

## ***Indiana Wastewater Plant Utilizes Sodium Aluminate to Solve Reoccurring Compliance Problem and Reduces Chemical Cost \$60,000/yr.***

### **A Difficult Situation**

The Dillman WWTP in Bloomington, Indiana is one of two municipal wastewater facilities that serve the area, however only Dillman must meet a phosphorus discharge limit of 1.0 mg/l from May through October. This facility processes 11 MGD with an average influent phosphorus of 5.0 mg/l. For the majority of each treatment season aluminum sulfate (alum) was very effective in the precipitation and removal of phosphorus to meet the permit limit. However, the plant experienced a reoccurring effluent pH problem at least three to four times during the summer months when low flow and low alkalinity conditions set in. Aluminum sulfate, which is made with sulfuric acid, (and consumes alkalinity at the rate of 0.5mg/l per 1.0 mg/l of alum), was reducing the effluent pH below their 6.0 limit. The plant had a difficult decision of whether to continue alum feed and violate the pH limit or discontinue the alum and exceed the permitted phosphorus concentration of less than 1.0 mg/l. Their decision was to discontinue alum to increase the effluent pH and live with the notice of violation for phosphorus.

### **An Easy Solution**

USALCO worked with plant personnel to thoroughly understand the problem, as well as the performance and cost of aluminum sulfate. Bench testing was conducted for a side by side comparison of the soluble phosphorus removal capabilities of alum versus liquid sodium aluminate. The results demonstrated that sodium aluminate performance was as good as or better than alum at 1/3 to 1/4 the dosage. Chemically this made perfect sense since the concentration of  $Al^{+}$  (needed for

phosphorus precipitation) is ~ 2.4 times greater with sodium aluminate.

Additionally, since sodium aluminate is made with caustic soda there would be no consumption of alkalinity and thus likely resolution of the plants compliance problem. Plant personnel agreed to run a trial with sodium aluminate for the entire phosphorus removal season.

### **It Pays to Be in Compliance**

The sodium aluminate trial commenced on April 28 and ended on October 31, 2010. Upon completion USALCO met with plant personnel to review performance, dosage, and cost comparisons. The primary conclusions of the study were as follows:

- Consistent and extremely effective phosphorus removal with an average effluent concentration of 0.3 mg/l.
- No violations for low PH, as the plant superintendent stated they did not even come close. He also indicated that if alum was still being used there would have been at least 4 violations.
- The average sodium aluminate consumption was 275gpd compared to 784 gpd with alum (historical average). The overall cost savings for the 2010 season was calculated to be \$60,461.

Overall the plant superintendent and deputy director were extremely pleased with the outcome of the chemical change and agreed to use sodium aluminate for many upcoming seasons.