INFLOW CONTROL

TENDEKA

Case Study:
UK's first retrofit AICD installation doubles oil production

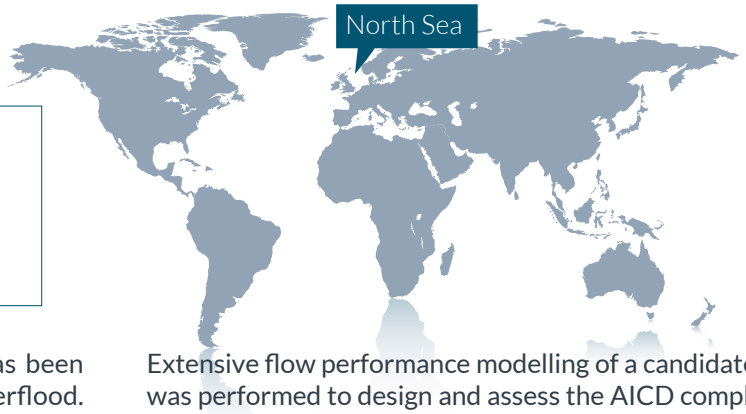
Reduction in gas-oil ratio ensures long term oil production in gas-cap blowdown application

Well Data

Location: UK North Sea

Well Type: Oil

Installation Date: April 2019



The field is a fractured chalk reservoir which has been developed over the past 20+ years through waterflood. To maximise economic recovery for the final phase of development, the field has entered blowdown. In blowdown, the gas cap will expand, and the oil and water columns will slump requiring the completed interval of each well to be gradually moved deeper over time to enhance oil recovery. Furthermore, production of gas in early blowdown is not desired in order to maintain reservoir energy for oil production.

The Challenge

Gradually moving a completion interval deeper in a well conventionally would require multiple interventions over time to isolate shallower perforations as they gas out. This would prove challenging to execute in any well but in a subsea well this is economically prohibitive. It would be additionally challenging to respect surface gas constraints.

Tendeka's Solution

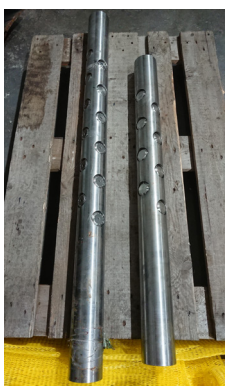
FloSure AICDs were identified as the optimum solution. Unlike conventional Inflow Control Devices, AICDs react autonomously to the fluid properties at each perforation interval and allow initial oil production but restrict production from perforations with high gas flows as they develop by introducing an additional pressure drop. For the field, installing a unique, compact FloSure AICD straddle completion on the remaining oil-bearing perforation clusters offered a cost-effective way to control Gas-Oil-Ratio (GOR) to maximise oil recovery without the need for multiple well interventions on these subsea wells.

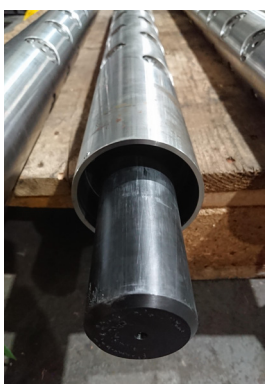
Extensive flow performance modelling of a candidate well was performed to design and assess the AICD completion performance by first matching production history to ensure the models used appropriate reservoir and production parameters. The well performance was then modelled with the AICD completion installed, examining several gas and water breakthrough scenarios for combinations of the producing perforation clusters. The FloSure AICD straddles were then designed with a maximum of 40 FloSure AICDs per sub with the ability to change out blank and AICDs dependent on the results of the PLT modelling, thus generating flexibility in each zone.

Project Results

The modelling results showed that the retrofit FloSure AICD completion would effectively control the breakthrough of gas and reduce the GOR for equivalent oil production compared to the non AICD case.

Actual field results from the initial retrofit installation are positive and reflect the modelling with a significant short term production benefit from a thousand barrels a day to 4,500 barrels a day. Additionally, there has been a reduction in gas-oil ratio of 60% thus keeping the GOR within surface facility production constraints and maintaining reservoir energy for oil production.





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