REFINERY TREATMENT CASE STUDY

OPPORTUNITY CRUDES

CHEMICAL TOOLS
SOLVE INTRACTABLE PROCESSING PROBLEMS

A 100,000 BPD refinery originally designed for lighter crudes struggled with serious desalter performance problems and unacceptably low throughput when processing blends of relatively heavy, acidic feedstocks, including Dar, Ratawi, Eocene, Duri, Stybarrow and Enfield. When a costly combination of five chemicals from a competitor failed to solve the problem, the refinery consulted a global technical solution provider who reported that the problems were caused by hardware constraints and chemical treatment would be ineffective.

In an effort to avoid the substantial cost of hardware upgrades, the refinery turned to Dorf Ketal for a solution. Samples were collected for analysis and the refinery established KPIs: Improve desalting and dehydration by 10 to 30% in a refinery the experts said was "hardware-limited."

Although the refinery was being pushed beyond as-designed performance levels, desalter adequacy tests (DAT) in Dorf Ketal labs indicated that advanced-technology Dorf Ketal additives could accomplish the objective, and technicians began collecting baseline data. Because refinery crude blends varied, data were collected for Jan-Feb and Jun-Jul to ensure valid comparisons.

The trial replaced the existing treatment program with a Dorf Ketal demulsifier and solids wetting agent in the desalter, an antifoulant in the hot preheat train and a corrosion Inhibitor and neutralizing amine in the atmospheric column overhead. Based on DAT data, Dorf Ketal also recommended adjustments in mix-valve settings, crude processing rates and wash water rates.

Desalting and dehydration efficiencies in the desalter improved immediately. BS&W dropped from 0.6 percent under the previous program to just 0.2 percent by volume.

FIGURE 1— Outlet BS&W, Baseline Data

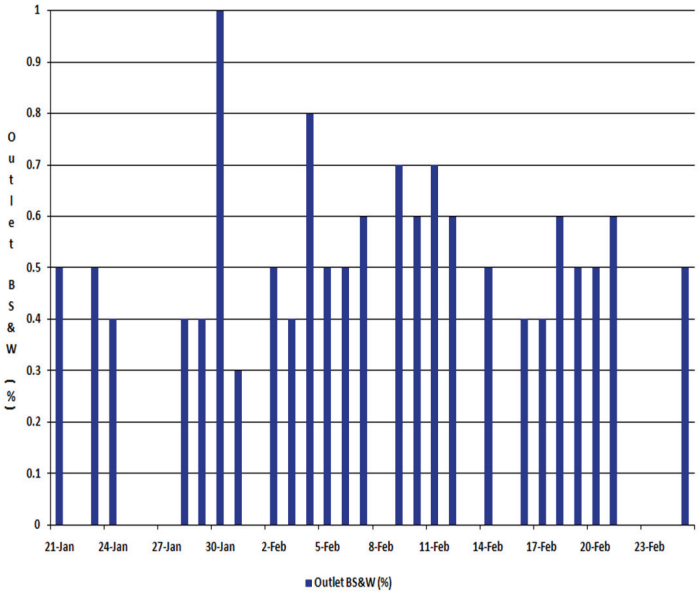
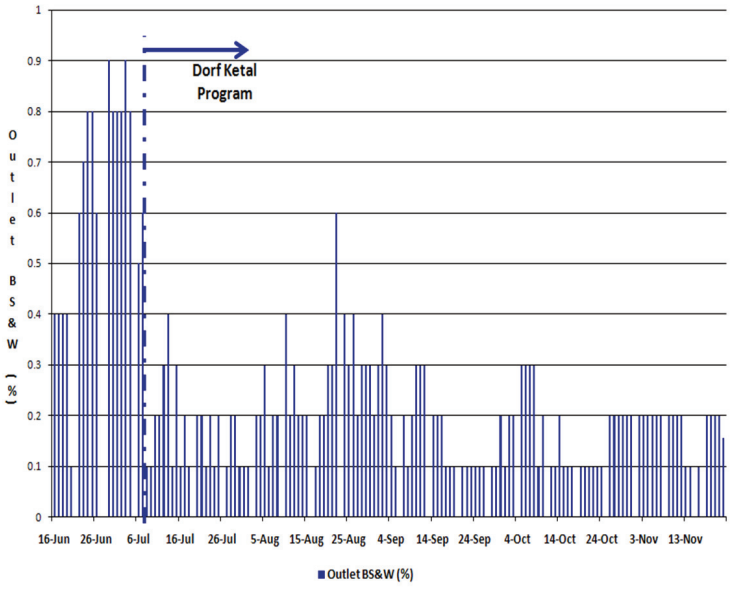


FIGURE 2 – Outlet BS&W, Dorf Ketal Program



These desalter performance improvements produced substantial fuel savings, allowing the refinery to increase throughput, as well. BS&W carryover reductions alone saved $120,000 in fuel gas consumption.

FIGURE 3 – Baseline Desalting Efficiency

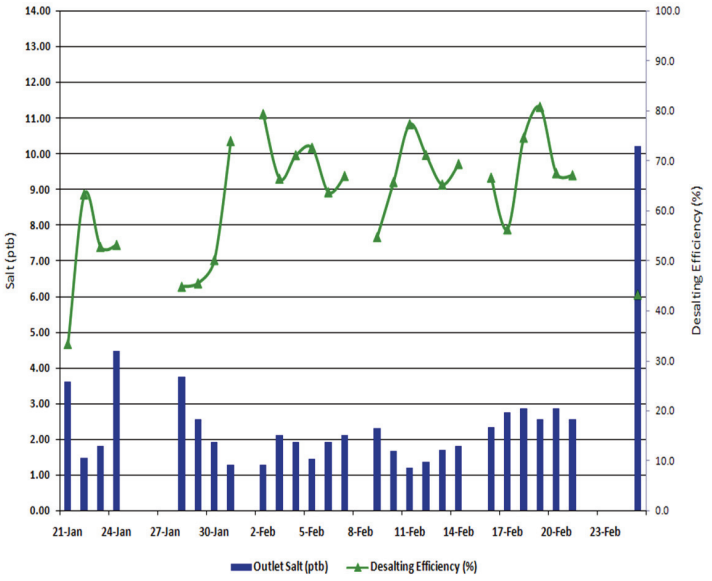


FIGURE 4 – Dorf Ketal Trial Desalting Efficiency

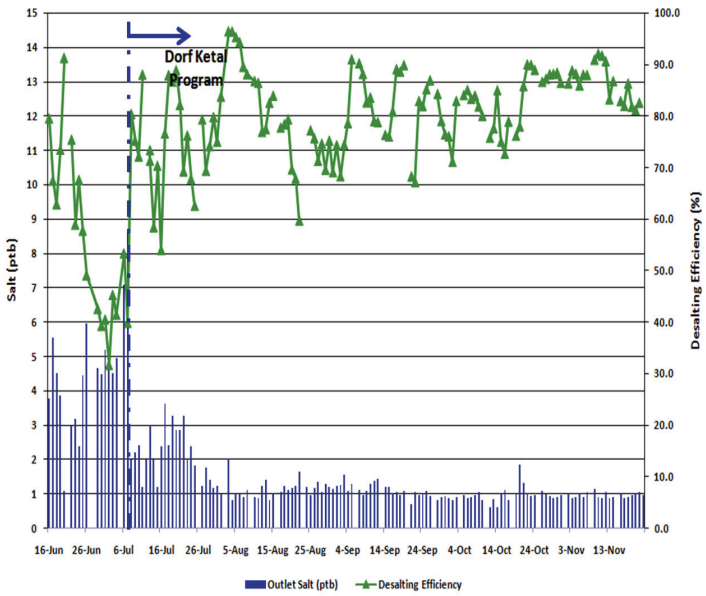
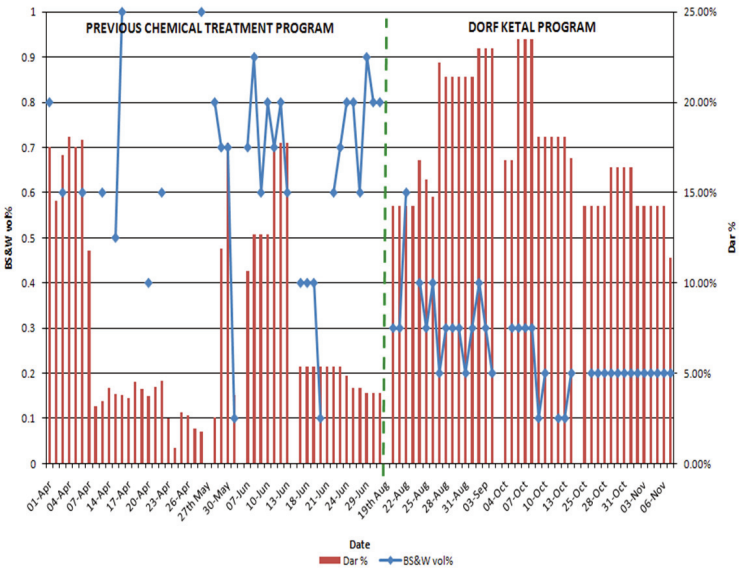


TABLE 1 – Fuel Gas Consumption Savings

Average FG consumption Pre-Program, kg/hr	6675
Average FG consumption Post-Program, kg/hr	6510
FG consumption , kg/hr	165
Average FG heat capacity, MMBtu/kg	0.052
FG cost, USD/MMBtu	$4.26
FG savings, USD/day	$876.89
FG savings for the duration of the trial, USD	$126,271.80

Desalter efficiency improvements were equally impressive, especially when crude API is considered. Average crude density actually increased during the trial to 28.6 API from a baseline average of 30.2 API, and as Stoke's law shows, settling velocities are lower with heavier crudes. Nonetheless, Dorf Ketal treatment exceeded the refinery target, maintaining average salt content at or below 1.3 ptb in desalted crude.

FIGURE 5 –Dar Crude Percentage Versus BS&W, Dorf Ketal



Bottom Line:
This refinery reversed net losses caused by poor desalter performance, saved money on fuel gas and was able to profitably process increasingly difficult crudes at higher rates.

Performance Observation:
State-of-the-art chemical treatment from Dorf Ketal can solve problems that only recently were considered to be impossible without system redesign.

Dorf Ketal Chemicals LLC
11200 Westheimer Road – Suite 400
Houston, Texas 77042
USA

Tel: +1-713-343-2377
E-mail: innovation@dorfketal.com
www.dorfketal.com