

Refinery - Overhead Filming Amine RPA-617

REDUCING CORROSION/FOULING OF CRUDE OVERHEAD SYSTEM, WHILE SAVING SIGNIFICANT COSTS

BACKGROUND AND CHALLENGES

A mid-sized inland refinery was experiencing elevated corrosion/fouling rates of the overhead system. The corrosion rates were of such magnitude that tube failures were occurring on nearly a weekly basis, resulting in reduced throughput rates and high maintenance costs. Since the overhead exchangers provide the preheat to the desalter, operating temperatures were greatly reduced due to the fouling. Overhead product/raw crude exchangers were being pulled and hydroblasted every four to six weeks.

The overhead system was being treated with a typical chemical program using a filming amine in conjunction with a neutralizing amine. Due to the poor WSIM characteristics of the filming amine, water washing of the overhead was impossible. When attempted it caused massive corrosion in downstream units and was quickly abandoned. The use of the neutralizing amine combined with the lack of water caused salting out of operating towers. Poor desalting also contributed to the overhead difficulties causing large variations in the pH. The overhead system constantly fluctuated from 5 to 8.5.

ATHLON'S RECOMMENDATION

Athlon, a Halliburton Service, addressed the overhead problems by using sound crude unit treating practices. The first step was to achieve control of the desalter. This was done by using a proprietary demulsifier product, which allowed for extreme mixing of the desalter washwater and incoming crude, while providing virtually dehydrated oil and oil free brine water. The second step was to initiate the injection of RPA-617 into the overhead system and to discontinue the neutralizing amine.

PERFORMANCE RESULTS

Overhead corrosion and fouling was virtually halted following the initiation of the Athlon program. Chloride levels in the overhead system dropped from 40 to 75 ppm to <10 ppm. The pH of the system has been stabilized in the 5.8 to 6.5 range without the use of neutralizer for the past five years.

Due to RPA-617's excellent WSIM properties, water washing of the overhead system has not only been implemented, but is a glowing success, with no downstream effects being noted and dryer naphtha product being produced. The overhead boot water has averaged less than 0.2 ppm iron and failures of the overhead exchangers/condensers has not occurred in the last five years. Fouling of the overhead has also been mitigated with desalter operating temperatures increasing approximately 25 degrees after four weeks of Athlon's overhead program implementation.

BENEFITS OF RPA-617

- » Reduced chemical costs (no neutralizer ~ \$100K/Year)
- » Increased throughput (no rate cutbacks or outages)
- » Reduced failures (weekly to none)
- » Downstream benefits (reduced downstream corrosion)
- » Increased desalter temperatures (improved desalting)
- » Operator-friendly (operators adjust pH only below 4.5)
- » Reduced maintenance costs (no failures)
- » Improved product quality (drier naphtha)

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