CASE STUDY

Refinery Saves \$238,000 Annually with TITAN360[™]

Background

A refinery was experiencing high levels of corrosion in its carbon monoxide (CO) boiler for several years. The system consisted of a 507-psig boiler that produced 78 ton/h of steam with demineralized water as the makeup, a condensate return of 60%, and two turbines. The boiler was being treated with a traditional program based on phosphates/oxygen scavenger. This refinery's ongoing corrosion problem was causing unplanned and expensive boiler shutdowns. Additionally, the operators were unable to maintain control of the fluctuating pH and high iron levels. These issues, compounded by a dramatic increase in blowdown, were having a large impact on the operating efficiency of the boiler.

Solution

This boiler, with a high condensate return of 60% and demineralizer water as the makeup, was a suitable candidate for film-forming amine (FFA) technology. The FFA program was expected to decrease high iron levels and reduce the frequency of boiler shutdowns. An FFA trial was initiated, with the following parameters being monitored over the four months of the trial: pH, iron concentration, blowdown volume, and leakage volume.



Figure 1: Iron Concentration (ppm) and pH Values of CO Boiler Over Time

Results

Within several weeks, the FFA program began to dramatically decrease corrosion rates and iron levels. In the CO boiler, the iron concentration dropped more than 80% from more than 0.25 ppm to less than 0.05 ppm. Additionally, the pH, which had a tendency to fluctuate from 9.8 to 10.1, was stabilized to a consistent value above 10. Figure 1 summarizes the iron concentration reduction and pH stabilization during the trial. The program also increased the operating efficiency of the boiler, with a blowdown reduction of 75%.

Summary

While the annual water treatment savings annualized to \$238,000, the plant also realized further savings in a reduction of energy and maintenance costs. The plant saved money with fewer boiler shutdowns and increased its boiler efficiency significantly.

Results are examples only. They are not guaranteed. Actual results may vary.

