

SiREM

CASE STUDY



Client
Geosyntec



Site Location
Confidential Site,
Eastern Canada, Mining
Water Discharge



Project Duration
Six Weeks



Services Provided

- Bench Scale Mine Effluent Discharge Water Treatability Testing
- Fast Turnaround time (TAT) and flexible testing
- Support for Field Pilot Testing

Precipitation of Calcium to improve water quality in Mine Effluent Discharge Water

Project Highlights

- High calcium concentrations in mine effluent discharge were tested for effective treatment methods
- Dose-Response curves, settling rates, and toxicity data was used to design and optimize a pilot scale field test
- A 0.7 g/L dose of soda ash was able to decrease the calcium concentration by an order of magnitude while increasing the effluent discharge water's buffering capacity.

Problem Definition

Treated effluent discharge from a mine Site was toxic to *Daphnia magna*, which was believed to be primarily caused by high concentrations of calcium. The existing treatment system was not treating the calcium to low enough levels to avoid this toxicity effect. SiREM was tasked with performing bench scale testing to assess toxicity reduction via calcium precipitation using several different reagents. Due to the nature of the water, the samples were shipped overnight and SiREM performed the testing immediately upon receipt.

Notable Results

SiREM tested a variety of reagents, including soda ash and carbon dioxide, to balance the calcium and alkalinity in the effluent discharge water. Treated water was then tested for *Daphnia magna* toxicity by an external laboratory to determine if the treatment was successful. The provided dose-response curves, settling rates of the precipitate, and *daphnia magna* toxicity results were used to design and optimize a pilot test on site that SiREM supported.

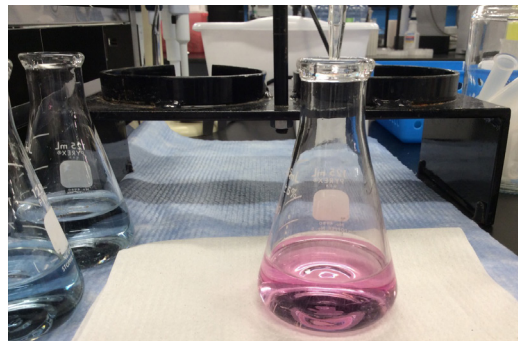


FIGURE 1: The treated water was tested for residual calcium concentrations

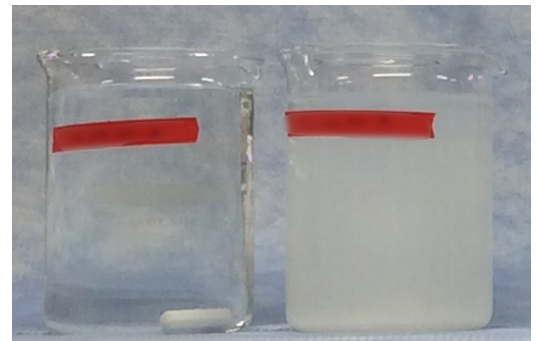


FIGURE 2: Different reagents were tested to precipitate CaCO₃