DRILLING
INNOVATIVE SOLUTIONS, LLC

DIS Gatekeeper 763 Cement Retaining Collar Installation Case History

PROJECT DETAILS

Client: Major Oil and Gas Operator
Project: Installation from a TLP Platform Rig
Location: Deepwater Gulf of Mexico

OVERVIEW

Purpose of the job, was to prove viability of Drilling Innovative Solutions, LLC Gatekeeper Cement Retaining Collar (CRC) run with an inner string during liner installation operations; as an option to conventional mechanical isolation devices. The 7-5/8" production liner was chosen as the application for the Gatekeeper CRC. The production liner application should produce the biggest cost savings; being no drill out would be required and brine displacement operations could commence following cement job without a pipe trip.

CHALLENGE

- Engineering and design by DIS required to produce a viable time savings solution. Extensive shop testing before field application
- Gain confidence and support from Operator's drilling/ completions team, being the Gatekeeper had never been utilized in the field.
- Instruct other service companies involved in the liner installation/cementing operation (Weatherford, TIW, etc.) as to the application and get their support for running the inner string.
- Getting approval from BSEE for utilization of the Gatekeeper Cement Retaining Collar as a mechanical isolation device.
- Sourcing of a bumper sub, to allow for rotation as well as space out of the inner string during liner installation.
- Producing a secondary Gatekeeper CRC after primary CRC was damaged during bucking operations on the rig. (Only one CRC and Stinger were initially manufactured being concept had not been proven).
- Getting liner hanger release ball to seat.

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Our Solution

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DIS SOLUTION

- Produce the Gatekeeper Cement Retaining Collar, which is installed with the liner. The Gatekeeper CRC will be opened and closed via pipe reciprocation, utilizing an inner string actuator stinger.
- The Gatekeeper CRC and inner string provided the following savings:
  - Allowed for shortening of the shoe track and eliminated the need to drill out after cementing operation. Field estimate 12 hours.
  - Eliminated round trip wiper/scraper run to clean out liner after cementing operation needed for successful installation of bridge plug/squeeze packer. Field estimate 48 hours.
  - Eliminated running of mechanical isolation device by wireline. Field estimate 9 hours.
  - Eliminated round trip pipe run to displace well bore fluids on bottom. Field estimate 48 hours.
- DIS manufactured a 7-5/8" OD Box by Box VAM 21 Gatekeeper CRC to by installed with the liner. We also manufactured an NC-38 actuator stinger. All equipment was designed for up to 10,000 psi (Actual field test was 3,350 psi; plan is to test to 5,000 psi before well handover).

COSTS

- Time to run the inner string assembly 6.67 hours (assume spread rate of $300,000/day) $84,000
- Time to clean pits for completion fluids 8.5 hours (assume spread rate of $300,000/day) $106,000
- Two 7-5/8" Gatekeeper CRCs and One NC-38 Actuator Stinger $55,000

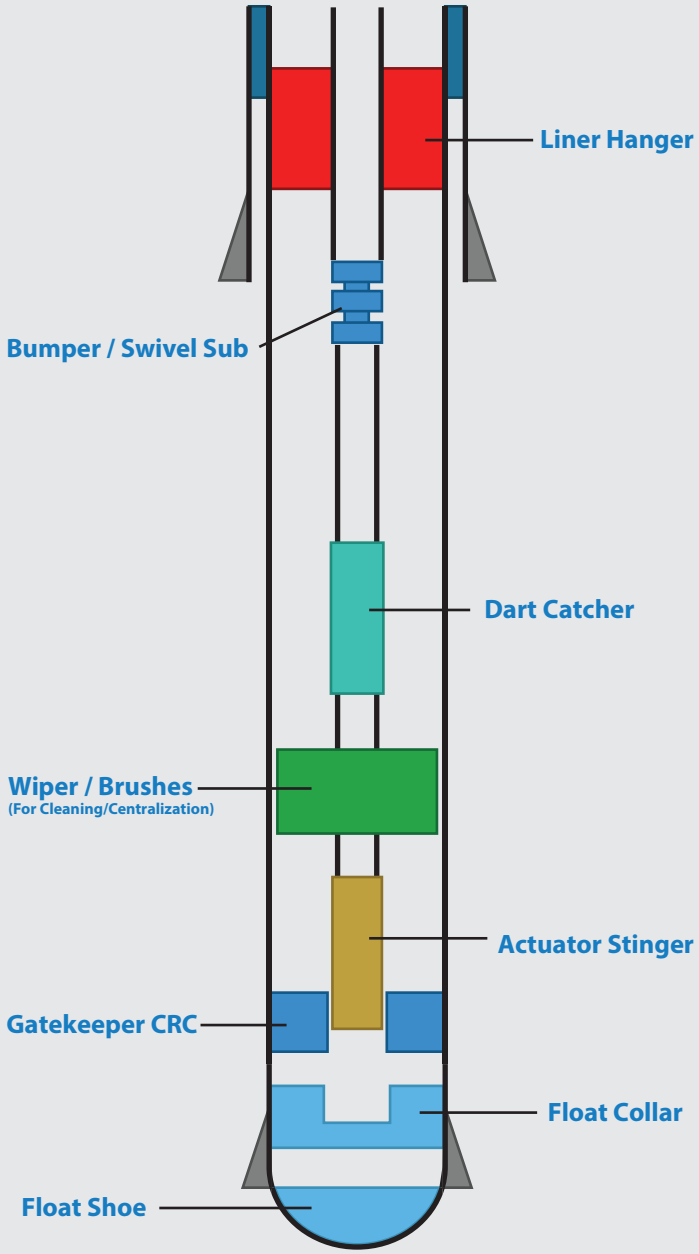
Total Costs $245,000 (15.17 hours)

SAVINGS

- Shortening of the shoe track and no need to drill out 12 hours (assume spread rate of $300,000/day) $150,000
- Round trip wiper run 48 hours (assume spread rate of $300,000/day) $600,000
- Wireline run to set squeeze packer 9 hours (assume spread rate of $300,000/day) $113,000
- Round trip to displace to brine fluids 48 hours (assume spread rate of $300,000/day) $600,000

Total Savings $1,463,000 (117 hours)
NET SAVINGS $1,218,000 (101.83 net hours of savings)

GATEKEEPER CEMENT RETAINING COLLAR INNER STRING SCHEMATIC



CONCLUSIONS

The biggest issue for DIS was supplying a secondary Gatekeeper CRC with the VAM 21 threads on short notice, after the threads were damaged during installation. This could be eliminated by manufacturing a stand by CRC initially as well as making them box by pin, thus eliminating the need for a crossover.

Some areas of improvement, which we are already considering would be to allow the Gatekeeper CRC to serve as dart/ball catcher. The CRC body will have to be lengthened, as well modifying the actuator stinger to allow for shearing at pre-determined pressures. Hopefully this will help to eliminate some issues with the inner string.

This application being it was conducted from a TLP platform rig had some added costs (critical path pit cleaning), that might not be encountered from a larger drilling rig. While drilling day rates vary extensively according to well complexities, the Gatekeeper CRC provides significant time and cost savings thus justifying the application.