

Custom Emulsion Breaker

Developed for Heavy Canadian Crudes



The chemistry of results™

Background and Challenges

A large U.S. refinery processing approximately 200 MBPD heavy Canadian crude was experiencing issues with desalter performance. The heavy Canadian crude accounted for greater than 70% of the crude charge, with the remainder being made up with light domestic crude. The crude quality and frequency of crude switches caused the refinery to consistently struggle with oil in the effluent and a large emulsion layer. In response to these challenges, the refiner used an excess of the existing emulsion breaker chemistry. Athlon Solutions identified this opportunity to develop a customized emulsion breaker chemistry that would efficiently desalt and dehydrate this heavy Canadian crude blend, as well as provide improved effluent water quality and control the rag layer.

Athlon Solutions' Recommendation

Athlon Solutions' Research and Development team conducted an audit of the unit in order to develop a test method representative of the specific refinery conditions. The team developed a field test method to effectively simulate desalter conditions and then screened the existing chemistry along with several potential components for a new chemistry. After selecting the best components based on desired results, blends of the most successful components were then created and evaluated for performance. Athlon Solutions screened the emulsion breaker components at various ratios in order to optimize the results. Finally, the formulation for the new, custom chemistry was tested on multiple crude blends to confirm its performance. The custom-designed emulsion breaker was commercialized for a trial on site and ultimately replaced the existing chemistry.

Performance Results

The typical emulsion breaker treatment range for the previous chemistry was approximately 20-30 ppm. In the 12 months preceding the trial, the average dosage was 25ppm. With the new emulsion breaker, treatment rates have dropped to an average of 15ppm. This 40% reduction in chemical usage results in over \$300,000 in annual savings. Even with this lower dosage, the new chemistry has effectively improved performance with respect to effluent water quality and has allowed for better control of the rag layer. The emulsion breaker trial was conducted in mid-November through January. After the successful trial, the new emulsion breaker was placed in service full time in March. Before implementing the new chemistry, the refinery experienced difficulty maintaining good desalter performance in the cold winter months and had to increase the emulsion breaker. With the new chemistry, the needed emulsion breaker dosage dropped during the coldest months of the year and has remained low. The new emulsion breaker has also provided for smoother desalter operations, minimizing the frequency of desalter upsets and excursions at the Waste Water Treatment Plant.

