Case study: Gulf of Mexico, United States

XACT telemetry service increased productivity in tight margin horizontal wells

A Gulf of Mexico operator had several fields requiring open hole gravel pack completions for increased production and well longevity. The wells had a very narrow margin between collapse and fracture gradient and were originally deemed to be too challenging to complete.

Baker Hughes recommended the **XACT™ bi-directional acoustic telemetry service** for this application. Unlike mud pulse telemetry systems which are limited by wellbore flow conditions, the XACT service transmits digital data along the drill pipe via encoded sound waves, so it can transmit data while tripping, running liners or even during cementing. This ensured the operator would have a clear, real-time understanding of the downhole environment during the innerstring operations—driving efficiencies safely and predictably.

Advances in deepwater managed pressure (MP) and controlled mud level (CML) technology, coupled with the XACT service, allowed the client to move the wells from open hole standalone screen completions to gravel pack solutions by utilizing downhole real-time pressure and weight data. The XACT service enabled the operator to push the various completion technologies to their limits through precise control of downhole pressures based on supplied downhole data. Conventionally, MPD and CML systems do not supply a live annulus necessary to monitor the gravel packing process, so real-time downhole data was critical to operational success.

With reliable downhole, real-time data, the client embarked on a campaign of six wells using the data to monitor tripping conditions to reduce invisible lost time (ILT) and monitor mechanical loads, optimizing operations to get the screens to total depth (TD). The data was also used to efficiently locate service tool positions, optimize displacement rates while avoiding losses, and spot breaker treatments. In addition, critical new algorithms were developed to monitor the alpha/beta pack based on differential downhole pressure measurements. The client moved from using downhole measurements to verify surface parameters to managing the gravel pack process entirely using the downhole data.

The customer was pleased the XACT service provided real-time downhole data, was efficient to install, added no additional risk or complications to the operation, and provided the eyes and ears of downhole conditions to set the critical surface pumping parameters.

Challenges

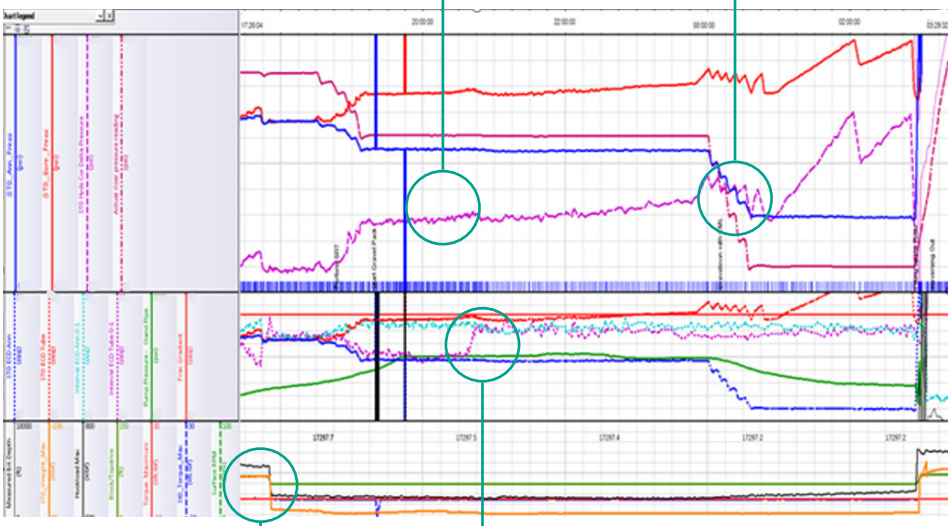
- Gravel pack completion installation in narrow mud weight window formation
- No live annulus data to manage gravel pack process
- Horizontal open hole sections critical to get screens to TD

Results

- Successfully deployed the XACT service with no additional complexity introduced—invisible to rig operations
- Maximized opportunity to get screens to TD and control gravel pack process using real-time downhole data
- Produced high resolution memory data and post run analysis for continuous learning and process improvement, aiding in future complex sand control operations

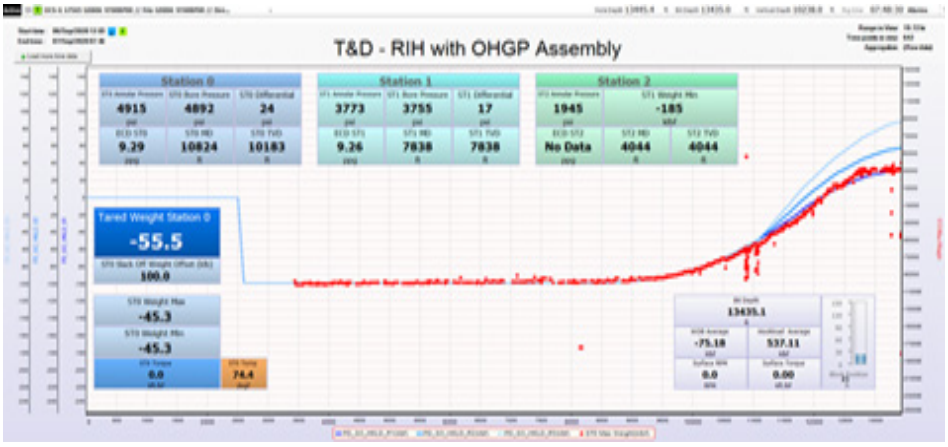
Differential pressure around gravel pack assembly showing alpha/beta pack

Flowrate and hydrostatic pressures adjusted based on downhole data



Real-time setdown weight monitoring

Real-time identification of gravel in tubing



Real-time weight at service tool plotted against modeled data with differing friction factors

Baker Hughes

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