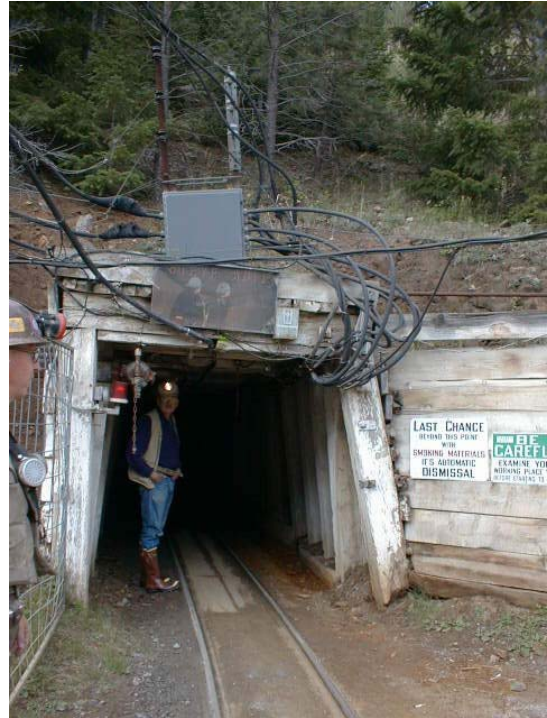


Cotter Corporation Schwartzwald Mine – Hydrologic Closure Study

The Schwartzwald Mine is an underground uranium mine located in the foothills west of Golden, Colorado. The mine was operated by Cotter Corporation from 1966 until May 2000, when mining operations ceased, dewatering pumps were shut off and the mine was allowed to flood. Closure of mine facilities including flooding the underground workings and decommissioning the water treatment pump-back sumps has the potential to impact Ralston Creek and groundwater adjacent to the mine.

Whetstone Associates assisted Cotter Corporation with the preparation of a hydrologic study for mine closure and reclamation. The scope of the study included the development of a conceptual hydrologic model for the site, calculation of discharge from adits, evaluation of potential impacts to water resources, numerical modeling of ground water flow, and geochemical modeling of uranium and molybdenum solubility.



The study concluded that the mine will discharge water containing uranium, molybdenum, and manganese starting in 2006. Construction of a bulkhead in the mouth of the lower adit will delay discharge from the mine until 2008 and decrease the volume of the outflow. Under current conditions, surface water and groundwater resources will be impacted by discharge from the mine and by leaching of contaminants from the uraniumiferous fill in the drainage.

Mitigation strategies that were evaluated for the Schwartzwald Mine include:

- Grouting to encapsulate uraniumiferous fill adjacent to Ralston Creek.
- Targeted removal of uraniumiferous fill and waste rock.
- Treatment of mine discharge and contaminated groundwater by reverse osmosis, anoxic drains, and constructed wetlands.
- Construction of hydraulic bulkheads and reducing cells to minimize mine discharge and decrease uranium concentrations.