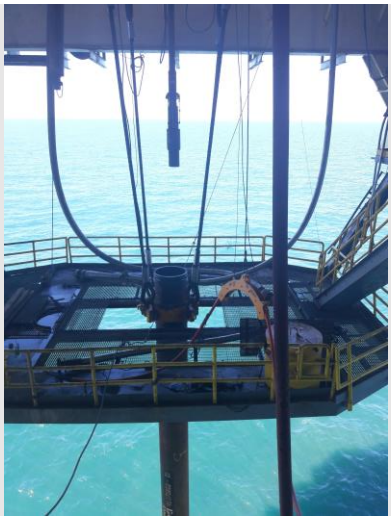
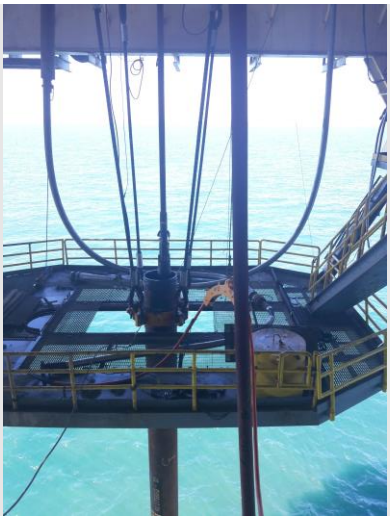
Case Study

Unique technology enables safe pressure testing of suspended mudline wells in advance of abandonment.





The Challenge

The temporary suspension of a well is an early stage of decommissioning whereby the well is isolated and the wellhead and/ or blow out preventer (BOP) is removed. A Temporary Abandonment (TA) cap is then fitted to the hanger system at the seabed, providing additional well and environmental barriers. Many offshore wells have been suspended for an extended period of time, often from ten to thirty years or more, during which it is possible for pressure to build-up, corrosion to take place and marine debris to accumulate.

Re-entering these wells, to complete the full abandonment operations, can therefore be challenging and high risk, particularly as the pressure build-up below the TA cap cannot normally be measured. Pressure build-up creates significant safety concerns, so intervention is normally conducted using a rig with heavyweight well control packages to ensure safety compliances are met. However, this is subject to rig availability and comes with high associated costs.

Spirit Energy was looking to commence abandonment work on suspended wells in the North Sea. To do so, the operator wished to assess and vent any pressure build up below the upper TA caps before re-entry. Given the age of the wells, it was important that the solution was flexible enough to latch and seal on to any type and size of cap, safely vent the pressure and provide a secondary well control barrier if the back pressure valve (BPV) failed to reseal once the test was complete. With no technology available on the market to solve this challenge, Spirit Energy approached Unity for a solution.

The Solution

Unity designed, engineered, prototyped, tested, verified, manufactured and worked with the operator to successfully deploy a new pressure test technology in the field. The Temporary Abandonment Cap Test Tool (TACTT) could seal onto any TA cap, stab through the back pressure valve (BPV) and both test for, and safely vent, any pressure build-up, while providing reliable well control and a secondary seal which could be left in place, if required, once the test was complete.

Unity's TACTT is the first and only technology of its kind. It was originally designed to be deployed from a rig (above photos), but working closely with Spirit Energy on subsequent campaigns it was further developed for open-water cable deployment from a vessel. Vessels have greater availability than rigs, can be deployed faster and generally save between 30-50% in costs when compared to rig-based intervention. This is an ideal solution for multi-well decommissioning campaigns, where the TACTT can assess each well using a vessel of opportunity prior to completing abandonment operations, or making the decision to defer to heavyweight intervention at a later stage.

Operational Value

- Pressure test suspended offshore wells prior to P&A.
- Reduce time and cost of abandonment through informed decision making.
- Enable safe vessel-based abandonment.
- Provide retrofitted mudline sealing solution for deferred abandonment.

Case Study

continued.

The Project

In the most recent Spirit Energy campaign, the TACTT was cable-deployed from a vessel where it was guided to the well by ROVs and divers, then latched and sealed on to the TA cap. The TACTT pressure seal was successfully tested from a surface control unit to ensure effective well containment before stabbing the BPV of the TA cap and testing the pressure below. This second test verified zero pressure and provided an accurate understanding of the well's condition, allowing the operator to make an informed decision on the next stage of decommissioning. Once zero pressure and well integrity was confirmed, the operator could safely continue with removal of the cap to proceed with vessel-based P&A operations.

Olav Log, Director of Drilling and Wells at Spirit Energy said: "Unity's TACTT allowed Spirit Energy to successfully abandon two North Sea wells in line with UK Government regulations. The solution removed all risk associated with re-entering a suspended well and the ability to deploy by vessel provided significant project savings. The TACTT technology was originally designed to our specification and successfully deployed from a rig in the North Sea. This latest development allowing for vessel deployment opens further opportunities."

Technology Capability

- Locate and latch a torque pin on the TA cap.
- Provide a double sealing system on the TA cap for pressure containment using a secondary check valve which can be disconnected from the TACTT and left in place to be interfaced at a later date.
- Provide a resilient seal solution for a seal land that had been exposed to the marine environment for 30 years.
- Provide a means of testing the seal once energised, from both the annulus side and drill string side, prior to stabbing the BPV on the TA cap.
- Incorporate a secondary internal seal that would retain pressure from below in the event that the BPV did not re-seal.
- Provide a method of telling if the original BPV was opening/sealing.
- Allow a straight pull to disconnect, leaving the tool holding integrity on the TA cap for a return trip at a later date with a retrieval tool.
- Enable simple operation, including rotate left or right and pull up or set down weight.