

Successful Well Intervention Through 7-inch Casing Using a Rigless Milling Strategy in Colombia

The 5500 Series Section Mill combined with a mud motor and Underreamer was used to provide a rock-to-rock window in a challenging well.

A challenging rock-to-rock window operation in Latin America

A major Oil & Gas Operator in Colombia planned a challenging onshore milling and underreaming operation to prepare a well for gravel pack completion. This task involved a short section milling interval across 7-inch casing, followed by underreaming to enlarge the formation to 16 inches. This preparation was critical to reduce sand intake during production using an ESP.

Efficient execution was essential, as the well intervention was expected to significantly boost production. Optimizing the Bottom Hole Assembly (BHA) design was a key focus due to the rig's limitations in RPM, flow rate, and weight on the mill.

Integrated Technology approach to provide customized solution.

The workover operation had to be conducted using a Rapid Service Unit (RSU) due to the well's remote location and restrictions on noise from indigenous sacred land, along with the customer's cost-saving initiatives. The RSU, by design, has a low pulling capacity and lacks a rotary system for milling, necessitating a unique solution using a mud motor drive system.

The section milling and 16-inch borehole enlargement were successfully executed through meticulous risk analysis and precise operational planning, surpassing the client's expectations. This achievement allowed the customer to complete the well intervention and establish the proper conditions for deploying the gravel pack completion.

CHALLENGE

The customer needed a 6-foot section milled window at a 71° well inclination and a depth of 4,566 feet to create a rock-to-rock interface across 7-inch (23#, N80) casing. This was necessary to enable gravel pack completion before setting a new Electric Submersible Pump (ESP).

SOLUTION

Deploy a milling system with a 5-inch OD mud motor to perform section milling of the 7-inch casing, followed by an underreamer run using the same 5-inch OD mud motor to enlarge the formation to 16 inches, creating a rock-to-rock interface.

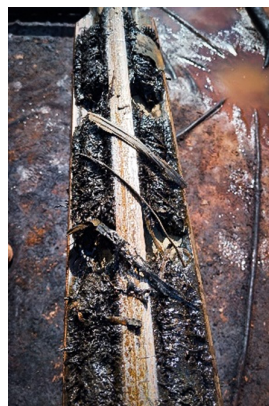
RESULTS

- A successful project execution that exceeded customer expectations delivering a 6 ft rock-to-rock barrier interface.
- Multiple technologies functioned as intended.



Well Information:

Location: Onshore, Colombia
Casing Size: 7 in (23 #), N80
Depth: 4566 ft to 4572 ft



Left: K-Mill 5500 Section Mill knives calibration 8.5 inch OD
 Center: K-Mill 5500 Section Mill knives wear (hook shape)
 Right: Swarf recovered in string magnet