AGR re-enters challenging well to cut and pull casing securing continuous operation

SUMMARY

The expertise of AGR's Aberdeen-based Well Management team in a complex well re-entry was tested to the full on this project. Continuing operation of the well, part of Orlando field development drilling, depended on recovering intermediate and production casing strings and successfully sidetracking the well.

CLIENT, LOCATION and DATE

Decipher Energy

The field is located in the UK P1606 seaward production licence in the Northern North Sea

The project was kicked off in 2018

THE CHALLENGE

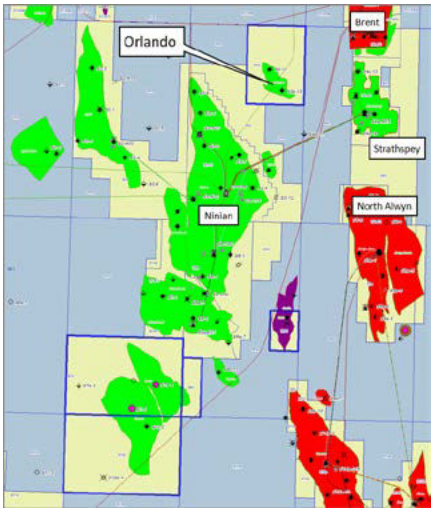
A well with a history of risks, on the brink of abandonment.

- Due to the complexity of cutting and pulling the existing casing strings and the location of the new reservoir target, previous license operators had considered drilling a new well, or attempting a deep kick-off point with challenging trajectories and non-standard casing sizes
- Engineering work had shown that to utilise the existing well and to provide an optimum well path for drilling and completion running, it would be necessary to cut and pull a 13-3/8" and 9-5/8" casing from the existing well and kick off the well below the 20" casing shoe
- There was an increased risk, because during the running of the 9-5/8" casing on the original well, losses had been experienced and no returns were observed during the cementing. The unstable Balder formation had been potentially left open and uncemented and there was a chance it had caved due to lack of pressure support
- There was also a concern that work would be required to manage backflow and cure losses, since this had been necessary across the interval during drilling the original well. The interval also included the over-pressured Lower Shetland Group, which presented further challenges

Client Quote:

"A great achievement! – AGR's effort and dedication allowed us to deliver first production in as early a timeframe as possible and at a reasonable cost outcome"

Chief Executive Officer



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CLIENT BENEFITS

Recovery strategy depended on expert well design.

Shallow kick-off

A simplified well design was key to the recovery and to the cost case for continuing with the project. AGR Well Management team recommended a shallow kick-off point to provide a trajectory design that would meet reservoir objectives and accommodate sufficient tangent sections for running of the dual-podded ESP completion.

Going straight

The design made sure dog-leg angles were minimized, a lengthy well bore avoided and all in standard hole sizes.

Optimum mud systems

Engineering studies established the most efficient mud systems. This included a system weighted precisely to balance the fluids inside and outside of the 9-5/8" casing and prevent u-tubing of fluids in-situ behind the casing strings creation of subsequent slops.

Cut and pull

A cut and pull programme, established with built in contingencies, was agreed up front. A one trip casing cut and pull system was selected, which allowed setting the bridge plug in the 9-5/8" casing to isolate the over-pressured Shetland Group below.

THE RESULT

Full recovery and all-round operational gains achieved.

- In the role of a Well Operator, AGR Well Management helped the client to kick off the well successfully on the first attempt, the desired well trajectory was achieved and there were no wellbore stability issues
- The need for an entire new well and the liability for the abandonment of the original wellbore was negated
- Our work also saved Decipher Energy considerable time, with the combined use of 9-5/8" bridge plug, casing cutter and multi-cycle circulation sub
- Slops and u-tubing were prevented when cutting both casing strings, by accurately designing mud systems to match what was in situ from the original well
- With a decision tree agreed upfront for the cut and pull strategy, all team members were aware of steps to be taken in every eventuality. Contingency equipment was mobilised prior to the operation and no time was lost in reviewing results
- The well was displaced and balanced efficiently prior to the 9-5/8" casing cut. A small volume of losses were observed immediately after the cut, but these diminished
- The tripping rate was controlled when recovering the 9-5/8" casing to minimise swabbing risk, and the loss rate was successfully maintained at a manageable level
- A 13-3/8" bridge plug was set once the 9-5/8" casing was recovered. It minimised the impact on the surface and allowed displacement to the lower weight mud system operation
- Optimised cement design included a combination cement plug, delivering a barrier to isolate the 13z well whilst also providing sufficient integrity to allow the well to be sidetracked
- Use of a third party cuttings containment system (installed offline during well re-entry phase) prevented delay in operations due to bad weather
- The well sidetrack trajectory delivered allowed for the smooth running of casing strings and completion

HSEQ ACHIEVEMENTS

- The project was completed with zero LTI or MTC in 134,520 Manhours
- <2% of waste generated went to landfill

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