

PRODUCTION
TECHNOLOGIES.
FULL SERVICE.

SYMETRI

DENDRIMER TECHNOLOGY

A step change in product delivery



Schlumberger

MAXIMIZE PRODUCTION FROM RESERVOIR TO REFINERY



UNLOCK POTENTIAL **OPTIMIZE PRODUCTION**

Our integrated production technology services deliver tangible benefits and assurance to worldwide oil and gas operations.

Firmly established at the forefront of technology, Schlumberger combines pioneering chemical and process solutions, equipment, and software with unrivaled technical expertise.

Customers benefit from a truly unique blend of outstanding technological capability, together with a distinct understanding of how to successfully address their production challenges.

Our global footprint and exceptional service delivery ensures customers reliably and efficiently maximize production, regardless of system complexities or geography.

Schlumberger uses specialized research laboratories and field support operations to analyze issues across operations. This enables us to engineer the best solutions by increasing customers' revenue, reducing their operational costs through protecting asset integrity, maximizing production, and enhancing product quality.





SYMETRI

DENDRIMER TECHNOLOGY

A STEP CHANGE IN PRODUCT DELIVERY

Schlumberger has developed pioneering dendritic technology for typical, subsea, deepwater, and unconventional applications. This reflects a step change in production chemical delivery in challenging conditions and environments.

SYMETRI* dendrimer technology delivers inhibitor chemistries that offer both high functionality and high activity, reducing the quantity of inhibitor required to attain flow assurance requirements and lowering chemical treatment cost per barrel of oil.

Inherent low viscosity and molecular stability renders SYMETRI technology ideal for deepwater and unconventional applications where the requirement to inject multifunctional, high-concentration products via long umbilical cords requires optimal product performance at all times.

BENEFITS—AT A GLANCE

- Reduces infrastructure demands
- Enhances safety and environmental profile

FEATURES

- Multifunctional chemistry
- High activity
- High stability
- Low viscosity

INNOVATING TO OPTIMIZE PRODUCTION IN COLD CLIMATES

As a response to global demands for cost-efficient solutions to challenges in deepwater and other difficult conditions, we developed, tested, and proved the efficiency of our low-viscosity, ultrastable SYMETRI technology.

The deposition of paraffin and asphaltene waxes has long been ranked as one of the industry's most costly and hardest to remediate flow assurance issues.

While the ramifications are especially pronounced in cold subsea environments, wax buildup can choke off flowline communication in cooler onshore environments too, negatively impacting production.

Traditionally, comb polymers are largely ineffective in these conditions and have to be heavily diluted.

In contrast, the SYMETRI technology is not subject to the wrapping effect commonly experienced using conventional polymers. Our technology ensures low viscosity and stability without the need for high dilution rates.

Keeping viscosity at low levels eliminates higher pumping pressures, avoiding production equipment damage.

Soluble in a wide range of oilfield solvents, these low-toxicity polymers with a multibranch structure are proven to dramatically reduce paraffin precipitation and deposition. They can be injected at subsea wellheads or manifolds via umbilicals or capillary strings, and because the dendritic technology works at high concentrations when the temperature drops, the extremely low dilution rates considerably decrease logistical requirements and associated costs.



Case Study

EAGLE FORD SHALE OPERATOR MITIGATES HIGH-MOLECULAR-WEIGHT PARAFFIN BUILDUP

CHALLENGE

An Eagle Ford operator faced challenges producing oil that contained highmolecular-weight paraffin (up to and greater than C100) that can crystallize into wax deposits and cause operational problems throughout the crude production and transportation system. Hot oiling was frequently used to dissolve the paraffin and prevent plugging in the wellbore and tubing. Although it was effective, hot oiling caused well downtime and increased the risk of formation damage caused by accumulation of high-molecular-weight paraffin near the wellbore.

SOLUTION

The operator turned to Schlumberger to effectively mitigate wax deposition. The Schlumberger team initiated development of a novel product—the PI-7478 wax dispersant. After thorough evaluation in the laboratory, the operator approved a short field trial, where it showed improved performance over the previous inhibitor.

RESULTS

The PI-7478 wax dispersant improved performance by reducing wax deposition, required cleanout, hot oiling, and pigging frequency. Over a 3-week treatment with PI-7478 wax dispersant, the operator observed consistently fewer wax deposits, reducing the risk of blockage.



Case Study

SYMETRI TECHNOLOGY REDUCES TREATMENT COST AT A 25% LOWER DOSAGE RATE THAN THE INCUMBENT CHEMISTRY

CHALLENGE

An interfield condensate pipeline experienced severe wax deposition leading field operator to conduct a best-in-class exercise to identify a suitable wax inhibitor chemistry product. Schlumberger had previously developed chemistry that successfully remediated this initial wax challenge, mitigating wax deposition potential between successive line pigging applications, for in excess of five (5) years.

However, recent addition of further subsea tiebacks to interfield line infrastructure has necessitated reevaluation of wax inhibition strategy.

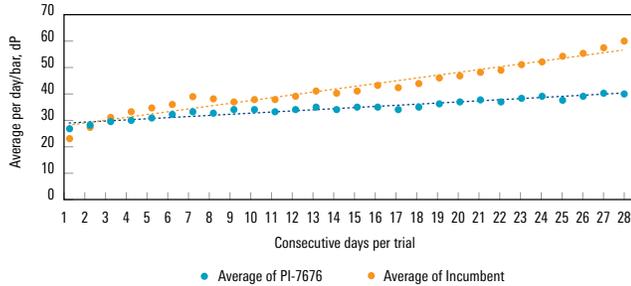
SOLUTION

Schlumberger recently developed and commercialized a pioneering dendritic technology for deepwater and unconventional applications. This technology is a step change in production chemical delivery in challenging production conditions and environments.

The SYMETRI technology delivers inhibitor chemistries that offer both high functionality and high activity, reducing the quantity of inhibitor required to attain flow assurance requirements (potentially as much as four-fold), lowering chemical treatment cost per barrel of oil. Accordingly, SYMETRI technology product PI-7676 was evaluated under production conditions and offered for field trial evaluation.

RESULTS

During initial field trial, SYMETRI technology was injected at the same dose rate as incumbent chemistry over 30-day period. The differential pressure in the export pipeline was measured during this period.



The differential pressure for the incumbent wax inhibitor dosage rate over a similar 30-day period is included above for reference.

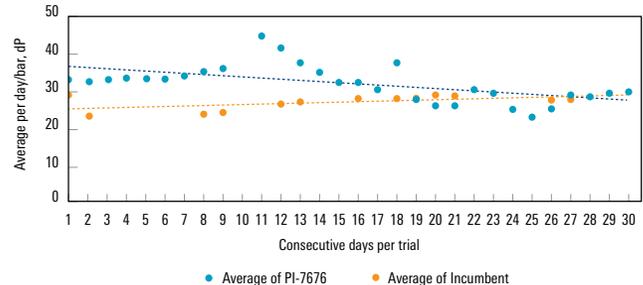
In both cases, the differential pressure in the pipeline increased, but at a reduced rate when treated with SYMETRI technology. Furthermore, during the 30-day trial, there was no requirement to pig the export pipeline.

During a subsequent field trial, SYMETRI technology was injected intermittently over a 4-month period, during which dosage rate was reduced by 25% relative to incumbent. The differential pressure in interfield pipeline was measured throughout.

Note: significant activity occurred on the production system over this time and stable production was only observed for two 30-day periods. The differential pressure in the export pipeline during these periods is presented to the down below.

During treatment with incumbent wax inhibitor, a steady increase in the differential pressure in the pipeline was observed. In contrast, treatment with SYMETRI technology returned an overall decrease in the differential pressure. This infers that wax deposition was still occurring with the incumbent, hence the requirement for ongoing pigging operations due to the pressure increase over time. Results with SYMETRI technology infer a reduction or halt in wax deposition during this 30-day period.

SYMETRI technology was as efficient as the incumbent chemistry at a (25%) lower dosage rate, delivering immediate reduction in treatment cost benefit.



UNLOCK POTENTIAL OPTIMIZE PRODUCTION

PREVENT

PERFORM

CURE

slb.com/pt

*Mark of Schlumberger or a Schlumberger company
Copyright © 2018 Schlumberger. All rights reserved. 17-MI-248140

Schlumberger

