



# FORSA PAO2016 dispersant ensured pipeline operation

The operator of a major oil transmission line in the Central Rockies was pigging a 16-mile (25.7-km), 12-in. (30.5 cm) diameter section of pipeline weekly, primarily to remove paraffin buildup. During each pigging operation, the cumulative mass of paraffin delivered to the pig receiver would plug the line, causing it to overpressure to the point of bursting the rupture disk.

Replacing the blown rupture disk required opening the system and removing hundreds of pounds of paraffin. This labor-intensive weekly repair deferred production for 12 hours, causing serious economic losses equating to 18,000 bbl/week of lost production. Based on \$47 USD/bbl oil, annualized costs could reach almost \$44 million USD.

Baker Hughes, a GE company (BHGE) currently treats other parts of the pipeline system with corrosion inhibitor and biocide.

After a quarterly lunch-and-learn session with the customer, a BHGE field engineer and local account representative heard about the paraffin problem and offered to help find a solution.

BHGE chemists at Upstream Chemicals Central Rockies lab in Casper, Wyoming, conducted paraffin analysis of the oil and subsequent product performance testing to help select the appropriate treatment chemical.

## Batch treatment ahead of pig prevented shut-in

Based on the high-level test results and experience managing unconventional paraffin problems, BHGE experts in the DJ Basin Upstream Chemicals group recommended using the **FORSA PAO2016 paraffin dispersant** to remove deposited paraffin and prevent congealed paraffin from depositing.

To help the customer keep costs down, BHGE sized a batch chemical treatment to run ahead of the weekly pig. This enabled the customer to pig the pipeline without risk of plugging and rupture blow out and prevented the weekly 12-hour shut-in for disk replacement, as well as the severe economic loss from deferred deferring production.

## Challenges

- Crude oil entering the pipeline was already below the paraffin cloud point (temperature at which solid paraffin begins to form), making it extremely difficult to treat economically and effectively
- No precedent on which to base a chemical application design

## Results

- Treatment prevented the weekly 12-hour shut-in to replace the rupture disk after pigging operation
- Preventing shut-in recovered the 12 hours of lost oil transport (~18,000 bbl oil) each week
- Savings to the operator equates to an annualized amount of \$43.9 million USD in deferred production (based on estimate of \$47/bbl)

In March 2017, the first pig run with the FORSA PAO2016 paraffin dispersant batch treatment resulted in a huge success and was the first run in more than five months without a blown rupture disk.

BHGE has since worked closely with the operator to further optimize the treating program with continued success.



Top photo shows the pig receiver. Bottom panel shows interior of receiver after pigging run before treatment program (left) and after initiation of FORSA PAO2016 paraffin dispersant prior to each pig run (right).



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