RUN-ON AND RUN-OFF CONTROL PLAN
40 C.F.R. PART 257.81
PLANT DANIEL GYPSUM STORAGE AREA
MISSISSIPPI POWER COMPANY

EPA's "Disposal of Coal Combustion Residuals from Electric Utilities" Final Rule (40 C.F.R. Part 257 and Part 261) ("Rule") requires the owner or operator of an existing or new CCR landfill or any lateral expansion of a CCR landfill to prepare a run-on and run-off control system plan to document how these control systems have been designed and constructed to meet the applicable requirements of this section of the Rule (§ 257.81.) Each plan is to be supported by appropriate engineering calculations.

The Gypsum Storage Area CCR landfill is located near Mississippi Power Company's Plant Daniel on property owned by Mississippi Power Company. The facility is constructed with a composite liner system, and consists of a CCR storage cell, a sedimentation pond, and a clear pool pond.

The storm water flows have been calculated using the Natural Resources Conservation Service method (also known as the Soil Conservation Service (SCS) method) using 24-hour storm events. The storm water detention system has been designed in accordance with the Mississippi Nonhazardous Solid Waste Management Regulations requirements, as well as other local, city, and government codes.

Runoff curve number data was determined using Table 2-2A from the Urban Hydrology for Small Watersheds (TR-55). Values for Type III Rainfall Distribution were determined from National Oceanic and Atmospheric Administration (NOAA) Atlas 14, Precipitation Frequency Data Server, Volume 9, Version 2.

The NRCS provided information on the soil characteristics and hydrologic groups present at the site. It was determined that the hydrological group "B" should be used to best reflect the characteristics of the soils on site. This information was placed into Hydraflow Hydrographs 2011 and used to generate appropriate precipitation curves, runoff curve numbers and storm basin runoff values.

The Gypsum Storage Area is designed and constructed with perimeter berms that prevent run-on to the landfill. The facility is a zero discharge facility, with water levels controlled by pumps that return flow back to the plant. An auxiliary spillway is installed on the clear pool, but with a crest elevation above the

100-year storm event elevation in the pond. Thus, there is no run-off from the facility during 100-year storm events per the design. This plan is supported by appropriate engineering calculations which are attached.

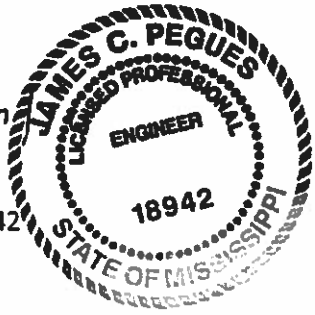
The facility is operated subject to and in accordance with § 257.3-3 of EPA's regulations.

I hereby certify that the run-on and run-off control system plan meets the requirements of 40 C.F.R. §257.81.

10/17

James C. Pegues, P.E.

Licensed State of Mississippi, PE No. 18942



Run-on and Run-off Control System Plan for Landfills:
Calculation Summary

for

Plant Daniel Gypsum Storage Facility

Prepared by:

Southern Company Services
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Originator: _____ 10/6/16
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Approval: _____ 10/12/16
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1.0 Purpose of Calculation

The purpose of this report is to demonstrate the run-on and run-off controls of the subject CCR landfill in order to prepare a run-on and run-off control system 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

2.1 Site Overview

The Plant Daniel Gypsum Storage Facility is located on Mississippi Power Company property in Moss Point, Mississippi. The total area occupied by the landfill is 61.6 acres. The facility includes a perimeter dike around the gypsum cell to contain surface rainfall runoff. Runoff from this area is directed into a sedimentation pond/clear pool via interior perimeter ditches and culverts. Water from the sedimentation pond/clear pool is pumped back to the plant and returned to the process as part of the limestone slurry mixture.

An overview of the facility is provided in Table 1 below.

Table 1. Landfill site characteristics

Pond Description	Gypsum cell	Emergency Slurry Pond	Sedimentation Pond	Clear Pool
Size (Acres)	37.32	2.39	11.79	2.32
Outlet Type	Four 42" HDPE pipes, plus a riser structure connected to a 36" HDPE pipe	Trapezoidal Spillway	Two 36" HDPE pipes	Two 14" pump lines and an auxiliary spillway
Outlets To	Sedimentation Pond	Gypsum cell	Clear Pool	Pumped back to the plant

2.2 Run-on Control System Plan

There is no stormwater run-on into the facility because it is contained within earthen berms that prevent stormwater from the surrounding area from entering the gypsum facility.

2.3 Run-off Control System Plan

A hydrologic and hydraulic model was developed for the Plant Daniel Gypsum Storage Facility to determine the hydraulic capacity of the Cell. The design storm for the purposes of run-off control system plans is the 24-hour, 25-year rainfall event. The results of routing the design storm event through the landfill are presented in the following table:

Table 2. Flood Routing Results

Plant Daniel	Normal Pool El (ft)	Top of embankment El (ft)	Spillway Crest El (ft)	Peak Water Surface Elevation (ft)	Freeboard* (ft)	Peak Inflow (cfs)	Peak Outflow (cfs)
Gypsum Facility	31.5	41.0	40.0	35.84	4.16	454.89	0

*Freeboard is measured from the spillway crest to the peak water surface elevation

3.0 Methodology

3.1 HYDROLOGIC ANALYSES

The design storm for all run-on/run-off analyses is a 24-hour, 25-year rainfall event. A summary of the design storm parameters and rainfall distribution methodology for these calculations is summarized below in Table 3.

Table 3. Design Storm Distribution

Return Frequency (years)	Storm Duration (hours)	Rainfall Total (Inches)	Rainfall Source	Storm Distribution
25	24	10.8	NOAA Atlas 14	SCS Type III

The drainage area for the Plant Daniel Gypsum Storage Facility was delineated based on design topography developed for construction of the facility in 2013 and as-built data. Runoff 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 methods prescribed in TR-55. Soil types were obtained from the Natural Resources Conservation Service. Land use areas were delineated based on aerial photography and design data. Time of Concentration was also developed based on methodologies prescribed in TR-55.

A table of the pertinent basin characteristics of the landfill is provided below in Table 4.

Table 4. Landfill Hydrologic Information

Drainage Basin Area (acres)	61.6
Hydrologic Curve Number, CN	89
Hydrologic Methodology	SCS Method
Time of Concentration (minutes)	18.8
Hydrologic Software	Hydraflow Hydrographs

Runoff values were determined by importing the characteristics developed above into a hydrologic model with the Hydraflow Hydrographs Extension for AutoCAD Civil 3D 2013.

3.2 HYDRAULIC ANALYSES

Storage values for the landfill were determined by developing a stage-storage relationship utilizing contour data. The discharge system at the Plant Daniel Gypsum Storage Facility consists of a pump structure and an auxiliary spillway. The pump structure consists of two 14” HDPE lines that pump water back to the plant to be returned to the process as part of the limestone slurry mixture. The normal operating

range for the pumps is EL 30.5 to EL 31.5. The auxiliary spillway is a concrete trapezoidal weir sloped at 1% slope with a crest elevation of EL 40.0. A summary of spillway information is presented below in Table 5.

Table 5. Spillway Attribute Table

Spillway Component	US Invert El (feet)	DS Invert El (feet)	Dimension (ft)	Slope	Length (ft)	Spillway Capacity (cfs)
Auxiliary	40.0	39.7	10' span 1' rise	1.0%	30	170

Based on the spillway attributes listed above, the data was inserted into Hydraflow Hydrographs to determine the pond performance during the design storm. Results are shown in Table 1.

4.0 SUPPORTING INFORMATION

4.1 CURVE NUMBER

Terrain Type	Area (ac)	Curve Number
Water/HDPE	13.55	100
Bare Gypsum	39.37	86
Gravel	8.69	85

4.2 STAGE-STORAGE TABLE

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	31.50	476,812	0	0
0.50	32.00	482,510	239,831	239,831
1.50	33.00	494,021	488,266	728,096
2.50	34.00	505,643	499,832	1,227,928
3.50	35.00	517,380	511,512	1,739,440
4.50	36.00	529,229	523,304	2,262,744
5.50	37.00	541,191	535,210	2,797,954
6.50	38.00	553,266	547,229	3,345,183

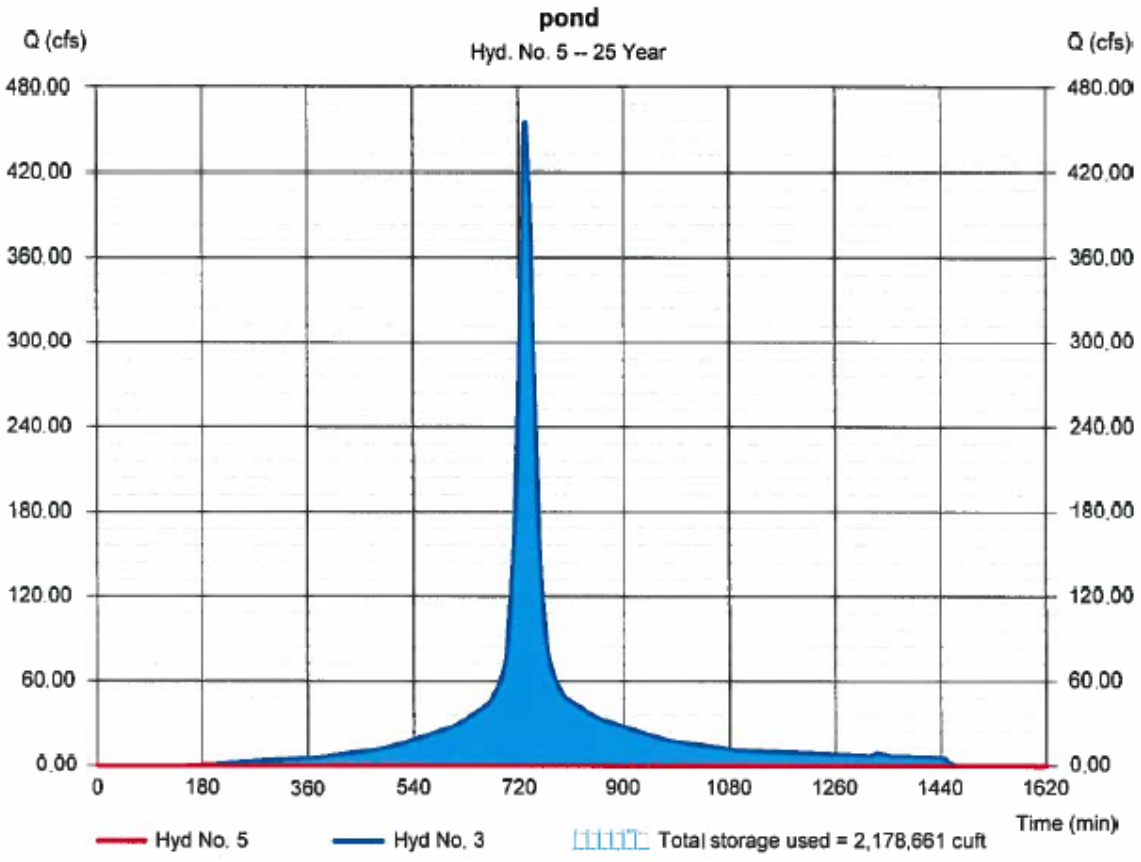
4.3 TIME OF CONCENTRATION

Description	A		B		C		Totals
Sheet Flow							
Manning's n-value	= 0.011		0.011		0.011		
Flow length (ft)	= 300.0		0.0		0.0		
Two-year 24-hr precip. (in)	= 6.10		0.00		0.00		
Land slope (%)	= 0.50		0.00		0.00		
Travel Time (min)	**= 3.68**	**+**	**0.00**	**+**	**0.00**	**=**	**3.68**
Shallow Concentrated Flow							
Flow length (ft)	= 1000.00		0.00		0.00		
Watercourse slope (%)	= 0.50		0.00		0.00		
Surface description	= Unpaved		Paved		Paved		
Average velocity (ft/s)	=1.14		0.00		0.00		
Travel Time (min)	**= 14.61**	**+**	**0.00**	**+**	**0.00**	**=**	**14.61**
Channel Flow							
X sectional flow area (sqft)	= 32.00		0.00		0.00		
Wetted perimeter (ft)	= 22.65		0.00		0.00		
Channel slope (%)	= 0.50		0.00		0.00		
Manning's n-value	= 0.011		0.015		0.015		
Velocity (ft/s)	=12.07						
			0.00				
					0.00		
Flow length (ft)	({0})350.0		0.0		0.0		
Travel Time (min)	**= 0.48**	**+**	**0.00**	**+**	**0.00**	**=**	**0.48**
Total Travel Time, Tc							**18.80 min**

4.4 RESULTS

Hydrograph type	= Reservoir	Peak discharge	= 0.000 cfs
Storm frequency	= 25 yrs	Time to peak	= n/a
Time interval	= 3 min	Hyd. volume	= 0 cuft
Inflow hyd. No.	= 3 - site total and process flow	Max. Elevation	= 35.84 ft
Reservoir name	= storm volume	Max. Storage	= 2,178,661 cuft

Storage Indication method used.



4.5 DRAINAGE BASIN