

Chlorine Dioxide Explosion & Remediation
Location: Northwestern Georgia
Client: Major Water Treatment Authority
Contract Amount: \$84,000

PROBLEM

Remtech was retained by a major water treatment authority to cleanup and determine the cause of a chlorine dioxide explosion which occurred at a raw water pumping station. Shock sensitive sodium chlorite burn residues remained in the building.

SOLUTION

A remediation plan was prepared to deactivate the reactor residues while keeping chlorine and chlorine dioxide ambient concentrations below detection limits. Bench-scale reactions were conducted to confirm full-scale reactions.

Forty gallons of burn residues were reacted with 200 pounds of soda ash and 100 pounds of sodium metabisulfite. Heat of reaction energy was dissipated by placing 150 pounds of cubed ice in the reactors.

Reactions were conducted in closed poly reactors. Off gasses were collected and passed through two gas scrubbers with a soda ash/sodium metabisulfite solution. Off gasses were monitored to ensure that no chlorine or chlorine dioxide was liberated from the reaction. The temperature of the reaction vessels was monitored to keep temperatures below 120° F. Over two (2) tons of residual sodium chlorite were reacted.

The walls and floor were cleaned with a hot pressure washer. Wash water was collected and run through the dechlorination reactors. Plastic components left a residue on the ceilings, glass block walls, and concrete floor. These residues were removed with caustic and acid cleaners.

COST/BENEFITS

Remtech prepared an engineering report delineating the cause of the fire. A short in a PLC controller panel for a motorized control valve initiated a fire.

This report allowed the insurance company for the water utility to secure reimbursement (several hundred thousand dollars) from the chlorine dioxide manufacturer's insurance company.



Explosion at Raw Water Pump Station



Explosion in Chlorine Dioxide Generation Room



Burn Residue Dechlorination Reactors