

**Trail Ridge Facility Treatment Summary:** This heavy minerals mining wastewater treatment system provides acidification with ferric chloride, sulfuric acid, aluminum sulfate, or ferric sulfate to a pH between 3.0 and 3.5 standard units for flocculation of colloidal material followed by settling in a series of diked ponds, neutralization with hydrated lime to a pH between 6.0 to 8.5, and additional settling with final discharge to Alligator Creek (D001). Polymer addition may be provided after neutralization for aluminum reduction prior to final discharge at D-001. Storm water and rainfall from the mined areas are also collected and treated as described above. The treatment train consists of the addition of barium chloride to the wastewater at the location where ferric chloride, aluminum sulfate and/or ferric sulfate is added (prior to the humate settling ponds). A portion of the effluent is directed to the Southwest Quadrant Pond. The existing recycle line from D-001 was tapped and a pipeline was constructed to route approximately 400 gallons per minute (gpm) of the treated wastewater to an existing ditch which then discharges into the Southwest Quadrant Pond (location D-002) with eventual discharge into Blue Pond. This rerouting of final effluent is the result of an effort by The Keystone Stakeholders to help improve lake water levels in the Keystone Heights area.

**Maxville Facility Treatment Summary:** A 4.0 MGD AADF heavy minerals mining wastewater treatment system providing acidification with ferric chloride, sulfuric acid, aluminum sulfate, barium chloride, or ferric sulfate to a pH between 3.0 to 3.5 standard units, for flocculation of colloidal material. There is an additional step in the dredge pond to precipitate humates using ferric chloride, alum and/or polymer.

**North Maxville Facility Treatment Summary:** 5-million gallon per day (MGD) maximum daily flow heavy mineral mining wastewater treatment system. Process water from the dredge mining operation will be collected in humate settling ponds that will be constructed as the mining progresses. Stormwater from mining areas and overflow from the humate settling ponds will be collected and treated in a set of polishing ponds in series to meet water quality standards prior to discharge through the outfall. Barium chloride may be added as needed to assure that radium levels will not be exceeded. There will be a total of 9 sets of polishing ponds with 9 outfalls due to the progressive nature of the mining operation. Each set of ponds will be constructed as needed as the footprint of the mine progresses. Ponds that are no longer in use will be properly decommissioned and closed. Three of the nine outfalls will discharge effluent into wetland areas that eventually discharge into Turkey Creek, Class III fresh water. The other six outfalls will discharge effluent into wetland areas that eventually discharge into Deep Creek, Class III fresh water.

**Highland Facility Treatment Summary:** This is a heavy minerals mining wastewater treatment system providing acidification with ferric chloride, sulfuric acid, aluminum sulfate or ferric sulfate to a pH between 3.0 and 3.5 standard units, for flocculation of colloidal material, followed by settling in a series of diked ponds, neutralization with hydrated lime to a pH of between 6.0 and 8.5 standard units, and additional settling with final discharge to the north (Outfall D-002) arm of Boggy Branch, a Class III fresh water of the state. Wastewater is generated from the dry mill operation and stormwater runoff from mining areas. Upon Department approval, polymer addition may be provided after neutralization for aluminum reduction prior to final discharge to the North Arm of Boggy Branch. A portion of the connector ditch for the current outfall D-002 will continue to serve as the seepage collection and recycle system.