Deepwater Lures Statoil Back

Reprocessing of several seismic data sets acquired offshore Norway in the 1980's have demonstrated significant improvements in both resolution and structural imaging. The improvements were gained mainly through more accurate velocity modelling and effective multiple attenuation.

Thomas Smith, Associate Editor

Using their successes in the North Sea, and looking for new opportunities in international areas, Statoil is investigating the huge potential of the deepwater Gulf of Mexico (GoM) for future growth. Operating in such extreme water and subsea depths include technical challenges the company is well positioned to meet. They plan to use their ground breaking seabed solutions developed from the North Sea to economically and efficiently exploit oil and gas fields here. Simply put, their experience with improved oil recovery (IOR) enhances the value of the projects they are involved in.

Aiming for Higher Recovery

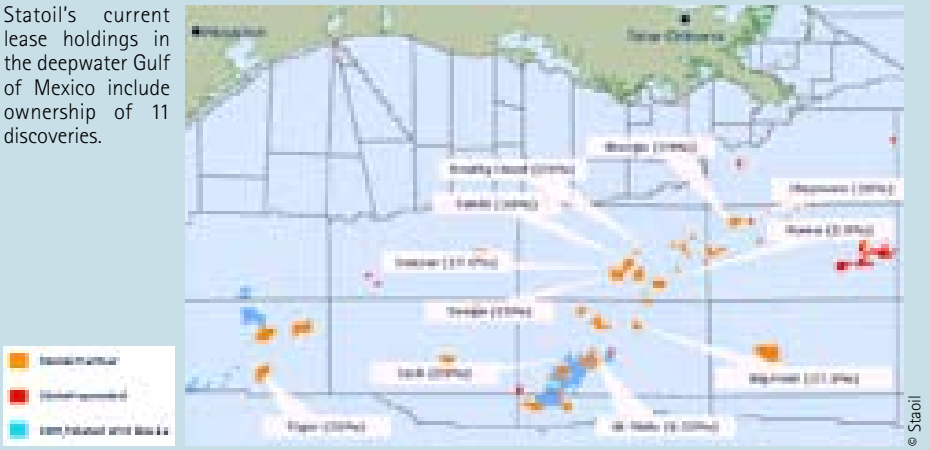
Statoil started out by farming into projects run by both ExxonMobil and Chevron so they could learn from companies experienced in the area. Next, they made a major acquisition by acquiring Canadian company EnCana's GoM portfolio. In 2005 they purchased Plains Exploration & Production's working interest in two deepwater discoveries and one prospect. Also in 2006, Statoil bought working interest in two deepwater discoveries and one prospect from Anadarko. Finally, Statoil desires to acquire new leases in upcoming sales and become a larger operator in the GoM. To accomplish all this, they have invested over $4.5 billion, staffed an office in Houston from the ground up, and have some of their most experienced experts working on solving the problems involved with production at the extreme water and drilling depths.

Photo: James Beach

Padre Island in Texas is one of a chain of 300 islands that stretches along the Atlantic and Gulf coasts of the United States from Maine to Texas. These are barrier islands that guard the mainland from the direct onslaught of storms. Barrier islands may also constitute excellent reservoir in the shallow water of the Gulf of Mexico. The huge deepwater potential, however, relies heavily on turbiditic sandstone reservoirs.

"We've secured a portfolio which provides the basis for achieving core asset status in 2012-13," observes Øivind Reinertsen, President of Statoil in Houston. "Our future strategy will be to look for new areas which can secure high production over a long period."

"Our experience with improved recovery represents an important tool. Deepwater fields in the GoM are held to offer around 30% recovery factor. We think it's possible to do better. By using experience from the Norwegian continental shelf and by applying new technology we think it will be possible to enhance value creation from fields in which we have interests."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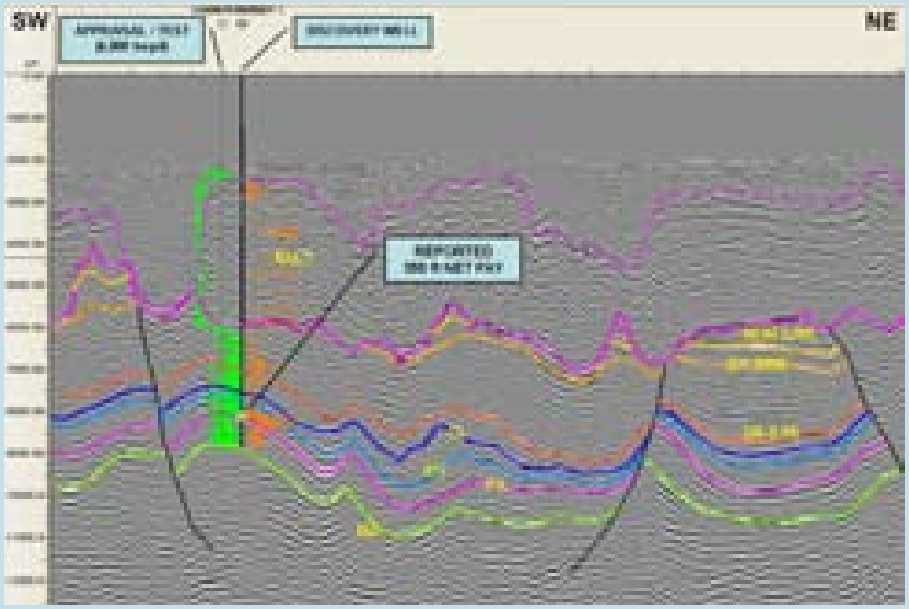
Statoil's current lease holdings in the deepwater Gulf of Mexico include ownership of 11 discoveries.

Recent Deepwater Discoveries

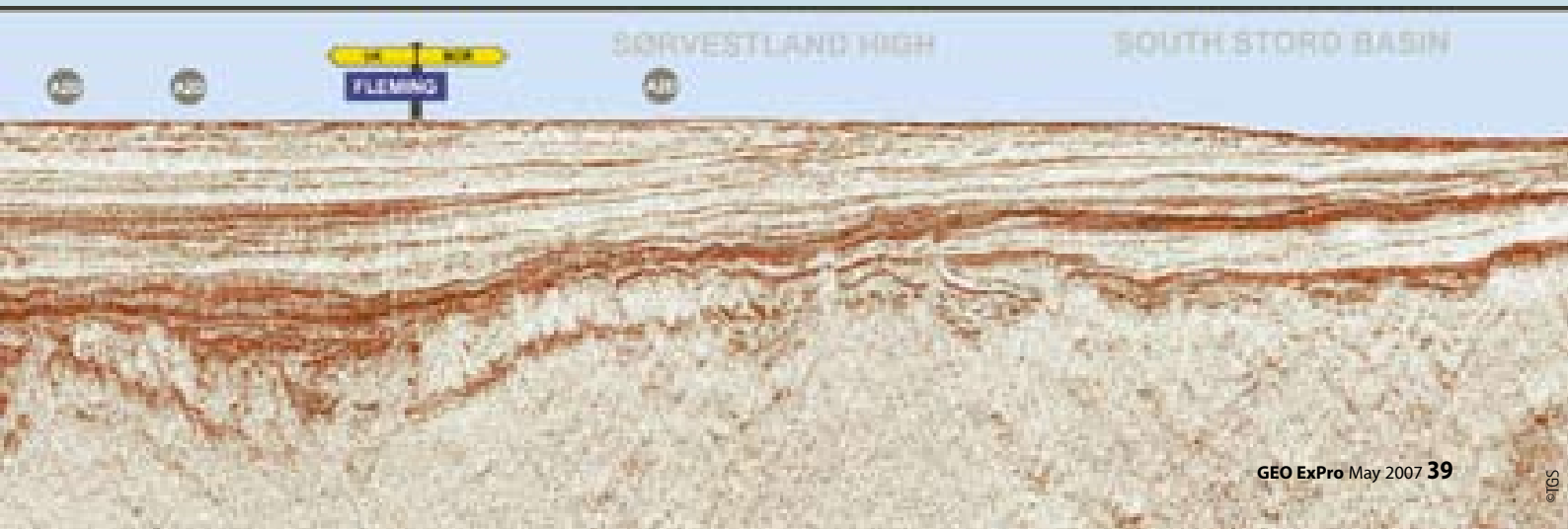
Twelve discoveries have been made in the deepwater GoM since 2001. Estimates suggest that over 3-15 billion barrels (0.5-2.4Bm^3) remain to be found.

The Jack 2 well is the most recent, and possibly the largest, discovery in the deepwater GoM to date. The discovery is located 430 km southwest of New Orleans in 2,130 m of water. Chevron, Devon Energy and Statoil announced results from well tests the fall of 2006. The well reached a total depth of 8,688 m and had a sustained daily flow of more than 6,000 barrels (950 m^3) of oil. Reserves could be considerable ranging between 200 and 400 MMbo (30-60 MMm^3), according to Statoil. An appraisal well to be drilled later this year will help to confirm reserves. Water depths, distance from shore, and formation pressures will make extraction very expensive. (**GEO ExPro v. 3, no. 4/5**, pp. 14-24 and **v. 4, no. 1**, pp. 22-33 for



Seismic line and interpretation: TGS

This seismic line across the Jack discovery, including gamma ray (on left) and resistivity well long curves, shows the subsalt, Lower Wilcox basin turbidite reservoirs (between the Paleocene (PA) and the Eocene (EO) horizons). The trap is a 4-way anticlinal closure. The other mapped horizons include Upper Miocene (MDB), Middle Miocene (DK), Lower Miocene (SB), Oligocene (OL), and finally the Cretaceous (MZ) below the Wilcox interval. Deepwater discoveries have also been made in turbidite sandstones in lower (SB) to middle (DK) intervals.



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information on the geology and recent successes www.geoexpro.com).

"The Walker Ridge Paleogene reservoirs are complex and much effort needs to be invested in studies including rock quality and permeability issues," says Michele O'Callaghan, Exploration Project Manager for Statoil in the Gulf of Mexico.

The Lower Wilcox has been an important target since the 1930's for southeast Texas and southwestern Louisiana exploration. Here, production is primarily gas from fluvial, deltaic, and shallow marine sandstones. The Jack 2 discovery extends the deepwater, turbidite play over 560 km down dip from the deltaic source (**GEO ExPro v. 4, no. 1**, p. 33).

Adding Value

Statoil believes their key to successful development of the deepwater GoM is to achieve high rates of recovery. The Gullfaks complex of fields in the Norwegian North Sea serves as a model of how their two-pronged approach has added value. IOR projects, combined with innovative subsea technology, will boost production and recoverable reserves. When production started in 1986, expected recoverable reserves were at 1.321 Bb (0.2 Bm^3), since then total reserves have increased to more than 2.2 Bb (0.35 Bm^3).

This reserve growth was achieved through extensive drilling and well intervention. A combination of gas and water injection and improving reservoir management through reservoir description, monitoring, and modeling, has enabled Statoil to obtain excellent volumetric sweep. In addition, satellite fields were exploited using new subsea technologies anchored by the larger field installations.

"Knowledge of the new sub-sea technologies allows the geoscientist to carry out early evaluation of the whole play, including the study of the smaller structures and prospects within the play. By doing so, the ultimate value of the project may be enhanced by planning for additional volumes over time," says O'Callaghan.

"We make a 3D model which is given to the reservoir engineer. This model will be used to plan for how many wells will be drilled, and where and what solutions will be chosen based on the magnitude of the field, the reservoir conditions and the oil quality."

Photo: Statoil

Øivind Reinertsen, President of Statoil in Houston, on board the Tahiti platform. The Tahiti project will be their first deepwater Gulf of Mexico development and will come online in 2008. Mr Reinertsen says "we were tempted back by the deepwater challenges".

Deepwater GoM Applications

Chevron's Tahiti development will come on stream in 2008 and will be the first to test some of the subsea technology and IOR in the GoM developed in the North Sea. Statoil's development of Snøhvit in the Barents Sea and Kristin in the Norwegian Sea test reservoir and completion conditions that will be encountered in the deepwater GoM.

The Kristin development involved temperatures of 170 degrees C and pressure of 911 bar (**GEO ExPro vl. 1, no. 3, 2004**). It is the first project in the world with these extreme conditions to use subsea installations tied back by flexible risers to a floating platform. The Tahiti field involves similar pressures but lower reservoir temperatures. The field is being developed using two subsea drill centers producing to a floating production facility. The facility will be capable of producing 125,000 bopd (20,000 m^3) and 70 MMscfpd (2.0 MMm^3) and can treat 120,000 bpd (19,000 m^3) of produced water.

Technology that originated in the GoM was used to open the North Sea for exploration and development. Now, Statoil's pioneering efforts in the North Sea to develop sub-sea systems and improve development efficiency are returning. The GoM deepwater discoveries will test their sub-sea solutions as well as the geoscientist's ability to model these complex sub-salt reservoirs. Once again, oil development in the deepwater GoM will likely lead to new innovations that can be applied around the world.