Advanced Kickover Tool Custom-Engineered for Subsea Gas Lift Intervention in Shut-In Gulf of Mexico Well, Production Restored Within Four-Month Window

Objectives

- Replace leaking gas-lift valve (GLV) at short notice (due to the operating window) on a subsea intervention vessel. The well was shut in and not producing, incurring significant daily costs.
- Allow the kickover tool to pass a minimum restriction of 3.313 in., then operate in a larger ID of 3.815 in.
- Function in a high-angle 65° well at 12,000 ft (3,657 m) with an S-shaped profile.

Our Approach

- With the well shut in and not producing, Weatherford experts identified a four-month window to plan and execute the operation. Among the factors considered were intervention vessel availability, time to design a kickover tool to pass minimum restriction, manufacturing, and testing.
- The Weatherford KOT series of kickover tools are an essential part in fully integrated gas lift systems. The unique re-pinning feature saves time by eliminating extra runs in the rare case of a missed installation or pull attempt.
- Engineers modified an existing, standard size tool (3.500 in./3.700 in.) to the special clearance size of 3.313 in. This involved the creation of new manufacturing drawings, assembly drawings, and a detailed field operation and maintenance manual.
- Key features of the modified kickover tool ensured operational success:
  - Friction-reducing “rollers” top and bottom to aide conveyance in/out of SPM, especially beneficial on high angle wells
  - Spring-loaded “offset dogs” to enable the kickover tool to pass through the minimum restriction and then open up in the SPM bore
  - Engineered trigger mechanism and “parallel arm” for efficient valve installation/retrieval to prevent damage to the seals and packing
  - Integrated valve catcher and “radially balanced” body
- The design was completed in 4 weeks, manufacturing completed in 8 weeks, system integration test, and deployment offshore to meet the operating window.

Pinning the engineered arm of the advanced kickover tool avoids misruns during deployment. When activated, the arm engages the gas-lift valves at the correct approach angle and avoids damage to the V-packing seals when setting gas-lift valves.

LOCATION
Gulf of Mexico

WELL TYPE
Deepwater, oil and gas

HOLE ANGLE
65°

DEPTH
12,000 ft (3,657 m)

PRODUCTS/SERVICES
- Advanced kickover tool
- Wireline services

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Value to Customer

- Weatherford expertise and efficient engineering enabled the team to modify an existing KOT series kickover tool to meet the project objectives.
- The modified kickover tool was successfully deployed through the smaller ID restriction and operated in the larger OD.
- The installation of a replacement gas-lift valve brought the well back into production.
- With a rate of +/- 5,000 barrels per day at approximately $80 per barrel, the operator was again able to generate $400,000/day in production.

The advanced kickover tool incorporates many unique features, including highly efficient rollers which eliminate contact friction, enabling access to gas-lift mandrels located at higher deviations. Reduced friction also delivers a more precise indication at the surface of the toolstring load transfer, enabling the slickline operator to identify toolstring movement more easily and make improved decisions to reduce the chance of a misrun.

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