6) and 257.102(b) and amended with Amendment No. 1 in November of 2020 by Burns & McDonnell. Interstate Power and Light Company (IPL) is submitting this as a replacement to the Closure Plan for the impoundments at the Ottumwa Generating Station (OGS).

According to §257.102(b)(1), the Closure Plan must contain the following:

- A description of how the CCR unit will be closed.
  - For in-place closure: A description of the final cover system, a description of the methods for installing the final cover system, and a discussion of how the final cover system will achieve the performance standards outlined in §257.102(d).
  - For closure by removal: A description of the procedures to remove the CCR and decontaminate the CCR unit in accordance with §257.102(c).
- An estimate of the maximum inventory of CCR ever on-site over the active life of the CCR unit e.
- An estimate of the largest area of the CCR unit ever requiring a final cover as required by §257.102(d) at any time during the CCR unit's active life.
- A schedule for completing closure activities, including the anticipated year in which all closure activities for the CCR unit will be completed and major milestones for permitting and construction activities.

The seal on this report certifies that this document meets the requirements of 40 CFR §257.102(b). This closure plan is in addition to, not in place of, any other applicable site permits, environmental standards, or work safety practices.

## 2.0 DETAILS OF CLOSURE

### 2.1 Surface Impoundments Description

OGS is located on the west bank of the Des Moines River near Chillicothe, Iowa. OGS has two surface impoundments, the Zero Liquid Discharge (ZLD) Pond and the OGS Bottom Ash Pond (See Appendix A.) The impoundments are located on the east side of OGS between the power plant and the Des Moines River. This Closure Plan will replace the Closure Plan previously submitted in September 2016 by Sargent and Lundy and amended with Amendment No.1 by Burns & McDonnell in November of 2020. It outlines the plan to close by removal of CCR of the ZLD and consolidate and close in place the OGS Bottom Ash Pond. CCR plus one foot of over excavation has been removed from the ZLD Pond. CCR has been consolidated from the northern portion the OGS Bottom Ash Pond to the southern portion of the pond. A new concrete lined wastewater treatment pond was constructed in this location after the consolidation took place. This plan will also outline steps to remove CCR potentially in contact with groundwater within the northern area of the OGS Bottom Ash Pond. The consolidated and remaining CCR will be covered with a final cover system described in Section 2.5.

#### 2.1.1 CCR Inventory and Extent

The ZLD Pond footprint was approximately 23 acres and contained an estimated 97,300 cubic yards of CCR material prior to excavation, which is estimated to be the maximum amount of CCR stored in the unit during its active life. The original footprint of the OGS Bottom Ash Pond covers approximately 39 acres. Approximately five acres of the OGS Bottom Ash Pond will be consolidated in the remaining 34 acres of OGS Bottom Ash Pond and will be graded and covered with the final cover system. There will be approximately 437,000 cubic yards of CCR material and CCR-impacted soils capped in the southern portion of the OGS Bottom Ash Pond, which is estimated to be the maximum amount of CCR stored in the unit during its active life. This number is different from previous estimates and is a result of further data investigations performed to obtain a more accurate volume of CCR stored.

### 2.2 Closure by Removal of CCR - Zero Liquid Discharge (ZLD) Pond

As described in the original Closure Plan submitted by Sargent and Lundy in September of 2016 and amended by Burns & McDonnell in November of 2020, the ZLD Pond met the CCR rule for the definition of an inactive CCR surface impoundment. The ZLD pond is currently being closed in accordance with 40 CFR 257.102(c).

Removal of CCR material from the ZLD Pond was performed by dewatering, excavating, loading, and hauling the material for compaction and disposal. Dewatering was performed and the water generated

during dewatering was discharged in accordance with the Iowa Department of Natural Resources Pollutant Discharge Elimination System (NPDES) permit (#9000101) through the existing Outfall 001 onsite. All CCR has been removed from the footprint of the ZLD Pond plus an additional one foot of native soil to bring the total amount of material excavated to be approximately 147,000 cubic yards. A visual inspection by an Iowa Registered Professional Engineer was performed to confirm CCR removal during the removal period which was completed in October of 2021. Completion of closure in the ZLD Pond will be verified by continued monitoring of groundwater and closure will be complete when groundwater monitoring concentrations do not exceed the groundwater protection standard established pursuant to 257 for constituents listed in Appendix IV of the CCR Rule.

### **2.3 Closure in Place - CCR Consolidation OGS Bottom Ash Pond**

The design plan has been modified from the initial issue of the closure plan to consolidate CCR by removing it from the northern portion (five acres) of the OGS Bottom Ash Pond and placing it in the southern portion of the OGS Bottom Ash Pond to make room for a concrete-lined air heater wash basin. Visual observations were conducted in June of 2022 to verify that all CCR material was removed from the northern portion of the OGS Bottom Ash Pond. After completion of the CCR removal a new concrete-lined air heater wash basin was constructed in the northern portion of the impoundment. Groundwater monitoring will continue in the northern portion of the OGS Bottom Ash Pond area as required. No adjustments to the groundwater monitoring network will occur in the northern portion unless it can be shown that groundwater quality in the area where CCR was removed meets groundwater protection standards established pursuant to §257.95(h).

### **2.4 Closure in Place – Evaluation of Groundwater Levels at the OGS Bottom Ash Pond**

Wells were installed by SCS Engineers in April of 2022 to determine groundwater elevations in the vicinity of the OGS Bottom Ash Pond. Groundwater elevations indicated potential interactions between groundwater and ash in the northern portion of the OGS Bottom Ash Pond, which was fully excavated, and in approximately 13% of the area (4.5 acres) of southern portions of the OGS Bottom Ash Pond. The areas estimated to be in contact with groundwater were determined by taking the estimated potentiometric groundwater surface and comparing to original construction drawings of the OGS Bottom Ash Pond. This is a conservative approach due to the presence of a clay layer at the OGS Bottom Ash Pond that is likely creating separation between CCR and groundwater in many areas (i.e., the groundwater may be lower than the potentiometric elevations).



Areas with potential contact between the CCR and groundwater are being excavated to native material, with a visual inspection to confirm CCR material has been removed from these areas and temporarily stockpiled within the OGS Bottom Ash Pond footprint. Clean fill material (local clay) is being brought in to bring grades up to the expected high groundwater table. The CCR will then be regraded above this elevation and covered with the final cover system described in Section 2.5. This activity will minimize or eliminate the potential for future CCR and groundwater contact. The CCR is being relocated so there will not be an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the CCR unit and the uppermost aquifer due to normal fluctuations in groundwater elevations (including the seasonal high-water table).

## **2.5 Closure in Place - Final Cover System OGS Bottom Ash Pond**

Pursuant to §257.102(d)(3)(i), the final cover system must be designed and constructed to meet the following criteria:

- Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than  $1 \times 10^{-5}$  centimeters per second (cm/sec), whichever is less.
- The infiltration of liquids through the closed CCR unit must be minimized by use of an infiltration layer that contains a minimum of 18 inches of earthen material.
- The erosion of the final cover system must be minimized by use of an erosion layer that contains a minimum of six inches of earthen material capable of sustaining native plant growth.
- The disruption of the integrity of the final cover system must be minimized through a design that accommodates settling and subsidence.
- The owner or operator may select an alternative final cover system design, provided the alternative final cover system meets the above requirements.

Because the OGS Bottom Ash Pond lacks a bottom liner system and the natural subsoils present are cohesive clays mixed with sandy soils, the cover system was designed to meet a minimum permeability of  $1 \times 10^{-7}$  cm/sec to ensure the cover system will have a permeability less than the bottom soil layers.

The final cover system will consist of a layer of 18 inches of compacted soil meeting the permeability stated above and a six-inch vegetative soil cover. Ditches along the perimeter and interior of the impoundment will be covered with a Hydroturf cover system which consists of a 40-mil Low Density Polyethylene with synthetic grass and a binder infill to limit erosion in the swales.

Closure activities will require drainage (unwatering of free water and dewatering of separable porewater) to allow for stabilization of the existing CCR material, placement of fill, regrading of CCR material, and installation of a final cover system over the CCR material to minimize erosion and infiltration.

Unwatering and dewatering activities have been and will continue to be performed throughout construction, as necessary, to manage surface water and storm water runoff. The water generated from the unwatering and dewatering activities is being discharged in accordance with the Iowa Department of Natural Resources Pollutant Discharge Elimination System (NPDES) Permit #9000101 through the existing Outfall 001 onsite.

The OGS Bottom Ash Pond has its own dedicated groundwater monitoring network and will continue to be sampled and analyzed for the constituents listed in Appendix III and Appendix IV of 40 CFR § 257. CCR removal and decontamination in the excavated areas of northern portions of the OGS Bottom Ash Pond will be considered complete when constituent concentrations are below the Groundwater Protection Standards (GWPS) pursuant to 40 CFR § 257.95(h), as outlined in 40 CFR § 257.102(c) of the CCR Rule. The facility is currently assessing potential corrective measures to address cobalt exceedances observed downgradient of the OGS Bottom Ash Pond.

### **2.5.1 Geometry and Stormwater Management**

The geometry and stormwater management controls of the closed impoundment will allow the CCR unit to meet the following requirements as outlined in §257.102(d) of the CCR Rule:

- Control, minimize or eliminate, to the maximum extent feasible, post-closure infiltration of liquids into the waste and releases of CCR, leachate, or contaminated run-off to the ground or surface waters or to the atmosphere.
- Prevent future impoundment of water.
- Provide for slope stability to protect against sloughing or movement of the final cover system.

The final cover system grade will slope at a minimum of two percent over the capped CCR surface to prevent the collection of standing water and limit the velocity of storm water runoff to reduce the potential for soil erosion. Ditches along the perimeter and interior of the impoundment will be utilized to reduce the maximum overland flow distance, thereby limiting the chance for ponding water as well as minimizing the potential post-closure infiltration of run-off. The ditches will collect area runoff and convey it to storm water outfalls. The ditches will also be covered with a Hydroturf cover system which consists of a 40-mil Low Density Polyethylene with synthetic grass and a binder infill to limit erosion in the swales. The period with the most potential for soil erosion (sloughing and movement) of the soil cover

system will be immediately after placement of the topsoil material, before vegetation is established. Manufactured erosion control products, as well as a seed mix containing quick-growth seed varieties, will be implemented to minimize erosion prevention during this timeframe. Post-closure care will include requirements to maintain this vegetation to prevent long term erosion of the cover system.

### **2.5.2 Integrity of the Final Cover**

Settling and subsidence of the final cover system is expected to be minimal. Settlement would potentially be caused by consolidation of the CCR material, general fill material, or underlying natural subsoils under new loads from construction activities; however, this settlement will likely occur during dewatering and site grading activities and is expected to be minimal after the cover system installation is completed. General fill and relocated CCR material from within the impoundment will be installed and compacted in a controlled manner to minimize post-fill installation settlement. The underlying natural subsoils at the site are not prone to long-term settlement.

### 3.0 FINAL CLOSURE SCHEDULE

A notification of intent to initiate closure of the ZLD Pond was placed in the facility’s CCR Operating Record on November 24, 2021. A notification of intent to initiate closure of the OGS Bottom Ash Pond (Main Ash Pond) was placed in the facility’s CCR Operating Record on June 1, 2022.

The estimated closure schedule is as follows:

Updated Closure Construction:	May 2021 – September 2023
Unwatering and dewatering of the ZLD Pond	May 2021 – September 2021 (Completed)
CCR Removal and one Foot over excavation	June 2021 – October 2021 (Completed)
Unwatering and dewatering of the OGS Bottom Ash Pond	September 2021- September 2023
Consolidation of CCR in northern portion of the OGS Bottom Ash Pond	April 2022 – June 2022 (Completed)
Cease receipt of wastestreams in OGS Bottom Ash Pond	May 2, 2022 (Completed)
Notice of Intent to Close OGS Bottom Ash Pond	June 1, 2022 (Completed)
Grading and drying of CCR within the OGS Bottom Ash Pond	June 2022 – December 2022
Temporary stockpile CCR material in potential contact with groundwater from northern portion of the OGS Bottom Ash Pond	September 2022 – December 2022
Import/place clean fill material in area when CCR material was removed from potential contact with groundwater	September 2022 – December 2022
Grade CCR back over imported clean fill	October 2022 – December 2022
Install final cover system	March 2023 – June 2023
Install Hydroturf within ditches	April 2023 – June 2023
Seeding	March 2023 – June 2023
Complete closure construction ZLD Pond	October 2021 (Completed)
Complete construction completion documentation ZLD Pond	November 2021 (Completed)
Complete construction completion documentation OGS Bottom Ash Pond	July 2023 – September 2023
Complete closure construction OGS Bottom Ash Pond	September 2023

The federal CCR rule requires that closure of the ZLD Pond and the OGS Bottom Ash Pond be completed within five years of commencing closure activities. The rule also allows the timeframe for completing closure of the CCR unit to be extended by multiple two-year extensions if IPL can substantiate the factual circumstances demonstrating the need for the extension.

For the purposes of this Closure Plan, closure of the ZLD Pond is considered complete when groundwater monitoring concentrations do not exceed the groundwater protection standard established pursuant to 257 for constituents listed in Appendix IV of the CCR Rule. Closure for the OGS Bottom Ash Pond will be considered complete when final cover system is installed, and the applicable construction completion documentation is finalized.

Within 30 days of completion of closure of the impoundments, IPL must prepare a notification of closure of the impoundments and place it in the facility's CCR Operating Record and on IPL's CCR public website. IPL will also record notation on the deed to the property or some other instrument that is normally examined during title search, noting that a CCR unit is located on the property and its use is restricted under post closure care requirements as provided by 40 CFR § 257.104(d)(1)(iii).

**4.0 RECORD OF REVISIONS AND UPDATES**

<b>Revision Number</b>	<b>Date</b>	<b>Revisions Made</b>	<b>By Whom</b>
0	09/08/2016	Initial Issue	Sargent & Lundy
1	11/16/2020	Amendment No.1	Burns & McDonnell
0	10/31/22	Revised Closure Plan	Burns & McDonnell

## **5.0 REVISIONS AND AMENDMENTS**


The Initial closure plan was submitted in September of 2016 by Sargent & Lundy in accordance with 40 CFR 257.100(e)(6) and 257.102(b) and amended with Amendment No. 1 in November of 2020 by Burns & McDonnell. IPL is submitting this Closure Plan as a replacement to the November 2020 Closure Plan.

If the Closure Plan is further revised, the written Closure Plan will be amended no later than 30 days following the triggering event. Additionally, the written Closure Plan will be amended at least 60 days prior to a planned change in the operation of the Impoundment, or no later than 60 days after an unanticipated event. The initial Closure Plan and any amendment will be certified by a qualified professional engineer in the State of Iowa for meeting the requirements of §257.102 of the CCR Rule. All amendments and revisions must be placed on the CCR public website within a reasonable amount of time following placement in the facility's CCR Operating Record.


## **6.0 REFERENCES**

40 CFR Part 257, Subtitle D – Environmental Protection Agency Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities.



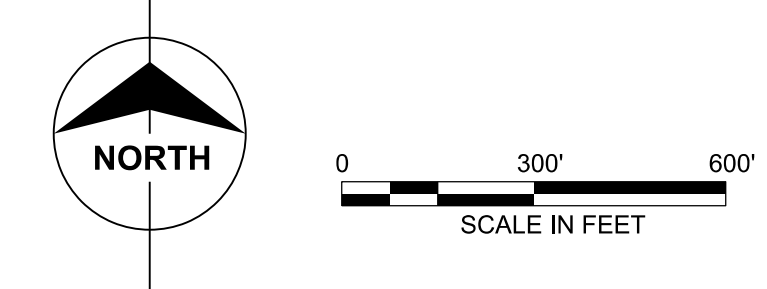
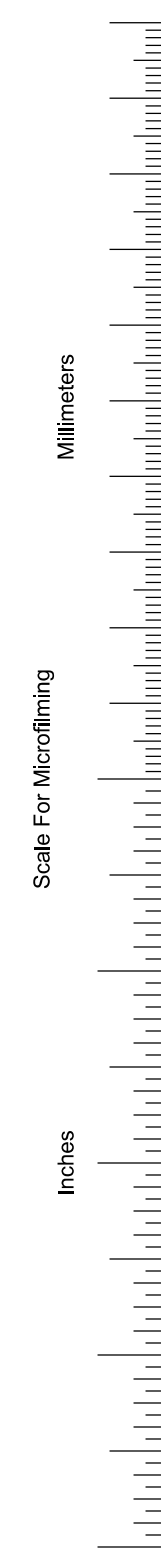
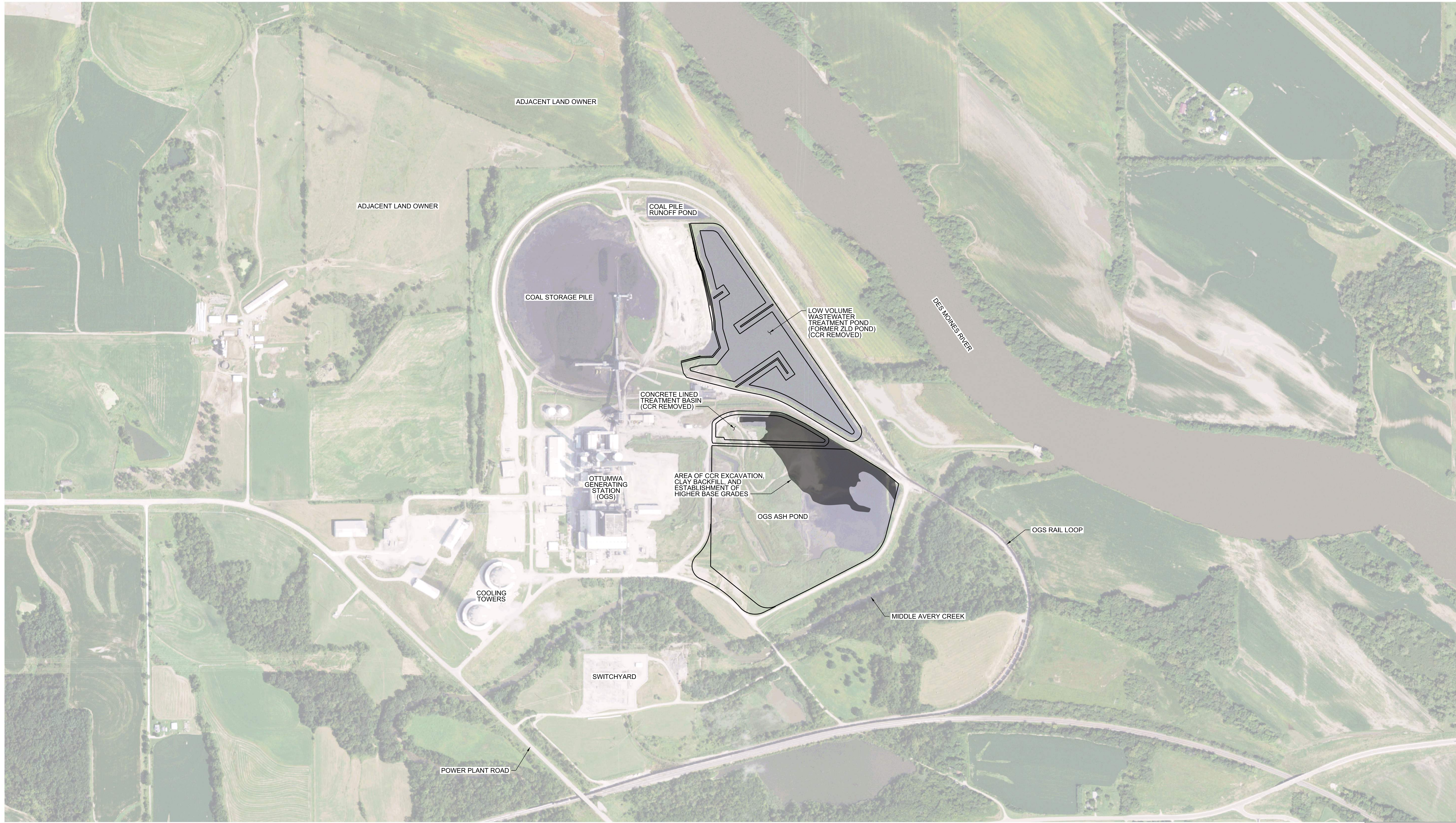


## APPENDIX A – SITE PLAN



Burns & McDonnell World Headquarters  
9400 Ward Parkway  
Kansas City, MO 64114  
O 816-333-9400  
F 816-333-3690  
[www.burnsmcd.com](http://www.burnsmcd.com)





**PRELIMINARY - NOT FOR CONSTRUCTION**

no.	date	by	ckd	description

<p><b>BURNS &amp; MCDONNELL</b>          9400 WARD PARKWAY          KANSAS CITY, MO 64114          816-333-9400          Burns &amp; McDonnell Engineering Co., Inc.</p>		<p>project 110321   contract</p>
<p>designed R. OWENS</p>	<p>detailed J. RIDDER</p>	<p>drawing <b>APPENDIX A - A</b></p>
<p>INTERSTATE POWER &amp; LIGHT          OTTUMWA GENERATING STATION          POND CLOSURE AND          WASTEWATER TREATMENT PROJECT          OTTUMWA, IA</p>		<p>sheet of sheets file 110321-APPENDIX_A.DGN</p>



CREATE AMAZING.

Burns & McDonnell World Headquarters  
9400 Ward Parkway  
Kansas City, MO 64114  
O 816-333-9400  
F 816-333-3690  
[www.burnsmcd.com](http://www.burnsmcd.com)