

Norwegian Continental Shelf (continued from page 5)

ing uncertainty is the amount of oil in addition to gas.

A new era of Norwegian exploration commenced in April when BP spudded the first of the Norwegian Sea deepwater wells on the Nyk High in the Vøring plateau. The well is in 1275 m of water, more than twice the previous record in Norwegian waters, and is the first of five wells planned in the next year to test licenses awarded in the 15th licensing round.

Following the BP well on Nyk High, we then expect, later on this year, new exploration wells on the Ormen Lange by Norsk Hydro as operator, on the Vema Dome by Statoil as operator and on the Helland Hansen by Shell as operator. Saga will drill the Gjallar Ridge in 1998.

There are, in addition, several other important licenses held by other operators. The initially explored licenses are independent and will open up for additional exploration in the adjoining areas.

We are talking here about several world class prospects. All the pre-drilling information available with the best technologies within seismic such as the seismic definition of accumulations, flat spots and direct hydrocarbon indicators and others suggests promising results. Success in the Norwegian Sea can add substantial reserves to the Norwegian reserve base.

When it comes to later field developments in these areas we expect to draw significantly on deep-water experiences from the Gulf of Mexico and deep-water developments in UK waters west of Shetland. Different types of Tension Leg Platforms (TLP) will be candidates. Further, floater concepts in general in combination with sub-sea installations, the Aker Spar concept and other solutions will be evaluated.

The international petroleum industry in Norway will face interesting and rewarding opportunities in the years to come and Norway will continue to be a major oil and gas producer far into the next century. The Norwegian Continental Shelf will, together with other important petroleum provinces like the Gulf of Mexico, continue to be important areas in the world for the development of new technologies and efficient ways to manage exploration and exploitation of hydrocarbons.

UK Oil Production - A Positive Outlook

By James Dyer*

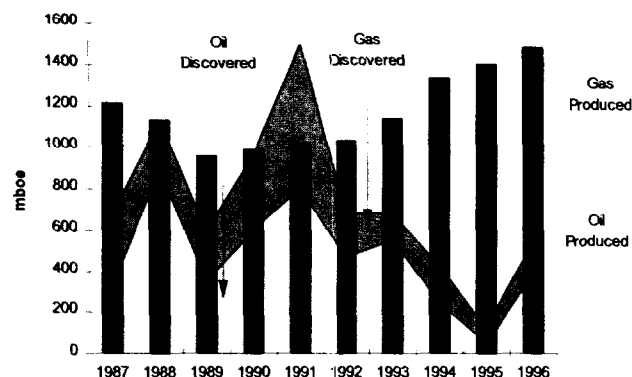
History

Offshore production from the UK Continental Shelf (UKCS) began in 1967 from the West Sole gas field. First oil production followed seven years later from the Argyll field located in the central North Sea. Since this time around 16 billion barrels of oil have been produced and some 8 billion barrels of oil (of reserves already discovered) remain to be produced. There are currently nearly 125 oil fields onstream on the UKCS which are estimated to produce 2.7 million barrels of oil per day in 1997.

* James Dyer is a Senior Consultant with Wood Mackenzie Consultants, Edinburgh, United Kingdom.

As Figure 2 highlights, for the last five years the volume of oil produced has not been replaced by new oil discoveries (at least those announced). However, there are now other less developed plays on the UKCS such as the West of Shetlands and Rockall Trough where exploration activity has recently been refocused. This has led to a number of significant oil and gas discoveries, with the first development, the BP-operated Foinaven field, due onstream in the second half of 1997.

Figure 2
UK Continental Shelf Production and Discovery Rates (1987-1996)



Business Environment

The future production from UKCS is governed by the business environment in place now and in the future. For new reserves to be discovered there must be an incentive to drill. For reserves already discovered to be brought onstream, there must also be an incentive to develop. These incentives are influenced by both factors specific to the UK and those that are applied externally.

Incentives to drill include the prospectivity of the target province (the chance of finding hydrocarbons). Although the majority of the UKCS' oil and gas provinces are mature there is still geological potential. Of the 83 exploration wells completed in 1996, 17 (or 20 percent) found oil, gas or condensate. Although not a vintage year for exploration success, this compares to a 30 percent average for the UKCS since 1965. Indeed, the disclosure of further discoveries will increase this percentage.

The key area of interest during the most recent UKCS license round was West of the Shetlands where there have been a number of significant oil and gas discoveries. Recently BP announced the discovery of the Suilven oil field which is estimated to contain some 150 million barrels. This is the largest oil discovery since BP found the Schiehallion field, likewise located in the West of Shetlands. The size of the discoveries in this area highlights its importance as a new province and attracts companies requiring significant finds to replace reserves produced.

In so far as the UKCS offers some geological potential, there will be competition for E&A funds between regional divisions of international companies. Other hydrocarbon-bearing regions may offer greater prospectivity; the decision to invest in the UK as opposed to elsewhere will, in part, be influenced by the companies' reserve replacement strategy. Some companies may focus their E&A activity outside the UK.

While the UKCS prospectivity may be on the decrease, most new discoveries are commercially viable due to the intensity of infrastructure already in place and the current fiscal regime.

The upstream fiscal regime is one of the most attractive in the world; the marginal rate of tax is 33 percent for all new field developments post March 1993 and 71 percent for all mature fields. Finally, in the past, the government has been keen to promote political stability, timely development approvals and has withdrawn from state participation. The recent change in government is unlikely to alter this position. The business environment in which companies active on the UKCS operate, reflects the maturity of the province and the competition for E&A and development funds worldwide.

Costs

It is important to remember that oil exploration and production is essentially a commodity. The key to success in any commodity business, particularly one where prices have been so volatile in recent years, is cost control. Although typical North Sea unit costs are significant, the UK industry has been successful in controlling both capital and operational expenditure.

This has in the main been achieved in three key areas:

- Technical innovation (multi-lateral wells, subsea developments and floating production systems – FPS)
- New project financing arrangements (leasing of FPSs)
- CRINE Network program (new business and working practices, contract alliancing and standardization).

Interest in the UK Continental Shelf

On a commercial basis (as opposed to a pure geological one) the UKCS remains an attractive investment area. This is demonstrated by the influx of new players (particularly North American) on the UKCS. These companies are keen to build a position in the UK as a low risk stepping off point for international diversification outside their own mature domestic basins.

In addition, as the oil majors move out to frontier regions, opportunities will continue for “second tier” companies to acquire mature assets. Through their more cost efficient operational bases in the UK and further capital investment (in-fill wells and water injection for example), these companies may realize greater value from remaining potential in the fields and surrounding acreage. This will extend the production life from mature assets and help slow the decline of the UK’s oil output once the peak is passed in coming years.

Conclusion

The UKCS is a mature province. However, it will remain an attractive area for oil companies to operate given the commercial viability of their reserves and the continuity of the political and fiscal regimes.

This is demonstrated by the interest shown by both existing and new entrants to the UK. The incentive to explore, appraise and develop within the UKCS is also evident from the increase in E&A activity and investment in mature assets.

Oil production from the UKCS may peak towards the end of the century at around 3 million barrels of oil per day. Further discoveries and the successful management of mature

producing fields will result in the decline in oil output being gradual. Consequently, the outlook for the UKCS is positive.

Oil In Angola

*By François Collignon**

From the oil standpoint, Angola forms part of a regional system – West Africa – comprising five countries around the Gulf of Guinea: Nigeria, Cameroon, Gabon, Congo and Angola, together with Chad, which could become a producer in the year 2000, and small fields in Ivory Coast, Equatorial Guinea and Zaire.

In total, this system, which holds about 3 percent of world crude reserves, contributed 5.5 percent of world oil supplies in 1995 with production of 170 million tonnes (3.4 million b/d). Angolan production during that year was 31.5 million tonnes (630,000 b/d), making it the world’s 23rd largest producer and the second in sub-Saharan Africa.

Recent discoveries under deep offshore waters are likely to enhance this position and give a new impetus to the oil business in this country.

History

The hydrocarbon reserves in Angola, like those in Congo and Gabon, are associated with the formation of the South Atlantic, the history of which began some 165 million years ago.

Oil exploration has been concentrated in the three coastal sedimentary basins: lower Congo, Kwanza and Namibia. Exploration of pre-saliferous series resulted in a few discoveries in Cabinda. This is far from being complete but has to cope with the technical problems raised by the salt deposits as regards the propagation of seismic waves. Until recently, the exploration of the post-saliferous series was the major theme, mainly in the compensating anticlines geographically located in the conventional offshore area; in other words, at depths of less than 200 meters. In recent years there has been renewed interest in the tertiary turbidite deposits mainly located in the deep offshore, which is at present being rapidly developed.

Although oil exploration began as early as 1906, it was not until 1955 that an initial field of very modest size was discovered onshore close to Luanda by Petrofina. After fruitless exploration in the onshore enclave of Cabinda lying between Congo and Zaire, Gulf began exploration at sea and in 1966 discovered the Malongo field, Angola’s first offshore field. Work then intensified and by the time of its independence in 1975 Angola already had 23 fields producing about 175,000 barrels a day, practically all from Cabinda, making Angola the third largest producer in the region after Nigeria and Gabon.

After Angolan independence, the oil sector was thoroughly reorganized: a national company – Sonangol – was established in 1977, and Act 13/78 regulating oil activities in Angola was promulgated on 20 April 1978. This Act authorizes Sonangol, as holder of all mineral rights, to conclude contracts with foreign companies on terms that must be

* François Collignon is Angolan Coordinator, Elf Aquitaine, Paris, France.

(continued on page 8)