

Subsea well trio plugged with vessel-based, diverless approach

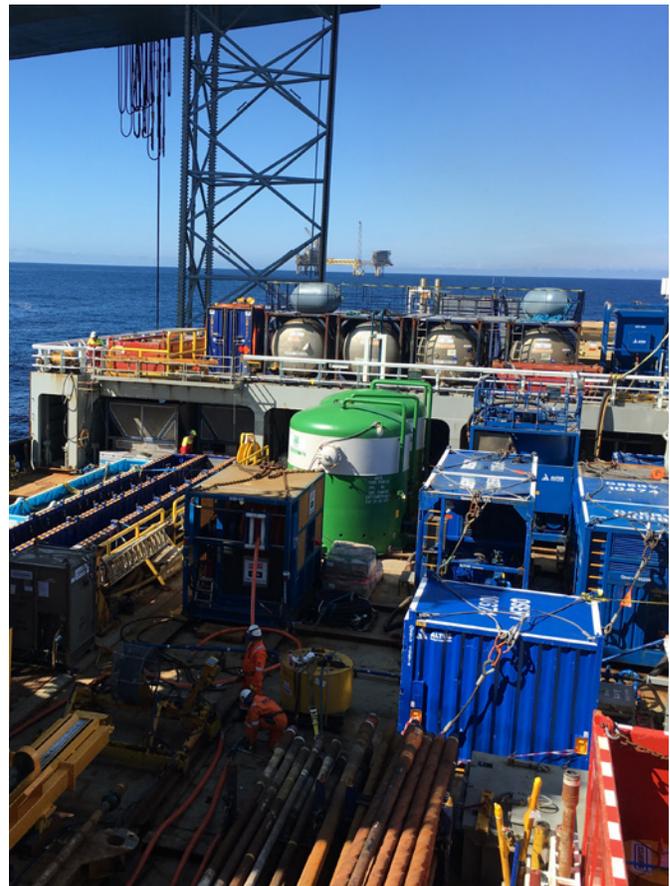
Following on from a six well clean-up and inspection campaign undertaken in 2016, Oceanearing successfully completed plugging operations on three category 2 wells in 2017.

Project Overview

Oceanearing was contracted to project manage, plan, and execute the vessel-based plugging of one subsea and three mudline suspension wells in the Danish sector of the North Sea. The scope of work included:

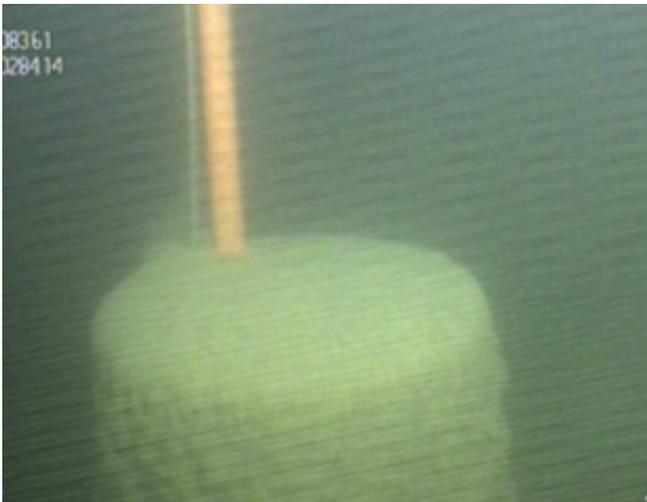
- » Casing scraping
- » Pressure control and bleed off
- » Casing perforation and annulus circulation (Perf and squeeze)
- » Temporary Abandonment (TA)/corrosion cap venting and removal
- » Casing cutting and pulling
- » Cementing

A vessel, equipped with a drill pipe handling spread and two Oceanearing-supplied Magnum work class ROVs, was chartered to provide the rigless work platform.



Project Overview

The customer wanted a cost effective alternative approach to using a jack-up rig to plug subsea and mudline suspension wells in a programmed campaign without compromising safety or quality. The customer was also looking for flexibility in the program so the vessel could be quickly relocated to the next well if a challenge was discovered, allowing changes to be planned and assessed while maintaining progress.



The Oceaneering Solution

Founded upon a track record of successful subsea well plug and abandonment operations, Oceaneering collaborated with the customer and subcontractors to develop procedures that used vessel-based tooling to successfully interface with the legacy wells (wells with unknown conditions behind the casing and below TA/corrosion caps). Examples included the use of drill pipe workstrings to:

- » Set and retrieve gas-tight plugs prior to the perforation of multiple casing strings

- » Vent and recover threaded TA/corrosion caps (including eccentrics)
- » Selectively cut and pull casing strings.

Oceaneering's solution also involved the integration of its subject matter experts (SMEs) both during the onshore planning stage and the offshore execution phase. This approach has been found to both increase the identification of potential scenarios during the planning phase and reduce the commercial and schedule impacts in the event that unexpected events do occur.

Execution Plan



Onshore Planning

As a result of the information gathered from the previous wellhead clean-up and inspection campaign, the onshore project team had an accurate overview of the wellheads' condition prior to planning the operations to plug the wells.

Offshore Execution

The offshore project team successfully plugged three wells in accordance with the P&A standards.



Challenges

There are two examples of operational challenges that were encountered and overcome.

Two wells were found to be retaining residual annulus gas pressure (gas caps). This pressure was successfully monitored and bled-off using the project-supplied contingency equipment, enabling Oceaneering to maintain safe operations.

The previous year's inspection campaign had identified that one of the corrosion caps was being obstructed by a piece of fouling debris. To clear this, a workstring milling operation was completed and was successful in partially clearing the

obstruction. Thereafter, an alternative strategy was developed offshore, a management of change request was approved by onshore management, a retrieval tool modified, and the partially obstructed corrosion cap successfully recovered.

Results

Three wells were successfully plugged on schedule, on budget, and without a lost time incident (LTI).

The vessel-based approach was completed at a cost significantly less than a traditional rig-based solution.

Project Highlights

TA caps recovered	7
Casing mechanically cut	3
Well cementation	3
Average duration per well	5.1 days
Waiting on weather	3%





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