

Oman

Latch-down plug system allows safe cement operation on production string

IsoLatch™ multiple plug cement system helped an operator in Oman achieve zonal isolation on production casing string equipped with TRSV

CHALLENGE

- Achieve mechanical separation between cement fluid and displace the wiper plug through the TRSV
- Perform successful casing pressure test after plug bump on “wet” cement

SOLUTION

- Deploy 4 1/2-in. IsoLatch™ multiple plug system with minimum wiper ID of 3.25 in. and latch-down feature

RESULT

- Displaced bottom and top plugs successfully down 5245-m long casing and passed through TRSV ID restriction
- Both plugs landed per plan and top plug allowed successful casing pressure test

Overview

During cement operations, it is vital to ensure the casing internal diameter is effectively wiped to minimize fluid contamination and achieve planned zonal isolation. Casing internal geometry transitions pose additional challenges to the cement wiper plug design and efficiency.

Challenge

A tubing-retrievable safety valve (TRSV) with an internal diameter of 3.63 in. was included near the mud line (at 90 m MD) of production casing string on a 5245 m MD well in Oman.

Within the primary cement operation, as the bottom and top wiper plugs are displaced through the TRSV, the internal restriction adds excessive risks of plug damage and full dimensional interference; both can cause negative impact to the operational outcome.

In addition, a requirement to pressure test the casing up to 10,000 psi on the landed plug was necessary to comply with the operator’s internal requirements.



Solution

To address the unique requirements of this operation, Halliburton recommended the IsoLatch™ multiple plug cement system. This system features a modular flex-cup design that provides broader wiper range with an improved minimum pass-through ID of 3.25 in. to reduce interference with the TRSV when plugs pass by.

Because the IsoLatch system features a latch-down design to land and latch the top cement wiper plug, it allows the bottom plug to pass through the seat and land on the float collar. The top plug then latches into the landing seat and provides string integrity to sustain the casing pressure test up to 15,000 psi on bump.

Result

The 4 1/2-in. casing was run in hole (RIH) to 5245 m MD, with the IsoLatch system float collar on the shoe track. The bottom plug was released and pumped down to mechanically separate fluid ahead of the cement slurry. It successfully passed through the TRSV with no pressure indications on the surface and landed on the collar at the calculated time, which indicated the casing ID was successfully wiped.

The top plug then followed, released behind the cement slurry to allow for displacement, until it landed and latched down into the collar within the calculated displacement volume. This indicated successful pass through the restrictive ID without impact to wiper efficiency.

Once latched, the casing was pressure tested to 5,000 psi to demonstrate string integrity and proceed with completion operations. With the success of this operation, the same solution was deployed on six additional wells and is planned for the remainder of the campaign.

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