

FAZEPRO

Reversible invert-emulsion reservoir drill-in fluid system

For openhole completions on producer or injector wells:

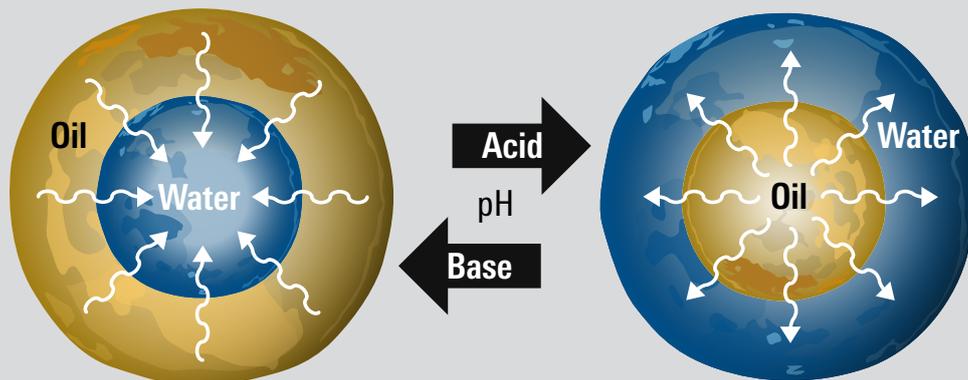
Oil-wet drilling performance.

Water-wet filtercake removal simplicity.

Get both with the **FAZEPRO*** reversible invert-emulsion reservoir drill-in fluid system.

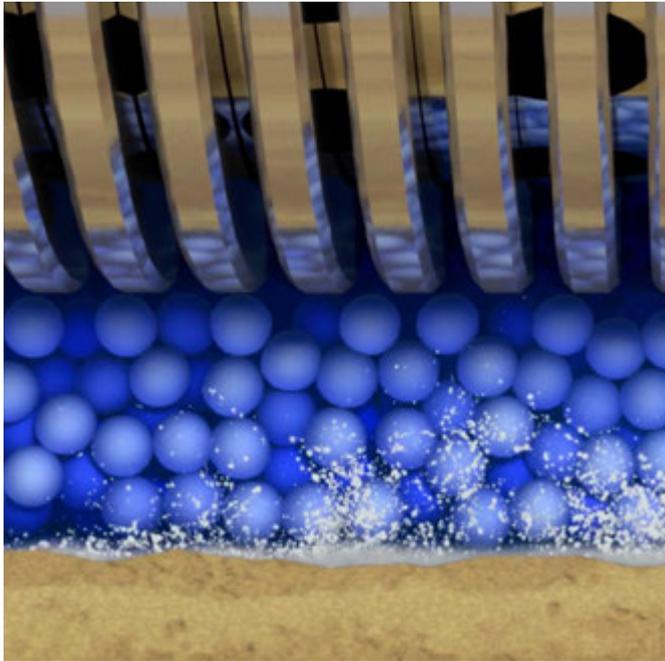
A **water-in-oil** emulsion provides optimal drilling performance.

An **oil-in-water** emulsion provides optimal cleaning for completions



With the **FAZEPRO system**, a single fluid provides both, simply by adjusting the alkalinity of the environment to reverse the emulsion.

Easy role reversal from water-in-oil to oil-in-water.



Applications

- Openhole completions requiring sand control
- Openhole injection wells
- Openhole completions requiring acid stimulation

Benefits

- Promotes faster drilling
- Delivers stable, high-quality wellbore
- Simplifies filtercake removal
- Minimizes equipment requirements and eliminates postcompletion remedial treatments
- Improves delivery of openhole gravel-pack (OHGP), stand-alone screens, and other complex completions
- Maximizes ROI by enhancing production and injection rates
- Enhances HSE profile by minimizing generated waste volumes

Features

- Invert-emulsion drilling performance
- Water-base filtercake removal performance
- Mild-pH, engineered-delay breakers and controlled breakthrough
- Stable, inhibitive drilling properties
- Simple pH adjustment for water-wetting filtercake surface
- Simplified single-stage cleanup

The advantages of the FAZEPRO system are realized not only in drilling through the pay zone at high performance but also in the completion phase. **By simply adjusting the pH of the breaker solution, the wettability of the filtercake transforms from an oil-wet state to a water-wet state.** Once the filtercake surface is water-wet, the bridging agent can be easily and completely removed.

The system also mitigates the formation damage and completion impairment of many gravel packs, which have historically restricted lift-off and flowback in addition to blocking uniform accessibility of breakers to the filtercake. For water injection wells, the FAZEPRO system enables immediate postcompletion injectivity without reproducing the well to clean up the reservoir.

The PRIMO-FAZE* low-oil/water-ratio reversible nonaqueous reservoir drill-in fluid (RDF) system expands the FAZEPRO system operating density window. It maintains the same reversibility while enabling higher-volume internal phases to replace solids required to attain a given density.

Thorough destruction of oil-base filtercakes

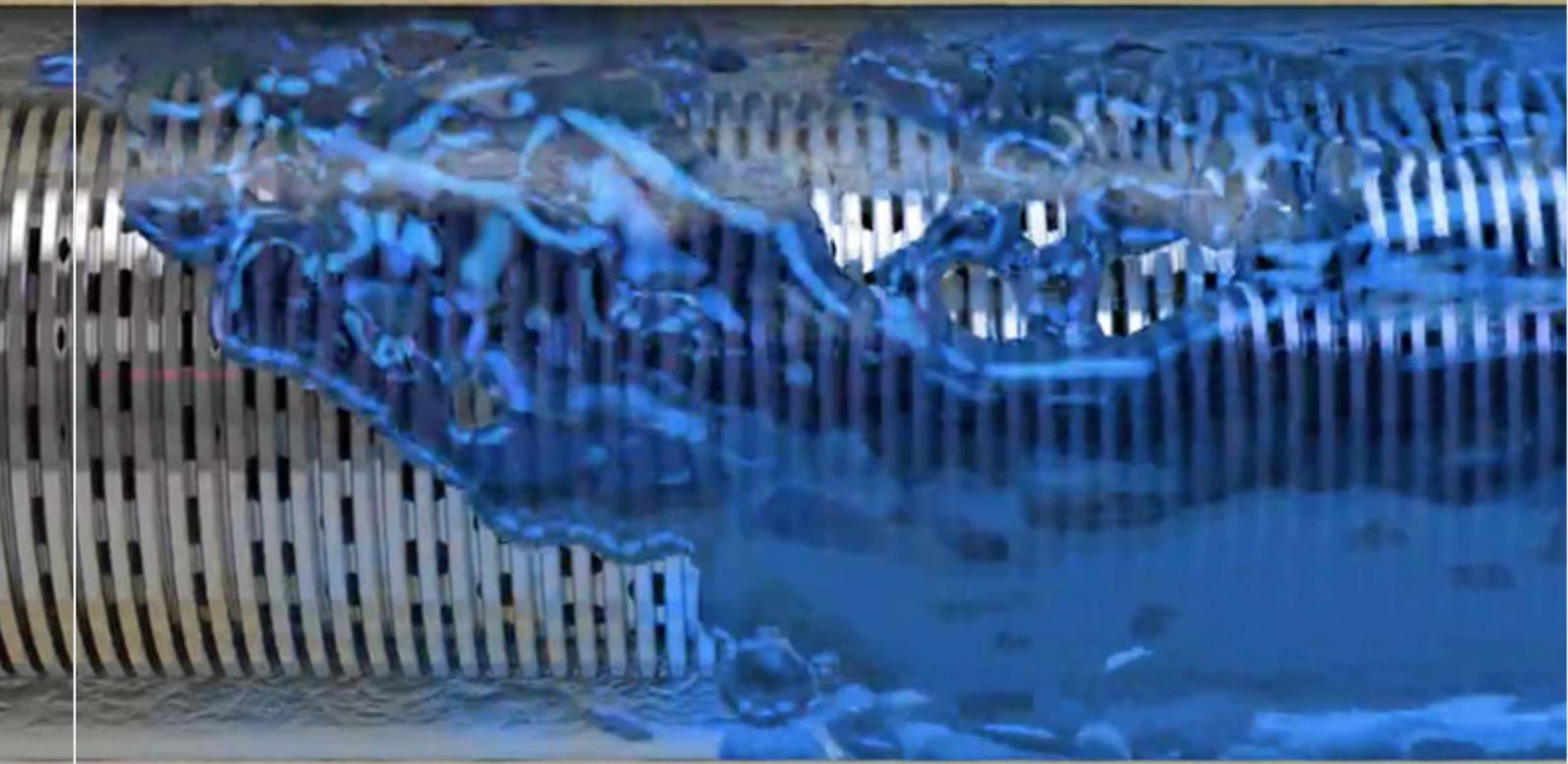
The FAZEPRO system chemical package comprises two easily converted chemicals—FAZE-MUL* primary reversible emulsifier and surfactant and FAZE-WET* primary wetting agent and fluid loss control additive.

The FAZE-MUL surfactant is the industry's only emulsifier capable of being reversed from an oil-wet to a water-wet state. It facilitates the transformation through a change in pH; during the change from oil-wet to water-wet, the emulsifier becomes a surfactant. This reversal mechanism permits total destruction of the filtercake, removing the barrier between the formation face and the wellbore. This helps regain reservoir connectivity and establish increased productivity or injectivity.

Simplified dual approach to filtercake removal

The distinctive chemistry of the FAZEPRO system simplifies both the dispersion and dissolution approaches to filtercake removal. Field data has shown that destroying a FAZEPRO system filtercake is easier compared with destroying a filtercake deposited by conventional water-base RDFs. While a conventional aqueous-base RDF requires locating and then breaking down polymers of various molecular weights, the invert emulsion is wholly responsible for the integrity of a FAZEPRO system filtercake. That means destruction simply requires separating the oil and water phases.

Whether through dispersion or dissolution, what results is a filtercake that is quickly and thoroughly destroyed, leading to a smooth completion operation.



The FAZE-OUT breaker system completely dissolves FAZEPRO system filtercakes by removing the bridging elements that bind the filtercake together.

Customizable options for controlled destruction.

With completion techniques becoming more complex, our MUDSOLV NG* integrated filtercake removal service ensures that the trio of FAZEPRO system breakers are placed perfectly with full well control throughout the completion.

The aim of the MUDSOLV NG service is to design the best possible openhole filtercake cleanup program for your specific application. The service ensures the proper treatment of the FAZEPRO system during completion. MUDSOLV NG service is a key component in the comprehensive M-I SWACO openhole completion portfolio that also includes gravel packs, displacements, and specially engineered proprietary software packages.

Performance metrics and laboratory verification testing are fundamental to this design. Combined with the latest analytical tools and breaker chemistries, the MUDSOLV NG service approach consistently delivers uniform, controlled, and complete removal of filtercakes in the most challenging and complex completions.

For immediate dissolution

FAZE-OUT* reversible-system water-base filtercake breaker dissolves FAZEPRO system filtercakes in injector or production wells. It can be mixed at the rig site and is designed for total dissolution of invert-emulsion filtercakes, thus enabling immediate flowback through restrictive openhole completions such as premium screens and gravel packs.

For short delays prior to dissolution

FAZEBREAK* chelant-base filtercake breaker system disperses residual deposited FAZEPRO system filtercakes while completing zones. Formulated primarily for postspotting in OHGP completions, the FAZEBREAK system delays the reversal of the residual FAZEPRO system solids from an oil-wet to a water-wet state, the water-wetting of residual solids, and the initiation of the dissolution or chelation of the bridging agent. These features allow placing the breaker during the completion and subsequent removal of tubulars without excessive losses.

For long delays prior to dissolution

FAZE-AWAY* reversible invert-emulsion filtercake breaker system dissolves FAZEPRO system filtercakes. The FAZE-AWAY system is recommended for openhole producer or injector completions using standalone or expandable screens as well as after an OHGP completion. This breaker is designed to delay breakthrough for extended time periods and can be used in formations that are sensitive to water-base breaker systems.

Case Studies

FAZEPRO system boosts injection rates at lower pressures, Equatorial Guinea

Challenge

The operator drilled an injector with a conventional oil-base drilling fluid, which provided the required inhibition and lubricity. However, after days of circulating and cleaning the wellbore, the acid breaker treatment was found unsatisfactory, and injection volumes were highly inadequate.

Solution

For its next injector well, the operator deployed the FAZEPRO and FAZE-OUT systems over the openhole section.

Results

The FAZEPRO system was used for drilling the reservoir interval and helped achieve the highest injectivity rate and lowest injection pressure in the area. The injection performance resulted in 30% more seawater at 40% less pressure than expected. This was also more than twice the amount injected on the best offset at 30% of the injection pressure.

Further, using the FAZEPRO system eliminated the costly rig and coiled tubing time, as well as the hazards, of conventional acid filtercake removal treatments.

FAZEBREAK system enhances completion efficiency in Cabinda, Angola

Challenge

After attempting to destroy a FAZEPRO system filtercake using acid on an OHGP producer, an operator realized that a more controlled treatment was required. The acid treatment had been performed postgravel pack with a short stinger and resulted in immediate breakthrough, allowing the acid to bypass the majority of the filtercake.

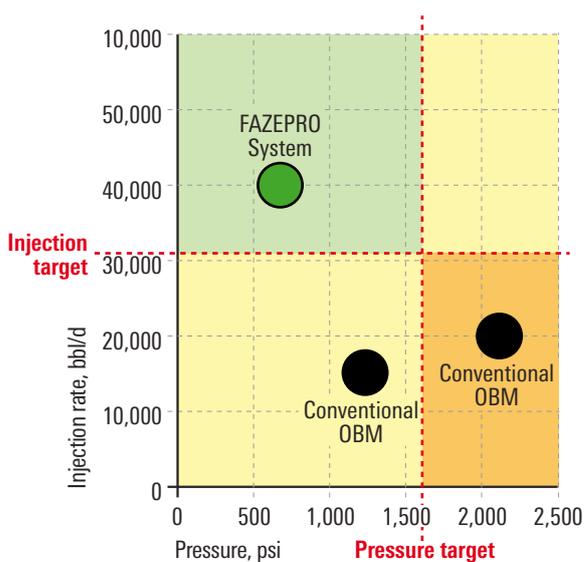
Solution

On subsequent wells, the FAZEBREAK system breaker was used to enable uniform placement across the entire interval.

The Results

The slow reaction rate of the FAZEBREAK system provided sufficient control and resulted in no unplanned losses, even during the gravel-pack operation. This method was used on a total of six OHGP completions with equal results.

The FAZEBREAK system was allowed to diffuse through the gravel and destroy the filtercake over several days. The wells produced above expectations and without the need for postcompletion intervention.



FAZEPRO system outperforms conventional oil-base mud (OBM) on injection wells in Equatorial Guinea.

Case Studies

FAZE-AWAY system enables completions in long, shallow North Slope wells, Alaska

Challenge

Two shallow, long-reach injector wells were drilled and completed on the North Slope. An invert emulsion-base RDF was required to deliver the lubricity necessary to install the completion assemblies, but a standard invert-emulsion filtercake would prevent direct injection.

Solution

A FAZEPRO system was designed for effective drilling and thorough filtercake removal. A FAZE-AWAY system was formulated for placement prior to inserting the completion assembly to promote efficient completion operations.

Results

After the two intervals were drilled without issue, the FAZEPRO system was displaced directly with the FAZE-AWAY system before running the complex lower completion assemblies. The FAZE-AWAY system promoted swelling of the isolation packers and, as designed, exhibited a controlled 8-day delay prior to filtercake breakthrough. Injection rates exceeded expectations. Without the FAZE-AWAY system, efficient completion of these wells would not have been possible.

FAZEPRO system outshines conventional oil-base drilling fluid, China

Challenge

An operator in China was drilling in the Bohai Bay with conventional OBM and achieved subpar oil production—an average of 1,500 bbl/d. Its next wells would penetrate six different producing zones, so it was critical that each contribute to overall production.

Solution

To increase field production rates, the operator decided to sidetrack the well and use the FAZEPRO system. After installing the completion assembly, the operator would break the filtercake with acid.

Results

Several wells were drilled with the FAZEPRO system. Once completed, the wells achieved production rates that exceeded the expected 3,000 bbl/d. The system was used in only half the wells in the field, and yet the field production rate doubled.



Case Studies

Operator achieves 70% higher production and 50% better injectivity, deepwater Angola

Challenge

An operator's deepwater field development plan included shutting in and suspending wells after drilling and completion installation. The gravel-packed completed wells would remain static and not flowed back for 8 to 10 months.

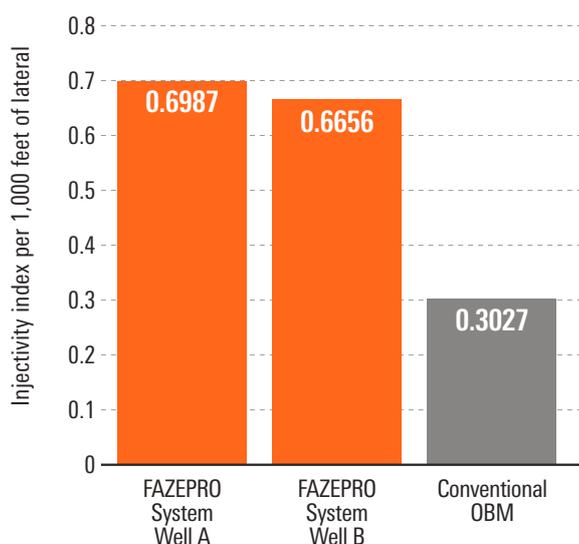
Solution

M-I SWACO collaborated with the operator to design and execute successful completions. Key to the strategy was using the FAZEPRO system for the 12 producer wells and nine injector wells.

Results

The FAZEPRO system was used in drilling the reservoir sands. Afterward, the FAZE-OUT system was incorporated. Following a 3-day soak, the FAZE-OUT system completely destroyed the filtercakes on the injector wells. Flowback with no breaker treatment was achieved on the 12 producers with negative skin reported after flow testing.

The wells exceeded both production and injectivity expectations—the best producer by 70% and the best injector by more than 50%.



Comparison of injectivity using OBM and FAZEPRO system in Angola

FAZEPRO system aids in drilling, completing HT carbonate reservoir, Gulf of Mexico

Challenge

An operator was using a water-base drill-in fluid for drilling a shallow-water Gulf of Mexico well, but the bottomhole temperature of 302 degF [150 degC] was posing a challenge. The reservoir also contained carbon dioxide (CO₂) and hydrogen sulfide (H₂S) gases. Because acid stimulation was required to fully access permeable pockets in the carbonate reservoir, conventional OBM would have created severe emulsion problems during acidization. These problems potentially could prevent the well from being properly stimulated.

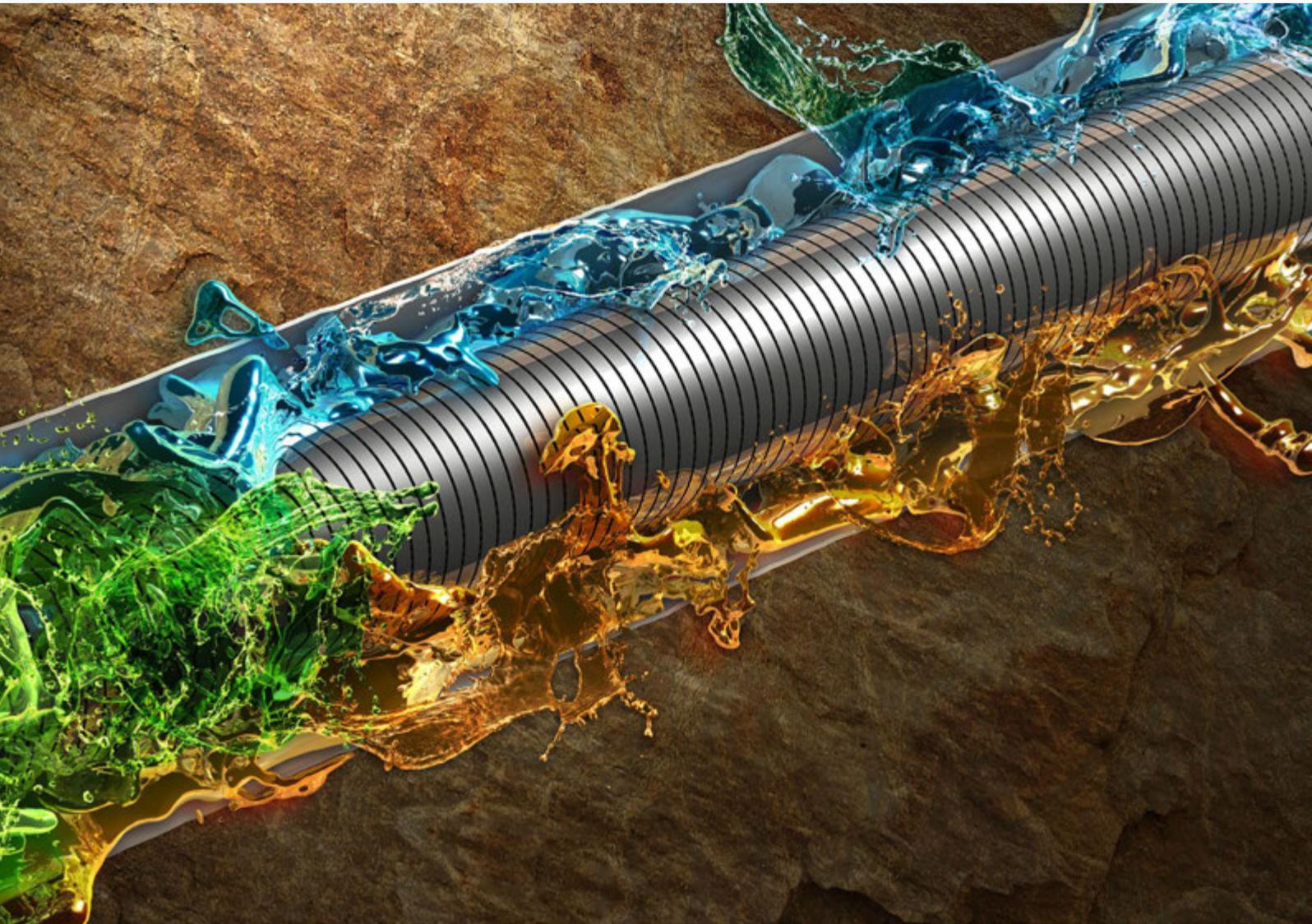
Solution

The operator decided to displace using the FAZEPRO system to complete drilling of the reservoir. The system was supplemented with conventional invert-emulsion products to enhance fluid loss control under high-temperature conditions.

Results

After displacement with FAZEPRO system fluid, the section was drilled and logged in only 16 days, and the system remained stable throughout the interval. The solids-free FAZEPRO system was placed in the open hole prior to inserting the sliding-sleeve ported liner, where it remained stable for 6 days.

Upon initial completion, the well produced 35% more gas than expected from wireline log interpretation. Once the interval was acidized through the sliding-sleeve ports, gas production was 90% greater than expected from the same log interpretation.



Put the FAZEPRO system to work for you.

To find out more about the FAZEPRO reversible invert-emulsion reservoir drill-in fluid system, visit miswaco.com/FAZEPRO.