

James E. Rogers Energy Complex (Formerly Cliffside Steam Station)

Supporting Factors and Other Considerations:

- Amount of Stored CCR Reported in an Impoundment:
 - Active Ash Basin, Retired Unit 1-4 Basin, and Retired Unit 5 Basin. **INTERMEDIATE RISK.** There are an estimated 7,730,000 total tons of CCR stored in the impoundments.
- Position of CCR Relative to the Water Table:
 - Active Ash Basin, to include adjacent ash storage areas. **HIGH RISK.** Based on data from the CSA Report, the bottom of ash is situated below the seasonal high water table.
 - Retired Unit 1-4 Basin. **HIGH RISK.** Based on data from the CSA Report, the bottom of ash is situated below the seasonal high water table.
 - Retired Unit 5 Basin. **HIGH RISK.** Based on data from the CSA Report, the bottom of ash is situated below the seasonal high water table.
- Exceedance of 2L Standard or IMAC at or Beyond the Established CCR Impoundment Compliance Boundary:
 - Active Ash Basin, including adjacent ash storage areas. **HIGH RISK.** Several constituents were detected at or beyond the compliance boundary above the 2L Standard or IMAC including iron, manganese, cobalt, vanadium, sulfate, and total dissolved solids.
 - Retired Unit 1-4 Basin. **HIGH RISK.** Data unavailable at or beyond compliance boundary in this area. However, several constituents were detected at or beyond the *waste* boundary above the 2L Standard or IMAC including iron, manganese, cobalt, vanadium, total dissolved solids, sulfate, antimony, chromium, thallium, and barium.
 - Retired Unit 5 Basin. **HIGH RISK.** Several constituents were detected at or beyond the compliance boundary above the 2L Standard or IMAC including iron, manganese, cobalt, vanadium, total dissolved solids, chromium, and antimony.

- Population Served by Water Supply Wells Within 1,500 feet Up-Gradient or Side-Gradient of the Established CCR Impoundment Compliance Boundary:
 - Active Ash Basin, to include adjacent ash storage areas. **HIGH RISK.** There are 23 reported supply wells positioned up-gradient or side-gradient of the impoundment within 1,500 feet of the compliance boundary. With the assumption of 2.5 users per well, there would potentially be 57 users.
 - Retired Unit 1-4 Basin. **LOW RISK.** There are no reported supply wells positioned up-gradient or side-gradient of the impoundment within 1500 feet of the compliance boundary.
 - Retired Unit 5 Basin. **LOW/INTERMEDIATE RISK.** Duke identified 4 supply wells positioned up-gradient or side-gradient of the impoundment within 1500 feet of the compliance boundary. With the assumption of 2.5 users per well, there would potentially be 10 users.

- Population Served by Water Supply Wells within 1,500 Feet Downgradient of the Established CCR Impoundment Compliance Boundary:
 - Active Ash Basin, including adjacent ash storage areas. **LOW/INTERMEDIATE.** There appears to be 2 wells that are potentially downgradient but could also be side-gradient. With the assumption of 2.5 users per well, there would be 5 users.
 - Retired Unit 1-4 Basin. **LOW RISK.** There does not appear to be any down gradient wells.
 - Retired Unit 5 Basin. **LOW RISK.** There does not appear to be any down gradient wells.

- Proximity of 2L Standard or IMAC Exceedances Beyond the Established CCR Impoundment Compliance Boundary with Respect to Water Supply Wells:
 - Active Ash Basin, including adjacent ash storage areas. **HIGH RISK.** There are several exceedances of the 2L Standard or IMAC less than 500 feet from a supply well including for cobalt, iron, manganese, and vanadium.
 - Retired Unit 1-4 Basin. **LOW RISK.** There are no supply wells within 1,500 feet of the Unit 1-4 Basin. The supply well nearest an exceedance of the 2L Standard or IMAC (Chromium and Vanadium) is on the opposite side of the Broad River 1,400 feet away from the monitoring well in which the exceedance was observed. That same monitoring well is located 1,000 feet from the Unit 1-4 Basin compliance boundary.

- Retired Unit 5 Basin. **HIGH RISK.** There is at least one reported supply well within 500 feet of exceedances of the 2L Standard or IMAC for iron and vanadium; however, it is believed that the supply well is up-gradient of the basin.
- Groundwater Emanating from the Impoundment that Exceeds 2L Standard or IMAC and that Discharges into a Surface Water Body:
 - Active Ash Basin, to include adjacent ash storage areas. **HIGH RISK.** Several constituents were detected above the 2L Standard or IMAC including iron, manganese, cobalt, vanadium, thallium, chromium, antimony, and total dissolved solids that are potentially discharging to a surface water body.
 - Retired Unit 1-4 Basin. **HIGH RISK.** Several constituents were detected above the 2L Standard or IMAC including iron, manganese, cobalt, vanadium, sulfate, chromium, thallium, barium, lead, and total dissolved solids that are potentially discharging to a surface water body.
 - Retired Unit 5 Basin. **HIGH RISK.** Several constituents were detected above the 2L Standard or IMAC including iron, manganese, cobalt, vanadium, sulfate, and total dissolved solids, that are potentially discharging to a surface water body.
- Exposure to Coal Combustion Residuals and Contaminated Soil by Ingestion or Fugitive Emissions:
 - Active Ash Basin, including adjacent ash storage areas. **LOW RISK.** Access to the site is restricted, therefore the potential for human exposure to ash and soil or fugitive emissions is negligible except to on-site workers and contractors.
 - Retired Unit 1-4 Basin. **LOW RISK.** Access to the site is restricted, therefore the potential for human exposure to ash and soil or fugitive emissions is negligible except to on-site workers and contractors.
 - Retired Unit 5 Basin. **LOW RISK.** Access to the site is restricted, therefore the potential for human exposure to ash and soil or fugitive emissions is negligible except to on-site workers and contractors.
- Data Gaps and Uncertainty Related to Transport of Contaminants to Potential Receptors:
 - Active Ash Basin, to include adjacent ash storage areas. **HIGH RISK.** There is a high degree of uncertainty with the data presented

in the CSA Report. The uncertainties pertain primarily to background concentration determinations, the extent of ash in storage areas, and subsurface heterogeneities that could affect flow and transport characteristics. Background concentrations, ash extent and subsurface heterogeneities will be addressed in supplemental reports. Data collected to date suggest that supply wells in proximity to the active basin are not impacted by CCR contamination.

- Retired Unit 1-4 Basin. **HIGH RISK.** There is a high degree of uncertainty with the data presented in the CSA Report. The uncertainties pertain primarily to background concentration determinations, the extent of ash in storage areas, and subsurface heterogeneities that could affect flow and transport characteristics. Background concentrations, ash extent and subsurface heterogeneities will be addressed in supplemental reports. Data collected to date suggest that supply wells in proximity to the active basin are not impacted by CCR contamination.
- Retired Unit 5 Basin. **HIGH RISK.** There is a high degree of uncertainty with the data presented in the CSA Report. The uncertainties pertain primarily to background concentration determinations, the extent of ash in storage areas, and subsurface heterogeneities that could affect flow and transport characteristics. Background concentrations, ash extent and subsurface heterogeneities will be addressed in supplemental reports. Data collected to date suggest that supply wells in proximity to the active basin are not impacted by CCR contamination. There are four reported supply wells within 1,500 feet (includes up-gradient and side-gradient supply wells) of the compliance boundary.

Surface Water Supporting Factors and Other Considerations:

- NPDES Wastewater and Ash Disposal Methods:
 - Active Ash Basin, including adjacent ash storage areas. **HIGH RISK.** Permitted discharge once through cooling water, yard drain basin, coal pile runoff ash pond discharges and flue gas desulfurization waste.
 - Retired Unit 1-4 Basin. **LOW/INTERMEDIATE RISK.** Retired Basin. Permitted discharge once through cooling water, yard drain basin, coal pile runoff ash pond discharges and flue gas desulfurization waste.
 - Retired Unit 5 Basin. **LOW/INTERMEDIATE RISK.** Retired Basin. Permitted discharge once through cooling water, yard drain

basin, coal pile runoff ash pond discharges and flue gas desulfurization waste.

- CCR Impoundments Footprint Siting in Natural Drainage Way or Stream:
 - Active Ash Basin, including adjacent ash storage areas. **LOW/INTERMEDIATE RISK.** A review of the aerial photographs and USGS topographic maps revealed that the CCR impoundment is located in a landscape position that depicts topographic contours indicating that it is sited in natural drainage ways and/or streams.
 - Retired Unit 1-4 Basin. **LOW/INTERMEDIATE RISK.** A review of the aerial photographs and USGS topographic maps revealed that the CCR impoundment is located in a landscape position that depicts topographic contours indicating that it is sited in natural drainage ways and/or streams.
 - Retired Unit 5 Basin. **LOW/INTERMEDIATE RISK.** A review of the aerial photographs and USGS topographic maps revealed that the CCR impoundment is located in a landscape position that depicts topographic contours indicating that it is sited in natural drainage ways and/or streams.

- Potential to Impact Surface Water Based on Total Ash Amount at Facility:
 - Active Ash Basin, including adjacent ash storage areas. **HIGH RISK.** The reported total amount of CCR in the impoundment is 5,570,000 tons.
 - Retired Unit 1-4 Basin. **LOW/INTERMEDIATE RISK.** The reported total amount of CCR in the impoundment is 320,000 tons.
 - Retired Unit 5 Basin. **INTERMEDIATE RISK.** The reported total amount of CCR in the impoundment is 806,000 tons.

- Potential to Impact Surface Water Based on Dilution:
 - Active Ash Basin, including adjacent ash storage areas. **LOW/INTERMEDIATE RISK.** The Broad River has a 7Q10 = 287 cfs with an average flow =1460 cfs.
 - Retired Unit 1-4 Basin. **LOW/INTERMEDIATE RISK.** The Broad River has a 7Q10 = 287 cfs with an average flow =1460 cfs.
 - Retired Unit 5 Basin. **LOW/INTERMEDIATE RISK.** The Broad River has a 7Q10 = 287 cfs with an average flow =1460 cfs.

- Development Density of Single-Family Residences Along Lake/Reservoir Shoreline:
 - Active Ash Basin, including adjacent ash storage areas. **LOW RISK.** This metric was not applied because the facility is located along the run of a river.
 - Retired Unit 1-4 Basin. **LOW RISK.** This metric was not applied because the facility is located along the run of a river.
 - Retired Unit 5 Basin. **LOW RISK.** This metric was not applied because the facility is located along the run of a river.

- Classification of the Receiving Waters:
 - Active Ash Basin, including adjacent ash storage areas. **INTERMEDIATE/HIGH RISK.** The Broad River is Class WS-IV waters.
 - Retired Unit 1-4 Basin. **INTERMEDIATE/HIGH RISK.** The Broad River is Class WS-IV waters.
 - Retired Unit 5 Basin. **INTERMEDIATE/HIGH RISK.** The Broad River is Class WS-IV waters.

- Proximity to Water Supply Intake:
 - Active Ash Basin, including adjacent ash storage areas. **HIGH RISK.** A review of drinking water supply intake revealed that a downstream intakes is located within 10 miles of the facility.
 - Retired Unit 1-4 Basin. **HIGH RISK.** A review of drinking water supply intakes revealed that a downstream intake is located within 10 miles of the facility.
 - Retired Unit 5 Basin. **HIGH RISK.** A review of drinking water supply intakes revealed that a downstream intake is located within 10 miles of the facility.

Dam Safety Supporting Factors and Other Considerations:

- Hazard Classification:
 - Active Ash Basin (CLEVE-049 & CLEVE-050). **HIGH RISK.** Impoundment has a volume of 1,843 acre-feet therefore is medium in size with downstream hazards being potential loss of life due to several structures being in the inundation area of potential breach.
 - Retired Unit 1-4 Basin (CLEVE-047). **LOW/INTERMEDIATE RISK.** Impoundment has a volume of 139 acre-feet therefore is

- small in size with downstream hazards being environmental concerns.
 - Retired Unit 5 Basin (RUTHE-070 & RUTHE-072). **LOW/INTERMEDIATE RISK.** Impoundment has a volume of 33.52 acre-feet therefore is small in size with downstream hazards being environmental concerns.
- Proximity to Waters of the State:
 - Active Ash Basin (CLEVE-049 & CLEVE-050). **HIGH RISK.** Impoundment is directly adjacent to waters of the state.
 - Retired Unit 1-4 Basin (CLEVE-047). **HIGH RISK.** Impoundment is directly adjacent to waters of the state.
 - Retired Unit 5 Basin (RUTHE-070 & RUTHE-072). **INTERMEDIATE RISK.** Potential coal combustion residual migration is constrained by physical barrier. There is approximately 600 feet of land between the embankment and the waters of the state.
- Volume of Facility:
 - Active Ash Basin (CLEVE-049 & CLEVE-050). **INTERMEDIATE RISK.** Impoundment has a volume of 1843 acre-feet.
 - Retired Unit 1-4 Basin (CLEVE-047). **LOW RISK.** Impoundment has a volume of 139 acre-feet.
 - Retired Unit 5 Basin (RUTHE-070 & RUTHE-072). **LOW RISK.** Impoundment has a volume of 33.52 acre-feet.
- Free Water Content:
 - Active Ash Basin (CLEVE-049 & CLEVE-050). **HIGH RISK** before being dewatered. **LOW RISK** after being dewatered.
 - Retired Unit 1-4 Basin (CLEVE-047). **LOW RISK.** Impoundment is dry.
 - Retired Unit 5 Basin (RUTHE-070 & RUTHE-072). **LOW RISK.** Impoundment is dry but does occasionally discharge water.
- Offsite Drainage Area:
 - Active Ash Basin (CLEVE-049 & CLEVE-050). **HIGH RISK.** Impoundment has an offsite drainage area of 295.32 acres. Greater than 75% of reservoir are is covered by water.

- Retired Unit 1-4 Basin (CLEVE-047). **INTERMEDIATE RISK.** Impoundment has an offsite drainage area of 154.08 acres. 25 to 75% of reservoir area is covered by water.
- Retired Unit 5 Basin (RUTHE-070 & RUTHE-072). **INTERMEDIATE RISK.** Impoundment has an offsite drainage area of 164.9 acres. 25 to 75% of reservoir area is covered by water.

- Overall Dam Safety Risk Classification
 - Active Ash Basin (CLEVE-049 & CLEVE-050). **HIGH RISK** before any repairs are made, **INTERMEDIATE RISK** once repairs are made, and **LOW RISK** once repairs are made and impoundment has been dewatered.
 - Retired Unit 1-4 Basin (CLEVE-047). **LOW RISK** before any repairs are made.
 - Retired Unit 5 Basin (RUTHE-070 & RUTHE-072). **INTERMEDIATE RISK** before any repairs are made and **LOW RISK** once repairs are made.