

**INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN**  
**40 C.F.R. PART 257.82**  
**PLANT YATES ASH POND B' (AP-B')**  
**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 system written plan documenting how the inflow design flood control system has been designed and constructed to meet the requirements of 40 C.F.R. §257.82.

The existing CCR surface impoundment known as AP-B' is located at Georgia Power Company's Plant Yates. The facility consists of a 25-acre CCR storage area. The inflow design flood consists solely of the rainfall that falls within the limits of AP-B'. Stormwater is temporarily stored within the limits of the AP-B' and discharged through a system of spillways. The pond is divided into a north and a south cell, each having a principal spillway. The north cell spillway is a 24-inch CMP while the south cell spillway is a 36-inch diameter CMP culvert. The auxiliary spillway for AP-B' consists of a 20-foot wide open-channel trapezoidal ditch.

The inflow design flood has been calculated using the Natural Resources Conservation Service (NRCS) method, also known as the Soil Conservation Service (SCS) method, using the 100-yr storm event required for a low hazard potential surface impoundment. 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 National Oceanic and Atmospheric Administration (NOAA)'s Precipitation Frequency Data Server (Atlas-14).

This information was placed into a level pool routing spreadsheet which accounts for 100% runoff with the rainfall distribution curves generated by TR-55 to produce rating curves to evaluate surface impoundment capacity.

Resulting calculations indicate that AP-B' can safely store and pass the inflow design storm. 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.

  
James C. Pegues, P.E.

Licensed State of Georgia, PE No. 17419



**Inflow Design Control System Plan:  
Hydrologic and Hydraulic Calculation Summary**

for

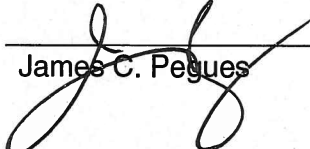
***Plant Yates Ash Pond B'***

Prepared by:

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Reviewer:  10/11/16  
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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 Yates Ash Pond B' to determine the hydraulic capacity of the impoundment. The design storm for the Plant Yates Ash Pond is a 100-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 100-year, 24-hour rainfall event through the impoundment are presented in Table 1 below:

**Table 1 - Flood Routing Results for Plant Yates Ash Pond B'**

Plant Yates	Normal Pool EI (ft)	Top of Embankment EI (ft)	Emergency Spillway Crest EI (ft)	Peak Water Surface Elevation (ft)	Freeboard* (ft)	Peak Inflow (cfs)	Peak Outflow (cfs)
Ash Pond B'	769.06	784.0	783.07	776.5	7.5	250	83

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

## 3.0 Methodology

### 3.1 HYDROLOGIC ANALYSES

The Plant Yates Ash Pond B' is classified as a low hazard structure. The design storm for a low hazard structure is a 100-year event. A summary of the design storm parameters and rainfall distribution methodology for these calculations is summarized below in Table 2.

**Table 2. Plant Yates Ash Pond B' Storm Distribution**

Hazard Classification	Return Frequency (years)	Storm Duration (hours)	Rainfall Total (Inches)	Rainfall Source	Storm Distribution
Low	100	24	8.0	NOAA Atlas 14	SCS Type II

The drainage area for the Plant Yates Ash Pond B' was delineated based on LiDAR data acquired for the Plant in 2014. The hydraulic capacity of Ash Pond B' was evaluated using level pool routing methodology. The level pool routing methodology assumes

100% runoff into the pond. The drainage basin for Ash Pond B' is approximately 0.04 mi<sup>2</sup> and consists primarily of the dam and impoundment.

### 3.2 HYDRAULIC ANALYSES

Storage values for the Ash Pond were determined by developing a stage-storage relationship utilizing contour data.

Ash Pond B' is divided into a northern and southern cell, each having an independent primary spillway. The primary spillway for the northern cell consists of a 24-inch diameter corrugated metal pipe culvert extending through the embankment. The primary spillway for the southern cell consists of a 36-inch diameter corrugated metal pipe culvert through the embankment. An auxiliary spillway consisting of an earthen channel with a control section approximately 70-feet wide is located in the northeast corner of the northern cell. Table 3 summarizes the spillway system of Ash Pond B'.

**Table 3 – Ash Pond B' Spillway Attribute Table**

<b>Plant Yates – Pond B'</b>	<b>Material / Size</b>	<b>US Invert, ft</b>	<b>DS Invert, ft</b>	<b>Length, ft</b>
<b>North Cell Principal Spillway</b>	24" dia CMP culvert	773.49	772.99	50
<b>South Cell Principal Spillway</b>	36" dia CMP culvert	769.06	768.24	82
<b>Emergency Spillway – Northern Cell</b>	70 ft wide Earthen Channel	783.07	-	-

Based on the spillway attributes listed above, a rating curve was developed and inserted into a level pool routing spreadsheet to determine the pond performance during the design storm. Results are shown in Table 1.

## 4.0 SUPPORTING INFORMATION

### 4.1 CURVE NUMBER

The purpose of this analysis is to develop runoff curve numbers for the land cover that is mapped in the drainage area of the Plant Yates Pond B' drainage area				
Total Drainage Area:		22.64	Acres	
Hydrologic Soil Group	Cover Description (Cover type, treatment, and hydrologic description; % impervious; connected or unconnected, etc)	CN	Area (Acres)	Product (CN*Area)
B	Industrial / Roads	88	0.0	0.0
B	Open Space - Fair Cover	69	3.3	225.2
B	Residential - 2 Acre	65	0.0	0.0
B	Ash	96	17.7	1699.6
B	Woods - Fair Cover	60	0.0	0.0
W	Water	100	1.7	166.9
<b>Totals</b>			<b>22.6</b>	<b>2092</b>
<b>Total (square miles):</b>			<b>0.04</b>	
<b>ARC II Composite CN:</b>				<b>93</b>
<b>References:</b>				
Land Cover was delineated using aerial imagery.				
Hydrologic Soil Groups obtained from NRCS Web Soil Survey for subject drainage area				
NRCS TR-55, Second Edition, June 1986				
NRCS Part 630 HNEH, Chapter 9, Hydrologic Soil-Cover Complexes, 2004				

4.2 RATING CURVE

<b>Elev.</b>	<b>North Culvert</b>	<b>South Culvert</b>	<b>P/S Total</b>	<b>E/S</b>	<b>Top of Dam Discharge</b>	<b>Total Discharge</b>
769.06	0.00	0.00	0.00	0	0	0.0
771.11	0.00	15.00	15.00	0	0	15.0
772.11	0.00	30.01	30.01	0	0	30.0
773.23	0.00	45.01	45.01	0	0	45.0
773.49	0.00	46.87	46.87	0	0	46.9
774.7	4.45	55.55	60.00	0	0	60.0
775.75	12.74	62.26	75.00	0	0	75.0
777.16	19.43	70.58	90.01	0	0	90.0
778.3	23.32	76.68	100.00	0	0	100.0
780.92	30.72	89.28	120.00	0	0	120.0
783.07	35.80	98.66	134.46	0	0	134.5

783.15	35.99	99.01	135.00	4	0	139.4
784	37.72	102.34	140.06	176	0	315.8
785.65	41.12	108.88	150.00	812	5934	6896.7
800	63.00	153.84	216.84	13653	179200	193070.3



### 4.3 STAGE STORAGE

ASH POND DAMS - PLANT YATES

POND B'

16C17025.00

Jun-16

STAGE STORAGE - AVERAGE END AREA METHOD

North Cell

EL (ft)	Area (ft <sup>2</sup> )	Area (ac)	Inc. Volume (ac-ft)	Cum. Volume (ac-ft)
773.1	15105	0.3	0.0	0.0
774	24076	0.6	0.4	0.4
775	38315	0.9	0.7	1.1
776	47747	1.1	1.0	2.1
776.5	128474.5	2.9	1.0	3.1
777	139170	3.2	1.5	4.7
777.1	188338.9	4.3	0.4	5.0
778	221019	5.1	4.2	9.3
779	262150	6.0	5.5	14.8
780	269348	6.2	6.1	20.9
781	299184	6.9	6.5	27.4
781.25	304564	7.0	1.7	29.2
782	320704	7.4	5.4	34.5
783	345646	7.9	7.6	42.2
784	362643	8.3	8.1	50.3

Interpolated Value

South Cell

EL (ft)	Area (ft <sup>2</sup> )	Area (ac)	Inc. Volume (ac-ft)	Cum. Volume (ac-ft)
769.06	1200	0.03	0	0
773.1	1600	0.04	0.1	0.1
777.1	2000	0.05	0.2	0.3
781.25	265324	6.1	0.2	0.5
782	321366	7.4	5.1	5.5
783	329894	7.6	7.5	13.0
784	337208	7.7	7.7	20.7

\*Note- Avg Eng Area not used between 778 and 781.25

Total

EL (ft)	Cum. Volume (ac-ft)
769.06	0.0
773.1	0.1
774	0.5
775	1.2
776	2.2
776.5	3.2
777	4.7
777.1	5.0
778	9.3
779	14.8
780	20.9
781	27.4
781.25	29.7
782	40.1
783	55.2
784	71.0

\*Add 0.1 ac-ft/ft for storage in South Cell between 773.1 and 777.1

# 4.4 DRAINAGE BASIN

