

ASPH16507A: DEEPWATER GULF OF MEXICO BEST-IN-CLASS CHEMISTRY FOR ASPHALTENE CONTROL



SITUATION

A major oil producer operates a TLP in 2,000 feet of water in the Gulf of Mexico. Startup was on time and went without major problems. The field produces from four wells completed to a depth of about 13,000 to 16,000 feet. All the wellheads are on the sea floor, with subsea flowlines about one to two miles long.

PROBLEM OR SOLUTION

Prior to startup, an independent laboratory performed crude oil analyses. The tests indicated that asphaltene deposition in the producing wellbores and in the flowlines would be severe enough to stop production if nothing were done to stabilize the asphaltenes in the produced crude oil.

PROBLEM SOLVING APPROACH

Nalco Champion was asked to evaluate the potential for chemical solutions. The Nalco Champion Flow Assurance lab in Sugar Land, Texas conducted analyses and performance testing on a sample of the crude oil, looking for potential problems and their solutions. Nalco Champion Flow Assurance research determined that asphaltene deposition would be a problem in the wellbores and flowlines.

SOLUTION

Asphaltene flocculation point tests performed in the lab indicated that a Nalco Champion asphaltene inhibitor could successfully stabilize the asphaltenes in the crude oil and inhibit deposition in the producing wellbores and flowlines. This asphaltene inhibitor had earlier been determined to be best in class in asphaltene inhibitor testing performed by another major Gulf of Mexico producer. At startup, this product was injected into each subsea wellhead through 316L stainless steel umbilicals, then into the bottom of the tubing string through an injection valve in each well. The dosage of the product was optimized over the next few months to achieve the most cost-effective program possible.

Soon after the successful startup, ongoing work by the Nalco Champion Flow Assurance research team produced a new asphaltene inhibitor. This new product—ASPH16507A—was evaluated in the lab for its performance on the subject crude and benchmarked against the incumbent best-in-class product. Lab tests indicated that ASPH16507A would be significantly more cost-effective, providing the producer with cost savings and establishing a new best-in-class benchmark.

RESULTS

ASPH16507A Asphaltene Inhibitor was tested in the field for several months and the findings by the Flow Assurance Research lab were confirmed: ASPH16507A reduced the amount of product required and the cost to inhibit asphaltene deposits by an average of 31%, with no decrease in performance. This does not include the additional savings attributable to the reduction in the volume of chemical shipped and handled.

The program was monitored by running the Asphaltene Deposition Test (ADT) on the platform and comparing the performance in each test to a standard curve.

In this monitoring method, ADT performance above the "Minimum Acceptable" baseline indicates the imminent formation of asphaltene deposits, while performance below the baseline indicates good stabilization of the asphaltenes in the crude oil.

The figures below compare the monitoring data for one well, first while the incumbent product was being used and then while ASPH16507A was being used. Even though the dosage of ASPH16507A was 37% lower, it performed as effectively as the incumbent, reducing the treating cost.

ASPH16507A has been formulated and manufactured to be compatible with subsea umbilical delivery systems.

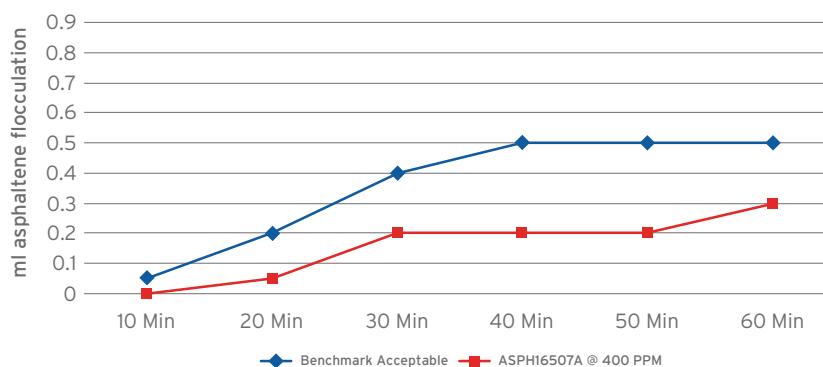


Figure 1 - ADT of a production sample from well #1, being treated with 400 ppm of the incumbent asphaltene inhibitor.

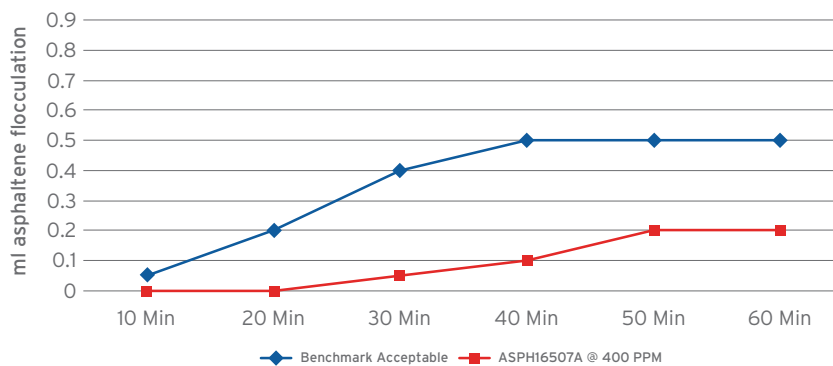


Figure 2 - ADT of a production sample from well #1, being treated with 250 ppm of ASPH16507A.

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