

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Finally, in the past, the government has been keen to promote political stability, timely development approvals and has withdrawn from state participation.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

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approved by the government.

Within this framework, Sonangol began in 1980 to negotiate with a number of companies for the award of 13 Blocks covering the whole of the Angolan offshore region at depths of under 200 m, except for Cabinda. This strategy of openness, allowing free play to competition, subsequently confirmed by the award of deep offshore Blocks, has generally proved its worth since all the main oil companies (except Conoco which left in 1993) are present in Angola.

Elf was awarded Block 3 in May 1980 as operator with a 50 percent interest. The same year Blocks 2 and 6 were awarded to Texaco and Total, respectively. Gulf also made a new significant discovery at Takula. In its first drilling operation Elf hit the bull's eye with the Palanca discovery in 1981. Pacassa was discovered the following year. Block 1 has been awarded to AGIP and Block 9 to Cities. In 1985, output at Cabinda reached 200,000 barrels a day, and Palanca came on stream. Following AGIP which acquired a participating interest of 9.8 percent in the Cabinda association where Chevron took over Gulf's in 1987, Elf took its turn in 1991 and obtained an interest of 10 percent.

In 1992, the deep offshore areas were opened up and Blocks 15, 16 and 17 were awarded to operators Exxon, Shell and Elf, respectively. Shell made the first deep offshore discovery with Bengo in 1994. Chevron was awarded Block 14 in 1995. Blocks 18 and 20 were awarded to Amoco and Mobil in 1996. The same year, Elf made the Girassol discovery. Today practically all the offshore area has been allocated, except for a few deep offshore blocks and the ultra deep offshore area to which the entire industry is now turning its attention.

### Legal and Contractual Framework

Within the joint venture or concessionary approach, which is applied only to areas that were producing before independence (offshore license at Cabinda operated by Chevron and the onshore licenses for lower Congo and Cuanza operated by Fina), Sonangol and the companies work together and have access to production in proportion with their share in the association. The fiscal system is conventional with royalty and taxes.

The production sharing contract is applicable to virtually all the Angolan offshore area and to the Cabinda onshore licenses. The operator and his partners constitute a Contractor Group which acts on behalf of Sonangol which alone holds the mineral rights. Under the general arrangements in this type of contract, the Contractor Group runs the operations and is responsible for all funding (exploration and, as appropriate, development and operation). Once a field has been developed, part of the output – the cost oil – is shared between Sonangol and the contracting group. The share of the profit oil allocated to the companies is subject to 50 percent tax.

### Current Developments

Oil output in 1996 reached the record level of 690,000 barrels a day, 9 percent up on 1995 (627,700 barrels a day). Chevron is the leading operator in the country: its production reached nearly 400,000 barrels a day in 1996, or a little under 60 percent of national output. This output comes from the

three zones (A, B and C) of the Cabinda concession where Chevron has a 39.2 percent interest. As a result of current developments in zones B and C (Kolongo, Sanha and N'Dola, Nemba Sud and Lomba) and of those that will shortly be decided (water injection in zone A, Nemba Nord) output from Cabinda could exceed 500,000 barrels a day by the year 2000. Although it has been explored for a very long time, this particularly prolific province is continuing to be the site of numerous discoveries. Chevron is also the operator in Block 14 offshore from the Cabinda concession and recently made a promising discovery there.

Elf is the operator in Block 3 where it has an interest of 50 percent, and produced 170,000 barrels a day in 1996. The important developments come to an end in 1997 with the drilling of the last Cobo/Pambi wells, the introduction of gas lift in most of the existing fields, and Oombo expected to come on stream in the autumn. With an eye to the future, and in order to renew its reserves, Elf has acquired interests in two of the new deep water licenses which the government offered in 1992. Thus Elf is operator in Block 17 and also involved in Block 16 operated by Shell. Drilling carried out over the last three years led in particular to the discovery of Girassol in Block 17 where appraisal work has just confirmed the importance of the discovery made.

The third large producer is Texaco, operator of Block 2, which produced 95,000 barrels a day last year. A number of current developments suggest that output might increase by 10 to 20 percent over the next few years.

As an onshore producer, Petrofina is building up its output at Soyo (8,000 barrels a day) and will shortly reach 20,000 barrels a day. Finally, Sonangol (Block 4) and AGIP (Block 1) produced 5,000 and 2,000 barrels a day, respectively in 1996.

### Outlook

This situation suggests that national output should increase steadily and probably reach 800,000 barrels a day before the year 2000, essentially from Cabinda and the near offshore region in shallow water close to the coast. However these prospects could soon be modified as a result of the recent discoveries made in the deep offshore zone: Girassol, Bengo and, very recently, Block 14, not forgetting those of Total in Block 2.

Girassol is ELF's second exploratory well in Block 17. The discovery made in 1995 under 1365 meters of water was followed by a 3D seismic survey, which was shot and analyzed in record time by processing the recorded data on board. An appraisal well drilled in the winter of 1996-97 confirmed the extent of the discovery, with production tests giving a cumulative output of 18,000 barrels a day. Reserves of at least 500 million barrels are expected and an output of 150,000 barrels a day is predicted for the year 2000. These results and the potential of the zone have boosted the general rush to Angola by the "majors" and oil companies in general.

The estimated figures for seismic and drilling activities in deep water speak volumes, because of the 76 exploration and appraisal wells expected to be drilled by the year 2002, about 30 will be deepwater exploration wells. Also, 3D seismic surveys are coming into general use for drawing up the "inventory" of new zones.

Against this background, the opening up of the deep offshore Kwanza basin (three blocks now being awarded and