

Case study: Plug & Perforate System Saves Costs

Plug & Perforate System Sets Benchmark for Annular Remediation

Challenge

Archer was challenged by a major operator to come up with a solution for 4 wells in the North Sea. The challenge for each of the four wells was to set a barrier against the overburden and to circulate oil based mud out of the annulus between 10 3/4" casing and 13 3/8" casing before pulling the wellhead.

Solution

Archer developed and successfully deployed a new downhole tool-based abandonment "Plug & Perforate" system to meet the operator's challenge.

The first stage of the operation was to run a perforation gun loaded with one foot of 18 shots per foot of the Archer abandonment charge (single casing perforation gun) to just below the wellhead at 475 ft. The 10-3/4" casing was then perforated with 0.8 inch diameter holes without damaging the 13-3/8" casing behind, to create a circulation path.

The second stage was to run a SAFELOCK plug with another one-foot long perforation gun below. The SAFELOCK plug was then set and perforated just above the 13 3/8" shoe at 2,300 ft.

Circulation was then established up to the shallow perforation and the oil based mud was circulated in the 10-3/4" x 13-3/8" annulus. After the circulation parameters were established, a wash pill was pumped around the annulus to clean out all the oil based mud.

The third stage was to set the overburden barrier in both the A annulus and the B annulus. This was done by displacing cement



Region: North Sea

Customer: Major Operator

Field: North Sea

Well type: Plug & Abandonment (P&A)

Case benefits

- Efficient plug setting with no need for weight below the SAFELOCK
- SAFELOCK barrier plug is retrieveable if no circulation is achieved
- Eliminating the need for cutting and pulling casing
- No tubular handling at surface
- Time efficient
- Can verify and pressure test both A and B annuli

Key capabilities

- ISO 14310 certified plug, available as VO rating
- Field proven in over 2000 wells
- Can be set and retrieved multiple times
- Perforation gun that only penetrates single casing

Typical Applications

- Plug & Abandonment
- Slot recovery
- Seal of annulus pressure
- Stuck casing with no circulation through the shoe

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through the SAFELOCK's ball valve and into the perforations below the SAFELOCK and the cement plug below, and into the 10-3/4" x 13 3/8" annulus.

The ball valve was closed and a cement plug was pumped on top of the SAFELOCK plug, completing the barrier. The barrier was verified by pressure testing through the shallow perforation to 1,000 psi above the seawater gradient. The pressure test results showed a solid barrier in both the A and B annuli.

Result

The result was a successful operation that saved the customer a great amount of time and expenses by eliminating the need for cutting and pulling the 10-3/4" casing to get the oil based mud out of the annulus before removing the wellheads. The operation was flawlessly executed and the time spent ranged from 15.5 to 18.5 hours per well.



Archer plug, pictured above.