# Shell, Norsk Hydro to drill world's largest deepwater wells in Ormen Lange field

**SHELL E&P EUROPE** is planning the world's largest deepwater wells in Norway's offshore Ormen Lange field. Each of the eight big-bore wells will feature 9 ⅝-in. tubing and lie in 850 m of water. Ultimately, each well will produce 10-13,000 cu m/day of gas (350-520 MM scf/day. Together, these wells will supply 20% of total UK gas supply, according to **Robin Hartmann** of **Norske Shell**, speaking at IADC World Drilling 2005. This year's World Drilling conference was held 9-10 June in Rome.

Drilling is scheduled to begin on 1 Nov using **Smedvig's** drillship West Navigator. Anticipated total drilling time is 715 days.

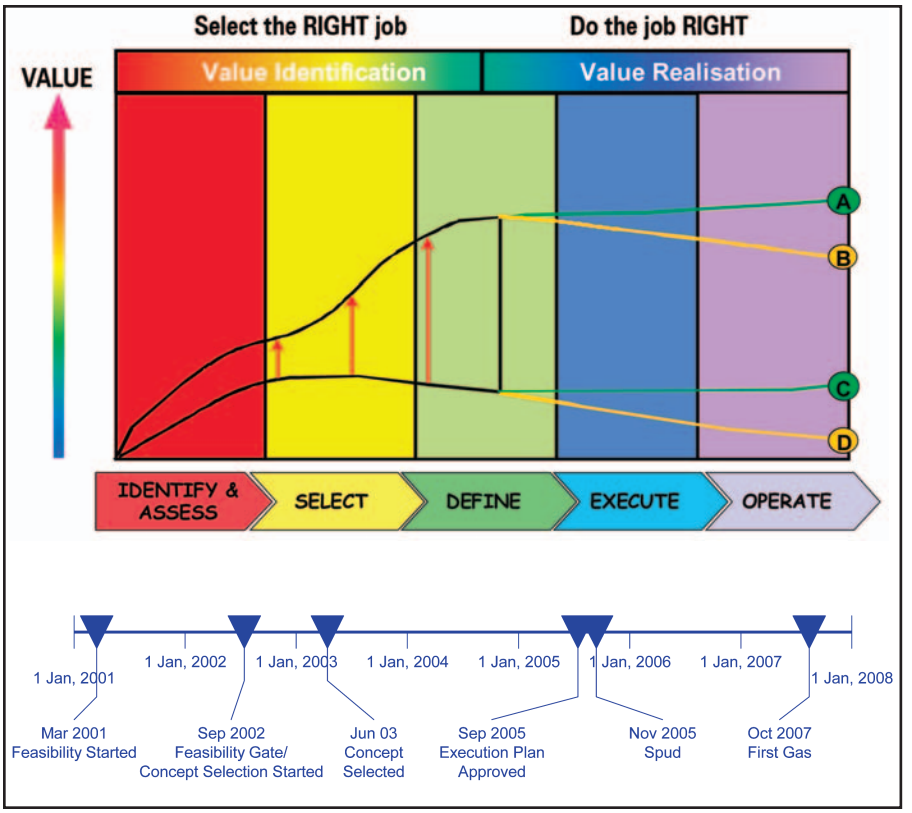
While **Norsk Hydro** is the field operator, Shell E&P designed the big-bore wells with assistance from Norwegian drilling professionals. Shell will eventually take over as operator of the field during the production phase, Mr Hartmann said.

Some 40 man-years have been invested in planning the big-bore wells since March 2001. Total investment for the wells is US $450 million.

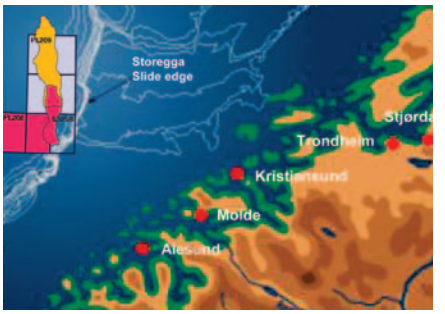
Ormen Lange lies 125 km offshore Norway in water depths ranging from 700-1,100 m and covering 350 sq km. The uneven seabed will prove a challenge for laying pipeline, Mr Hartmann pointed out.

The complete US$11 billion subsea development plan will pipe gas from Ormen Lange to the Norwegian coastal city of Nyhamna. From there, a 42-in. pipeline will transport the resource to the existing Sleipner platform, which will receive modifications and risers. From Sleipner, a 44-in. pipeline will speed the gas to Easington, England.

The reservoir lies at 2,600-2,950 m subsurface and contains an estimated 14 Tcf gas in place. However, the reservoir thickness is just 50 m, with permeabilities ranging from 200 md-1,000 md. The operators anticipate that Ormen Lange will go on stream in 2007.




Well delivery process: Planning for the November 2005 spud began in March 2001 and followed several distinct steps of option identification, selection, further definitition, execution and operation.




Big bore gas wells: Shell and Norsk Hydro will drill 8 wells with 9 ⅝-in. tubing in the Ormen Lange field, some 125 km offshore Norway.

## WHY GO BIG BORE?

Cost drove the choice of wellbore geometry. It would take fourteen 7-in. wells to match the anticipated production of the 9 ⅝-in. The Phase I pre-drilling stage of those 14 would cost US$700 million, compared to US$400 million for the eight larger wells. The decision to go big bore, therefore, produced a cost savings of US$300 million in Phase I alone.

However, the decision to go big bore brought with it certain risks, Mr Hartmann noted. First, the possibility of well control incidents merit careful study, he said. Second, these large wells include larger internal loads.

The resulting higher flowrates can also be problematic, he said. For example, erosion is a potential problem, as are vibrations and water hammer effects.

And because there are fewer wells, production is proportionately more dependent on each, so reliability is a key consideration.

"It means quality is paramount," Mr Hartmann said.

## WELL DELIVERY

Mr Hartmann highlighted two key areas in the well delivery process—selecting the right concept and implementing the right concept. Shell and its partners kicked off the feasibility study in March 2001.

"It is very important in planning these wells that the engineering is done on time," he said.

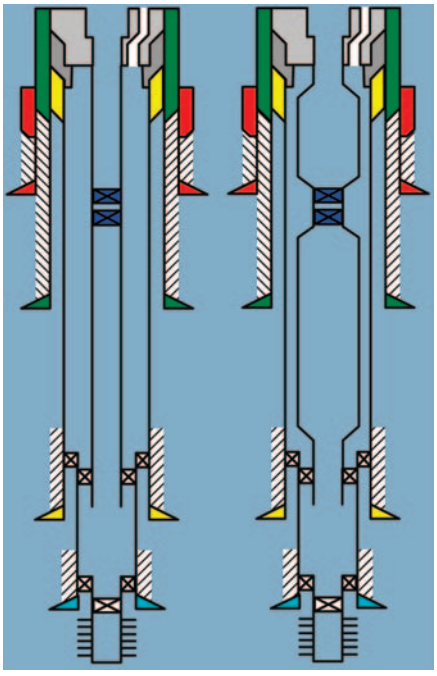
The well-delivery process established by Shell consists of 5 distinct steps from initiation to handover of the wells. First was to "identify and assess" alternative strategies. The primary activity here is identification of field development and well-design options. The process encompassed value creation through defining

Smedvig's DP drillship West Navigator, built in 2000, will drill the Ormen Lange big-bore wells.

the opportunity and working through the conceptual design. After field development and well design options were identified, all underwent a feasibility review.

Feasibility began in March 2001.

This led into the "select" step. Here, a decision review board comprising senior managers decided on the most valuable options, which then received technical endorsement. The concept was selected in June 2003.



Cost savings: Eight big-bore wells (right) will provide the same production as fourteen 7-in. wells, saving some US $300 million in predrill.

From this concept selection stage came the detail design in the "define" stage. Here, the well program is optimized and endorsed, leading to the "execute" stage, which includes drilling the well on paper (DWOP). In this stage, the execution plan should be approved in September, followed by a November spud. The final stage is "operate" the field, with first gas set for October 2007.