Allen Ash Basin (NPDES Permit NC0004979)
Groundwater Monitoring Program
Reports and Recommendations

Groundwater monitoring is conducted around the ash basin system at the Allen Steam Station under NPDES Permit NC0004979. The following items are presented to describe potential on-site and off-site receptors, the nature of the groundwater flow regime around the Allen site, and the Allen groundwater monitoring program.

- **Item 1** - Receptor Survey Allen Steam Station Ash Basin
- **Item 2** - Generalized Groundwater Flow Direction Figure
- **Item 3** - Groundwater Monitoring Program Sampling, Analysis, and Reporting Plan

The referenced items and documents are included to describe the current state of the groundwater monitoring program and any changes to the existing monitoring plan. Changes to the current program (including installation of additional observation or monitoring wells) which are proposed by Duke Energy in the future may be allowed following consultation with NCDENR and should not require a re-opening of the Allen NPDES permit.

Item 1 - Receptor Survey Allen Steam Station Ash Basin

A receptor survey has been completed to identify private water supply wells, public water supplies, surface water bodies, and wellhead protection areas (if present) within a 0.5-mile radius of the Allen ash basin compliance boundary. The report presents the methodology and findings of the survey. This report is included as Enclosure 1.

Item 2 - Generalized Groundwater Flow Direction Figure

The Allen ash basin site and the generalized groundwater flow directions for the shallow water table are presented in a figure contained in Enclosure 2. The figure presents the generalized groundwater flow direction around the ash basin with arrows depicting probable generalized groundwater flow directions for the shallow water table. These generalized flow directions were developed based on the site hydrogeologic conceptual groundwater flow model, site topography, and historic site groundwater elevation data.

Item 3 - Groundwater Monitoring Program Sampling, Analysis, and Reporting Plan

The groundwater monitoring program sampling, analysis, and reporting plan (Plan) was developed to support the requirement for groundwater monitoring around the Allen ash basin.

The Plan describes the groundwater monitoring network, methodologies of field sampling, record-keeping protocols, analytical procedures, data quality objectives, data validation, and reporting that will be used to support the Allen ash basin groundwater monitoring program. This document is included as Enclosure 3.

As stated in the Plan, it is recommended that sample reporting requirements be changed to require reporting within 60 days of the date of sample collection. It is recommended that the compliance monitoring wells at the Allen site continue to be sampled at a frequency of three times per year and analyzed for the same constituents that have been historically analyzed for the NPDES-required groundwater monitoring.

We also plan to develop a groundwater flow model of the site predicting expected groundwater flow paths from areas around the ash pond system to the appropriate receiving water body. The groundwater flow model would be used to verify the current understanding of the groundwater flow directions at the site and could be used to evaluate exceedances if any are found to be related to impacts from the ash basin. We propose that model will be developed and the groundwater flow modeling report be submitted to NCDENR within 120 days of the NPDES permit being issued. As plans are made to develop the groundwater flow model, the installation of additional observation wells in or around the ash basin system may be beneficial to enhance the model. If Duke's evaluation deems additional observation wells to be beneficial, we will communicate our recommendations to NCDENR prior to well installation.

NCDENR Aquifer Protection Section (APS) developed a policy for compliance evaluation of groundwater results at ash basins with no prior groundwater monitoring and published a memorandum providing that policy on June 17, 2011. The memorandum titled *Policy for Compliance Evaluation of Long-Term Permitted Facilities with No Prior Groundwater Monitoring Requirements* outlined the process for evaluating compliance of groundwater monitoring results based on the requirements in 15A NCAC 2L .0106.

The memorandum acknowledges the factors that monitoring well placement and existing conditions at the ash basins have on determination of exceedances of 2L Standards in groundwater monitoring results at ash basins.

The memorandum included a flow chart showing the process for determining if a measured groundwater concentration greater than 15A NCAC 02L .0202 would cause the facility to be non-compliant and would result in implementation of corrective action.

Duke recommends continued utilization of the June 17, 2011, NCDENR memorandum to evaluate exceedances of 2L Standards at the Allen ash basin. For exceedances that are not the result of naturally occurring site conditions, the process prescribed in the memorandum requires

the permittee to comply with corrective action requirements as specified in 15A NCAC 02L .0106.

Enclosures: Enclosure 1 – Receptor Survey Allen Steam Station Ash Basin
Enclosure 2 – Generalized Groundwater Flow Direction Figure
Enclosure 3 – Groundwater Monitoring Program Sampling, Analysis, and Reporting Plan