

TDP NONEX INSTALLED AS A HIGH DIFFERENTIAL PRESSURE RATED BARRIER PLUG IN LOWER COMPLETION

CASE STUDY – OFFSHORE NORWAY – 2021

TCO was contacted by a major Norwegian operator with a request for a high differential pressure rated barrier plug. This plug needed to be installed in a 4 ½" lower completion and would need to be rated to 10,000 psi differential to ISO 14998 Vo.

CHALLENGE

The reason for the high differential pressure requirement was that operator initially expected 4,350 psi reservoir pressure, but due to uncertainty for this well, there was a fair chance that this pressure could be far lower. This pressure would not be known until they had drilled the section and hence made the desire for a high differential pressure rated plug to cover all pressure scenarios.

SOLUTION

TCO proposed to use the TDP NonEx 472×275 plug which is a 10 000psi, ISO 14998 Vo pressure differential rated glass plug. This size was suitable for the 4 ½" completion string and was a match both in terms of pressure and temperature with a 10 000psi at 155°C rating.

The TDP NonEx includes a hydrostatically balanced counter system which self-calibrates to the hydrostatic pressure at installation depth. Since this plug was to be placed deep in the well at 4 600mMD/3 650mTVD, the balanced counter accommodated for both the depth and the hydrostatic fluid column changeout to base oil, making it more reliable and accurate to perform operations and cycle the plug open. During the cycle open process, the operator only needed to follow that the applied surface pressure was above 2 400psi to ensure a confirmed cycle at the plug.

RESULT

The success of the installation relied on a close cooperation with the client during the installation, operations, and cycle open of the TDP NonEx. The plug was installed as an integral part of the 4 ½" completion and suspended in brine. Prior to opening the plug, the well was displaced to a light base oil, the packer was set and the tubing was tested towards the glass plug.

As a last operation, the glass plug was successfully cycled opened by 14 pressure cycles as planned. The maximum differential pressure the plug experienced was 9 570psi at 137°C, making this the highest in-service pressure differential for a TDP NonEx to date. Reliability both for the barrier and the cycling mechanism gave the client the means to perform all operations for both middle completion and upper completion, without having to consider the uncertain reservoir pressure.

PRODUCT

TDP-NONEX 472×275

