Duke Energy Company
Allen Steam Station - Ash Basin Forecasting
2014 Wet Weather Detention Volume Calculation

Determination of Wet Weather Detention Volume: Wet Weather Detention Volume is the sum of the runoff accumulated in the ash basin which results from a 10-yr 24-hr storm (assuming 100% runoff) plus the maximum 24-hr dry weather waste stream which discharges to the Ash Basin (refer to NPDES Permit NC0004979)

I. Estimate Runoff to the Ash Basin from a 10-yr 24-hr storm:

1. Natural Drainage Area of Ash Basin = 288.0 Acres
   Station Yard Drainage Area Pumped to Ash Basin = 40.0 Acres
   Total = 328.0 Acres

2. Precipitation from 10-yr 24-hr storm = 5.0 Inches

3. Total Stormwater Runoff to Ash Basin = 136.67 Acre-feet
   (Assuming 100% runoff)

II. Estimated Maximum 24-hr Dry Weather Waste Stream Discharging to Ash Basin:

1. Maximum recorded Ash Basin Discharge = 21,000,000 Gallons/day

2. Increase maximum daily disharge by 10% for conservatism and convert units to acre-feet = 70.89 Acre-feet

III. Wet Weather Detention Volume:

Sum of Parts I. and II. = 207.55 Acre-feet

IV. Estimated Quantity of Solids (Ash) to be discharged to Ash Basin through December 31, 2020.
Note: NPDES Permit expiration date is 5/31/2015.

Time Period	Actual or Estimated Coal Consumption (1000's tons)	% Ash	Estimated Total Ash Production (1000's tons)	Estimated Ash Sent to Structural Fill or Lined Land Fill (1000's tons)	Estimated Ash Discharged to Ash basin (1000's tons)	Estimated Ash Discharged to Ash basin (Acre-feet)
2014 (Jun-Dec)	848.41	10.00%	84.84	72.11	12.73	10.62
2015	1283.88	10.00%	128.39	109.13	19.26	16.08
2016	489.32	10.00%	48.93	41.59	7.34	6.13
2017	232.88	10.00%	23.29	19.79	3.49	2.92
2018	107.53	10.00%	10.75	9.14	1.61	1.35
2019	47.95	10.00%	4.80	4.08	0.72	0.60
2020	77.74	10.00%	7.77	6.61	1.17	0.97
Total	3087.71	10.00%	308.77	262.46	46.32	38.66

* Calculation assumes an in-place ash density of 55 lbs. per cubic foot.

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V. Estimated Total Storage Volume Required through 2015:

Wet Weather Detention Volume =	207.6	Acre-feet
Estimated Solids to Ash Basin =	38.7	Acre-feet
Required Storage Volume Through 12/31/2020 =	246.2	Acre-feet

VI. Results:

Ash Basin @ Pond Elevation 644'+0" =	672.5	Acre-feet
Total Available Storage =	672.5	Acre-feet

Note: Available Storage based on basin survey dated 7/18/2014

Available Storage > Required Storage

Based on these calculations, there is sufficient capacity in the ash basin to provide the retention volume specified in the permit through the year 2020.