Cost Savings with Wastewater Plan for Metals Removal

**Problem**
A battery manufacturer in the Southeastern U.S. was using a lead paste to make large lead acid batteries for equipment and vehicles. Periodically, large concentrations of this paste were sent to their wastewater treatment plant (WWTP) where it was processed by adding ferric sulfate, caustic, a metals precipitant, and an anionic flocculant. The treated waste was then processed through an inclined plate clarifier and the effluent was sent to discharge storage tanks where tests were performed before any water could be directed to the publicly owned treatment works (POTW). The tested lead levels for the battery manufacturer’s waste were typically between 0.014 and 0.01 ppm when the system had low lead concentrations coming in. The waste was exceeding permitted levels for both the daily maximum and monthly average when the pasting operation experienced upsets.

**Analysis**
The manufacturer invited Chem-Aqua to analyze the system and see if improvements could be made to prevent further excursions of lead from entering the POTW’s collection system and also provide positive results for their WWTP. Inspection of the pasting room revealed an old system with several areas where the lead paste could easily make its way to the wastewater system. Bench tests were performed to determine the best way to control the lead excursions and also to see if the ferric sulfate dose could be reduced without negative effects.

**Solution**
Chem-Aqua recommended including filtration steps to keep the majority of the suspended lead from entering the wastewater system and advised changing the order in which the chemicals were added to the system. Based on the bench test results, it was suggested to reduce the ferric sulfate dose by 75% and to replace ferric sulfate with ferric chloride as ferric chloride costs around 30% less.

The manufacturer followed these recommendations with outstanding results. Adding chemicals to the system in a different order created dramatic changes: the water was clear, the flocculant was quick settling, and the lead in the supernatant tested at less than 0.002 ppm. Switching to ferric chloride at a lower dosage amount decreased operational costs, created a better performing program, and reduced the amount of sludge produced and land filled.

Switching to the Chem-Aqua treatment program improved operations, helped the manufacturer meet their discharge limits, and decreased costs. The reduced ferric dose alone was equivalent to a $2,000 monthly savings.