Wellbore Integrity SOLUTIONS

ProMill Duo* Application Sets Record of a 111 ft window in Qatar

Barrier restoration across 7 inch and 9⅝ inch casings achieved successfully.

CHALLENGE

- Section mill casing to restore cap rock barrier across 7 inch and 9⅝ inch casing
- High ratio opening for section milling 9⅝ inch casing from inside 7 inch casing
- Underream the open hole to provide rock-to-rock zonal isolation

SOLUTION

Deploy 6000 Series ProMill Duo to drift through 7 inch casing and section mill 9⅝ inch casing to the desired depth. Subsequently, enlarge the wellbore to achieve a high quality rock-to-rock abandonment barrier.

RESULT

- An estimated saving of 40 days was accomplished. A long interval of 7 inch casing milling was eliminated using the ProMILL Duo technology
- The window length of 111 ft was a record run for the 6000 Series ProMILL Duo. This was completed in a single run.
- No operational down time occurred. A highly efficient operation was recognized by the client

Dual Casing Section milling 7 inch and 9⅝ inch casing.

When cap rock sealing restoration was required in a complex, well abandonment project, the client contacted WIS. The challenge was to mill the inner 7 inch casing, that was cemented to the surface, without damaging the outer 9⅝ inch casing and then mill the 9⅝ inch casing by drifting through the 7 inch casing with minimal trips when compared to standard conventional methods. WIS recommended the new ProMILL Duo technology with high ratio section milling capability that enables a rock to rock seal in a dual casing section milling application.

Operational challenges were mitigated by using both the standard section mill and the new ProMILL Duo technology. The ProMILL Duo is a combination of a unique, high expansion ratio hydraulic section mill and a precisely oriented hydraulic stabilizer below it. This creates a unique 6-point stabilization system that helps to minimize dynamic loads and vibrations in the BHA. The ProMILL Duo is deployed once the inner 7 inch casing window has been milled. An underreamer is also utilized to achieve a 13.5 inches diameter window to enable a rock to rock seal.

Detailed pre-job planning is essential.

To mill the windows at the cap rock depth, particular attention was placed on starting and ending depths. Detailed road maps were created to optimize the operational parameters for the job. The job procedures included both risk assessments and mitigation measures. Milling fluid rheology including, in particular, yield point optimization during milling was monitored to ensure that swarf recovery was accomplished efficiently. The operation was initiated with the inner casing window being milled in two stages. The cut initiation run on the 7 inch casing was completed using rapid cut out knives. This was followed by section milling 139 ft of 7 inch casing using the flush knife design with high performance WavEdge* insert technology. The flush knives ensured that no damage was done to the outer casing. The new ProMILL Duo technology was run and completed 111 ft of 9⅝ inch casing in one run, which was followed by 100 ft of hole enlargement to open the hole to 13.5 inches diameter. The cement job was completed and the objective of restoring the cap rock seal across two strings of casing was achieved.

The new ProMILL Duo Dual Casing section milling technology provided the planning engineer an efficient way to achieve a rock-to-rock seal across the 7 inch and 9⅝ inch casings, that resulted in saving at least 40 days of rig time when compared to conventional plug and abandonment solutions.