PERIODIC INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN
PLANT GREENE COUNTY ASH POND
ALABMA POWER COMPANY

EPA's "Disposal of Coal Combustion Residuals from Electric Utilities Final Rule (40 C.F.R. Part 257 and Part 261) and the State of Alabama's ADEM Admin. Code Chapter 335-13-15 establish certain hydrologic and hydraulic capacity requirements for CCR surface impoundments. Per §257.82 and ADEM Admin. Code r. 335-13-15-.05(3), the owner or operator of an existing or new CCR surface impoundment or any lateral expansion of a CCR surface impoundment is required to design, construct, operate and maintain an inflow design flood control system capable of safely managing flow during and following the peak discharge of the specified inflow design flood. The owner or operator also must prepare a written plan documenting how the inflow flood control system has been designed and constructed to meet the requirements of the referenced sections of the rules. In addition, §257.82(f)(4) and ADEM Admin. Code r. 335-13-15-.05(3)(c)4. require a revision to the inflow design flood control system plan be prepared every 5 years.

The existing CCR surface impoundment referred to as the Plant Greene County Ash Pond is located at Alabama Power Company's Plant Greene County. The facility consists of a 489-ac storage area. The inflow design flood consists of the rainfall that falls within the limits of the surface impoundment. The impoundment is currently undergoing closure in place and the water level has been lowered substantially. Also, a new outlet works has been constructed as a part of closure construction. Stormwater is temporarily stored within the limits of the surface impoundment and pumped to a temporary water treatment system before being discharged through a permitted NPDES discharge point. The new primary spillway remains available, consisting of a square concrete riser with nominal dimensions of approximately 8 feet. The riser connects to a 36-inch diameter concrete discharge pipe that passes through the existing exterior dike and discharging to a riprap channel and into the Black Warrior River.

The inflow design flood has been calculated using the Natural Resources Conservation Service method (also known as the Soil Conservation Service (SCS) method) using the 1,000-yr event required for a significant hazard potential facility. Runoff curve number data was determined using Table 2-2A from the Urban Hydrology for Small Watersheds (TR-55). Appendix A and B from the TR-55 were used to

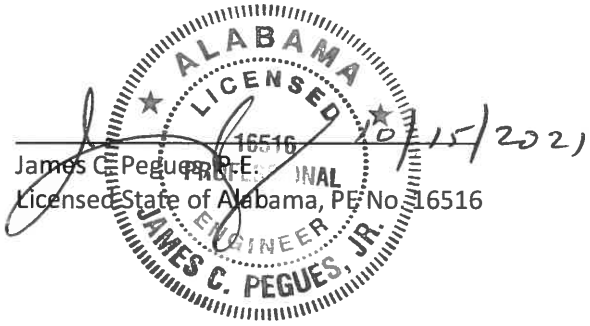
determine the rainfall distribution methodology. Precipitation values were determined from NOAA's Precipitation Frequency Data Server (Atlas-14).

The NRCS provided information on the soil characteristics and hydrologic groups present at the site. It was determined that the hydrological group "C" should be used to best reflect the characteristics of the soils on site. This information was placed into Autodesk Storm and Sanitary Analysis 2019 and used to generate appropriate precipitation curves, storm basin routing information, and resulting rating curves to evaluate surface impoundment capacity.

Calculations indicate the unit can safely store and pass the inflow design storm without overtopping the perimeter embankments. Supporting calculations are attached for reference.

The facility is operated subject to and in accordance with § 257.3-3 of EPA's regulations and ADEM Admin. Code r. 335-13-4-.01(2)(a) and (b).

I hereby certify that the inflow design flood control system plan meets the requirements of 40 C.F.R. §257.82 and ADEM Admin. Code r. 335-13-15-.05(3).



10/15/2021

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Inflow Design Control System Plan:
Hydrologic and Hydraulic Calculation Summary

for

Plant Greene County Ash Pond

Prepared by:

Southern Company T&PS Environmental Solutions

Originator: _____ 10/6/21
Daniel E. Drennen Date

Reviewer: _____ 10-7-21
Jason S. Wilson Date

Approval: _____ 10/7/21
James C. Peggues Date

1.0 Purpose of Calculation

The purpose of this report is to demonstrate the hydraulic capacity of the subject CCR impoundment in order to prepare an inflow design flood control plan as required by the United States Environmental Protection Agency's (EPA) final rule for Disposal of CCR from Electric Utilities (EPA 40 CFR 257) and the State of Alabama's ADEM Admin. Code Chapter 335-13-15.

2.0 Summary of Conclusions

A hydrologic and hydraulic model was developed for the Plant Greene County Ash Pond to determine the hydraulic capacity of the impoundment. The design storm for the Plant Greene County Ash Pond is a 1,000-year rainfall event. Southern Company has selected a storm length of 24-hours for all inflow design flood control plans. The results of routing a 1,000 year, 24-hour rainfall event through the impoundment are presented in Table 1 below:

Table 1. Flood Routing Results

Plant Greene County	Normal Pool El (ft)	Top of embankment El (ft)	Peak Water Surface Elevation (ft)	Freeboard* (ft)	Peak Inflow (cfs)	Peak Outflow (cfs)
Ash Pond	87.5	95.5	89.71	5.79	3,426.79	43.72

*Freeboard is measured from the top of the embankment to the peak water surface elevation

3.0 Methodology

3.1 HYDROLOGIC ANALYSES

The Plant Greene County Ash Pond is classified as a significant hazard structure. The design storm for a significant hazard structure is a 1000-year rainfall event. A summary of the design storm parameters and rainfall distribution methodology for these calculations are summarized below in Table 2.

Table 2. Bottom Ash Pond Storm Distribution

Hazard Classification	Return Frequency (years)	Storm Duration (hours)	Rainfall Total (Inches)	Rainfall Source	Storm Distribution
Significant	1000	24	13.4	NOAA Atlas 14	SCS Type III

The drainage area for the Plant Greene County Ash Pond is delineated as the pond area itself. No contributing areas outside the pond drain into the pond. The topography is based on LiDAR data acquired for the plant in 2021. Run-off characteristics were

developed based on the Soil Conservation Service (SCS) methodologies as outlined in TR-55. An overall SCS curve number for the drainage area was developed based on the National Engineering Handbook Part 630, Chapter 9. Land use areas were delineated based on aerial photography. Time of Concentration and Lag Time calculations were developed based on methods as described in paragraph 4.3.

A table of the pertinent basin characteristics of the Ash Pond B is provided below in Table 3.

Table 3. Ash Pond Hydrologic Information

Drainage Basin Area (acres)	489
Hydrologic Curve Number, CN	93
Hydrologic Methodology	SCS Method
Time of Concentration (minutes)	44.54
Hydrologic Software	Autodesk Storm and Sanitary Analysis 2019

Run-off values were determined by importing the characteristics developed above into a hydrologic model using Autodesk Storm and Sanitary Analysis 2019.

3.2 HYDRAULIC ANALYSES

Storage values for the Ash Pond were determined by developing a stage-storage relationship utilizing contour data. The spillway system at the Plant Greene County Ash Pond consists of an outlet control structure having rectangular geometry approx. 8-ft x 8-ft. Stormwater enters the riser through a series of stop logs. Water is then routed to the ultimate discharge point through a 36” pipe.

4.0 SUPPORTING INFORMATION

4.1 CURVE NUMBER

The pond has no other contributing drainage area, hence the curve number for the basin is calculated using area of exposed ash (CN 90) and curve number of water surface (CN100) for a composite curve number of 93.

4.2 STAGE-STORAGE TABLE

Storage Nodes

Storage Node : Pond

Input Data

Invert Elevation (ft)	87.50
Max (Rim) Elevation (ft)	95.00
Max (Rim) Offset (ft)	7.50
Initial Water Elevation (ft)	87.50
Initial Water Depth (ft)	0.00
Ponded Area (ft²)	3561990.00
Evaporation Loss	0.00

Storage Area Volume Curves

Storage Curve : Pond

Stage (ft)	Storage Area (ft²)	Storage Volume (ft³)
0	0	0
.5	9778960.00	2444740
1.5	10540188.00	7905141
2.5	11108352.80	13885441
3.5	11667995.43	20418992
4.5	12178973.33	27402690
5.5	12681922.55	34875287
6.5	13215118.46	42949135
7.5	13785169.07	51694384

4.3 TIME OF CONCENTRATION

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Subbasin 489AC
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Sheet Flow Computations

-	Flowpath A
Manning's Roughness:	.1
Flow Length (ft):	100
Slope (%):	.68
2 yr, 24 hr Rainfall (in):	4.40
Velocity (ft/sec):	0.18
Computed Flow Time (minutes):	9.30

Shallow Concentrated Flow Computations

-	Flowpath A
Flow Length (ft):	2812.0545
Slope (%):	.68
Surface Type:	Unpaved
Velocity (ft/sec):	1.33
Computed Flow Time (minutes):	35.24

Total TOC (minutes):	44.54

4.4 DRAINAGE BASIN