

Case study: United States

LIFESPAN antifoulant reduced fouling and saved \$700,000 USD

The ultralow sulfur diesel (ULSD) unit at a US fully integrated refinery processes primarily straight-run diesel from the crude units with about one-third of the feed coming from intermediate storage tanks. The unit has to be brought down annually to change out the catalyst bed. Under the previous antifoulant program, the primary feed-effluent heat exchangers had been fouling at a rapid rate, achieving an average of only 200 days between cleanings. As the feed-effluent heat exchangers foul, high differential pressure forces reduce throughput that allows more rapid fouling. Lost throughput is valued at \$375,000 USD annually.

The refinery wanted to run for at least two years before the feed-effluent exchangers had to be cleaned. The exchangers downstream of the primary feed-effluent exchangers begin to foul once the primary exchangers lost most of their heat transfer ability. These downstream exchanges had to be taken out of service and sent off-site for cleaning, which was very expensive—estimated to be \$1 million

USD, including cleaning costs and lost throughput every two years. The goal was to run at least four years between cleaning the critical exchangers.

Based on results from feed analyses and excellent performance with the **LIFESPAN™ antifoulant refinery heat exchanger fouling control product** in similar applications, Baker Hughes proposed a significantly improved program. Results of the first 160 days (see Chart 1 on back) significantly improved fouling control of the primary feed-effluent heat exchangers.

This program is performing well at a 28% reduction in treat rate compared with the previous program. The refinery has agreed to continue the program and will review economic impacts annually. The estimated savings to the refinery for this improved antifoulant is \$700,000 USD per year above the previous treatment program, with a return on investment of 300%.

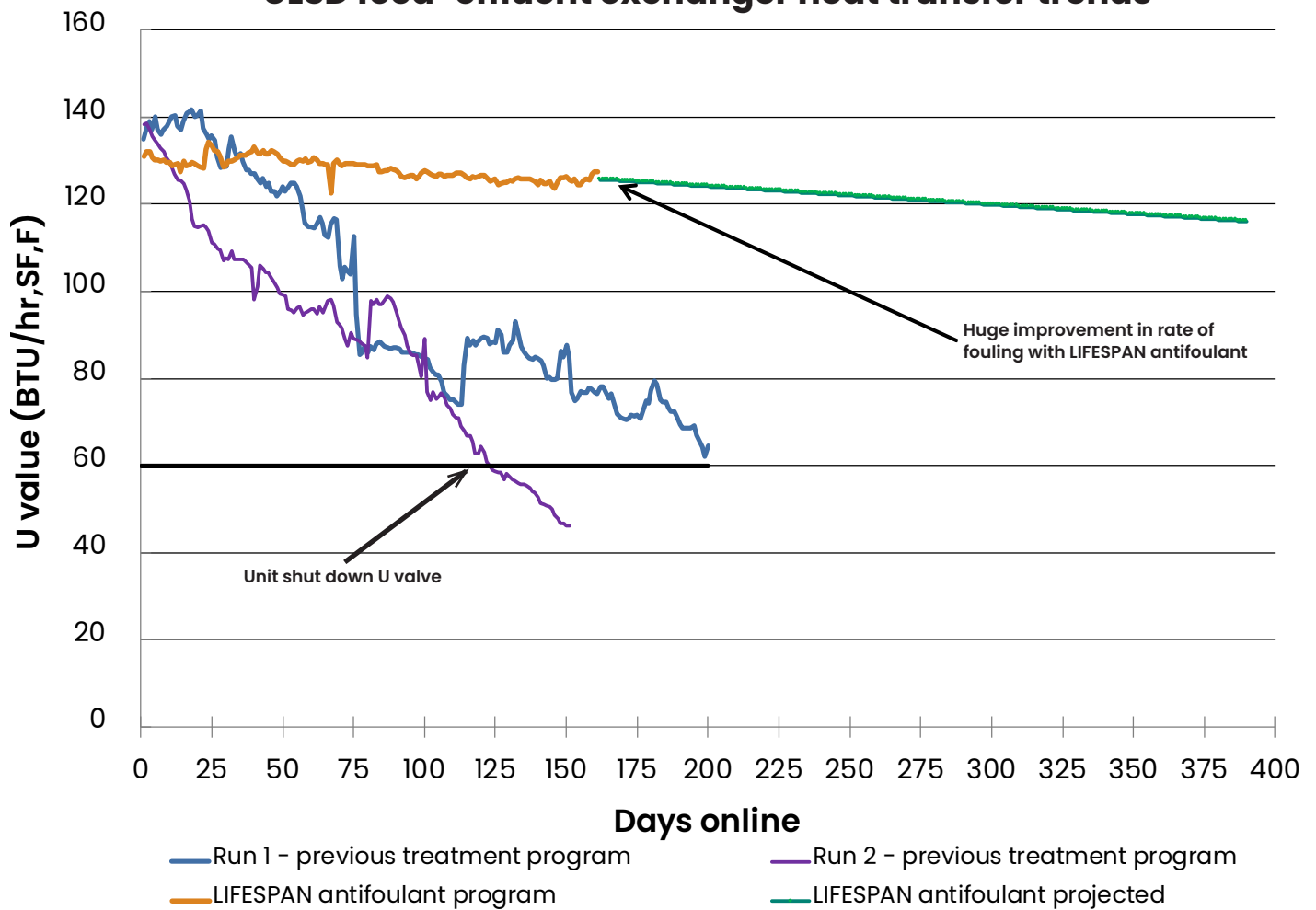
Challenges

- Reduced throughput due to fouling
- Routine monitoring was increased to ensure critical exchangers were not impacted

Results

- Controlled deposition of organic and inorganic materials in preheat exchanger systems
- Reduced fouling rate 85%
- Generated \$700,000 USD return on reduction in fouling rates
- Improved run length to more than two years between exchanger cleanings

ULSD feed-effluent exchanger heat transfer trends



Feed-effluent exchanger performance for the previous antifoulant program versus significant improvement from the LIFESPAN antifoulant program, which will provide a return of 300%