Duke Energy Company  
Marshall 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 NC0004961)

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

1. Natural Drainage Area of Ash Basin = 1180.0 Acres  
   Station Yard Drainage Area Pumped to Ash Basin = 14.7 Acres  
   Total = 1194.7 Acres

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

3. Total Stormwater Runoff to Ash Basin = 497.79 Acre-feet (Assuming 100% runoff)

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

1. Maximum recorded Ash Basin Discharge = 11,200,000 Gallons/day

2. Increase maximum daily discharge by 10% for conservatism and convert units to acre-feet = 37.81 Acre-feet

III. Wet Weather Detention Volume:

Sum of Parts I. and II. = 535.60 Acre-feet

IV. Estimated Quantity of Solids (Ash) to be discharged to Ash Basin through December 31, 2020.  
Note: NPDES Permit expiration date is 4/30/2015.

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Actual or Estimated Coal Consumption (1000's tons)</th>
<th>% Ash</th>
<th>Estimated Total Ash Production (1000's tons)</th>
<th>Estimated Ash Sent to Structural Fill or Lined Land Fills (1000's tons)</th>
<th>Estimated Ash Discharged to Ash Basin (1000's tons)</th>
<th>Estimated Ash Discharged to Ash basin (Acre-feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014 (Jun-Dec)</td>
<td>2744.79</td>
<td>10.00%</td>
<td>274.48</td>
<td>233.31</td>
<td>41.17</td>
<td>34.37</td>
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<tr>
<td>2015</td>
<td>3642.73</td>
<td>10.00%</td>
<td>364.27</td>
<td>309.63</td>
<td>54.64</td>
<td>45.61</td>
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<tr>
<td>2016</td>
<td>4106.74</td>
<td>10.00%</td>
<td>410.67</td>
<td>349.07</td>
<td>61.60</td>
<td>51.42</td>
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<tr>
<td>2017</td>
<td>3495.78</td>
<td>10.00%</td>
<td>349.58</td>
<td>297.14</td>
<td>52.44</td>
<td>43.77</td>
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<tr>
<td>2018</td>
<td>2442.76</td>
<td>10.00%</td>
<td>244.28</td>
<td>207.63</td>
<td>36.64</td>
<td>30.59</td>
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<tr>
<td>2019</td>
<td>2371.18</td>
<td>10.00%</td>
<td>237.12</td>
<td>201.55</td>
<td>35.57</td>
<td>29.69</td>
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<tr>
<td>2020</td>
<td>2406.97</td>
<td>10.00%</td>
<td>240.70</td>
<td>204.59</td>
<td>36.10</td>
<td>30.14</td>
</tr>
<tr>
<td>Total</td>
<td>21210.94</td>
<td>10.00%</td>
<td>2121.09</td>
<td>1802.93</td>
<td>318.16</td>
<td>265.60</td>
</tr>
</tbody>
</table>

* Calculation assumes an in-place ash density of 55 lbs. per cubic foot.
V. Estimated Total Storage Volume Required through 2015:

- Wet Weather Detention Volume = 535.6 Acre-feet
- Estimated Solids to Ash Basin = 265.6 Acre-feet

Required Storage Volume Through 12/31/2020 = 801.2 Acre-feet

VI. Results:

- Ash Basin @ Pond Elevation 793’+9” = 849.9 Acre-feet
- Total Available Storage = 849.9 Acre-feet

Note: Available Storage based on basin survey dated 8/13/2014

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.