

Case study: Middle East

# Fully-integrated 15,000 psi-rated multistage system optimized hydraulic fracturing of HPHT tight formations

An operator in the Middle East was searching for a new supplier to meet its aggressive production objectives. The operator needed to hydraulically fracture, stimulate, and produce from tight reservoirs that required significantly higher bottom hole treatment pressures than it typically encountered. Multistage completion designs available in the market were restricted by the operational capabilities of the tools, limiting the effectiveness of the fracture treatment and reducing the overall efficiency of the completion.

The operator reached out to Baker Hughes for an improved HPHT multistage completion system that would meet its aggressive production objectives. Their requirements included a 15,000 psi pressure rating, 350°F (177°C) working temperature, slimhole tool dimensions, and the capability to start production without intervention.

Baker Hughes collaborated with the operator to engineer a fit-for-purpose fully integrated **15,000 psi-rated multistage completion system** from the liner top to the toe of the well to reliably withstand the extreme downhole conditions required. The system eliminates the complexity of building a solution assembled by multiple vendors, while also ensuring all of the components function as a holistic system for increased reliability and performance.

The system utilized the **ZXtreme™ HP/HT liner top packer** with **HRD-E™ running tool**, in conjunction with the **ControlSET™ FLEX-LOCK™ V liner hanger** to rotate and wash down during deployment, improving operational efficiency. This also reduced overall completion installation time by eliminating the need for an additional reamer or cleanout run prior to system deployment. The system also improved circulation rate capability without compromising the seal integrity of the packers, optimizing hole cleaning and the ability to work through tight spots—ensuring the system reached target setting depth.

System deployment required significant integration between the customer and Baker Hughes' completions, drilling services, and reservoir technical services teams to monitor well progress during various phases of the well construction process. A structured project workflow was implemented with constant cross-segmented real-time well analysis and interdisciplinary real-time communication for a successful completion design. The multistage system also incorporated **RockLock™ 15k openhole packers**, which provided reliable zonal isolation with differential pressure ratings up to 15,000 psi.

## Challenges

- Hole stability issues
- Operational challenges during deployment due to the lack of ability to rotate and circulate the liner down hole with different vendor systems
- Tight reservoirs requiring high bottom hole treatment pressures
- Incurring additional completion costs due to intervention required to mill non-disintegrating frac balls

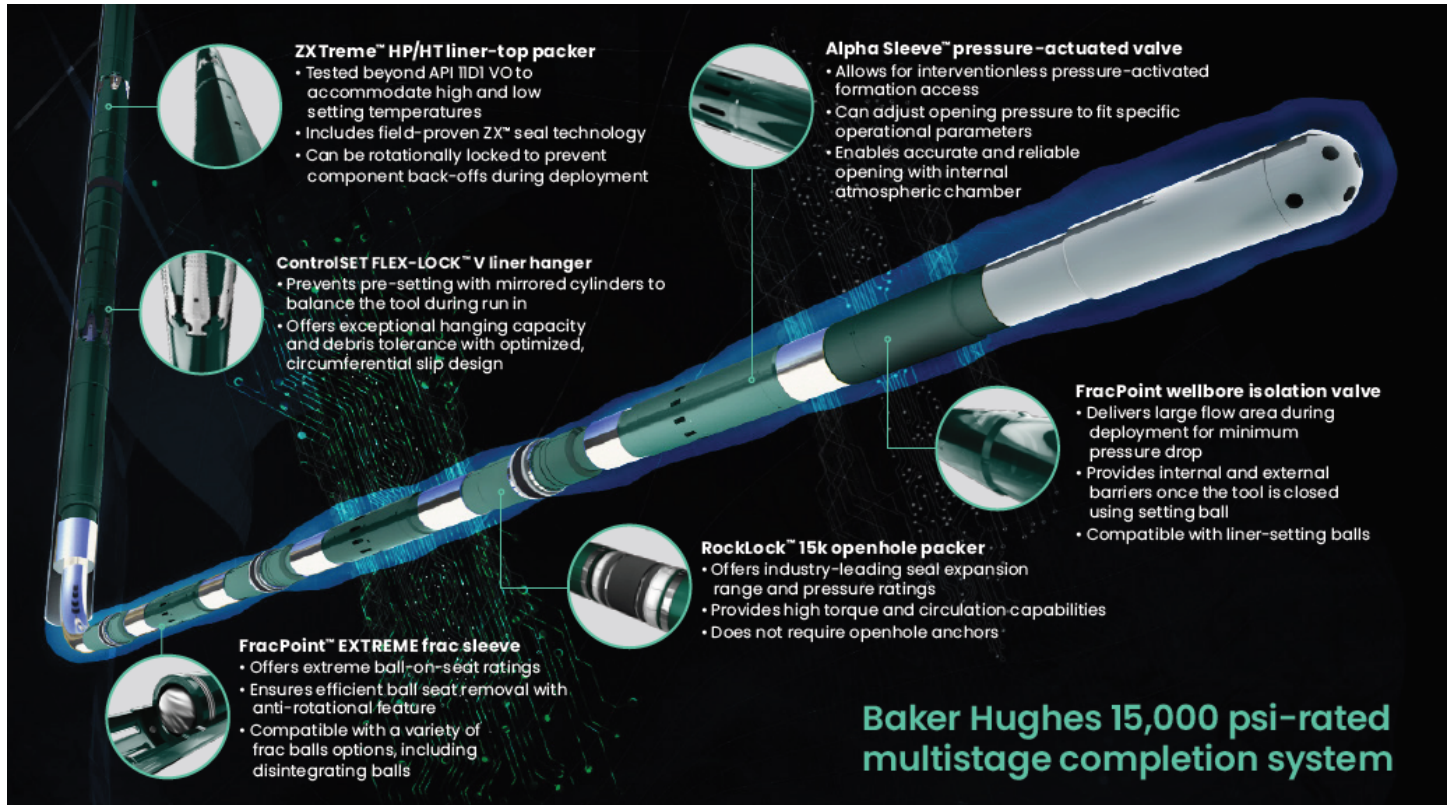
## Results

- Ensured the completion reached planned, optimal setting depth by improving hole cleaning
- Eliminated the use of openhole anchors and reduced the need for downhole hydraulically-operated tools and their associated risks during stimulation
- Increased reliability and service quality by allowing the operator to work closely with one service provider for end-to-end services
- Eliminated post frac intervention, saving as estimated \$250,000 USD by utilizing disintegrating frac balls

Designed with the industry's first additive-manufactured backup system and proprietary **Aptum™ seal**, the packer offers a broad expansion range at extreme differential pressures, as well as a long-lasting seal in irregular openhole wellbores, regardless of fluid type or temperature range. The RockLock 15k openhole packer also offers an anchorless completion design, which reduces overall well completion costs.

The stimulation phase was executed with close collaboration between the customer and the Baker Hughes' completions and stimulation teams from frac design through field operations, until the well was put on production. **FracPoint™ XTREME frac sleeves** and disintegrating balls were used during frac operation, reliably achieving formation breakdown pressures exceeding 10,000 psi differential pressure at tool depth.

The successful deployment of disintegrating balls increased early production and eliminated the need to mill balls and seats, saving the customer an estimated \$250,000 USD on associated intervention and milling costs.



The 15,000 psi-rated multistage completion system reliably withstands extreme downhole conditions and offers a holistic, fit-for-purpose solution from the liner top to the toe of the well, eliminating the complexity of building a solution assembled by multiple vendors.