

# **AMENDED CLOSURE PLAN FOR ASH POND**

**Plant Miller**  
**Alabama Power Company**  
**Quinton, Alabama**

Revision 1 April 2020

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## 1.0 INTRODUCTION

This Amended Closure Plan has been prepared to support the permit application previously submitted to the Alabama Department of Environmental Management (ADEM) for the CCR Surface Impoundment known as the Plant Miller Ash Pond, located in west Jefferson County, Alabama. The permit application was submitted in accordance with ADEM Admin. Code r. 335-13-15-.09(1)(c). This Amended Closure Plan, along with other documents, is intended to supplement the previous submittal in response to the ADEM letter dated May 24, 2019 which provided response comments to the original application.

## 2.0 GENERAL

The Plant Miller Ash Pond was designed to receive and store coal combustion residuals produced during the electric generating process at Plant Miller. Most of the CCR placed in the impoundment in recent years was dry-stacked CCR. The pond covers approximately 321 acres, and currently stores about 19,500,000 cubic yards of CCR.

The Ash Pond was originally constructed in the late 1970's. The initial phase constructed the main cross-valley dam and saddle dike to EL 425 ft. There have been no significant alterations to the Ash Pond since the original construction. The main dike is approximately 170 feet tall at its highest point and 3,300 feet long, while the saddle dike is 25 feet tall and 1,000 feet long. The main dam is a zoned embankment constructed with a relatively impervious clay core, random soil and rock fill on the embankment to each side of the core, and a chimney drain on the downstream side of the clay core. The design crest width is 45 feet. Exterior and interior slopes are 2.5(H):1(V). The up-gradient slope has a rip-rap cover as protection from wind-blown wave erosion. The downgradient slope is vegetated with grass and other low growing grassy vegetation. The saddle dike, located in the northeast corner of the impoundment, is an earth fill embankment constructed across a topographic low area, or saddle, within the up-gradient perimeter of the impoundment. The saddle dike has a design crest width of 45 feet and side slopes of 2.5(H):1(V). The up-gradient slope has a rip-rap cover previously placed for protection from wind-blown wave erosion when the pond maintained free water in this area of the pond. The down-gradient slope is vegetated with grass and other low growing vegetation. An adjoining surface mine excavation, located in the southeastern portion of the facility, was also used for bottom ash storage.

The Plant Miller Ash Pond will be closed by leaving CCR in place, with consolidation of ash to reduce the closure footprint to approximately 191 acres. The pond will be dewatered sufficiently to remove the free liquids, and to an extent, to provide a stable base for the construction of the final cover system. CCR will be consolidated within the footprint of the impoundment to the extent practical and used to create a subgrade for the final cover system. The final cover will be constructed to control, minimize or eliminate, to the maximum extent feasible, post closure infiltration of liquids into the waste and potential releases of CCR from the unit. This will be prevented by providing sufficient grades and slopes to: 1) preclude the probability of future impoundment of water, slurry, or sediment; 2) ensure slope and cover system stability; 3) minimize the need for further maintenance; and 4) be completed in the shortest amount of time consistent with recognized and generally accepted good engineering practices.

The final cover system will be designed to minimize infiltration and erosion. The final cover system, at a minimum, will be designed to meet or exceed the requirements of r. 335-13-15-.07(3)(d)3.(ii) (alternative cover

system). The permeability of the final cover system will be less than the permeability of the natural subsoils present beneath the surface impoundment. Final design will ensure the disruption of the integrity of the final cover system is minimized through a design that accommodates settlement and subsidence, in addition to providing an upper component for protection from wind or water erosion.

### **3.0 NOTIFICATION – INTENT TO CLOSE**

Notification of intent to close the Plant Miller Ash Pond was placed in the plant's Operating Record on April 15, 2019. The notice of intent was subsequently submitted directly to ADEM. The surface impoundment is closing under the requirements of § 257.101(a)(1) and r. 335-13-15-.07(2)(a)1. Closure of the surface impoundment will be conducted under §257.102(d) and r. 335-13-15-.07(3)(d), *closure performance standard when leaving CCR in place*. As described below, the surface impoundment will be closed in a manner that will control, minimize or eliminate, to the maximum extent feasible, post-closure infiltration of liquids into the waste and releases of CCR, leachate, or contaminated runoff to the ground or surface waters or to the atmosphere. Closure will also preclude the probability of future impoundment of water, sediment or slurry. Measures will be taken during design and construction of the closure system that provide for major slope stability to prevent the sloughing or movement of the final cover system. Closure will also minimize the need for further maintenance of the CCR unit.

Major closure activities will commence following receipt of a CCR permit from ADEM pursuant to r. 335-13-15-.09.

### **4.0 WRITTEN CLOSURE PLAN – § 257.102(B)(1)(I),(III) AND R. 335-13-15-.07(3)(B)1.(I),(III)**

#### **a) Overview**

A written closure plan to comply with § 257.102(b) was posted to the Plant Miller Operating Record on October 17, 2016. A revised written closure plan incorporating reference to applicable ADEM Administrative Codes was submitted as a part of the original CCR Permit application.

As required by § 257.102(b)(3)(ii) and r. 335-13-15-.07(3)(b)3.(ii), the written closure plan must be amended whenever (i) there is a change in the operation of the CCR unit that would substantially affect the written closure plan or (ii) before or after closure activities have commenced when unanticipated events necessitate a revision of the written closure plan. The time frames for amendment to the written closure plan is in accordance with those specified in § 257.102(b)(3)(iii) and r. 335-13-15-.07(3)(b)3.(iii).

#### **b) Closure Steps**

The primary construction closure tasks are listed below. More details on specific procedures undertaken during these tasks are described in the following subsection.

- i. Site preparation
  - Contractor mobilization and site establishment
  - Clearing, grubbing and vegetation management

## Plant Miller Ash Pond Amended Closure Plan

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- Abandonment, demolition and relocation of existing structures and utilities
  - Construction of a working platform and access for heavy equipment
  - Construction of parking areas, and installation of security and access gates
- ii. Mechanical excavation and placement of fill for construction of dredged ash processing area
  - iii. Removal of free water and in-situ dewatering
  - iv. Excavation of CCR from the closure by removal areas
  - v. Blasting and excavation of rock for perimeter stormwater channel
  - vi. Placement and stabilization of CCR within the consolidation area
  - vii. Partial excavation of existing dam
  - viii. Construction of cross-valley access embankment and culvert
  - ix. Buttress and buttresses drainage system construction
  - x. Final grading of consolidation area
  - xi. Installation of final cover system and stormwater management system
  - xii. Final grading of closure by removal areas

The construction sequence is organized into seven primary phases. A summary of each of these phases is described next. **Figure 1**, located below, provides a visual reference for the terminology used in the phasing summary.

The phasing shown is preliminary, and will likely change based on site conditions, construction sequencing, and other factors.

## Plant Miller Ash Pond Amended Closure Plan

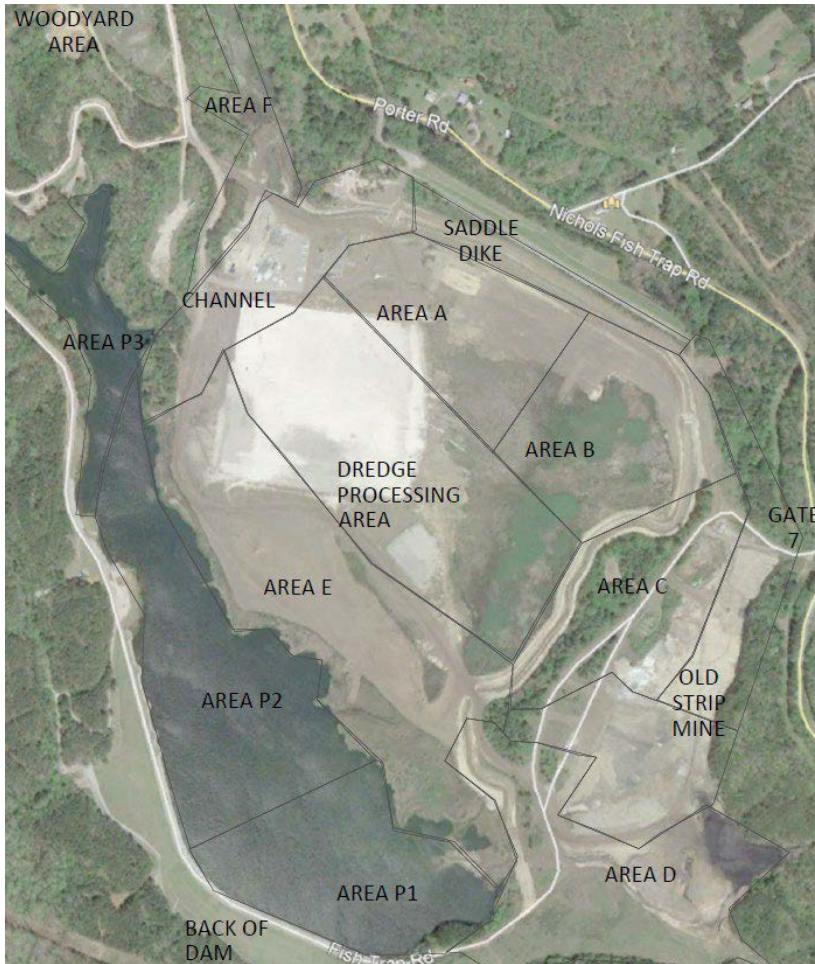


Figure 1

### Phase 1

CCR excavation for the construction of the dredge processing area will take place in Phase 1. CCR excavation will begin in Area D, Channel, Area E, and the Woodyard Area. The dredge will be mobilized and assembled, and initial dredging will be performed during this phase. Pumps will be installed on modular floating systems for pumping free water to the water treatment system. Clearing of vegetation will also take place in Phase 1 and/or Phase 2.

### Phase 2

In this phase, dredging will be performed in Area E, P1, & P2. Mechanical excavations in Area E, Channel, Saddle Dike, Old Strip Mine, Area D, and the Woodyard will be performed.

For slope stability reasons, Area E will be excavated in shallow cuts close to water level. For this phase, once Area E is excavated down to near water level, the dewatering pumps will start lowering the water level down from EL 421 ft to EL 400 ft. As this occurs, the dredge will be performing cuts in subsequent lifts to capture material down to EL 380 ft.

In order to achieve appropriate stormwater flow during mechanical excavation, Crew 1 will begin excavations in Area E and Channel area and will work in a clockwise motion around towards the Old Strip Mine and Area D. The end result in this phase will allow stormwater to gravity flow from the north side of the Old Strip Mine, through the Saddle Dike and Channel and outlet back into the pond in Area P2. Both crews will be placing CCR on the north side of the stack in Area B and Area C. The fill will be constructed and sloped to promote stormwater runoff away from the working area. Deep dewatering wells will be activated during this phase to support dewatering the in-situ water within the CCR stack Area E. The deep dewatering wells will keep the water level within the CCR stack approximately the same elevation as the water level in the pond.

### **Phase 3**

Bulk dredging, ash excavation, soil excavation, additional deep wells, and the first stages of cover liner installation will be performed in this phase.

Dredging operations will continue in P1, P2 and portions of Area E. Dredged material will continue to be placed on the north side of the stack. Mechanically excavated material operations will continue being performed in a south to north direction starting in the channel and will proceed around the stack in a clockwise direction toward the Old Strip Mine area. Area F excavation will start and will be completed in this Phase 3. Once Area F is completely excavated, a temporary stormwater pond will be constructed on the north side of the channel area. Soil mechanically excavated from the channel will be used to construct buttresses for stability.

During this phase a controlled pond drawdown will occur from water elevation 400' to 370'. This will enable the dredge to continue dredging both Areas P1 and P2 in controlled lifts down to elevation 350'.

Cover liner installation will begin on the lower end of Areas A, B, and C, Saddle Dike and the northern section of the Old Strip Mine. During installation, stormwater control will be performed by the construction of temporary stormwater ponds and diversion berms. Additional deep dewatering wells be installed for slope stability and the continued mechanical excavation in Area E.

### **Phase 4**

Dredging, mechanical ash excavation, and channel blasting will be performed in this phase. Dredging will be performed in Area P1. Mechanical ash excavation will focus on hauling blasting material from the channel area and excavating in Areas E and D. The blasting and fill areas will be protected from stormwater runoff. Additional berms, diversion ditches, and stormwater collection areas with pumps will be constructed during Phase 4.

### **Phase 5**

Final dredging, mechanical ash excavation, and closure turf installation will take place in this phase. Final dredging will commence in P2. Ash and soil excavation will take place in Area E, P1, P2, Old Strip Mine and Area D. Ash fill will continue in Area A and B until dredging is complete. Once dredging is complete, the rim ditches will be taken out of service.

Closure Turf installation will be performed in Areas A, B, C, and the Old Strip Mine. All ash contact stormwater will be diverted away from final closed areas and into the temporary stormwater ponds. A final lowering of the remaining water in the main pond will occur allowing for the start of the final cleanup in Areas P1 and P2.



Temporary diversion berms and ponds will need to be constructed so the lowest points of the pond can be cleaned effectively. Dewatering pumps will continue to pump from temporary ponds to the water treatment facility. Additional dewatering wells will be installed to allow for final CCR excavation in Area E.

#### **Phase 6**

Construction of the roadway embankment and main soil buttress, final mechanical excavation of Area D, final grading, cover system installation, and storm water pond construction will be performed in this phase. The buttress drainage system will be installed concurrently with construction of the main buttress.

Other activities will consist of filling restoration areas, constructing the North and South final stormwater ponds and associated spillways, and the roadway embankment culvert. CCR excavated from Area D will be placed in the former dredge processing area and Area E in order to achieve stack final grades. The final cover system installation will be complete on the north side of the stack.

#### **Phase 7**

Final restoration of closure by removal areas, final cover system installation, and stormwater pond cleanout will take place in this phase. Final restoration will be performed in Area D and P1. Restoration will consist of topsoil placement and hydroseeding. The stormwater ponds will be cleaned and final hydroseeding will be performed around the perimeter of the ponds and surrounding area. The final cover system will continue to be installed in the dredge processing area and in Area E.

### **c) Procedures During Closure**

#### **i. Dewatering**

This section provides a summary of the removal of free water, interstitial water, contact water, and stormwater. The following terminology is used in this section:

- Free water – water contained in the CCR unit above the surface of CCR material
- Interstitial water – water within the pore space of CCR material
- Contact water – stormwater that comes in contact with CCR material

The management of the free water level in the pond will be important for the dredging process and hence these activities will be closely coordinated. Multiple modular floating platforms will be used to pump from the pond to the water treatment facility. As the free water is drawn down, interstitial water will flow into the pond, and can be pumped from the pond. The pumps have been sized to accommodate expected inflows from direct precipitation and run-on, and can pump at a rate of approximately 4,000 gpm. Treated water from the water treatment facility will be discharged through the NPDES discharge point.

To allow for safe excavation and working areas it will be necessary to lower and maintain water levels below the current CCR surface. Interstitial water will be removed using a system of deep wells, well points, and collection trenches. Collected interstitial water will be routed through the water treatment facility before being discharged.

Contact water will be directed to collection points by temporary diversion berms and ditches located within the limits of the Ash Pond. Overflow water from the dredge processing area will be directed back to the main pond.



The main dam creates a perimeter control for contact water and acts as a final collection point during most phases of construction. When the final phases of construction are being performed and the main dam can no longer act as a stormwater pond, additional temporary ponds will be created upstream of the main dam.

Variations in site conditions, construction means and methods, weather conditions, and other factors impact the dewatering sequencing and approach to the project. During the project, specific means and methods will be reviewed and approved by the construction management and oversight team.

## **ii. Liquids Management**

During closure construction, run-on stormwater and run-off contact water will be controlled with best management practices such as channels, diversion berms, and pumps and managed in accordance with the NPDES Construction Stormwater, Industrial Stormwater and Industrial Wastewater Discharge permit(s).

The existing dam will be retained during most of the construction. This will allow for stormwater generated from the adjacent drainage areas and the pond surface to be contained. Contact water will in general be allowed to drain into the main pond.

Non-contact water is expected to be generated in areas that have the final or temporary covers installed. These areas will be isolated and will have some temporary storage capacity (typically by constructing temporary containment berms). The storage areas will be equipped with pumps to convey the non-contact water directly to the NPDES discharge points.

## **iii. Dredging and CCR Removal Activities**

Dredging of CCR will take place within the approximate limits of the existing pond. Dredging will be performed using a suction dredge and auger cutter head, generally making a cut approximately 10 to 30 ft beneath the current water level. Dredged material will be pumped to the ash processing area, which includes two rim ditches each approximately 2,000 feet long. The ash processing area requires approximately 35 acres. Approximately 3.1 million cubic yards of material is expected to be dredged.

The CCR slurry from the dredge is discharged into one end of a rim ditch, and the CCR is allowed to settle out. Overflow water from the rim ditches will be directed back to the main pond. The ash processing area includes space for CCR excavated from the rim ditches to be windrowed and loaded into haul trucks when sufficiently dry.

Mechanical excavation will be undertaken using conventional excavators, loading directly into off-road articulated dump trucks (ADTs). These operations will occur primarily in Areas D, F, the Woodyard, Channel area, and P3. Mechanical excavation will also be used for final excavation and over-excavation in the closure by removal areas. Mechanically excavated ash may need to be placed in windrows for further drying. Once sufficiently dried, the ash will be loaded into ADTs and transported to the final placement area. Temporary access roads and ramps may have to be constructed to allow for access into the closure-by-removal area. The CCR removal verification protocol will be followed to finalize the excavation limits.

The average depth to which CCR removal is required is approximately 37 feet, with a maximum depth of approximately 130 ft beneath existing ground surface.

**iv. CCR Removal Verification Protocol**

The CCR removal verification protocol and the roles and responsibilities of Southern Company, the Contractor, and the certifying engineer, are described in detail in the technical specifications for construction. An outline of the protocol is presented below:

1. Identification and demarcation of the area subject to removal verification.
2. Removal of accumulated CCR such that no CCR remains visible.
3. Visual inspection and documentation of the area by certifying engineer or other CQA personnel.
4. If required, repeat steps 1 through 3 until certifying engineer is satisfied that no CCR remains visible.
5. Complete "Pre 6-Inch Over-Dig Survey" and photographic documentation of applicable removal area.
6. Over-excavation of a minimum of 6 inches across the designated area.
7. If this additional visual inspection shows no visible or other evidence of CCR materials at depth, continue to Step 9. If additional CCR materials are discovered either during the over-dig and or during the additional visual inspection, additional excavation is required under direction of Southern Company.
8. Complete Post 6-Inch Over-Dig Survey and photographic documentation using the same survey points, procedures, and prescribed minimum tolerances as for the Pre 6-Inch Over-Dig Survey. Complete verification of the prescribed minimum 6-inch removal across the removal area by survey and visual comparison of the removal area(s).
9. If required, perform additional excavation and repeat steps 7 through 9 until the certifying engineer is satisfied that no CCR remains visible and that a minimum of 6 inches has been over-excavated below the observed limits of visual CCR.
10. Visually inspect materials obtained by hand-augering (or similar technique) at an interval of one sample per acre, or part thereof, to a depth of 12 inches beneath the bottom of the over-dig excavation.

For areas where rock, existing concrete designated to remain, or other similar hard surfaces are present in the excavation area (including the over-excavation zone) the surface will be cleaned to a visually-clean condition through hydraulic or mechanical means such as pressure washing. The soils surrounding the hard areas will be removed to the 6-inch over-excavation criterion.

Documentation of the removal verification procedure will include pre and post over-dig photographs documenting the removal verification area, daily field reports from the certifying engineer, and survey data indicating removal verification areas and confirmation that the over-excavation criterion was achieved. This documentation will be compiled into a CCR Removal Verification Report at the completion of the project. Also, all photographs will be maintained at the site and will be available for review by project team members and ADEM personnel as necessary.

The certifying engineer and land surveyor must be professionally licensed in their respective disciplines in the State of the Alabama.

**v. CCR Placement**

The final consolidation area encompasses approximately 191 acres. CCR will be tipped at the final placement area and spread using bulldozers. It is anticipated that CCR will generally be dried to close to optimum moisture content prior to placement in its final deposition area, and that pre-hauling conditioning may require double or triple handling of certain portions of the excavated CCR. CCR will be placed within the allowable moisture content limits and once spread, will be compacted to meet the technical specifications.

Dewatering and bridge lifts will be used, as needed, to create a firm and stable base to ensure proper compaction of CCR. The groundwater elevation under the majority of the consolidation area is approximately 10 ft below the pre-existing ground surface. Groundwater levels will be continuously monitored as the water level in the pond is drawn down, which should result in a draw down in the water levels in the consolidation area. Deep and shallow dewatering will also be performed, as needed.

Stormwater will be managed, as described in other sections, to protect CCR placement areas and reduce erosion and rework. All final closure slopes and conditions are designed to meet the stability requirements for each loading case outlined in section § 257.73(e) and r. 335-13-15-.04(4)(e).

**vi. Fugitive Dust Control Plan**

A fugitive dust control plan identifies and describes the CCR fugitive dust control measures that will be implemented during closure to minimize CCR from becoming airborne at the facility, including CCR fugitive dust originating from ash ponds, roads, and material handling activities. 40 CFR § 257.53 and ADEM Admin. Code r.335-13-15-.02(11) defines “fugitive dust” as “solid airborne particulate matter that contains or is derived from CCR, emitted from any source other than a stack or chimney”.

Fugitive dust mitigation shall be implemented on-site through the use of water trucks and/or large sprinklers. Water trucks will be equipped with front, rear and side spraying nozzles to maximize the versatility of dust mitigation.

Water trucks routinely operate anytime the weather conditions or work activities promote dusting concerns onsite. Water will be sprayed on active construction areas including, but not limited to, the Ash Pond soil stockpile/borrow source, paved haul roads, and gravel haul roads.

In order to control dust, work areas that achieve final grades or intermediate cover grades will be seeded, stoned, or use of another approved alternative will be used to reduce dusting.

In the event that dusting occurs over holidays or weekends, employees will be on call to perform dust mitigation as needed.

Southern Company and construction personnel will assess the effectiveness of the control measures by performing visual observations of the ash pond and surrounding areas and implementing appropriate corrective actions for fugitive dust, as necessary. Complaints received from citizens regarding CCR fugitive dust will be documented and appropriate steps will be taken, including any corrective action, if needed.

**vii. Stormwater Management**

Managing water is a critical aspect of this closure project. Stormwater management during closure will be achieved by the management and operation of temporary berms, ditches, ponds, and pumps to convey contact water to the water treatment facility. Once final cover grades have been achieved, a cover system will be installed

to limit the infiltration of surface run-off into the CCR unit, and stormwater will be managed in a series of channels and spillways.

Post-closure, stormwater is managed through a series of berms and channels on the closure cap. Trapezoidal channels on benches direct stormwater to downslope channels, lined with protective Hydroturf. In turn, stormwater is conveyed off the cap and into either the perimeter stormwater channel or to restoration areas, and finally into the stormwater ponds.

The Hydroturf layer will be used for cap stormwater conveyance in all areas of concentrated flow, such as downslope channels. Hydroturf consists of an impermeable geomembrane and engineered turf which is infilled with Hydrobinder in order to provide armoring against high flow velocities and shear stresses. On areas of the cap in which sheet flow will be encountered (embankment surface between benches) ClosureTurf will be installed, which differs in that a sand infill is used rather than the cement infill used in Hydroturf sections.

Stormwater runoff from the restored Northern Finger will be directed into the perimeter channel upstream of the rock-cut reach and ultimately in to the main stormwater pond. Stormwater runoff from the restored North area will be directed into the main stormwater pond. Stormwater from the restored South area will be directed to the Southern stormwater pond.

The perimeter stormwater drainage channel will surround the edges of the lined capping system collecting runoff from both adjacent on-cap and off-cap areas. The perimeter channel north of the high point will convey water from the high point at the east side of the CCR cap around to the main stormwater pond on the west side of the site. The perimeter channel south of the high point will convey storm water from the high point to the Southern stormwater pond.

The north perimeter channel will be trapezoidal in section with a longitudinal slope varying from 0.75% to 6%. The south perimeter channel will have a longitudinal slope of up to 10%. Hydroturf will be used to line the side slopes of the perimeter channel, with a riprap layer placed along the channel bottom.

Transitional areas and energy dissipation devices such as large-size riprap bolder aprons, level spreaders or concrete structures will be needed at locations along the perimeter channel at downslope inflow points, sharp bends, transitions between high capacity (steep slope) reaches and lower capacity (shallower slope) reaches, and at discharge points to natural or restored areas. The location and nature of these transitions are shown in the drawings.

In places the perimeter drainage channel will be directed through culverts where access roads cross the drainage channel. The downstream end of the perimeter channel will be a rock-cut reach that will allow runoff from the Northern Finger stormwater basin and the northern reach of the perimeter channel to join and drain towards the main stormwater pond to the south. The soil overburden will need to be removed and graded to a 3H:1V slope to expose the underlying rock. Once the rock is exposed, a second cut through rock up to about 70 feet deep will establish the rock-cut reach of the perimeter channel. Drilling and blasting, and ripping will be required to construct this channel reach.

The stormwater ponds and spillways are designed to safely pass the 1,000-year, 24-hour storm event. The proposed auxiliary spillways consist of earthen grass-lined overflow spillway channels.

#### **viii. Equipment Decontamination**

All equipment (vehicles, pumps, pipelines, etc.) departing site that have been in contact with CCR will be decontaminated via washing to remove all CCR materials, and/or materials will be disposed of offsite in a landfill certified to accept applicable CCR wastes. The overspray and all contact water from decontamination operations will be stored on site and treated prior to discharge. To the extent possible, all wash down activities will take place within the footprint of the ash pond.

**ix. Site Security**

The site has a perimeter fence on public-facing boundaries with two exterior controlled access points at Gate 5 and Gate 7. Both gates are equipped with security cameras and access through these gates is by approved persons in possession of a valid keycard only. Security personnel will be present at Gate 7 during work hours, and will also perform routine perimeter inspections. The security plan for the site will be overseen and managed by the permanent Plant Miller security team.

**x. Groundwater Monitoring**

A groundwater monitoring plan was submitted with the original Plant Miller Ash Pond permit application. Please refer to Appendix 8 of the original permit application.

**xi. Operational Inspections**

Inspections will be conducted by a Qualified Person at intervals not exceeding 7 days to look for appearances of structural weakness and for proper operation of all outlet structures maintained for use during closure. Furthermore, an annual inspection will continue to be conducted by a qualified Professional Engineer throughout the closure process.

**d) Closure Design Features**

**i. Soil Buttress**

The Ash Pond closure design incorporates a soil buttress to maintain the stability of the closed CCR unit. The containment buttress will provide long term stability to the ash stack and will be constructed of a combination of engineered earth and rock fills. The containment buttress will be designed to meet the stability requirements for each loading case outlined in section § 257.73(e) and r. 335-13-15-.04(4)(e).

The main soil buttress will be constructed with the earth fill obtained from excavating the main dam. The buttress will be constructed according to the structural fill specifications, so the quality and strength of the soil fill can be verified. The main soil buttress extends from the natural ground surface exposed at the base of the excavation up to an elevation of 420 ft.

The buttress also incorporates a drainage system, designed to convey remaining interstitial water to a collection sump. The drainage system includes approximately 8,000 linear feet of finger and toe drains, constructed with a stone filter layer and internal perforated pipes. Flow from the toe drain is directed to a rectangular precast concrete sump located within the soil buttress. The sump will be approximately 35 feet deep and will be progressively constructed in sections as the buttress is built up. Electric pumps located in the base of the sump will pump flow to a water treatment system. Backup power for the pumps will be provided by diesel generators with an automatic transfer switch.

Soil fill will be placed against the highwall in the Old Strip Mine Area to create a 12-ft wide wedge of soil between the highwall (natural ground) and compacted CCR. CCR in this area will thus be maintained within the existing limits of the CCR limit. The geomembrane cover layer will terminate against the highwall in an anchor trench of compacted backfill. It will be protected from stormwater infiltration by sloping the cover and providing protection with geocomposite and riprap.

Reducing infiltration of stormwater into the placed CCR through the gravel access roads will also be accomplished through underdrainage installed at the base of the structural fill prism supporting the roadway.

## **ii. Cover**

Closure of the Plant Miller Ash Pond shall be accomplished by the installation of a final cover system designed to minimize infiltration and erosion. An engineered turf product was selected for the final cover system and will be placed directly on top of the placed CCR. The cover system consists of a three-component system which comprises a structured geomembrane, an engineered turf, and engineered sand or cementitious infill. The geomembrane in the system provides an impermeable barrier and can either be a 40-mil or 50-mil geomembrane. A textured geomembrane is used for the flatter top deck, while a geomembrane with an integrated drainage layer has been specified for use on slopes. The sand infill protects the geotextile from UV degradation and provides ballast for the system.

## **iii. Achievement of Closure Performance Standards**

In accordance with § 257.102(d)(1) and r. 335-13-15-.07(3)(d)1., the final cover will be constructed to control, minimize or eliminate, to the maximum extent feasible, post closure infiltration of liquids into the waste and potential releases of CCR from the unit. This will be achieved by providing sufficient grades and slopes to; 1) preclude the probability of future impoundment of water, slurry, or sediment; 2) ensure slope and cover system stability; 3) minimize the need for further maintenance; and, 4) be completed in the shortest amount of time consistent with recognized and generally accepted good engineering practices.

The final cover grades were designed such that side slopes are either 4H:1V or 6H:1V. The top deck of the cover is graded at 5% to promote drainage. Benches are installed at 25-ft vertical spacing, with trapezoidal channels on the benches. A variance is being requested to allow for berms or terraces on a 25-ft vertical spacing rather than 20-ft as required by r. 335-13-15-07(3).

An Assessment of Corrective Measures (ACM) for the Plant Miller Ash Pond was placed in the Plant's Operating Record in June 2019 and submitted to the Department in July 2019. The development of the ACM considered the planned closure approach which will include dewatering, consolidating the footprint of the ash, and constructing a cover system over the consolidated footprint that meets the requirements of r. 335-13-15-.07(3)(d). This closure approach will effectively control the source of CCR constituents to groundwater by removing free water and some interstitial water from the ash, reducing the footprint area of the ash and preventing further infiltration of surface water resulting from rainfall through the ash. Removal of the free liquid will reduce the volume of water available to flow from the Ash Pond during and after closure, while also minimizing the hydraulic head driving water through the subsurface.

Outside the consolidated footprint, ash will be excavated to remove all visible ash and a minimum of 6 inches of the underlying subgrade soils, thereby removing the source from these areas. The cover system that will be constructed over the consolidated footprint will have a permeability several magnitudes lower than the

permeability of the natural clay subsoils beneath the impoundment, reducing the likelihood of future migration of water through the ash below the cover.

At the present time, a combination of the closure process and source control measures discussed above along with Monitored Natural Attenuation and adaptive site management are anticipated to provide the necessary remedy for this facility. However, in an adaptive site management process, system performance is monitored, and one or more of the technologies identified in the ACM will be used to supplement the remedy as needed if the selected approach is not performing as intended or corrective action goals are not met. If necessary, modifications to the closure plan may also be amended or supplemented to include other protective measures.

#### **e) Final Cover System**

The final cover system for the Ash Pond closure is designed in accordance with § 257.102(d)(3)(i) and r. 335-13-15-.07(3)(d)3.(i) to minimize maintenance after closure of the CCR unit. The final cover system is designed to prevent the future impoundment of water and includes measures to prevent infiltration, sloughing, minimize erosion from wind and water, settling, and subsidence. The largest area requiring a final cover is approximately 191 acres. The engineered final cover system consists of the following minimum components, listed from top to bottom:

- Specified final cover infill as outlined in the final closure plan design (see the Design Drawings)
  - 1/2" minimum sand infill or
  - 3/4" minimum HydroBinder® infill OR
  - Riprap overlying a geocomposite separation and protection layer
- Engineered Synthetic Turf (ClosureTurf)
- A textured 40 mil (minimum) geomembrane liner

### **5.0 MAXIMUM INVENTORY OF CCR– § 257.102(B)(1)(IV) AND R. 335-13-15-.07(3)(B)1.(IV)**

The final closed configuration of the Ash Pond is designed to contain approximately 19.5 million cubic yards of CCR material. Volume estimates for the CCR within the Ash Pond were calculated by comparing topographic and bathymetric survey data of existing conditions (top of in-place CCR) with an estimate of the bottom of CCR surface. The bottom of CCR surface was estimated using USGS 1971 Sylvan Springs topographic survey information, original design drawings, and geotechnical investigation data from both recent and historical field investigations.

### **6.0 LARGEST AREA REQUIRING FINAL COVER– § 257.102(B)(1)(V) AND R. 335-13-15-.07(3)(B)1.(V)**

The closure configuration requiring final cover is estimated to total approximately 191 acres (r.335-13-15-.07(3)(b)1.(v)).



## 7.0 SCHEDULE FOR COMPLETING CLOSURE ACTIVITIES– § 257.102(B)(1)(VI) AND R. 335-13-15-.07(3)(B)1.(VI)

A detailed construction schedule for the closure has been developed by construction managers and schedulers experienced with ash handling and heavy civil construction. The schedule is based on estimates of quantities, productivity rates, manpower, and equipment fleet size. The construction schedule is below. Key estimated construction milestone dates are summarized below.

Construction Milestone	Expected Date
Start of Construction	August 2019
Demolition Work	August 2019
Mechanical CCR Excavation	August 2019 – June 2026
Dewatering	February 2020 – July 2025
Final Cover Installation	March 2022 – October 2026
Soil Fill and Buttress Construction	August 2022 – May 2026
Buttress Drainage	August 2024 – December 2024
Restoration Area Grading	May 2022 – March 2027
End of Construction	May 2027

## 8.0 CERTIFICATION OF CLOSURE

Within 30 days of completion of the Plant Miller Ash Pond closure construction, a professional engineer registered in Alabama will prepare, and APC will submit, a Closure Construction Certification Report, which will include a Removal Certification Report, documenting the completion of closure activities as indicated in r. 335-13-15-.07(3)(f)3. APC, as required by ADEM, will submit confirmation that a notation on the property deed has been recorded in accordance with § 257.102(i) and r. 335-13-15-.07(3)(i).

## 9.0 DIRECTIONAL INFORMATIONAL SIGNS

Signs will be posted at the entrance gate to the facility notifying users of the closed CCR pond. Contact information will be provided on the sign.

## **10.0 VEGETATIVE PLAN**

The Ash Pond has existing trees and smaller vegetation that require removal. The trees, stumps, and vegetation debris will be excavated, stockpiled and burned onsite using an Air Curtain Firebox, in accordance with APC air compliance guidelines, Jefferson County Department of Health, Alabama Forestry Department, and the Alabama Department of Environmental Management requirements.

A long reach excavator will travel the perimeter of the Ash Pond and will remove vegetation in areas easily accessible. In order to provide adequate stability for further vegetation removal, a bridge lift will be constructed by placing material at an adequate lift depth out into the ash pond vegetated area.

## **11.0 SITE EQUIPMENT NEEDED**

The Contractor selected to perform closure construction will be responsible for all equipment needed during the construction period. For post-closure care, Alabama Power will provide all necessary company owned, leased or contracted equipment needed to perform maintenance and any necessary repairs.

## **12.0 SEDIMENT REMOVAL**

On a periodic basis, accumulated sediment will be removed when necessary from drop inlets, drainage pipes, diversion ditches and other drainage structures.

## **13.0 EROSION AND SEDIMENT CONTROL**

A Construction Best Management Practices Plan (CBMPP) will be developed and will comply with the *Alabama Handbook for Erosion Control, Sediment Control and Stormwater Management on Construction Sites and Urban Areas*. Typical erosion and sedimentation techniques will be applied, which may include construction exit pads, silt fencing, check dams, filter rings, mulching, and temporary grassing. Drawings showing the perimeter controls for three broad stages of construction are included as attachments. The three phases are (1) Dredging and Initial Perimeter Controls, (2) Final Grading, and (3) Final Stabilization.

Most construction stormwater will be ultimately directed to the main stormwater pond for sediment removal and pumping to the water treatment plant. Construction stormwater runoff not directed to the main stormwater pond will be managed by a series of erosion and sedimentation control devices pursuant to the sensitivity of the site and discharge location.

Temporary cover will be an important means for managing the closure prior to installation of the final cover system. Temporary cover can limit contact water (and consequently water treatment demands), reduce the need for dust control measures, and reduce erosion. Different methods and products are available, ranging from engineered turf products to a traditional soil cover.

Final site stabilization will be provided through previously described closure cover, permanent grassing and native vegetation, channel linings, and sediment removal at the main stormwater pond.

## 14.0 COST OF CLOSURE

Through coordination with the engineering design team and the subcontractor selected to execute the closure activities, the estimated cost of closing Plant Miller’s ash pond is approximately \$415 million. The estimate is considered to be at feasibility level with a moderate to high level of project definition. However, due to the complexity, quantities, and duration of the overall project, some variability in costs is expected. Additional expenses of post closure care, maintenance, and corrective action are currently estimated at \$27 million. Fully detailed long-term maintenance and corrective action strategies have not yet been determined which will have the potential to influence current estimates.

Some of the most significant cost items include:

- Water management including contact and noncontact water;
- ClosureTurf® cover system;
- Construction management and construction quality control (CQC);
- Offsite fill materials such as soil and clay fill, gravel and riprap;
- Dredging operations;
- Excavation, placement, compaction, and grading of CCR into the consolidated footprint;
- Construction quality assurance (CQA);
- Dust control management;
- Engineering support; and
- General contingency and inflation on construction items.

## 15.0 CLOSURE SCHEDULE

The closure of Plant Miller’s Ash Pond is expected to exceed the closure activity timeline of five years (§ 257.102(f)(1)(ii) and r. 335-13-15-.07(3)(f)1.(ii)) and is expected to require the allowable two-year extensions to complete the closure due to the excavation moisture conditioning, placement, compaction, and grading of approximately 9,500,000 cubic yards of CCR and underlying soil. Key estimated milestone dates for the closure of the Ash Pond are summarized below.

Milestone	Expected Date
CCR placement ceased	April 15, 2019
Closure construction starts	August 2019
Begin dewatering activities	Q2 2020

Final cover construction completes	Q4 2026
Closure constructions ends	Q2 2027

**16.0 RECORDKEEPING/NOTIFICATION/INTERNET REQUIREMENTS**

As outlined in § 257.105 and r. 335-13-15-.08(1), each Owner or Operator of a CCR unit subject to the Department regulations must maintain files of certain information in an operating record at the facility. Each file is to be retained for at least five years following the date of each occurrence, measurement, maintenance, corrective action, report, record or study. Electronic storage of the records is acceptable. These records are to be made available to the Department upon request.

Certain notifications are to be made in accordance with the requirements of § 257.106 and r. 335-13-15-.08(2). In many instances, such notifications are to be placed in the facility’s Operating Record. In certain instances, further notifications are to be made to the Department Directory within 30 days of placement of a notification into the Operating Records. Furthermore, a publicly accessible internet site must be established for posting of certain notifications and compliance information within 30 days of it being placed in the Operating Record.

Alabama Power and Plant Miller maintain an electronic Operating Record for the facility. In addition, a publicly accessible internet site has already been established for compliance with EPA’s CCR Rule. Required notifications and compliance data, as outlined in § 257.105 through § 257.107 and r. 335-13-15-.08 and as applicable to the Plant Miller Ash Pond, will be maintained in the electronic Operating Record, and as required, made available on the publicly accessible internet site within 30 days of placement in the Operating Record. Furthermore, required notifications will be made to the Department Director within 30 days of placement in the Operating Record.

Certain plans and assessments are required to be updated at specified intervals and/or upon modification of certain components of the facility. If and when applicable, updates will be made to the respective plans and assessments, and notifications placed in the Operating Record, posted to the publicly accessible internet site, and communicated in writing to the Department Director in accordance with the Department rules.

**17.0 WRITTEN POST-CLOSURE PLAN**

40 CFR § 257.104 and ADEM Administrative Code r. 335-13-15-.07(5) requires the owner or operator of an existing CCR surface impoundment that is closed in place to provide for post-closure care of the unit for a period of at least 30 years. Post-closure care includes maintenance of the facility, as well as groundwater monitoring in accordance with § 257.90 through § 257.98 and r. 335-13-15-.06(1) through r. 335-13-15-.06(9).

The Plant Miller Ash Pond is currently expected to be closed in place under the performance standards outlined in § 257.102(d) and r. 335-13-15-.07(3)(d). Following closure, maintenance will be provided on the final cover system for the required post-closure care period so that the integrity and effectiveness of the final cover system will be maintained. Maintenance activities will include, as needed, repairs to the final cover to correct any effects related to settlement, subsidence, erosion or other events, and will be performed to prevent run-on or run-off from eroding or otherwise damaging the final cover. Maintenance tasks could include, but not be limited to, repair of subsidence or erosion features, replacement of sand in-fill within the synthetic turf and re-establishment of

## Plant Miller Ash Pond Amended Closure Plan

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vegetation, where applicable. Maintenance will be performed on a semi-annual schedule, or more frequently if needed.

The groundwater monitoring system will be maintained throughout the required post-closure care period. Groundwater monitoring will be performed on a semiannual basis during the required post-closure care period as well.

The following office(s) can be contacted about the facility during the post-closure care period.

Plant Miller  
Environmental Asset Manager  
4250 Porter Road, Quinton, AL 35130  
1-205-488-2999  
G2CCRPstMIL@southernco.com

At the present time, there is no planned use of the facility after closure. If current plans change, they will be noted in an amendment to this post-closure care plan. Any future use of the property after closure will not disturb the integrity of the final cover, liner or any other component of the containment system. Furthermore, the functionality of the groundwater monitoring system will be maintained.

No later than 60 days following completion of the post-closure care period of 30 years, Alabama Power Company will prepare a notification verifying completion of the post-closure care.