Case History
0-76

Filmic Corrosion Inhibitor: Venezuelan East Refinery FCC Unit

Background

A refinery located east of Venezuela has an FCC unit with a capacity of 15,000 bbl/day. This unit has an H_2S stripping tower to stabilize the FCC naphtha. Every three months, the failure of the FCC naphtha reboiler in the naphtha side housing rich in H_2S caused unplanned plant stops. ChemTreat and the refinery established a work plan to determine the corrosion mechanism and correct the issue.

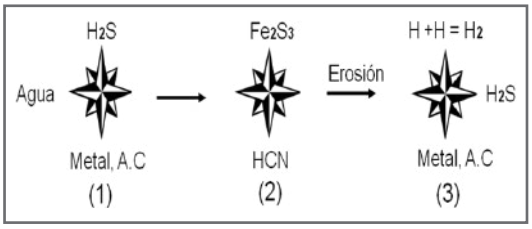
The Facts

- High levels of H_2S in FCC sour water: > 5,000 ppm
- Presence of water in naphtha: >10 ppm
- Sour water pH: 8.0 – 9.0
- Presence of HCN in the sour water: > 100 ppm

As shown in Figure 2, the presence of water, carbon steel, and H_2S produce ferric sulfide. In the presence of HCN (a gas that forms in FCC), ferric sulfide reacts to form atomic hydrogen. When it bonds with another hydrogen atom, there is a sudden strong increase in localized pressure as a result of the molecular hydrogen formation. This sudden pressure increase inside metal produces the blistering shown in Figure 1.

Figure 1: Photo of the Issue

Figure 2: Proposed Mechanism



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

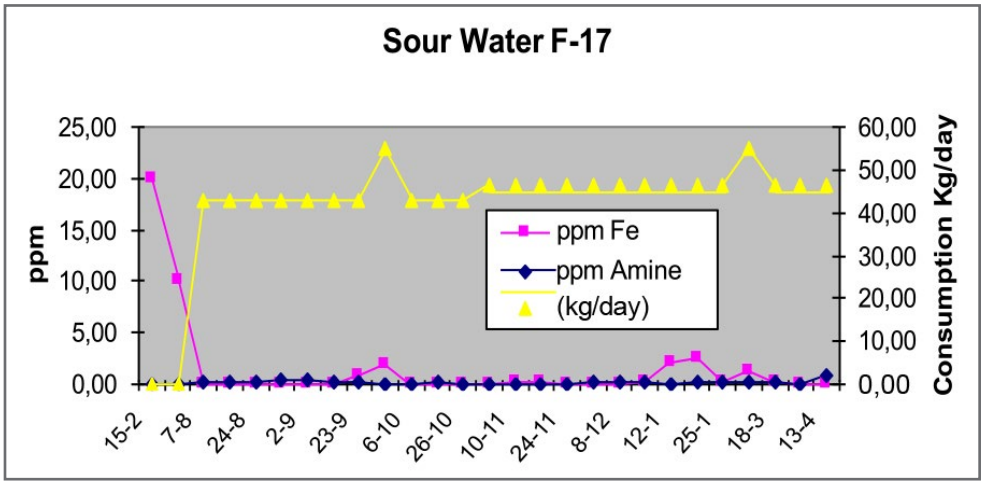
ChemTreat's Solution

ChemTreat's recommendation was based on cutting the formation mechanism of the atomic hydrogen through the application of a film amine capable of forming a protective film on the carbon steel. The recommended product was Lipesa 229, and the point of injection was the feeding of destabilized naphtha to the stripping tower.

Results

Figure 3 illustrates that as soon as the Lipesa 229 injection was started, iron ppm fell on the F-17 drum (sour water) from more than 20 ppm to less than 1 ppm at a consumption of only 45 kg/day. The Lipesa 229 has been injected without interruption, and the blistering failure has not been repeated.

Figure 3: Treatment Results



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