

Quadrasperse® Saves Money & Increases Cycles of Concentration Over 200% at Gulf Coast Chemical Plant

BACKGROUND

The primary cooling system at a Gulf Coast chemical plant was operating at 2 to 3 cycles of concentration using a competitive alkaline phosphate program. The competitive program was based on a proprietary carboxylate technology marketed as AEC. The high pH program provided good results with corrosion rates <1 mpy; however, because of the low cycles of concentration, water consumption and program costs were unnecessarily high.

SOLUTION

A recommendation was made to the plant to evaluate an alkaline high cycle program based on Quadrasperse® quadpolymer technology. Makeup water and system operating conditions indicated that Quadrasperse® could be used to treat the system more cost effectively, allowing the tower to be operated at 5 to 6 cycles of concentration. It was estimated that for every 10 gpm of tower makeup saved, over \$20,000 in water/wastewater costs and in chemical treatment savings would be achieved by switching to the new high cycle chemistry.

RESULTS

Results of the high cycle evaluation were exceptionally good. Figure 1 illustrates the increase in cycles that were achieved in the six months after the change to the Quadrasperse® program. Cycles of concentration were increased to an average of 5.1. Calcium and magnesium hardness transport through the high cycle tower all remained in balance, indicating no calcium carbonate or other scale forming deposition in the system. Corrosion control with the high cycle program remained <1 mpy on mild steel as with the previous treatment program.

Table 1: Gulf Coast Chemical Plant Typical Makeup Water Analysis

pH	7.0
Conductivity, μ mhos	385
“M” Alkalinity, as mg/L CaCO ₃	90
Calcium Hardness, as mg/L CaCO ₃	105
Magnesium Hardness, as mg/L CaCO ₃	25
Phosphate, mg/l	0.1
Iron, mg/l	0.03

Table 1 shows a typical makeup water analysis from the system. At 5.1 cycles of concentration and pH 8.8 where the high cycle water program averaged, LSI and Calcite Saturation Index were 2.81 and 201, respectively, well within the maximum recommended ranges (3.0 and 275) for the Quadrasperse® program.

During the last stage of the trial, the PolyTrak® polymer test was used to optimize the level of Quadrasperse® in the system. Product levels were monitored and tracked as a function of calcium transport. Figure 2 shows the results of the optimization. Calcium transport remained high until the level of Quadrasperse® polymer reached approximately 120 ppm as product. At this level, calcium transport decreased to approximately 90 percent. This enabled the plant to optimize product dosage to maintain 100 percent calcium transport in the system.

Figure 1: Gulf Coast Chemical Plant, Improved Cycles and Higher Calcium Hardness

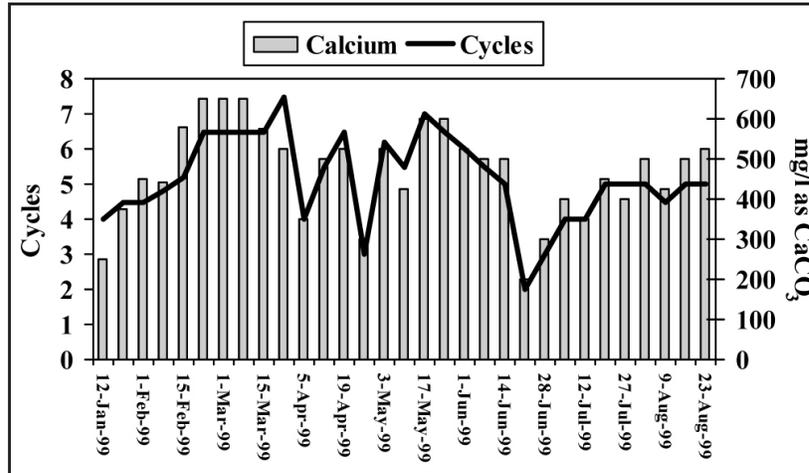
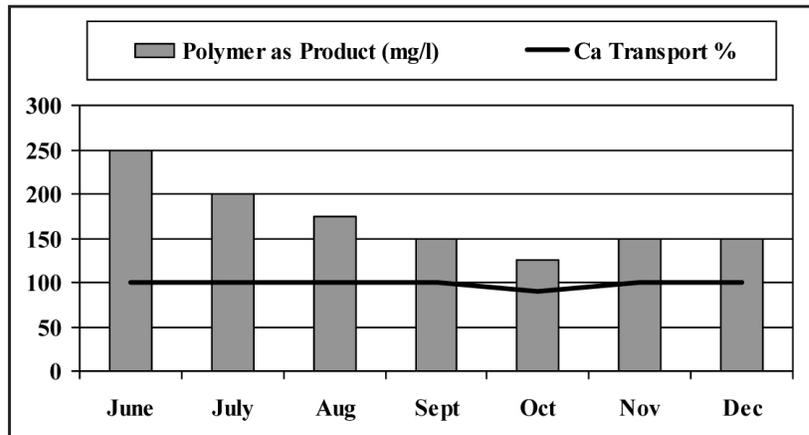


Figure 2: Optimization of Product Dosage Based on Calcium Transport



SUMMARY

ChemTreat was awarded the water treatment business at the plant. System performance has never been better, and the customer is realizing a total savings of greater than 30 percent per year on cooling water treatment and water costs.