

Inflow Tech® Packer Enables Operator to Identify Liner-top Leaks in Long and Complex Big-Bore ERD Well

PACKER PERFORMS SUCCESSFULLY IN SINGLE TRIP, SAVING OPERATOR MILLIONS OF DOLLARS IN BLOWOUT AVOIDANCE

OFFSHORE SAKHALIN, RUSSIA

CHALLENGE

Successfully run and set a packer to depth in a complex, big-bore ERD well, which included the following factors:

- » Longest well drilled by the operator to date
- » Complex well architecture
- » Unknown friction factors from drilling mud

SOLUTION

CleanWell® Inflow Tech® packer, which can:

- » Rotate in hole up to 80 rpm in tension
- » Provide extensive T&D simulations

RESULTS

- » Successfully identified liner-top leaks in this challenging big-bore ERD well, thus preventing a blowout that could have cost the operator millions of dollars to save the well
- » Packer was rotated down the hole with 30 rpm for 8,743 feet (2,665 meters), and then successfully set and pressure-tested without any issue

OVERVIEW

A major customer operating offshore Sakhalin, Russia, needed a reliable, field-proven packer to perform a single-trip wellbore cleanup and negative test on a 13 3/8-in. x 9 5/8-in. liner lap and a 9 5/8-in. liner shoe in a complex big-bore extended-reach-drilling (ERD) well. The packer would need to be set at approximately 12,795 feet (3,900 meters) at an 85° inclination, which was the deepest and most deviated setting depth recorded for this model of packer.

CHALLENGE

This was the longest well that the operator had drilled in the region and the most complex in terms of architecture. The well construction consisted of 12,831 feet (3,911 meters) of mixed 13 5/8-in. and 13 3/8-in. casing, as well as 13,330 feet (4,063 meters) of 9 5/8-in. liner. The ERD lateral kicked off at 5,643 feet (1,720 meters) and continued all the way to 24,508 feet (7470 meters), at an inclination up to 84–87° all through the lateral.

The big-bore architecture of the well, along with its steep trajectory and depth, made it very challenging to run the packer to depth and to set it successfully. By design, this packer is activated and set by applying compression to shear a shear ring installed in the packer. However, in this case, due to the high amount of drag expected during the run in hole, there was a risk that excessive compression might accidentally shear the shear ring prematurely. Furthermore, the client's drilling mud was new for the region, so historic information on previous friction factors was not available. This made it necessary to estimate various friction factor scenarios in the torque and drag (T&D) modeling. There was a risk that, if the friction factor was higher than expected, the work string would lose all its weight before reaching target depth, thus exceeding the shear ring rating installed in the packer and setting it too high, or simply not having enough weight available to get the string to the desired depth and to carry out the operation in a single trip.

SOLUTION

For this complex task, Halliburton recommended its CleanWell® Inflow Tech® packer – a compression-set, retrievable, negative-test packer, activated by shearing a predetermined-value shear ring. This packer has a simple design and can be rotated in the hole with up to 80 rpm in tension.

Extensive T&D simulations were performed by Halliburton engineers to validate the run and determine if it would be achievable. To counteract the expected excessive compression at the packer due to high drag, a shear ring with the highest rating (65 kips) was selected. It was also recommended that the operator closely monitor the hook load while running in hole to determine the drag friction factor for T&D model calibration in order to avoid shearing the shear ring prematurely. Primary and backup packers were prepared in a Halliburton shop in Sakhalin, Russia, and then sent to this offshore location.

RESULTS

The Inflow Tech packer was rotated down the hole at 30 rpm for 8,743 feet (2,665 meters), and then successfully set and pressure-tested without any issue. The packer enabled the operator to identify liner-top leaks at a point in well construction that allowed for the issues to be corrected and operations to continue.



A 13 3/9-in. Inflow Tech® packer is pulled out of hole.



After being pulled out of hole, these packer elements are still in good condition.

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