

Completion Solutions

SmartWell® Electro-Hydraulic Disconnect tool facilitates reliable disconnect and reconnect of tubing and umbilicals for Petrobras well

Location: Brazil

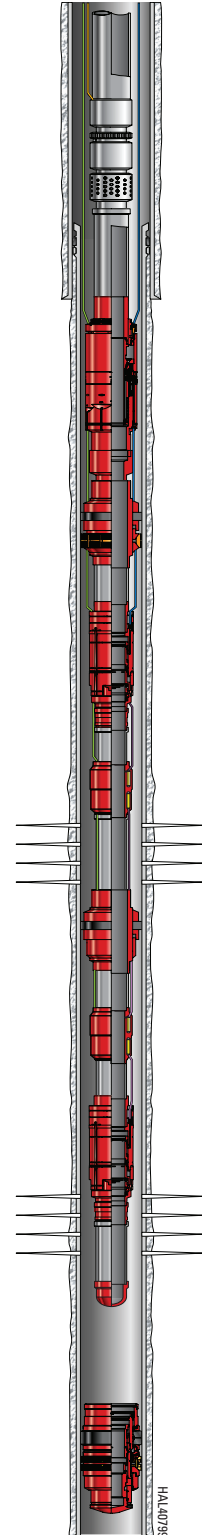
Overview

Regulatory requirements in Brazil dictate that a non-functional downhole safety valve (DHSV) be replaced during a well's operational life. In an intelligent completion well, replacing the DHSV requires that the intelligent completion also be retrieved, thus making this approach not only challenging but uneconomical, especially in a subsea environment. On the Carapeba-47 field in Brazil, Petrobras wanted to field trial a first-of-its-kind technology that would disconnect and reconnect the electric and hydraulic lines of an intelligent completion. They hoped to enable regular replacement of upper completion components, such as DHSV or electrical submersible pumps (ESP), without having to replace all of the intelligent completion equipment.

Solution

Halliburton proposed the SmartWell® Electro-Hydraulic Disconnect tool, which is exclusively designed for intelligent completions. This tool facilitates running intelligent completions in wells that will require periodic workovers of the upper completions. In addition to providing tubing to annulus integrity, the Electro-Hydraulic Disconnect tool facilitates multiple connections and reconnections of the tubing and umbilicals required for intelligent completions, without compromising the functionality of the downhole intelligent completion hardware. The tool design provides for six hydraulic channels to control multiple interval control valves (ICVs) and one electrical channel to multi-drop multiple gauges. Three run-in-hole or retrieval configurations provide operational flexibility. Design features, such as a protective sleeve and a check valve, protect the electrical connector and prevent contamination of the hydraulic fluid when the two halves of the tool are disconnected.

Since this was the first run with this technology, multiple meetings between the client, operations, and technology teams were required.



Result

The first installation of the Electro Hydraulic Disconnect Tool was successfully executed.

The Electro-Hydraulic Disconnect tool was part of an electrical submersible pump (ESP) intelligent completion.

A requirement of the trial test was to successfully disconnect and reconnect the Electro-Hydraulic Disconnect tool.

Once reconnected, the functionality of the downhole intelligent completion was to be verified. All the objectives of the trial test were successfully achieved.

After one year, the ESP needed to be replaced. The client successfully retrieved the ESP and the upper half of the Electro-Hydraulic Disconnect tool. Four months later, a new ESP and the upper half of the Electro-Hydraulic Disconnect tool were installed. Once reconnected, the functionality of the interval control valves (ICVs) and gauges were successfully tested.

The subsequent workover was not part of the original trial test objective; nevertheless it proved the robustness and reliability of Electro-Hydraulic Disconnect tool technology. The success of Halliburton Electro-Hydraulic Disconnect tool technology has helped pave the way for Petrobras to comply with the Brazilian regulatory requirements for the pre-salt development.

[Reference technical papers OTC 24371 and SPE 172193]

CHALLENGE	SOLUTION	RESULTS
<p>Replacing a non-functional safety valve without retrieving the entire intelligent completion so as to comply with regulatory requirements</p>	<p>SmartWell® Electro-Hydraulic Disconnect tool facilitates reliable disconnect and reconnect of tubing and umbilicals</p>	<ul style="list-style-type: none"> • Successful installation of the electrical disconnect • Demonstrated the robustness of the system by disconnecting and reconnecting tubing and umbilicals and successful testing of valve and gauge functionality • Proved reliability of the tool by successfully intervening a year later with a new ESP; yet again proving functionality of the downhole tools once reconnected