

Case study: Integrated pressure point measurement, Middle East

TesTrak formation pressure testing service records 40 pressure points in lateral sections with no stuck pipe events

An operator in the Middle East required a solution to efficiently measure pressure points while drilling two laterals in a water injector well.

The operator wanted to minimize the high probability of stuck pipe incidents while recording pressure points. Previous pressure measurements in offset wells were challenged by frequent stuck pipe events that added nonproductive time (NPT) and rig costs to the project.

The customer asked the Baker Hughes Integrated Well Services (IWS) team to develop a pressure testing solution that enabled trouble-free pressure point measurements in the 6-1/8-in. laterals while avoiding stuck pipe incidents.

Aligning on the well plan

The Baker Hughes IWS team accepted responsibility for managing the full scope of this project. A Project Management Team (PMT) was assembled to collaborate with the operator and identify specific challenges and project goals.

During the planning stage, the team concluded that the stuck pipe events could be minimized by a reaming operation to smooth the hole surface and improve tolerance.

Reaming operations are typically conducted in a separate run after drilling. But pressure point measurements were required at 300-ft (91-m) intervals during the drilling operation. Therefore, a dogleg reamer would be installed above the bottomhole assembly (BHA) to allow

hole reaming and conditioning during the drilling run and just prior to a pressure point measurement.

The Baker Hughes PMT recommended the **TesTrak™ LWD formation pressure testing service** for the pressure point measurements. The TesTrak service offers real-time formation pressure and mobility data that provides clear insight into reservoir connectivity, compartmentalization, and the location of sealing faults for early planning of completion and production operations.

Designing the solution

The original plan called for enlarging the borehole and recording 35 pressure points in two laterals, without a separate reaming run.

To ensure risk-free operation, the full solution also included:

- A water-based mud (WBM) to allow for logging measurements with a nuclear magnetic resonance (NMR) imaging tool
- A WBM lubricant to enhance mud lubricity and prevent differential sticking
- Optimized bridging materials to minimize fluid losses and maintain a good filter cake

The dogleg reamer, TesTrak service, and mud additives were already in country, ensuring rapid project execution once the plan was approved.

Challenges

- Record 40 pressure points in 6-1/8-in. laterals while drilling
- Avoid stuck pipe events while recording pressure points, drilling, and tripping

Results

- Successfully recorded 40 pressure points at 300-ft (91-m) intervals in two lateral sections
- Saved rig time and costs by avoiding intervention operations to free stuck pipe and conduct fishing operations to retrieve the BHA
- Recorded more pressure points than planned as operator gained confidence in the service

The PMT reviewed the hole enlargement plan with the Baker Hughes Drilling Services team and the operator's engineers and project supervisor. All parties approved the plan and the PMT immediately executed the operation.

Each pressure measurement began by activating the dogleg reamer to enlarge the borehole at the intervals of interest. The drillstring was moved to align the TesTrak tool and take a pressure reading at each measurement point. The mud parameters were continuously monitored and changed as needed to prevent fluid losses and differential sticking.

Executing with predictable performance

The operator's rig personnel and the Baker Hughes IWS team worked together to record the pressure points in the two laterals.

The team successfully recorded pressure points at the required 300-ft intervals with no stuck pipe events and zero NPT. As the operation continued, the operator gained confidence in the process and requested additional pressure measurements. The TesTrak service recorded a

total of 40 pressure measurements, which provided the operator's reservoir engineers greater insights on the condition and properties of the reservoir. The team used TesTrak's real-time pressure and permeability data to adjust the mud properties for greater assurance against stuck pipe and well control issues.

The success in this first water injector well prompted the operator to deploy the dogleg reamer and TesTrak formation pressure testing service in another well. In addition to stuck pipe concerns, this well was also drilled in a high-pressure reservoir. Once again, the integrated service offering successfully recorded the required number of pressure points, with no stuck pipe events and no NPT.