

Replacing Ferrous Chloride with Sodium Aluminate Enables NE Ohio WWTP to Avoid Prohibitive Increase in Sludge Disposal Costs

Near Hazardous Conditions

The Ashtabula OH wastewater treatment plant nestled along Lake Erie treats on average 6MGD with an influent phosphorus concentration of 3 to 4 ppm. For many years ferrous chloride was effectively used to meet the plant's 1.0 mg/l permit limit. During 2008 difficulties arose with the metals content of their sludge. Specifically the plant failed TCLP tests for chromium and cadmium, which mandated more frequent monitoring and investigation to determine the source of these metals. The new Plant Superintendent began an extensive investigation which concluded with ferrous chloride (pickle liquor) being definitively confirmed as the culprit. The problem had escalated to a point where it was a very real possibility that the plants sludge would be reclassified as hazardous. This meant a significant increase in disposal/landfill costs that the city could not afford.

Evaluating the Solution

The Plant Superintendent contacted USALCO to inquire if and how his problem could be remedied. Numerous discussions and technical evaluations were conducted, culminating in bench testing of a much more pure phosphorus removal agent; sodium aluminate. Based on the positive results obtained in preliminary testing USALCO recommended an extensive on line trial. Normally a trial will last 30 to 45 days to evaluate phosphorus removal efficacy, and insure that system sludge volume is turned over so that dewatering and other facets of system operation can be monitored. In this case additional time was required so that numerous TCLP and other sludge testing could be performed. Given what was at stake it was critical to definitively confirm the solution.

Performance, Value, and Cost Avoidance

The sodium aluminate trial commenced on May 16, 2010. After five months of extensive testing and evaluation it was decided to permanently change from ferrous chloride to sodium aluminate. The plant superintendent based his decision on many factors with the following being most significant:

- The sludge concentration and TCLP levels for chromium, cadmium, and all metals were vastly lower and below the established limits. In many test results these metals were found to be below detection limits (BDL).
- The threat of the plant's sludge being classified as hazardous was eliminated, thus avoiding an increase of \$88,000 per year in sludge disposal cost!
- Sodium aluminate consistently removed effluent phosphorus to concentrations well below 1.0 mg/l at a daily dosage that was 72% less than ferrous chloride. (230 gpd versus 64gpd)
- Removing the corrosive/aggressive ferrous chloride from their chemical storage building enabled the city to proceed with a budgeted \$950,000 renovation of the area. The upgrade was needed in part due the damage ferrous had caused over the years.

In addition to solving a huge problem sodium aluminate may open the door to additional benefits and savings in the future as the superintendent will now likely evaluate land application of sludge.