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CLIENT

Fugro for Shell Todd Oil Services (STOS), New Zealand

LOCATION

Maui oil field located 30-50 km WSW of Opunake, New Zealand

PROJECT BACKGROUND

The Maui field was discovered in the 1960s, resulting in the drilling of one exploration well and two appraisal wells in 1969. The appraisal wells were left in a suspended state with wellheads capped. Prior to the removal of the caps and the completion of the abandonment the integrity of the plugging needed to be verified, and this necessitated the monitoring and sampling of any product that may be under the cap without removing it from the well head.

Land-based hot tapping operations are commonplace with a number of vendors able to supply equipment supported by extensive track records, but this is not the case for subsea applications. The hot tapping equipment that exists for subsea use is typically much larger and used on subsea pipelines, and this drove the need to develop a bespoke solution for this application.

Requirements:

- Drill a small hole (1/2") through the wall of a well cap and contain pressure with a double block and bleed valve arrangement.
- Have the ability to increase the diameter of the hole to 2" and drill a second hole at 180 degrees in the event the well needs to be killed.
- Provide a system whereby a sampling skid could be connected to take samples and monitor the well.
- All equipment to be installed, operated and monitored by ROV alone.

SOLUTION

Proserv was approached by STOS to devise a method to deploy and install the required hot tap equipment onto two of the well caps, and convert an existing top-side hot tap machine into one suitable for subsea deployment and operation via ROV.

The final system comprised a number of elements:

- 1. A tool that enveloped the large pressure-retaining clamp and provided the ability to open and close the clamp, and pressure test the seal against the cap once installed. This tool provided exacting alignment and guidance of the clamp over the cap whilst ensuring that the sealing faces were not damaged.
- 2. A deployment frame that interfaced with the original 50 year old guide posts provided risk-free coarse alignment of the clamp assembly, with further features providing fine alignment as the assembly was lowered over the cap.









- 3. High-torque hydraulic wrench assemblies that were used to sequentially tighten the clamp around the well cap.
- 4. A neutrally buoyant structure that encased the hot tap machine and allowed it to be flown to place by the ROV. Control panels and various monitoring features allowed the equipment to be operated by the ROV, whilst maintaining all the functionality and control of a top-side operation.
- 5. All equipment was transported and deployed in bespoke skids that doubled as service centres for the equipment, allowing even major components to be removed and replaced easily.

INNOVATION, BENEFITS, ADVANTAGES

It is believed that this is the first fully remote, small bore, high pressure hot tap through a subsea well cap to be conducted.

DELIVERY

Once the go-ahead was received it took 8 months to design the solution and deliver a fully qualified and thoroughly tested system to the client.

QUOTE

"With this project Proserv Perth again demonstrated their ability to provide successful solutions for a technology new to our office, and supported the client from problem identification through design to completion offshore. The project provided many challenges including understanding the hot tapping technology, integrating equipment from multiple vendors, designing multiple new tools and usual design challenges of a subsea environment and ROV operations." Jakub Kawka (Principal Engineer, Proserv Perth)

CONCLUSION

Offshore operations were completed early April 2018 with all equipment performing extremely well and as designed.



PHOTOS



CASE STUDY /// FUGRO - SHELL











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