INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN
40 C.F.R. PART 257.82
PLANT HAMMOND ASH POND 1 (AP-1)
GEORGIA POWER COMPANY

EPA's "Disposal of Coal Combustion Residuals from Electric Utilities" Final Rule (40 C.F.R. Part 257 and Part 261), §257.82, requires the owner or operator of an existing or new CCR surface impoundment or any lateral expansion of a CCR surface impoundment to design, construct, operate and maintain an inflow design flood control system capable of adequately managing flow during and following the peak discharge of the specified inflow design flood. The owner or operator must prepare an inflow design flood written plan documenting how the inflow design flood control system has been designed and constructed to meet the requirements of 40 C.F.R. Part 257 §257.82.

The existing CCR surface impoundment known as AP-1 is located in Floyd County, west of Rome, Georgia on Plant Hammond property. The facility consists of a 35-acre CCR storage area. The inflow design flood consists primarily of the rainfall that falls within the limits of AP-1, along with a nominal amount (relative to rainfall) of process flows and periodic flows from other ponds. Stormwater is temporarily stored within the limits of AP-1 and discharged through the spillway system. The principal spillway for AP-1 is located on its western edge and consists of a 36-inch diameter fiberglass reinforced pipe (FRP). The 36-inch FRP pipe extends from a reinforced concrete intake structure into the Plant for process water return flows or blowdown to the river through the Plant's discharge tunnel. The auxiliary spillway for AP-1 is located in the southwestern corner of the pond and consists of a 3'-8" by 3'-8" (interior dimension) reinforced concrete riser structure 18 ft. tall with stop logs. The riser is connected to a 36-inch diameter reinforced concrete pipe (RCP) which remains closed during normal operations. The discharge pipe flows into a small pool which is connected to the Coosa 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 1000-yr storm event required for a Significant hazard potential facility. Appendix A and B from the Urban Hydrology for Small Watersheds (TR-55) were used to determine the rainfall distribution

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

This information was placed into a customized level pool flood routing spreadsheet to analyze the design storm while assuming 100% run-off into the surface impoundment from the contributing drainage area. Resulting calculations indicate that AP-1 can safely store and pass the 1,000-yr, 24-hr inflow design flood. This plan is supported by appropriate engineering calculations which are attached.

The facility is operated subject to and in accordance with § 257.3-3 of EPA's regulations.

I hereby certify that the inflow design flood control system plan meets the requirements of 40 C.F.R. Part 257.82.

10/17

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Inflow Design Control System Plan:
Hydrologic and Hydraulic Calculation Summary

for

Plant Hammond Ash Pond 1

Prepared by:

Southern Company Services
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Originator: Schnabel Engineering, LLC

Reviewer: _____ 10/11/16
Jason S. Wilson Date

Approval: _____ 10/12/16
James C. Pegues 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).

2.0 Summary of Conclusions

A hydrologic and hydraulic model was developed for the Plant Hammond Ash Pond 1 to determine the hydraulic capacity of the impoundment. Ash Pond 1 is located in the eastern portion of the plant. The pond currently serves as a co-treatment facility and receives a limited amount of stormwater runoff from the plant. Stormwater releases from Ash Pond 1 are conveyed through a series of conduits and discharged into the Coosa River. The design storm for the Plant Hammond Ash Pond 1 is a 1000-year rainfall event. Southern Company has selected a storm duration of 24-hours for all inflow design flood control plans. The results of routing a 1000-year, 24-hour rainfall event through the impoundment are presented in Table 1 below:

Table 1 - Flood Routing Results for Plant Hammond Ash Pond 1

Plant Hammond	Normal Pool El (ft)	Top of embankment El (ft)	Peak Water Surface Elevation (ft)	Freeboard* (ft)	Peak Inflow (cfs)	Peak Outflow (cfs)
Ash Pond 1	584.0	591.0	585.2	5.8	502	0**

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

**Based upon uncertainties related to the principal spillway operations and the emergency spillway, an outflow of 0 was assumed in the analysis for conservatism. Additionally, if engaged, Ash Pond 1 spillways have the capacity to drain the impoundment to below normal pool during the design storm.

3.0 Methodology

3.1 HYDROLOGIC ANALYSES

The Plant Hammond Ash Pond 1 is classified as a significant hazard structure. As a significant hazard structure, Ash Pond 1 must be capable of safely storing and/or passing runoff resulting from the 24-hour, 1000-year storm event. A summary of the design storm parameters and rainfall distribution methodology for these calculations is summarized below in Table 2.

Table 2 - Plant Hammond Ash Pond 1 Storm Distribution

Hazard Classification	Return Frequency (years)	Storm Duration (hours)	Rainfall Total (Inches)	Rainfall Source	Storm Distribution
Significant	1000	24	10.6	NOAA Atlas 14	SCS Type II

The hydraulic capacity of Ash Pond 1 was evaluated using level pool routing methodology. The level pool routing methodology assumes 100% percent runoff into the pond. The contributing drainage area to Ash Pond 1 is approximately 0.054 mi^2 and consists primarily of the dam and impoundment. The drainage basin for Ash Pond 1 is shown on Figure 1 within the supporting information.

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 Hammond Ash Pond 1 consists of a primary spillway and an auxiliary spillway. The principal spillway for Ash Pond 1 consists of 36-inch diameter fiberglass reinforced pipe (FRP) with upstream invert at elevation 581.5 feet. Discharge is controlled by a flashboard system. The 36-inch diameter FRP travels approximately 330 feet to a manhole. The outlet invert of the manhole is at elevation 580.35 feet, and the outlet pipe reduces to a 24-inch diameter FRP. From there, flows travel approximately 700 feet to the crown of a discharge tunnel. The outlet conduit then bends 90 degrees to a vertical configuration and terminates at a capped end founded on the invert of the tunnel. The vertical pipe has 18 holes acting as orifices, three inches in diameter within the pipe.

The emergency spillway for Ash Pond 1 consists of a 3’-8” by 3’-8” interior dimension reinforced concrete riser structure approximately 18 feet tall. The riser structure has an open top at approximate elevation 589 ft. There are sixteen 3-foot by 1-foot rectangular openings in the riser structure walls, with two of the sidewalls having eight openings each. The riser structure is connected to a 36-inch diameter reinforced concrete pipe (RCP). Approximately 290 feet downstream of the riser structure, a sluice gate structure is in line with the 36-inch diameter RCP which remains closed during normal operating conditions. Approximately 900 feet downstream of the sluice gate structure is a manhole. The inlet invert in the manhole is at elevation 566.1 feet. The outlet invert in the manhole is at elevation 564.2 feet. The pipe which outlets from the manhole is a 36-inch diameter HDPE pipe, approximately 130 feet long and having a downstream invert of 563.1 feet. The HDPE pipe discharges into a small pool which is connected to the Coosa River via three 72-inch diameter conduits of unknown material having estimated upstream invert elevations of 545 feet. Table 3 summarizes the spillway system of Ash Pond 1.

Table 3 – Ash Pond 1 Hydraulic Characteristics

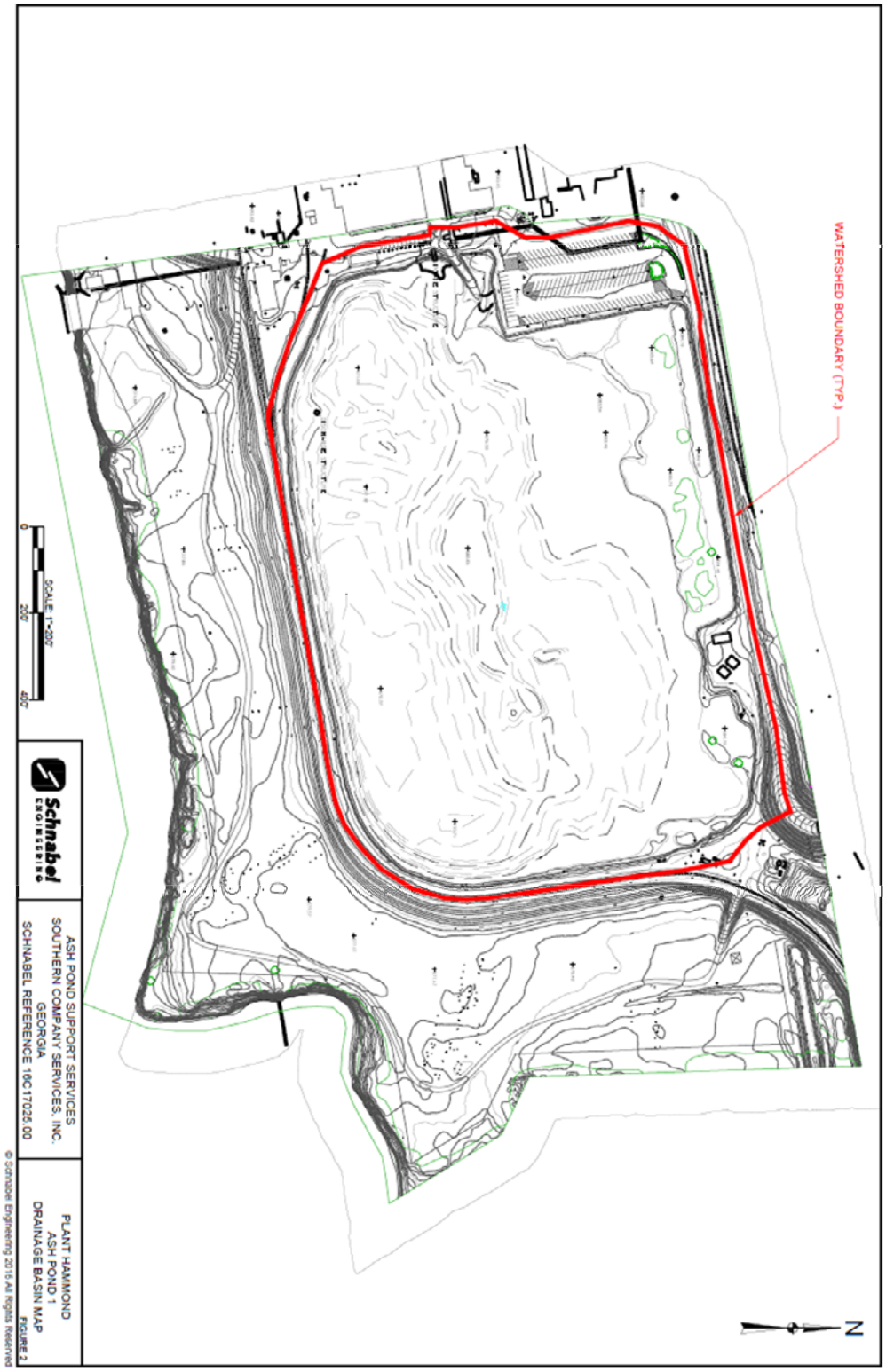
Plant Hammond – Pond 1	Material / Size	US Invert, ft	DS Invert, ft	Length, ft
Principal Spillway	36” dia. FRP to 24” dia. FRP to 3” dia. Orifices x 18	581.5*	551	1,020
Emergency Spillway	Riser Structure with 36” dia. RCP into 36” dia. HDPE pipe	572.1	563.1	1,320

*Normal pool at elevation 584 feet, controlled by a flashboard system.

Due to the manual operational requirements of the spillways associated with Ash Pond I, the model was developed assuming zero outflow for conservatism. Results of the hydraulic analysis are shown in Table 1.

4.0 SUPPORTING INFORMATION

4.1 Drainage Basin



4.2 STAGE STORAGE

ASH POND DAMS - PLANT HAMMOND

POND 1

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STAGE STORAGE - AVERAGE END AREA METHOD

EL (ft)	Area (ft^2)	Area (ac)	Inc. Volume (ac-ft)	Cum. Volume (ac-ft)
584	1028782	23.6	0.0	0.0
585	1117327	25.7	24.6	24.6
586	1218190	28.0	26.8	51.4
587	1228533	28.2	28.1	79.5
588	1238077	28.4	28.3	107.8
589	1250079	28.7	28.6	136.4
590	1275905	29.3	29.0	165.4