

Precise Valve Shifting Steers High-Rate Injection Process, Gulf of Mexico

Wireline services use extreme-performance cable and a smart shifting tool to avoid injection surges in a deepwater well

ReSOLVE iX* extreme-performance instrumented wireline intervention service successfully shifted three sliding side door (SSD) valves while constantly monitoring cable tension and downhole pressure to avoid injection surges during the startup of 18,000-bbl/d injection.

Intervention required to boost production

To boost production from a deepwater reservoir in the Gulf of Mexico, Talos Energy found it necessary to transfer water from a high-pressure to lower-pressure aquifer under challenging conditions. Talos needed to increase injection to the reservoir by injecting a massive flow of water from the surface, with pump flow rates reaching up to 18,000 bbl/d. A critical part of the operation was making sure that the opening and closing of the SSD valves were properly synchronized to maintain smooth injection transition from surface to downhole.

In this case, Schlumberger was the only provider with the requisite technology and skills to perform the delicate operation at an acceptable level of risk. Its ReSOLVE iX service uses precise instrumentation to confirm movements of each component with more than 40 downhole automation sequences, such as stroking, opening anchors, managing motor and voltage, and milling. StreamLINE iX* extreme-performance polymer-locked wireline cable—with up to 11,000-lbf safe working load—was the only wireline product capable of withstanding the extreme injection rates anticipated during the operation.



ReSOLVE iX service smart shifting tool's slim 2⅝-in diameter minimizes flow restrictions and has a unique ability to open and close multiple SSDs in a single run.

Intricate SSD shifts required

The first step in the intervention was to characterize pressure by opening and closing several SSDs. The operation was further complicated because two different SSD types would be shifted, one of which required a large-diameter anchor kit.

The solution was to deploy the ReSOLVE iX service's smart shifting tool with its slim 2⅝-in diameter that minimizes flow restrictions and its unique ability to open and close multiple SSDs in a single run. Because the sleeve shift distance was longer than the shifting tool stroke, the shifting was performed using an inchworming technique.

Wellbore pressure and temperature controlled in real time

The ReSOLVE iX service successfully shifted the three SSDs while constantly monitoring the cable tension and downhole pressure to ensure that the high flow rate was not

eroding the cable. During the operation, one of the SSDs partially opened, and the ReSOLVE iX service was smart, flexible, and precise enough to identify the opening, relatch the sleeve, and close it fully.

All shifting interventions were monitored using real-time displacement and force measurements to ensure that shifting was confirmed. The effects on wellbore pressure and temperature were controlled in real time to an accuracy level never achieved before on wireline. Pumping rates were adjusted constantly during sleeve opening and closing to maintain well integrity. The operation was a success despite the intense challenges involved: The outcome was a result of advanced Schlumberger technology in combination with superior domain expertise and proactive job design, leveraging digitalization to ensure that appropriate decisions based on precise downhole measurements are taken each time.