

Value-Engineered Wastewater Treatment System

To Treat Contaminated Groundwater for Mining Client in North Central USA

Customer: North Central USA Ore Mine

Project Award: September, 2022

Customer Challenge:

The mining Customer is required to pump groundwater to keep abandoned mining excavations above the water table. The groundwater has elevated mercury, iron, and manganese concentrations, which must be removed before discharging to a local waterway.

UCC Solution: Chemical Precipitation and Filtration

UCC Environmental (UCC) was invited to propose a groundwater treatment solution for the mine. After thoroughly analyzing the specified process, UCC provided a value-engineered design concept that includes the chemical oxidation of manganese followed by chemical precipitation and filtration. The UCC system is engineered to flow by gravity, eliminating several components from the original system. This includes two greensand pressure filters, two tanks, and several pump skids. Eliminating this equipment reduces the system's footprint and makes operating easier. The UCC value-engineered solution lowers capital, operational, and maintenance costs. As a result of this value-engineered design, UCC was selected as the preferred supplier to design and supply the process equipment and treat the contaminated groundwater.

Scope of Work:

- Reaction Tank - to oxidize manganese and promote the settling of solids before filtration
- Inclined Plate Clarifier with integrated thickener - to remove settled and suspended solids to a suitable level before further treatment
- Continuous backwash gravity sand filter - to assist in removing heavy metals
- Sludge Dewatering - sludge storage tank, sludge pump skids, and plate and frame filter press to dewater sludge to suitable levels for final disposal
- Chemical injection skids - for optimized removal of sodium oxidize manganese, organosulfide mercury, and iron.

Results:

The UCC system lowered the project's capital cost by ~40%, significantly reducing the footprint of the required building and making the system much easier to operate.

UCC Value Engineering Summary:

- A technology-neutral approach in selecting the most suitable clarifier significantly reduced project cost
- Streamlining the specified process allowed two greensand pressure filters to be replaced with a single continuous backwash gravity sand filter
- The gravity flow approach eliminated several tanks and pump skids
- In-house treatability testing eliminated a chemical feed
- Reduced building footprint and lowered operations and maintenance costs

For a century, UCC has engineered technical solutions in solids handling, air pollution control, and wastewater treatment. Our continuous development and testing provide significant advancements in meeting stringent environmental regulations. With thousands of high-performing systems in service, UCC is considered the industry standard for mission-critical, value-engineered solutions worldwide.

UCC MINING CUSTOMER NORTH CENTRAL USA ORE MINE

