West Navion faced several challenges on Qullec-1

A NORTHWARD STEPOUT well west of the Fylla Bank in West Greenland, drilled by **Statoil** in the summer of 2000 with the brand new dual activity deepwater rig West Navion, was unique in a number of ways.

The Qullec-1 well combined the challenges of very remote location, deep water, dual operations, high iceberg activity and the water depth record for the drilling contractor.

The operation took place in the Northern Deepwater Play, often defined as West of Shetland, West of Ireland/Scotland and the deepwater areas off Norway and Nova Scotia.

The authors of a paper prepared for IADC Drilling Northern Deepwater 2001, 31 May-1 June in Stavanger, report that the project met all the unique challenges successfully.

Smedvig Offshore's West Navion drillship completed the Qullec-1 well offshore Greenland in about 80 days while facing challenges of remote location, deep water and iceberg management.

The report, "Qullec-1: Drilling Deepwater in Iceberg Country," was prepared by **Magnar Gresseth**, Operations Manager West Navion; **Frithjof Knutsen**, Captain West Navion; and **Arnfinn Nergaard**, Marketing Manager, **Smedvig Offshore AS**. Mr Nergaard presented the paper.

THE PROJECT

West Navion had operated for about 15 months and drilled 9 wells at the time of the conference presentation, said Mr Nergaard. She is one of five 100,000 dwt dual activity drillships that began operations in 1999, 2000 and 2001.

Since beginning operations in March, 2000, West Navion has operated in Norway for Statoil and **BP**, in Greenland for Statoil, for **Shell** in Egypt, for **Enterprise** west of the British Isles and for **Conoco** west of Shetland.

The water depth record for West Navion is now 1,920 m (6,300 ft).

The Qullec-1 well was in 1,152 m (3,800 ft) of water and was drilled to a total depth of 2,970 m (9,700 ft). The well casing program included 36-in. x 26-in. x 17½-in. x 12¼-in. x 8½ in. The well was drilled between 3 July and 25 Sept, 2000, with overall vessel related downtime of 5, 2 and 3% for July, August and September, respectively.

In August, the project had 31% downtime related to pulling and repairing the BOP after rough treatment related to a seal assembly problem, said Mr Nergaard.

A number of unique challenges were faced in the project including long distance logistics, deepwater dual operations, transportation/crew change and practical iceberg management.

LONG DISTANCE LOGISTICS

The Fylla Bank in Greenland is about 2,000 nautical miles from Norway. This represented a logistic problem that was solved by loading about 90% of all needs including two full casing strings onboard before the transit. In addition, 2 heavy-duty anchor handler vessels were brought along loaded with miscellaneous equipment and bulk.

It was a challenge to position deck-loaded equipment such that the sequence of use was accounted for, said Mr Nergaard. Only one trip with a supply vessel from Norway was needed during the operation.

The West Navion normally has diesel supplies for 50 to 60 days. Diesel and water was supplied locally from Nuuk, which also provided workshop facilities, storage facilities, hotel and offices for the onshore operations management.

The 2 heavy-duty anchor handlers became multipurpose vessels; they did all but anchor handling, including supply function, standby function, towing icebergs, and serving as a hotel for crews in transit. On one occasion, one of the vessels had the chance to take personnel sightseeing in the Greenland fjords, said Mr Nergaard.

DUAL OPERATIONS

This was the first deepwater dual operation for West Navion. After careful planning Statoil elected to take full advantage of the dual activity capability. The well took a total of slightly over 80 days to drill.

Following completion of this well the effect of dual handling was studied by simulating the total operation assuming that the West Navion had a single rig.

The study was performed by splitting the actual operation into 557 single

activities in an MS Project spreadsheet over the 80 days of operation.

The main phases of the well were (note that overlaps are not presented):

- Transit to well site: 1.67 days;
- Drilling tophole: 9.67 days;
- Rig and run BOP: 9 days;
- Drill 17½-in. section: 26.83 days;
- Pull and repair BOP: 9.46 days;
- Drill 8½-in. section: 25.58 days;
- P&A: 11.13 days.

This reflects the actual performance, including unplanned activities like pulling and repairing the BOP.

The comparison was simplified by reducing the 577 steps into 106 by combining operations. Then the 1-derrick program was established with 107 steps, the difference indicating only that some of the sequences will necessarily need to be different.

Then duration for each of the 107 steps was established using tripping, running and handling times identical to those from the actual case to isolate the effect of dual operations.

Simplifying and condensing activities into the same main phases as for the actual case gave the following results:

- Transit to well site: 1.67 days;
- Drilling tophole: 12.38 days;
- Rig and run BOP: 9 days;
- Drill 17½-in. section: 34.67 days;
- Pull and repair BOP: 9.46 days;
- Drill 8½-in. section: 25.58 days;
- P&A: 11.13 days.

Overall, the 1-derrick simulated program concluded with a duration of 103.89 days while the actual time spent by West navion on the Qullec-1 well was 80.17 days.

The dual handling effect is minus 23.72 days corresponding to a 22.8% time reduction. The result of the study is in line with the theoretical evaluations performed during the design of the rig.

The dual handling effect varies with the phase of the operation. Dual handling savings is generally greater in the tophole and the P&A phase since these phases allow operations with two strings in the water. In the phase between these two, the dual handling effect comes from making/breaking tool strings and BHAs.

"The operation was OK, I see no problem in going back."

Fridthjof Knutsen
Captain, West Navion

In the Qullec-1 well there is a significant saving in this phase due to the fact that it was necessary to work in the damaged seal assembly in open water.

In the single-derrick case this required pulling the BOP, while in the dual-derrick case the remedial work was done by the auxiliary rig while the BOP was kept suspended in water in the main rig.

TRANSPORT/CREW CHANGE

The West Navion has a Norwegian crew working a Norwegian rotation schedule. This implied 55 crewmembers traveling from Stavanger every Tuesday and the same number returning every Wednesday. Flight time from Stavanger to the rig totaled 7-7½ hours.

Due to frequent fog, crew change became a challenge in itself. Some extra cost was thus encountered in extra hotel stays, cost allowances and replacements and stand-ins.

The land-based operations management consisted of 3 contractor and 7 company personnel who had offices and lived in Nuuk.

ICEBERG MANAGEMENT

The **Danish Meteorological Institute** issues iceberg maps once a week. These are prepared from observations from planes and ships in the area. These maps could have contained more detail but gave a fairly good picture of the situation.

Onboard West Navion the icebergs were plotted by radar with good success, reported Mr Nergaard. The difficulty was positive identification during bad weather.

In such cases extra watches were established from each bridge wing, assuming that a sight of 100 to 200 m was sufficient if a disconnect should become necessary.

Icebergs generally moved from east to west in a northwest and then southwest direction. Speed of the icebergs was normally less than 0.5 knots. These patterns were temporarily disturbed by tides. In general, more icebergs were observed and tracked than had been expected. A total of nearly 275 icebergs were identified that had the potential for interference with the operation.

Mr Nergaard noted that the following rules for iceberg management were established:

- If an iceberg got inside a 1 nautical mile radius, the rig should be prepared for a controlled disconnect;
- Exact plotting and calculation of the drift route was necessary;
- Close communication from bridge to drill floor was critical;
- Careful control of tools in BOP and timing for controlled and emergency disconnect were necessary;
- One of the anchor handlers had to be ready to tow at short notice at any time.

Anchor handlers normally started towing at a distance of 7 to 8 nautical miles to steer the icebergs outside the 1 nautical mile circle, normally in a westerly direction.

The iceberg management was very successful. No lost time was noted because of icebergs, said Mr Nergaard. At one time the vessel had to move out of position to let an iceberg pass, but this was in a period before latching the BOP on the wellhead.

CONCLUSION

The Qullec-1 operation represented an interesting and challenging task, said the authors. It is felt that the strategies established to meet the different challenges were successful.

"Considering that the combination of these challenges is a 'first off' we have to credit all involved and especially the personnel from the client Statoil for an enthusiastic and aggressive approach."

The words of Captain Fridthjof Knutsen probably represent the attitudes of the crewmembers of West Navion, said Mr Neergaard:

"The operation was OK, I see no problem in going back." ■