

Think, Innovate, Deliver, Learn ...

Two Celtic Sea wells: one appraisal and one exploratory with a semi-submersible drilling rig

Summary

A small operator engaged one of the principals of Summit to act as Drilling Superintendent for two wells; one appraisal and one exploration in the Irish Sea in the spring of 2006. At a time when rigs were in short supply, the Operator had managed to agree an attractive day rate with a small drilling contractor to take a 1975 vintage Pentagon rig to drill the two wells. The rig had been stacked 5 years, having had problems with the SCR system on its last well before stacking.

The drilling rig was in surprisingly good shape and the drilling contractor did mostly good job in bringing the rig back into operation. There were minor problems with motors for the anchor winches. However, the BOPs were the cause of major downtime. Other issues: anchor wire change out in the Cromarty Firth, planning the 30 day tow to Ireland, and anchoring out on location on the hard bottom of the Celtic Sea.

The operational base/logistics base was in Marathon's office in Cork; the Operator head office in Dublin.

Logistics – engaged all forms; sea, land, and air transport

- Sea - 2 towing vessels (one stayed on as a supply vessel), 1 anchor pre-lay vessel, one standby vessel
- Air Fixed wing crew change charter and scheduled service between Aberdeen & Cork Helicopter – crew change out of Cork
- Land – tractor/trailers from Aberdeen for drilling contractor & all equipment/consumables

Rig - 5 leg pentagon rig, stacked for 5 years, re-activated after an extensive overhaul

- BOP over haul – the BOP went into the shop in Aberdeen for complete refurbishment
- Anchor wires – all anchor wires were changed out in Invergordon before being towed to location

Drill the Well on Paper (DWOP) - an exercise to encourage Teamwork, Communications, and Decision making – a DWOP was held in the week preceding spud. A draft programme was provided and the step-by-step procedures were projected in front of all drilling and well services contractor personnel.

Drilling services - All services were contracted from scratch

- Drilling rig
- Transport – fixed wing, helicopter, tow vessels, work vessels, standby vessel
- Well position surveyor
- Mud
- Mud motor
- Casing/tubing and casing running services
- Cementing
- Drill bits
- Wireline logging
- Mud logging
- Well testing

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General data

- One appraisal, one wildcat. Objective – dry gas
- Water depth 335 ft
- Duration – circa 30 days, dry hole basis; 40 days if tested

Drilling programme

- Normally pressured but with severe problems with hard chalk starting at the seabed
- 30" conductor – 94 ft penetration
- 20" x 13-3/8" Surface casing – 1800 ft BDF
- 9-5/8" – set at 3287 ft BDF

Producing formation – projected to be a very porous/permeable, layered sandstone

- Appraisal well – tested by running TCP guns and perforating underbalanced. Metrol gauges provided surface readout. The test proceeded without incident.
- Exploratory well – tested by running TCP guns and perforating underbalanced. Metrol gauges provided surface readout. The test proceeded without incident.
- Governmental authorities overview – the government about a dispute with a major oil company and some west Ireland farmers. Therefore, they kept a close watch on these two wells. The well plans and safety case had to be submitted in great detail before permission was granted to drill the wells.
- Local impact – Ireland does not have enough gas and oil to provide for itself, therefore interest in these wells was high. Press interest was moderate to high.

QHSE

- Rig safety – the rig crew had a decent safety management system but all the crews were new. The challenge was to ensure that they kept focus and worked proactively on all teamwork issues.

Major issues

- Anchor wires – all 10 anchor wires had to be changed out prior to the tow to Ireland. This was a major undertaking, requiring two work vessels, considerable heavy lifting, and performing activities that the rig crew were not used to doing.
- Tow to Ireland – the tow was 30 days duration, some of that time in busy shipping lanes. Detailed planning was required, entailing two tow vessels.
- Anchoring on location – the bottom in the Irish sea is hard chalk, preventing anchor flukes from "digging in". Trident, the towing company, recommended Stevshark anchors. However, these anchors did not provide the necessary holding power and piggy-back anchors had to be installed on both locations.
- Blowout preventers – the BOP was sent to Aberdeen specialists for re-furbishing. It was re-assembled on the rig but the process resulted in the BOP frame being somewhat mis-aligned. The problems manifested themselves on the first well under the stress of being on the sea bottom (which could not be replicated in the Cromarty Firth). Some downtime was suffered to get the BOPs to test properly. The problems were solved however, and the BOPs tested properly on the 2nd well.

Conclusion: The appraisal well was over budget due to the problems experienced with the BOPs resulting in something on the order of 9 days downtime (30%). The second well downtime figure was on the order of 3%, a great improvement and a generally acceptable figure.

The Operator's appraisal and exploratory wells were both successful. But for low oil prices and the credit crunch, both would likely now be in production. The well cost was quite low as the rig was contracted at a price of \$150-170,000 (the rate varied with time) at a times when rigs were not available or priced over \$300,000 per day during the winter months.

For further information,

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