CASE HISTORY

DuraSet WELLBORE RESTRICTION ANALYSIS

APPLICATION

Completions, Wellbore Positioning Services, Cased Hole Services, High Dogleg Severity, Wellbore Restriction Determination

TECHNOLOGY

DuraSet Analysis, Keeper Wireline Gyro, MFT-24 Caliper

LOCATION

Texas Panhandle

CUSTOMER CHALLENGE

During a multi-stage frac operation, wireline conveyed plug and perforation assemblies were routinely becoming stuck in the curve of the wellbore. The plugs were setting prematurely in low 5-8º / 100' Dog Leg Severity build section between 50-60º inclination as measured by the MWD tool. This forced the customer to rig up and drill out three separate set plugs, incurring significant cost and NPT. Several remedial actions were taken during this process including gauge ring runs and attempted use of smaller plug OD with limited success.

SCIENTIFIC SOLUTION

Scientific Drilling deployed a combination Keeper Wireline Gyro and MFT-24 multi-finger caliper as a one run solution. The Keeper Gyro was used to survey the wellbore on very short 1' spacing.

The DuraSet Analysis, performed at SDI's remote data center, showed significant tortuosity and highly inconsistent dogleg severity throughout the curve portion of the wellbore (see figure 1).

It was determined that the wellbore casing's minimum effective diameter was smaller than the OD of the plug based on the length of the assembly (see figure 2, 3-D visualization). The caliper data confirmed no casing deformation had occurred while also enabling the DuraSet's Free Internal Diameter (ID) Analysis to be calculated with respect to the wellbores true ID instead of an assumed nominal diameter.

Using this data the customer was able to modify the length of the assembly based on the SDI recommended maximum length. Operations recommenced and were completed without another premature plug setting incident.

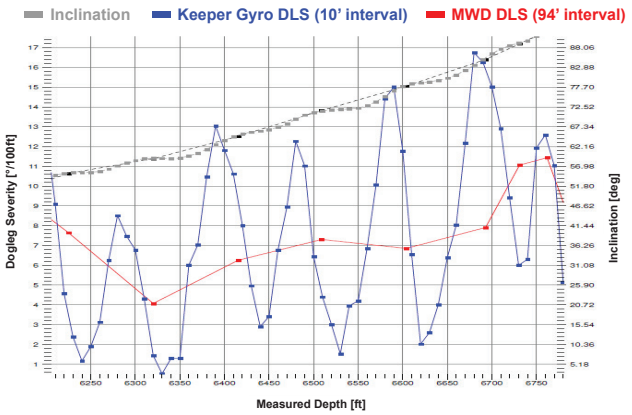

Figure 1: High Resolution Dog Leg Severity VS Measured Depth

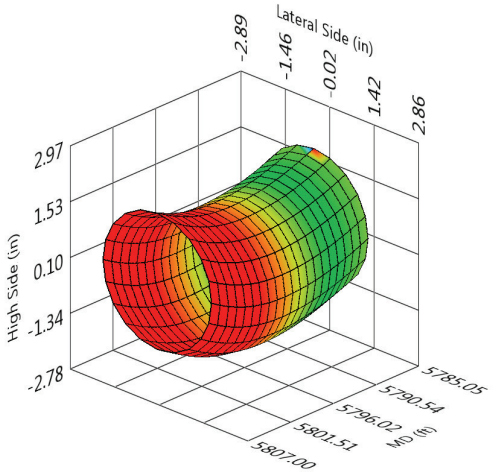

Figure 2: Free ID 3-D Visualization

CUSTOMER VALUE

Without the knowledge of the minimum effective diameter of the wellbore, the customer would have been required to guess and check until an assembly was determined which allowed the plugs to pass through the tortuous section and reach the desired location. Knowing the correct assembly length enabled the operator to redesign the operation and prevent further unplanned milling operations, which cost the customer an estimated $50,000 per run. The customer had already completed 3 unsuccessful runs for a total cost many times the SDI service cost.

With this data, the customer also indicated that not only did the service solve the immediate issues, but will add value later on in the well life cycle since the DuraSet analysis provided detailed data for pump and rod guide setting depth determination.

Updated July 2017