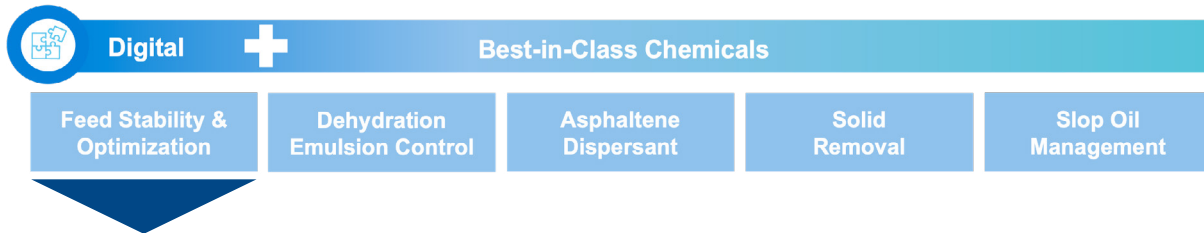


Crude Unit Feedstock Pretreatment

Comprehensive offering built on best-in-class chemicals and proprietary digital technology helps improve the quality of crude charge into the desalter and reduce fouling and corrosion.



Ecolab® FeedFlexIQ™ **Portable digital feedstock analyzer provides near real-time actionable insights for crude oil compatibility and blending scenarios.**



**ASSET
PROTECTION**

Improve the quality of crude charge into the desalter by managing filterable solids, BS&W content, and asphaltene-related issues to improve desalter performance and minimize impact to WWTP



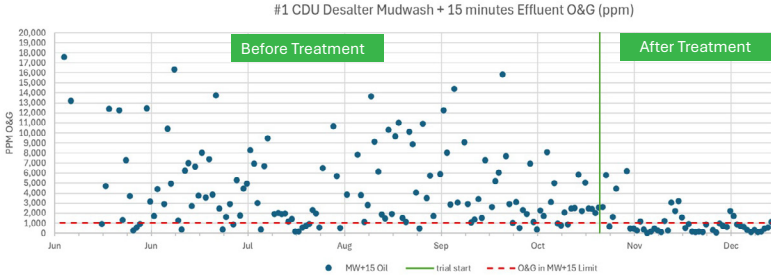
**TOTAL VALUE
DELIVERED**

Maximize profit by reducing fouling and corrosion in the refining process, preventing oil under carry, and reducing overall treatment cost

SUCCESS STORY

Ecolab® FeedFlexIQ™ and Pretreatment Chemicals Improve Brine Quality in a Midwest Refinery

- A direct correlation between low NCSV and high brine oil and grease was observed
- Significantly reduced the oil and grease content in the desalter brine to help prevent oil under carry to the wastewater plant (WWTP)

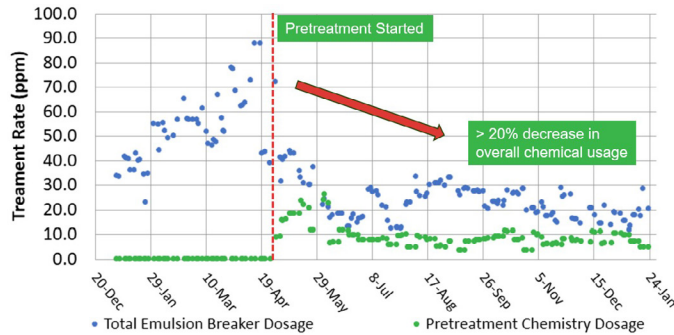


FeedFlexIQ
measured crude
compatibility results in
near real-time
Ecolab® FeedFlexIQ™

SUCCESS STORY

Feedstock Pretreatment Helps a Gulf Coast Refinery Process Opportunity Crudes and Prevent Fouling in Hot Pre-Heat Trains

- Solids removal efficiency improved by 15% across desalter
- Higher efficiency led to >20% decrease in overall chemical usage
- **\$2.68M** Total Value Delivered in processing more opportunity crude



In another crude unit at the same refinery, pretreatment chemistry - asphaltene stabilizer - was injected into the raw crude and significantly reduced fouling in all hot pre-heat trains

SUCCESS STORY

Enhanced Solids Management Enables A European Refinery to Reduce Slop Oil Inventory and Improve Desalter Operation

- Improved quality of the oil charged to the crude unit and effluent sent to WWTP
- An 8% improvement in crude charge rates, worth over **\$4M**

