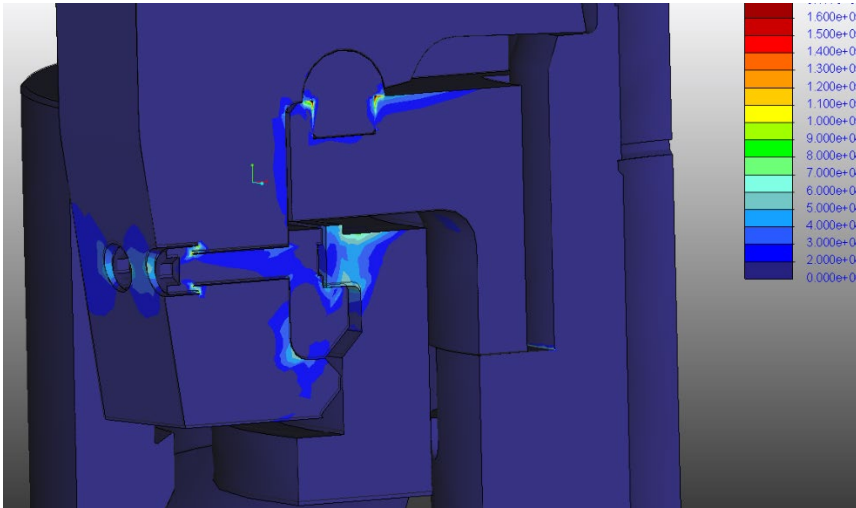


Firma™ Solution Including Custom Cutting Tool Cuts 27 Cemented Platform Well Conductors in a Batch Process Taking Only 10 Days



The Weatherford engineering department redesigned the MOST Plus system, a key technology in the Firma abandonment portfolio, for the requirements of the job. The above image shows finite element analysis (FEA) as part of the process.

Objectives

- Deliver equipment in less than 1 week to help complete the final phase of abandonment. The operator needed a quick solution after the planned rigless cutting solution had failed. The delivery would allow the jackup rig to be released for drilling operations ahead of schedule.
- Cut the remaining 27 conductors, including twenty-two 20- × 30-in. conductors and five 18 5/8- × 24-in. conductors on the 30-slot, shallow-water platform using the jackup rig already in place.
- Confirm all 30 well conductors, with a length of 213 ft (65 m) and weight of 132,277 to 143,300 lb (60 to 65 T), are free of the lower well and platform jacket structure.

Our Approach

- The operator contacted Weatherford for an alternative cutting solution after initiating operations using a competitor's rigless system installed on the weather deck. The system included a jacking unit incapable of lifting the wellhead and applying tension on it while cutting, which made it necessary to perform abrasive jet cutting in ± 60 -T compression. This limitation resulted in 12 partially cut wells and only three complete cuts, with an average cutting time of approximately 22 hours per well, over 40 days of operational time.
- Weatherford recommended a Firma solution with a modified MOST Plus system. The system comprised a next-generation MOST tool, mud motor, non-rotating flexible stabilizer (NRFS), and 17-in. A-1 M24 hydraulic casing cutter including high-angle knives dress with Custom Cut™ inserts.

LOCATION

North Sea, Norway

WELL TYPE

Offshore, shallow platform

HOLE SIZE AND ANGLE

Cased hole, vertical

CASING SIZES

20 × 30 in. and 18-5/8 × 24 in.

DEPTH

>984 ft (>300 m)

PRODUCTS/SERVICES

- Well abandonment services
- Fishing services
- MOST Plus system
- NRFS
- A-1 M24 hydraulic casing cutter



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Our Approach (continued)

- Normally used for subsea wellhead retrieval and casing cutting, the MOST Plus tool required design customizations because it had never been used on a fixed platform to latch onto wellheads with an A210 hub profile. As an added challenge, the hub profile in each well had slight variances in length and shape.
- The Weatherford engineering department in Houston, Texas, began redesigning the MOST Plus tool by modifying its grapple arms to fit the A210 hub profile of the wellhead and to lift the heavy cemented conductors. The clamping and lifting capabilities would enable cutting the conductors and verifying movement in the platform substructure.
- In just 3 days, the department created a three-dimensional model, simulated fit and function, and evaluated it using finite element analysis.
- One week after the initial request, the manufacturing facility in Stavanger, Norway, locally produced the grapple arms.
- The Weatherford service team deployed the custom-built Firma solution on the jackup rig and, while maintaining a lifting load of 143,300 lb (65 T), averaged a cutting time of just 1 hour per well.
- The service team delivered 27 cuts in 7 days, which is an average of just more than 6 hours per well, inclusive of all assembly, tripping, skidding, and maintenance. The experience and expertise of the field technicians and the design, performance, and durability of the high-angle knives resulted in noteworthy performance. The team only used one bottomhole assembly (BHA) and 11 sets of knives for all the dual-string cuts, which reduced BHA handling time between cuts. Remarkably, just four of those 11 sets completed 20 of the cuts.
- The team completed cutting and verification in 27 wells in just 10 days. To ensure that all 30 wells were conductor free, the team verified the cuts previously made with the abrasive cutter over 3 additional days.
- The job completed without nonproductive time or operational incidents, and the operator released the rig ahead of the AFE schedule to begin other operations.



The top image shows the MOST Plus system, a proven subsea wellhead recovery tool that latches onto the external profile of a subsea wellhead while a hydraulic internal casing cutter cuts the conductors. The bottom image shows a well conductor cut by this system and then recovered.



Value to Customer

- The Firma solution, featuring the MOST Plus tool, accommodated the expedited schedule of the operator with on-time delivery of customized equipment in just 1 week.
- Compared to a 40-day operation ending with only three successful cuts, the MOST Plus system with optimized knife technology provided a cost-effective tool for efficient cutting and verification that finished in just 10 days.

