BAKER HUGHES
a GE company

XACT service delivered real-time data during deepwater frac pack

Casing, cementing, and completion installation operations have, until now, not possessed the capability of real-time, downhole data. As well complexity increases, the incidences of failure and/or sub-optimal installation of downhole completion systems has risen dramatically. This has led to large increases in nonproductive time (NPT) as well as impaired production.

Until recently, almost all completion installation operations were carried out effectively blind to downhole conditions, using only surface measurements and models often at variance with what was actually happening downhole. Real-time data collection during a frac pack or gravel pack installation requires the ability to transmit data with a variety of different fluid conditions including low flow, no flow, high rate, and proppant laden, all while maintaining an unrestricted through bore. Additionally telemetry must also operate while the blowout preventers (BOP) are closed and in reverse circulating conditions.

A customer drilling a well in deepwater Gulf of Mexico faced this type of situation. The well trajectory was S-shaped with a build up to 30 degrees followed by a drop-off to the reservoir at about 15 degrees. Surface measurements and models could not adequately predict with the required degree of certainty the actual weight applied downhole.

Baker Hughes, a GE company (BHGE), recommended the **XACT™ downhole acoustic telemetry service**. The tool was deployed to monitor the downhole conditions including pressures, temperatures, and weights applied during screen installation, packer setting, and manipulation of the crossover tool during critical operations such as the mini-frac, step-rate tests, and frac operations. After screen out, the actual downhole overbalance was also monitored prior to picking up to the reverse position, which was also confirmed from the downhole pressures.

Armed with the real-time telemetry data provided by the XACT service, the customer successfully engineered and safely executed the completion installation. The telemetry operations were conducted with minimal impact to normal rig operations and

Challenges

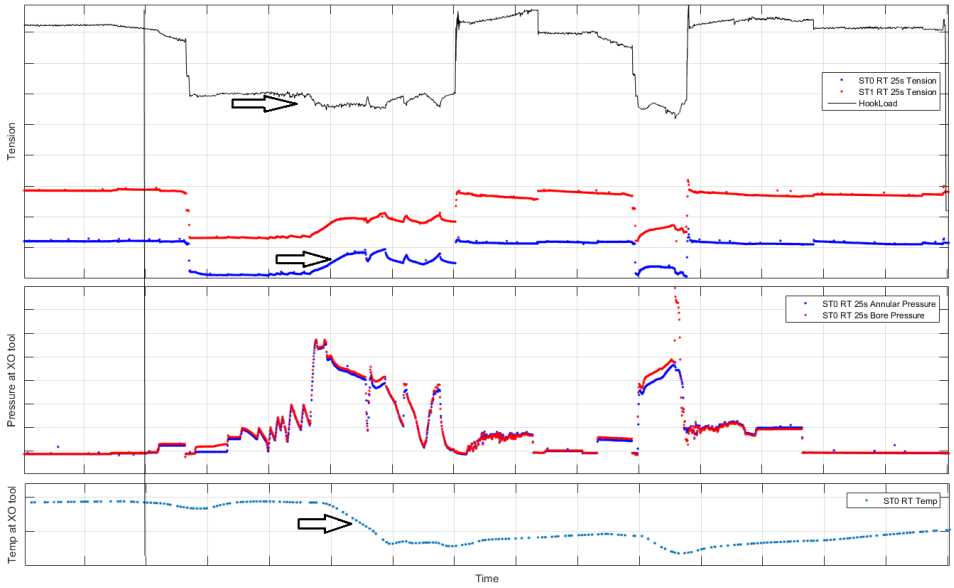
- Monitor S-shaped completion
- Predict accurate weight applied downhole
- Reduce impact to rig operations

Results

- Acquired real-time data to deliver accurate completion engineering data
- Incurred minimal impact to standard rig operations
- Provided industry-first downhole real-time data during a deepwater frac pack

provided excellent insight into the actual downhole situation at the crossover tool during the critical phases of the installation. Significant changes in downhole weight caused by contraction and expansion of the string while pumping fluids were monitored to ensure safe and reliable operations and enabled the customer to make real-time decisions rapidly at the rigsite to adjust weights as necessary. Telemetry was provided throughout the entire completion installation for the first time in the deepwater Gulf of Mexico, including during packer setting, acidization, mini frac, frac pack and reverse out operations.

As a result, the customer qualified the technology for use in the demanding deepwater completion environment and look forward to expanding the applications of the technology into all aspects of well construction.



Real-time results transmitted during the completion installation process. The arrows indicate when cooler fluids were pumped down the string. The bottom light blue curve is the temperature downhole at the crossover tool. As the temperature cooled, over 70 klb came off the packer due to contraction of the string. Surface data indicated in error only a 20 klb reduction.

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