CHAPTER - IV
YEMENI OIL SECTOR
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1) RETROSPECTIVE GROWTH AND PROSPECTIVE DEVELOPMENT SCENARIO:

Despite many odds, Yemen has come a long way in striking oil in modest quantities and, at the same time, it is still to go quite a long way to strike it rich like some of its closer Gulf neighbours such as Saudi Arabia or Oman. It may said to be still in the midway of its goal of becoming a major oil producer, provided it will continue to find new deposits of economic significance. Actually, it has been a little saga of about three decades of efforts for Yemeni people to succeed in locating first of the moderate oil reserves and three more years to witness the great event of the crude oil gushing out for the commercial exploitation. However, this long delayed process was characterized by the sporadic efforts in the earlier decades mainly due to political instability and techno-economic resource crunch.

In the present chapter, an attempt is made to highlight the Yemenese path to the present stage and the likely scenario of prospective hydrocarbon sector's development in the 1990s. In its scope, it also takes into account the concessions, royalty and other facets of exploration, production and distribution agreements with the oil companies operating in Yemen and the oil infrastructure. The utiliza-
At the outset, it may be mentioned that the present chapter is based on the information and the relevant data that are available from the limited sources, both government and Non-government agencies. The main sources, from which much of information is culled to provide the basis, are as shown below.


2) OIL EXPLORATION:

2.1 Early Efforts in North Yemen:

Historically, the earliest effort in oil exploration dates back to 1953, when the North Yemen government entered into an agreement with a West German firm. This firm was entrusted with the work of oil prospection in a coastal
zone north of Hodeidah. However in 1955, this German effort proved a short lived one consequent to a license covering 40,000 Sq.Km., in almost the identical area, was awarded to an American firm. Even this was abortive due to capital shortage and the firm withdrew a few years later. Next, in the year 1959, the American Overseas Investment Corporation was awarded a concession of 10,000 Sq.Km. in the Tihama coast and its adjacent waters. However, this company did not sink any exploration well at all. The exploration rights to this area were reassigned to John Mecom Company in 1962. However, the four exploratory wells it drilled stopped dry and the civil war subsequently put an end to its operations.

In 1964, Yemen established a joint venture to conduct the exploration, namely, Yemen Fuel company in collaboration with Egypt and in 1970, it set up the Yemen Oil and Mineral Industrial Company, another joint venture with Sonatrach of Algeria. However, both the joint ventures were dissolved in 1972, due to Yemen’s inability to fulfill its financial obligations. Nevertheless, in 1973 the government created the Yemen Oil and Mineral Corporation (YOMINCO), which became North Yemen’s National Oil Company. In the same year, a new company called Yemen Fuel Company was set up with the state owning 51 per cent share and the Yemen Bank for Reconstruction and Development, a semi-public establishment, the other 49 per cent.

In 1974, a subsidiary of Deutsche Shell, called Yemen Shell Exploration (YSE) was given exploration rights
over a 19,000 Sq.Km. offshore area in the Red Sea, between the Port of Hodeidah and the Saudi Border. However, the drilling operations carried out by the company in 1976 did not bear results and YSE relinquished its right in early 1977. Later in the same year, Shell obtained a new license and began geological and seismic surveys in 1978. Even these efforts proved futile and it relinquished its concession in 1981.

The 1980s also witnessed several attempts in exploration and drilling proving abortive and in some cases, wells drying up too soon after spudding. Among these, the prominent ones are mentioned here. Firstly, the British Petroleum in a 22,000 Sq.Km. area in Tihama Coastal Plain began the quest in 1984 and after the seismic surveys relinquished the acreage in early 1990. Secondly, the Exxon has had the similar experience during 1985-88 in a 22,000 Sq.Km. acreage in the central plateau. It relinquished the license after completing seismic survey and drilling of two wildcats. The Exxon acreage was taken over by Texaco in 1989 but met with the same fate after drilling two dry holes and relinquished the claim in 1990. Thirdly, the French company, Total CFP made unsuccessful attempts in Al-Mukha acreage, South of Tihama plain. Its onshore and offshore explorations jointly with Texaco (50% interest) ended up with the first well, Jambiyya lasting only three months before going dry in 1989. Fourthly, a similar pattern was seen in the unsuccessful attempts by Elf Aquitaine of France in part onshore and part offshore...
Abyan acreage close to the Shabwa region. It entered into farm-in-agreements with two British companies in 1988. After the marine seismic surveys, the group spudded its first wildcat, Amran I, in December 1989. However, this well stopped dry and the group relinquished its claim by the end of 1990.

Lastly, even Hunt Oil failed to find oil in two tracts jointly with other companies. Its offshore drilling in the Red Sea, north of Hodeidah, with the help of Elf Aquitaine, its first well, Al-Meethaq I dried up. As a result, the latter pulled out of the partnership agreement. Later, Hunt Oil engaged Santa Fe to drill a second offshore exploration well Al-Meethaq II in November 1987. However, this also was stopped dry in February 1988 and the company promptly relinquished this acreage. Before proceeding with the successful part of the oil sector in North Yemen, it may be necessary to digress here to see the scenario of early efforts of exploration in South Yemen.

2.2 Early efforts in South Yemen:

In South Yemen, the oil exploration actually began even before its counterpart, the North Yemen. The very first effort was in the year 1938 when the Governor of Aden granted a concession to an affiliate of Iraq Petroleum Company, covering the entire land area. However, after failing to make any discoveries, the company withdrew in 1960. Then in 1961, the American International Oil Company, an affiliate of Standard Oil of Indiana, was awarded two acreages in Hadhra-
maut and Mahara regions. However, the company relinquished both concessions in 1967 after extensive surveys and drillings (dry well). In 1971 the Yemen National Petroleum Company (YNPC) with Sonatrach of Algeria conducted several seismic surveys in the South-Eastern Part and gave up after drilling one dry well. This joint venture was liquidated in 1976 and assets were taken over by Petroleum and Minerals Board (PMB).

Moreover, during 1972-76, the Chinese, Russians, Cubans and Canadians conducted explorations in several parts of the main land and around Socotra Island for six years. In all, eight wildcats were drilled without any success.

Since September 1979, South Yemen embarked upon organizing exploration bidding and offering more attractive production-sharing terms for new licenses. Besides, the government itself decided to participate in the national exploration effort and seek foreign aid to finance oil exploration operations. Accordingly, the Petroleum Exploration Department (PED) was established in 1980 to conduct surveys and supervise the activities of foreign companies. It formed a survey team with the technical help of the Compagnie Generale Geophysique (CGG), a French firm. In keeping with the new policy, the government also raised two foreign loans; one from IDA of World Bank (U.S. $ 9 million) and another from the then Soviet Union (U.S. $ 56 million) to finance explorations and construction of oil and minerals laboratory. This was followed by awarding in 1980 an exploration license for an acreage in the Shabwa basin to Soviet Technoexport. By
1984, the seismic surveys totaled 2,20,000 Km. of lines and drilling of 20 wildcats of which one yielded small discovery and 13 shows. However, the exploration activities were interrupted for some period following the violent unrest that broke out in Aden in January 1986.

During the period lasting from late 1970s to mid-1990, there were three production sharing agreements, eventually relinquished by the time of unification with North Yemen. The companies involved were Agrip SPA of the Italian ENI group in the Gulf of Aden, Braspetro in the Haurin-Ghayada Block and Independent Petroleum Group (IPG) a Private Kuwaiti Company in the region of Bahalf. All these encountered dry wells or wells that stopped dry soon.

2.3 Early Successful Efforts:

In North Yemen, it was in the Marib-Jawf basin where the Hunt Oil Group made its first successful discovery of oil with its Wildcat, Alif No.1 which was spudded on January 31, 1984. This well was located 40 Km. North-East of Marib and reached a depth of over 13,000 feet in July 1984, yielding a flow of 4,612 barrels per day on tests. Additional tests yielded a flow of 3,690 barrels per day. Following the Alif's commercial level discovery in 1984, drilling in neighbouring zones in 1985 and 1986 resulted in significant oil discoveries in the Wadi Al-Jawf region. Four fields were found at Azal, Raydan, Kamran and Balqis. The Azal discovery well was tested at 5,400 barrels per day and it was promising one for development. Three more reservoirs were discovered
within a 30 Km. radius of Alif. At Meem both oil and gas flowed while at Lam and Ya gas was found. Several small structures in nearby areas were developed at the same time, yielding a combined production capacity of 7,000 barrels per day.

On the other hand, the quest for oil in South Yemen continued more intensively by the Technoexport of the then Soviet Union. It struck oil in Shabwa region, which was adjacent to the Marib-Jawf acreage in North Yemen where Hunt Oil had made a major oil discovery. The crude discovered in Shabwa in December, 1986 was very light with low sulphur content. The first find at East Iyad was followed by two more at West Iyad and Amal. After the necessary tests, the three discovery wells were declared commercial in April 1987. At the same time, substantial reserves of natural gas were also discovered in the same region. At the beginning of 1989, South Yemen’s oil production averaged 5,690 barrels per day, transported by trucks to Aden refinery for processing. With the completion of production facilities at Shabwa, the output of oil was expected to reach 30,000 barrels per day in 1990.

3) **EXPLORATION AND PRODUCTION SHARING AGREEMENTS**

Even before their unification in May 1990, the North and South Yemen governments had adopted a number of measures to facilitate the exploration activities of foreign concerns. These measures included exemptions from customs duties and import and currency restrictions in place in North and South Yemen, from import licenses for equipment and
materials used for exploration and development of the areas from customs duties on those supplies. The concessions and facilities to create atmosphere were required to lure the foreign companies to undertake elaborate and often heart-breaking exploratory exercises. The attractive terms and other conditions were also required to be offered for the subsequent production sharing agreements in view of the huge investments, technology and risk and uncertainty factors involved in this sector.

3.1 Agreements Signed Before Unification:

Among the agreements entered into that were assigned before the unification in May 1990, seven are currently in force. Two are in the North of the country, four are in the South and one in what was the border region between the two Yemens. The two groups still operating in North are Yemen Hunt Oil Company with Exxon and Phillips with IPC and Monument Resources. In South, the companies or consortia operating are a consortium of:

- Canadian Oxy, Consolidated Contractors International Company and Peeten;
- Total of France with Kufpec, Unocal and Peeten;
- Elf Petroland BV and;
- Petro-Canada.

In the former border zone, a joint exploration company of North and South Yemen governments was to operate in the not-so-well demarcated border areas. Even this joint
venture involved some foreign concerns to carry out the operations.

3.2 Agreements Signed After Unification:

By early 1993, the Republic of Yemen government had assigned some 34 tracts out of a total of 42 blocks delineated in the unified country. In addition to seven agreements already in force, a further 17 tracts were awarded to 14 licensee groups in the first two years after unification. Another 11 tracts were provisionally awarded to ten companies or Consortia during the period of July 1992 - March 1993. Another development in the post-unification period has been the exit of Technoexport from the Shabwa concession in the South. In view of its slow progress, the new government had decided to break up this concession and offered two blocks under the new production sharing terms. The Technoexport refused the offer and relinquished the license. The whole area was given to other foreign concerns under the agreements containing the following basic conditions.

3.3 Basic Conditionality of Agreement:

A) EXPLORATION PHASE:

It involves spending of U.S. $10 million to 30 million and drilling of two to five wells in the first phase of four to six years. Signature and production bonuses also payable.

B) DEVELOPMENT PHASE:

This extends to a period of 20 years initially and renewable for a further period of five years.
C) COST OIL :

It ranges from 20 per cent to 30 per cent of crude oil production.

D) ROYALTY :

It varies from a minimum of 2.5 per cent of production rising to 20 per cent in excess of 1,50,000 - 1,75,000 barrels per day.

E) PRODUCTION SPLIT :

Government share of 72 per cent on output up to 25,000 barrels per day rising to 75-82 percent between 25,000 and 50,000 barrels per day and, to a maximum of 92.5 per cent over 1,75,000 barrels per day 1/.

The above shows only the general nature or broad range of basic conditions. The actual agreement and specific conditions and terms vary for different licensees depending upon the factors like, nature of operation, area, extent of the block, etc. The details of basic conditions in the case of 16 licensee companies or consortia are charted out and appended to this chapter. This Appendix (see charts) gives licensee-wise details in respect of the following eleven items of particular.

1. Name of the Licensee.

2. Effective Date of the Agreement.

3. Area of Assignment.

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4. Exploration period, sub-divided into the initial, the second and the third exploration period as the case may be.

5. Working Programme and Minimum Expenditures for the above mentioned three periods.

6. The Period of Development.

7. Terms of Relinquishment:
   (a) Mandatory and (b) Voluntary


9. Royalty.

10. Production sharing after Deducting Cost Oil and Royalty.

11. Bonus: (a) Signature Bonus, (b) Training Bonus,
    (c) Institutional Bonus and (d) Production Bonus.

4) RECENT DISCOVERIES:
The Canadian Oxy, the subsidiary of Occidental Petroleum has emerged as the most successful operation in unified Yemen. It has added five finds on South Masila (Block-14) in 1992 and a sixth one in 1993. Canadian Oxy also drilled several appraisal wells in 1992. In all, it has completed a total of 37 exploration and appraisal wells on the Masila tract; of which 28 flowed oil. Similarly, the French Total Company also made good stride in Jannah area, two of its wells yielding over 10,000 barrels per day in 1992. In 1993, it struck oil in two other wells in the East Shabwa, producing 12,000 barrels per day of crude. Elsewhere on the same acreage it had earlier struck gas and condensate with its first two wildcats. The West Iyad field in the Shabwa region was restored on stream towards the end of 1992.
It had remained shut down for some period after technexport pulled out. The field is now exploited by the Saudi-owned Nimir Petroleum. In early 1993, the total oil production was running in the range of 1,80,000 - 2,00,000 barrels per day. Meanwhile, a third big oil region has been discovered in the Masila area and due to enter production in September 1993 and expected to reach the production level of 1,20,000 barrels per day. It is estimated that by the end of 1993, the Yemeni oil production may cross 3,00,000 barrel (per day) mark 2Z.

5) RESERVES AND PRODUCTION:

5.1 Reserves:

So far it has been seen the Yemeni efforts to explore the oil and gas resources across its terrain and off-shore sites. The attention may now be turned to see the situation in regard to the reserves and actual flow of production. The position of reserves, at the best, may be estimated and tends to be in broad terms. In this direction, an independent study of the proven oil reserves of known oil fields in Yemen is now being carried out. This study has been entrusted to Intera Information Technologies (IIT), a firm based in U.K. The ongoing study has been commissioned by the Ministry of Petroleum and being part financed by the World Bank. However, the findings of the study are yet to be made available.

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2. Ibid, Page 499.
According to the Arab Oil and Gas Directory, Yemen's proven oil reserves were estimated at four billion barrels on January 1, 1993. These are concentrated in three areas, namely, The Marib-Jawf Tract in the North and The East Shabwa and Masila Tracts in the South. On the other hand, the natural gas reserves are put at 15-17 trillion cubic feet and mostly consist of associated gas. This figure, however, may have excluded the natural gas and condensate fields discovered by Total on the Jannah Tract 3/.

5.2 Production:

The production of crude oil, in terms of barrels per day, which stood at 1,89,000 in 1989 increased by two per cent to 1,93,000 in 1990, by another two per cent to 1,97,000 in 1991 but fell by 13.7 per cent to 1,70,000 in 1992. The fall in the output was ascribed to some technical problems and rising gas/oil ratios at the Alif field. The down trend was likely to be reversed if the output in the early 1993 could be of any indication as it was streaming out at around 1,80,000-2,00,000 barrels per day. On the other hand, the estimates of production capacity of crude oil reveals the rising potentiality. The capacity was estimated at 2,20,000 barrels per day at the end of 1991 and it amounted to the range of 2,30,000-2,40,000 barrels per day at the end of 1992. Nevertheless, the commencement of the initial fields on the Masila Tract, scheduled for September 1993, would be expected to increase the capacity to over 3,00,000 barrels

per day by the end of 1993. Moreover, the other fields at Shabwa, Iyad and Amal, on the verge of production, will boost the production capacity to cross the mark of 4,00,000 barrels per day in 1994, 5,00,000 barrels per day in 1995 and reach 7,50,000 barrels per day in 1996. Eventually, the government hopes to achieve the crude production capacity of one million barrels per day by the end of the century 4/.

6) INFRASTRUCTURE FOR OIL INDUSTRY:

The comprehensive development of hydrocarbon sector involves other supporting infrastructure facilities such as storage tanks, pipelines, pumping stations and oil terminals for transport to refineries and ports for processing and shipping. The domestic oil and gas infrastructure, especially the refinery and gas filling plants, will strengthen the export promotion and import substitution aspects. In the following are presented the available information on the main aspects of these supporting facilities.

As regards oil transport, the pipelines form an important component. The Marib-Ras Isa network started up in 1987 consists of a 438 Km., 24/36 inch pipeline running from the Marib oil fields to the deep sea port of Ras Isa on the Red Sea. It has a capacity of 2,00,000 barrels per day which could subsequently be increased by 100 per cent through the installation of additional pumping stations. This network has three pumping stations, two processing plants, 186 Km. subsidiary pipelines for gathering oil from the Alif and neigh-

bouring fields. It has been provided with an offshore section of the pipeline, for a length of 8.5 Km. from the Port Salif to the storage tanker.

The Shabwa-Rudhum network of pipeline, constructed in 1990-91 is a 204 Km. long 20" pipe, linking the Shabwa fields to the Rudhum terminal on the Gulf of Aden. It has a capacity of 1,35,000 barrels per day at present which could be raised to 2,00,000 barrels per day through the installation of additional pumping stations. It provides for three pumping stations, two storage tanks and a Single Buoy Mooring (SBM). It has a floating storage facility as well and operational since 1992.

The Masila-Ash Shihr Complex is the third export pipeline, now being built from the Masila fields to a terminal near Ash Shihr on the Gulf of Aden. The pipeline is 150 Km. in length and 24 inches in diameter, the initial capacity being 2,00,000 barrels per day with a proviso for additional 2,50,000 barrels per day. Besides, the complex will have storage facilities at the central production station at Masila and a two million barrel tank farm at the export terminal. Besides, a single point mooring is to be installed at the terminal to berth large tankers. The work was scheduled for completion by the end of 1993.

Furthermore, the Yemeni Ministry of Petroleum is also considering the possibility of constructing a link between the two existing export pipelines to provide commercial
and strategic flexibility for oil exports as also a spur line to the Aden Refinery 5/.

7) OIL REFINING:

Presently, Yemen has two oil refineries, the old one at Aden with a capacity of 1,70,000 barrels per day and the new topping plant at Marib with 10,000 barrels per day capacity. Both are managed by the Yemen Refining Company in the public sector. Despite the theoretical capacity, the plants could not refine more than 1,25,000 barrels per day of crude in 1992. This is entirely due to aging Aden Refinery, actually a forty year old plant operating on the effective capacity of less than 1,20,000 barrels per day. It may be of interest to briefly retrace the unique role played by the Aden Refinery in Yemenese economy and view the present plans for its modernization and expansion.

7.1 Aden Refinery:

It was built by the British Petroleum (BP) and became operational in July 1954, with an initial capacity of five million tons per year. Subsequently, the capacity was increased to 8.5 million tons per year (1,70,000 barrels per day) with two identical distillation units. In May 1977, the government of South Yemen nationalized the refinery though retaining British Petroleum to provide technical assistance. Although South Yemen did not have any oil production, the Aden Refinery was providing the processing facility to other

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5. Ibid, Page 517.
oil producers on the basis of fees or service charges. In view of its strategic location and excellent harbour infrastructure, the Aden Refinery was always in demand for contract processing.

Prior to Gulf crisis, the refinery was processing a little over 1,00,000 barrels per day of crude under contract for foreign customers. These included Iraq (30,000 barrels per day), Kuwait (20,000 barrels per day), Iran (20,000 barrels per day), the then Soviet Union (12,000 barrels per day), the Petrovas of Malaysia (10,000 barrels per day) and Coastal of the U.S.A. (10,000 barrels per day). However, consequent to the U.N. Embargo on Iraq, the Aden Refinery lost the deliveries from Iraq and Kuwait as also from its other customers, virtually putting an end to its contractual business. In addition to foreign crude, the Aden Refinery prior to Gulf crisis was producing more than 30,000 barrels per day of refined products for domestic consumption from crude oil feed stock comprising 10,000 barrels per day from the West Iyad field and 23,000 barrels per day supplied by the National Oil Corporation of Abu Dhabi.

In all, the refinery processes 4.2 million tons of crude in 1990, 0.7 million tons more than the previous years’ average. However, in 1991, it was operating at about 65 per cent of its capacity by the end of the year, processing between 1,10,000 and 1,20,000 barrels per day of crude. The domestic market absorbed about 50,000 barrels per day of the output in 1991 and the rest was exported. During the same
year. Marib crude accounted for about half of its output. Besides, the Aden Refinery started receiving foreign crude for processing and accordingly about 60,000 barrels per day of Omani and Iranian crude was refined. The Petrovas of Malaysia concluded a deal in 1992 for processing 50,000 barrels per day.

The process of expansion and modernization has been going on since 1990. The improvements that have been made include innovations in dock facilities, achievement of new output in asphalt production at a capacity of 1,00,000 barrels per year and provision for greater harbour depth. In addition, the construction of a new tank farm, comprising 16 tanks with a total capacity of 2.2 million barrels of crude oil and refined products and building two new loading and unloading jetties at the refineries harbour were completed in 1992 6/.

7.2 Marib Oil Refinery;

Marib Refinery is actually a topping plant, located 56 Km. East of Marib to process the crude from Marib fields. The capacity of the plant is only 10,000 barrels per day. It was built by Yemen Hunt Oil Company in 1986, in anticipation of the start-up of its first Marib/Jawf field in 1987. In addition to its 10,000 barrels per day distillation unit, it is provided with a 2,500 barrels per day reforming unit. The

plant is operated by the Yemen Refining and Marketing Company, a subsidiary of Yemen Hunt (75.5 per cent) and the South Korean Group (24.5 per cent) which has a corresponding interest in the Alif field. In all, it has the capacity to produce 3,054 barrels per day of petrol, 3,600 barrels per day of diesel oil and 3,000 barrels per day of fuel oil, as well as L.P.G. It's storage facilities consist of two tanks, each of 55,000 barrel capacity.

8) EXPORT OF CRUDE OIL:

In order to handle the export of the government's share of oil production, the state-owned Yemen Petroleum Company (YPC) had set up, in September 1987, a marketing wing named the General Department of Crude Oil Marketing (GDCOM) three months before the actual export. In fact, Yemen became an oil exporter in December 1987, when it made the first shipment of Marib Light Crude from the Red Sea Port of Ras Isa. The government also made a provision of about 50,000-60,000 barrels per day of domestic feed stock for the Aden Refinery. The rest of the share of its crude output was meant for exports, either under one year's contract subject to quarterly price reviews or in the spot market. On the other hand, the 90,000 barrels per day of equity crude reverting to the YEPC, the consortium operating the Marib/Jawf concession was marketed by Exxon and the South Korean Group.

In 1991, the GDCOM concluded the deals amounting to 47,000 barrels per day for the year. The parties involved were Mobil of Germany purchasing 22,000 barrels per day, Agip
taking 20,000 barrels per day and OeHV of Austria lifting the remaining 5,000 barrels per day. However, the deals came under market pressure and Yemen was forced to reduce the export price of Marib *Light* by U.S.$ 0.20 per barrel, for the second quarter liftings. It may also be mentioned that pricing of different grades of crude are always subject to international market pressures and are determined by formula varying from quarter to quarter of each calendar year. The new price for second quarter liftings was equivalent to the spot rate of dated Brent plus U.S. $ 0.05 per barrel. In the first quarter, the pricing formula was spot rate of dated Brent plus U.S. $ 0.25 per barrel. In table given below, the figures relating to production of crude oil in Marib and Shabwa fields and the total exports (Government and Contractors) from Yemen during 1989 -1992.

**TABLE - 4.1 : PRODUCTION OF CRUDE OIL AND EXPORTS**

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Marib</td>
<td>183</td>
<td>188</td>
<td>197</td>
<td>168</td>
</tr>
<tr>
<td>Shabwa</td>
<td>6</td>
<td>5</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Total Production</td>
<td>189</td>
<td>193</td>
<td>197</td>
<td>170</td>
</tr>
<tr>
<td>Total Exports</td>
<td>178.8</td>
<td>151.7</td>
<td>144.7</td>
<td>125.0</td>
</tr>
</tbody>
</table>

*Source: Arab Oil and Gas Directory published by Arab Petroleum Research Center, Paris, 1993.*
In 1992, the GDCOM concluded contract with Mobil 22,000 barrels per day, Chevron Corporation and Independent Petroleum Group for 10,000 barrels per day each. Moreover, Yemen started exporting a second grade of crude in 1992, following the start-up of the West Iyad Field in the last quarter of the year. For the year 1993, the GDCOM entered into crude contracts amounting to a total 45,000 barrels per day with four companies. The Norway's Statoil was lifting 15,000 barrels per day while the Idemitsu and Cosmo Oil of Japan and OeHV 10,000 barrels per day each. Since the first quarter of 1992, the formula pricing has been increasing, rising to spot rate of dated Brent plus U.S. $ 0.35 up to third quarter and another U.S. $ 0.05 from fourth quarter of 1992 up to second quarter of 1993. This pricing formula was applicable to Marib Light, f.o.b. of Ras Isa Port. In the accompanying table given below, the data in respect of monthly average selling price of Marib Light crude oil for the year 1991, 1992 and the first quarter of 1993.
### TABLE 4.2: AVERAGE SELLING PRICE OF MARIB LIGHT (40.4°API)

(Figures in U.S. Dollars per barrel)

<table>
<thead>
<tr>
<th>Month</th>
<th>1991</th>
<th>1992</th>
<th>1993</th>
</tr>
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<tbody>
<tr>
<td>January</td>
<td>23.93</td>
<td>18.53</td>
<td>17.79</td>
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<tr>
<td>February</td>
<td>19.74</td>
<td>18.42</td>
<td>18.90</td>
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<tr>
<td>March</td>
<td>19.18</td>
<td>17.94</td>
<td>19.14</td>
</tr>
<tr>
<td>April</td>
<td>19.20</td>
<td>19.33</td>
<td>-</td>
</tr>
<tr>
<td>May</td>
<td>19.17</td>
<td>20.27</td>
<td>-</td>
</tr>
<tr>
<td>June</td>
<td>18.19</td>
<td>21.49</td>
<td>-</td>
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<tr>
<td>July</td>
<td>19.46</td>
<td>20.61</td>
<td>-</td>
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<tr>
<td>August</td>
<td>19.46</td>
<td>20.10</td>
<td>-</td>
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<td>September</td>
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<td>October</td>
<td>22.36</td>
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<tr>
<td>November</td>
<td>21.08</td>
<td>19.58</td>
<td>-</td>
</tr>
<tr>
<td>December</td>
<td>18.42</td>
<td>18.55</td>
<td>-</td>
</tr>
</tbody>
</table>

9) PRODUCTION AND UTILIZATION OF GAS:

It may be worthwhile to turn the attention to briefly review the situation obtainable in respect of this sub-sector of hydrocarbon in Yemen. The natural gas reserves at the conservative level, are estimated to be 15-17 trillion cubic feet. Despite the great potential, the required facilities for recovering and utilizing the associated gas are relatively quite few up to the end of 1993. Moreover, the rising gas-oil ratios in the Marib/Jawf oil fields have been creating problems. The Marib/Jawf possesses the highest concentration of gas reserves (12-15 trillion cubic feet) and the drop in crude production in 1992 has been ascribed to higher gas-oil ratio as one of the technical reasons. Since the work on infrastructure for additional gathering and processing facilities is going on, some part of associated gas continues to be reinjected into the fields at an average rate of 650 million cubic feet per day.

In order to develop the associated gas gathering network at the Marib fields, the YEPC in August 1992 awarded an U.S. $ 85 million contract to a foreign concern. The network includes installation of additional gas treatment plants at the Alif and Asad Al-Kamil fields and for the expansion of their existing production facilities. Besides, a Satellite Production Base is to be constructed at the Al-Raja gas field, which will be integrated into a network of 16 inch and 20 inch gas lines. Apart from this, the existing processing plant at Asad Al-Kamil, operational since Septem-
ber 1992, is being expanded. Presently, this and Alif I Plants have the capacity of 400 million cubic feet per day.

In regard to non-associated natural gas and condensate fields, the YEPC is also planning to develop two fields at Al-Saidah and Destour Al-Wihdah, in addition to Al-Raja fields. The production trials at the three fields were due to be started in 1993 and expected to produce 30-40 million cubic feet of gas in the initial stage. The development of Masila gas project began in 1992 and due for production in later part of 1993. It is the government’s policy to substitute the increased natural gas production in place of oil for the country’s energy consumption and thereby release the oil for greater export. However, YEPC is also contemplating production of Liquefied Natural Gas (LNG) for export. It is still in a proposal stage and if approved it would entail an estimated investment of U.S. $5.5 billion for the entire project.

As regards the utilization aspect, all the gas produced in the country is locally consumed at present. By the end of 1993, Yemen was to achieve self-sufficiency in L.P.G., when a number of bottling plants and distribution centres under construction were due for completion. Presently, the L.P.G. is carried through a 27 Km. pipeline to the Alif fields facilities and thereon transported by road tankers to bottling plants and distribution depots. In several parts of the country, L.P.G. filling stations are being constructed and the three plants in Taiz and Aden were com-
pleted in early 1993. The Danish company, Kosan Crisplant provided the equipment and technology for the production and maintenance of gas cylinders. Earlier, the same company had built the L.P.G. plants in Sana’a and Hodeidah.

According to government sources, the annual L.P.G. consumption in Yemen amounted to 1,92,500 tons during the year 1992. The domestic production provided only 28 per cent of this quantity and the remaining was imported. The consumption of L.P.G. was forecast to rise to 2,31,600 tons in 1993, and would be entirely met by internal production. By the end of the century gas consumption is expected to be around 3,62,000 tons per annum. The consumption of dry gas in particular could be boosted by the construction of gas-fired power generating stations in the near future. In this regard, the Public Electricity Corporation commissioned a feasibility study in October 1992. It is a project to build a 180 MW gas-fired power generating station at Marib to supply electric power to Sana’a and the neighbouring area, where demand has been rapidly rising. The project, costing U.S. $ 7,65,000 was expected to be financed by U.S. government and the decision was to be taken in early 1994. Similarly, an ammonia plant, with a daily capacity of 300 tons, using gas as feed stock was also under consideration.
APPENDIX

CHARTS FOR COMPANYWISE DETAILS OF THE CONTRACTORS FOR EXPLORATION AND PRODUCTION SHARING TERMS & AGREEMENT SIGNED BY REPUBLIC OF YEMEN

CHART - 1 : SUN OIL COMPANY, BLOCK NO. 1, AMAKEEN.

1. NAME OF THE COMPANY : SUN OIL COMPANY
2. EFFECTIVE / AWARDED DATE OF AGREEMENT : January 27, 1991
3. OPERATIONAL AREA OF AGREEMENT : 2,182 Sq.Km.
4. PERIOD OF EXPLORATION :
   4.1 Initial Phase : 36 months.
   4.2 Second Phase : 24 months.
   4.3 Third Phase : 12 months.
5. MINIMUM OBLIGATORY EXPENDITURE AND WORK PROGRAMME
   5.1 Initial Exploration Phase : 17 million U.S. dollars.
      Drilling and evaluation of five exploration wells.
      Conducting, processing and interpretation of 1,500 Km. of new seismic data.
   5.2 Second Exploration Phase : Expenditure of 16 million U.S. dollars.
      Drilling and evaluation of four exploration wells.
   5.3 Third Exploration Phase : Minimum expenditure of 5 million U.S. dollars.
      Drilling and evaluation of one exploration well.
6. DEVELOPMENT PERIOD :
   6.1 Mandatory : 20 years and extendable by another five years.
7. RELINQUISHMENT :
   7.1 Mandatory :
      30 per cent of the original agreement area at the end of the initial exploration phase.
      30 per cent at the end of the second exploration phase.
      At the end of third exploration phase, the contractor shall relinquish all of the total agreement area, not then converted to development area.
   7.2 Voluntary :
      The contractor may make voluntary relinquishment of all or part of the agreement area subject to fulfilling all of its obligation.
8. COST RECOVERY

Maximum 27.5 per cent per quarter inclusive of all operating expenses before a commercial production.

20 per cent per annum from the development expenses inclusive of those incurred prior to commercial production.

9. ROYALTY:

<table>
<thead>
<tr>
<th>Average daily production in barrels</th>
<th>Royalty</th>
</tr>
</thead>
<tbody>
<tr>
<td>25,000 - 50,000</td>
<td>5.0%</td>
</tr>
<tr>
<td>50,001 - 1,00,000</td>
<td>7.5%</td>
</tr>
<tr>
<td>1,00,001 and above</td>
<td>10.0%</td>
</tr>
</tbody>
</table>

10. PRODUCTION SHARING OF THE REMAINDER AFTER DEDUCTION OF ROYALTY AND COST OIL

<table>
<thead>
<tr>
<th>Average daily sharing oil production in barrels</th>
<th>Percentage Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to 25,000</td>
<td>State Contractor</td>
</tr>
<tr>
<td>25,001 - 50,000</td>
<td>7:2.5 27.5</td>
</tr>
<tr>
<td>50,001 - 75,000</td>
<td>75.0 25.0</td>
</tr>
<tr>
<td>75,001 - 1,00,000</td>
<td>77.0 22.5</td>
</tr>
<tr>
<td>1,00,001 - 1,25,000</td>
<td>80.0 20.0</td>
</tr>
<tr>
<td>1,25,001 - 1,50,000</td>
<td>82.5 17.5</td>
</tr>
<tr>
<td>1,50,001 and above</td>
<td>85.0 15.0</td>
</tr>
<tr>
<td></td>
<td>90.0 10.0</td>
</tr>
</tbody>
</table>

11. BONUS:

11.1 Signature                                  : 10 million U.S. dollars.
11.2 Training                                   : 200 thousand U.S. dollar per annum.
11.3 Institutional                              : 150 thousand U.S. dollar per annum.
11.4 Production:
    a) One million U.S. dollar at the initial commercial production.
    b) One million U.S. dollar when the production reaches 25,000 barrels a day.
    c) Two million U.S. dollar when the production reaches 50,000 barrels a day.
    d) Three million U.S. dollar when the production reaches 75,000 barrels a day.

Source: Ministry of Oil and Mineral Resources Sana'a of Republic of Yemen.

N.B.: The above source is applicable for all the charts started from page No. 162 to 179.
<table>
<thead>
<tr>
<th><strong>1.</strong> NAME OF THE COMPANY</th>
<th>CRESCENT/CLYDE/CIECO/INPEX</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3.</strong> OPERATIONAL AREA OF AGREEMENT</td>
<td>4,019 Sq.Km.</td>
</tr>
<tr>
<td><strong>4.</strong> PERIOD OF EXPLORATION</td>
<td></td>
</tr>
<tr>
<td>4.1 Initial Phase</td>
<td>36 months.</td>
</tr>
<tr>
<td>4.2 Second Phase</td>
<td>24 months.</td>
</tr>
<tr>
<td>4.3 Third Phase</td>
<td>-</td>
</tr>
<tr>
<td><strong>5.</strong> MINIMUM OBLIGATORY EXPENDITURE AND WORK PROGRAMME</td>
<td></td>
</tr>
<tr>
<td>5.1 Initial Exploration Phase</td>
<td>20 million U.S. dollars.</td>
</tr>
<tr>
<td>Drilling and evaluation of four exploration wells.</td>
<td></td>
</tr>
<tr>
<td>Reviewing, processing and interpreting the available seismic data.</td>
<td></td>
</tr>
<tr>
<td>Conducting, processing and interpretation of 2,000 Km. of new seismic services.</td>
<td></td>
</tr>
<tr>
<td>5.2 Second Exploration Phase</td>
<td>Expenditure of 13 million U.S. dollars</td>
</tr>
<tr>
<td>Drilling and evaluation of three exploration wells.</td>
<td></td>
</tr>
<tr>
<td>Conducting, processing and interpretation of 500 Km. of seismic data.</td>
<td></td>
</tr>
<tr>
<td>5.3 Third Exploration Phase</td>
<td>-</td>
</tr>
<tr>
<td><strong>6.</strong> DEVELOPMENT PERIOD</td>
<td>20 years and extendable by another five years.</td>
</tr>
<tr>
<td><strong>7.</strong> RELINQUISHMENT</td>
<td></td>
</tr>
<tr>
<td>7.1 Mandatory</td>
<td>25 per cent of the original agreement area at the end of the initial exploration phase.</td>
</tr>
<tr>
<td>At the end of second exploration phase, the contractor shall relinquish all of the total agreement area, not then converted to development area.</td>
<td></td>
</tr>
<tr>
<td>7.2 Voluntary</td>
<td>The contractor may make voluntary relinquishment of all or part of the agreement area subject to fulfilling all of its obligation.</td>
</tr>
</tbody>
</table>
8. COST RECOVERY:
Maximum 27 per cent per month inclusive of all operating expenses before a commercial production.
25 per cent per annum from the development expenses inclusive of those incurred prior to commercial production.
25 per cent per annum from the exploration expenses inclusive of those incurred prior to the commercial production.

9. ROYALTY:
Average daily production in barrels

<table>
<thead>
<tr>
<th>Range</th>
<th>Royalty</th>
</tr>
</thead>
<tbody>
<tr>
<td>upto 25,000</td>
<td>2.5 %</td>
</tr>
<tr>
<td>25,000 - 50,000</td>
<td>5.0 %</td>
</tr>
<tr>
<td>50,001 - 1,00,000</td>
<td>10.0 %</td>
</tr>
<tr>
<td>1,00,001 - 1,50,000</td>
<td>15.0 %</td>
</tr>
<tr>
<td>1,50,001 and above</td>
<td>20.0 %</td>
</tr>
</tbody>
</table>

10. PRODUCTION SHARING OF THE REMAINDER AFTER DEDUCTION OF ROYALTY AND COST OIL
Average daily sharing oil production

<table>
<thead>
<tr>
<th>Range</th>
<th>Percentage Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>upto 25,000</td>
<td>78.0 22.0</td>
</tr>
<tr>
<td>25,001 - 50,000</td>
<td>80.0 20.0</td>
</tr>
<tr>
<td>50,001 - 75,000</td>
<td>82.0 18.5</td>
</tr>
<tr>
<td>75,001 - 1,00,000</td>
<td>85.0 15.0</td>
</tr>
<tr>
<td>1,00,001 - 2,00,000</td>
<td>90.0 10.0</td>
</tr>
<tr>
<td>2,00,001 and above</td>
<td>92.0 7.2</td>
</tr>
</tbody>
</table>

11. BONUS:

11.1 Signature 5 million U.S. dollars.
11.2 Training 150 thousand U.S. dollar per annum.
11.3 Institutional -
11.4 Production:
   a) One million U.S. dollar at the initial commercial production.
   b) Two million U.S. dollar when the production reaches 50,000 barrels a day.
   c) Four million U.S. dollar when the production reaches 1,00,000 barrels a day.
   d) Six million U.S. dollar when the production reaches 1,50,000 barrels a day.
   e) Eight million U.S. dollar when the production reaches 2,00,000 barrels a day.
   f) Ten million U.S. dollar when the production reaches 2,50,000 barrels a day.
CHART - 3: SHELL/SODEC/NISHO IWAI, BLOCK NO. S1, DAMIS

1. NAME OF THE COMPANY : SHELL/SODEC/NISHO IWAI


3. OPERATIONAL AREA OF AGREEMENT : 4,434 Sq.Km.

4. PERIOD OF EXPLORATION :
   4.1 Initial Phase : 48 months.
   4.2 Second Phase : 24 months.
   4.3 Third Phase : 12 months.

5. MINIMUM OBLIGATORY EXPENDITURE AND WORK PROGRAMME :
   5.1 Initial Exploration Phase : 70 million U.S. dollars.
      Drilling and evaluation of seven exploration wells.
      Reviewing, reprocessing and reinterpreting the available seismic data.
      Conducting, processing and interpretation of 3,500 Km. of new seismic data.
      Conducting, geochemical and geological programme.
   5.2 Second Exploration Phase : Expenditure of 30 million U.S. dollars.
      Drilling and evaluation of four exploration wells.
      Reviewing, reprocessing and reinterpretation of available seismic data.
      Conducting, processing and interpretation of 500 Km. of seismic survey.
   5.3 Third Exploration Phase : Minimum expenditure of 15 million U.S. dollars.
      Drilling and evaluation of two exploration wells.

6. DEVELOPMENT PERIOD : 25 years and extendable by another five years.

7. RELINQUISHMENT :
   7.1 Mandatory :
      25 per cent of the original agreement area at the end of the initial exploration phase.
      100 per cent at the end of the second phase or 25 per cent if the contractor elects to extendable the second phase.
      At the end of third phase, the contractor shall relinquish all of the total agreement area, not then converted to development area.
7.2 Voluntary:

The contractor may make voluntary relinquishment of all or part of the agreement area subject to fulfilling all of its obligation.

8. COST RECOVERY:

Maximum 25 per cent per quarter inclusive of all operating expenses before a commercial production.

25 per cent per annum from exploration expenses inclusive of those incurred prior to commercial production.

20 per cent per annum from development expenses inclusive of those incurred prior to the commercial production.

9. ROYALTY:

<table>
<thead>
<tr>
<th>Average daily production in barrels</th>
<th>Royalty</th>
</tr>
</thead>
<tbody>
<tr>
<td>upto 1,25,000</td>
<td>10.0%</td>
</tr>
<tr>
<td>1,25,001 - 1,50,000</td>
<td>11.0%</td>
</tr>
<tr>
<td>1,50,001 - 2,00,000</td>
<td>13.0%</td>
</tr>
<tr>
<td>2,00,001 and above</td>
<td>15.0%</td>
</tr>
</tbody>
</table>

10. PRODUCTION SHARING OF THE REMAINDER AFTER DEDUCTION OF ROYALTY AND COST OIL

<table>
<thead>
<tr>
<th>Average daily sharing oil production in barrels</th>
<th>Percentage Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>upto 25,000</td>
<td>State  Contractor</td>
</tr>
<tr>
<td>25,001 - 50,000</td>
<td>80.0  20.0</td>
</tr>
<tr>
<td>50,001 - 75,000</td>
<td>82.5  17.5</td>
</tr>
<tr>
<td>75,001 - 1,00,000</td>
<td>85.0  15.0</td>
</tr>
<tr>
<td>1,00,001 - 1,25,000</td>
<td>87.5  12.5</td>
</tr>
<tr>
<td>1,25,001 and above</td>
<td>90.0  10.0</td>
</tr>
</tbody>
</table>

11. BONUS:

11.1 Signature : 15 million U.S. dollars.

11.2 Training : 250 thousand U.S. dollars per annum.

11.3 Institutional : 250 thousand U.S. dollars per annum.

11.4 Production:

a) One million U.S. dollar at the initial commercial production.
b) One million U.S. dollar when the production reaches 25,000 barrels a day.
c) Three million U.S. dollar when the production reaches 50,000 barrels a day.
d) Five million U.S. dollar when the production reaches 1,00,000 barrels a day.
CHART - 4 : OCCIDENTAL/CCC, BLOCK NO. S2, AL-OQLAH

1. NAME OF THE COMPANY : OCCIDENTAL/CCC
3. OPERATIONAL AREA OF AGREEMENT : 2,800 Sq.Km.
4. PERIOD OF EXPLORATION :
   4.1 Initial Phase : 24 months.
   4.2 Second Phase : 24 months.
   4.3 Third Phase : -
5. MINIMUM OBLIGATORY EXPENDITURE AND WORK PROGRAMME
   5.1 Initial Exploration Phase : 10 million U.S. dollars.
      Drilling and evaluation of three exploration wells.
      Conducting, processing and interpretation of 1,000 Km. from seismic survey.
   5.2 Second Exploration Phase : Expenditure of 8 million U.S. dollars.
      Drilling and evaluation of two exploration wells.
   5.3 Third Exploration Phase : -
6. DEVELOPMENT PERIOD : 20 years and extendable by another five years.
7. RELINQUISHMENT :
   7.1 Mandatory :
      25 per cent of the original agreement area at the end of the initial exploration phase.
      At the end of the second exploration phase, the contractor shall relinquish all of the total agreement area, not then converted to development area.
   7.2 Voluntary :
      The contractor may make voluntary relinquishment of all or part of the agreement area subject to fulfilling all of its obligation.
8. COST RECOVERY :
   Maximum 26 per cent per quarter inclusive of all operating expenses before a commercial production.
   20 per cent per annum from development expenses inclusive of those incurred prior to the commercial production
9. ROYALTY : 10% from the total crude oil production commencing from the first barrel of the initial commercial production.
10. PRODUCTION SHARING OF THE REMAINDER AFTER DEDUCTION OF ROYALTY AND COST OIL

<table>
<thead>
<tr>
<th>Average daily sharing oil production in barrels</th>
<th>Percentage Share</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>up to 25,000</td>
<td>80.0</td>
<td>20.0</td>
</tr>
<tr>
<td>25,001 - 50,000</td>
<td>82.0</td>
<td>18.0</td>
</tr>
<tr>
<td>50,001 - 75,000</td>
<td>84.0</td>
<td>16.0</td>
</tr>
<tr>
<td>75,001 - 1,00,000</td>
<td>86.0</td>
<td>14.0</td>
</tr>
<tr>
<td>1,00,001 - 1,25,000</td>
<td>88.0</td>
<td>12.0</td>
</tr>
<tr>
<td>1,25,001 - 1,50,000</td>
<td>90.0</td>
<td>10.0</td>
</tr>
<tr>
<td>1,50,001 and above</td>
<td>92.0</td>
<td>8.0</td>
</tr>
</tbody>
</table>

11. BONUS:

11.1 Signature: 20 million U.S. dollars.
11.2 Training: 200 thousand U.S. dollars per annum.
11.3 Institutional: 200 thousand U.S. dollars per annum.
11.4 Production:
   a) Two million U.S. dollar when the production reaches 25,000 barrels a day.
   b) Five million U.S. dollar when the production reaches 50,000 barrels a day.
   c) Seven million U.S. dollar when the production reaches 75,000 barrels a day.
   d) Ten million U.S. dollar when the production reaches 1,00,000 barrels a day.
   e) Fifteen million U.S. dollar when the production reaches 1,25,000 barrels a day.
### Chart 5: Chevron International Company, Block No. 3, Jardane

<table>
<thead>
<tr>
<th><strong>1. NAME OF THE COMPANY</strong></th>
<th>CHEVERON INTERNATIONAL COMPANY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3. OPERATIONAL AREA OF AGREEMENT</strong></td>
<td>2,953 Sq.Km.</td>
</tr>
<tr>
<td><strong>4. PERIOD OF EXPLORATION</strong></td>
<td></td>
</tr>
<tr>
<td>4.1 Initial Phase</td>
<td>48 months.</td>
</tr>
<tr>
<td>4.2 Second Phase</td>
<td>24 months.</td>
</tr>
<tr>
<td>4.3 Third Phase</td>
<td>-</td>
</tr>
<tr>
<td><strong>5. MINIMUM OBLIGATORY EXPENDITURE AND WORK PROGRAMME</strong></td>
<td></td>
</tr>
<tr>
<td>5.1 Initial Exploration Phase</td>
<td>Expenditure of 27.3 million U.S. dollars. Reviewing, interpreting the available seismic data. Conducting, processing and interpretation of 1,500 Km. of new seismic surveys. Conducting, geochemical and geological programme. Processing 500 Km. or drilling additional wells. Drilling and evaluation of four exploration wells.</td>
</tr>
<tr>
<td>5.2 Second Exploration Phase</td>
<td>Expenditure of 17 million U.S. dollars. Processing interpretation of available seismic data.</td>
</tr>
<tr>
<td>5.3 Third Exploration Phase</td>
<td>-</td>
</tr>
<tr>
<td><strong>6. DEVELOPMENT PERIOD</strong></td>
<td>20 years and extendable by another five years.</td>
</tr>
<tr>
<td><strong>7. RELINQUISHMENT</strong></td>
<td></td>
</tr>
<tr>
<td>7.1 Mandatory</td>
<td>25% of the original agreement area at the end of the initial exploration phase. If the contractor elect to enter the second stage. At the end of second exploration phase, the contractor shall relinquish for the remainder of the agreement area which, not converted to development area.</td>
</tr>
<tr>
<td>7.2 Voluntary</td>
<td>The contractor may make voluntary relinquishment of all or part of the agreement area subject to fulfilling all of its obligation.</td>
</tr>
</tbody>
</table>
8. COST RECOVERY:
28 per cent per quarter. The contractor shall recover all costs, expenses and expenditures incurred for all petroleum operations, in the following manner.

All operating expenses incurred and paid after the date of initial production.

25 per cent from exploration expenditures including to those prior to the initial commercial production.

25 per cent per year from development expenditure inclusive of those prior to the commercial production.

9. ROYALTY:

<table>
<thead>
<tr>
<th>Average daily production in barrels</th>
<th>Royalty</th>
</tr>
</thead>
<tbody>
<tr>
<td>upto 25,000</td>
<td>2.5%</td>
</tr>
<tr>
<td>25,001 - 50,000</td>
<td>5.0%</td>
</tr>
<tr>
<td>50,001 - 75,000</td>
<td>7.5%</td>
</tr>
<tr>
<td>75,001 - 1,25,000</td>
<td>12.5%</td>
</tr>
<tr>
<td>1,25,001 - 1,75,000</td>
<td>17.5%</td>
</tr>
<tr>
<td>1,75,001 and above</td>
<td>20.0%</td>
</tr>
</tbody>
</table>

10. PRODUCTION SHARING OF THE REMAINDER AFTER DEDUCTION OF ROYALTY AND COST OIL:

<table>
<thead>
<tr>
<th>Average daily sharing oil production in barrels</th>
<th>Percentage Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>upto 25,000</td>
<td>State  Contractor</td>
</tr>
<tr>
<td>25,001 - 50,000</td>
<td>80.0  20.0</td>
</tr>
<tr>
<td>50,001 - 1,25,000</td>
<td>82.0  18.0</td>
</tr>
<tr>
<td>1,25,001 - 1,75,000</td>
<td>83.5  16.5</td>
</tr>
<tr>
<td>1,75,001 and above</td>
<td>85.5  7.2</td>
</tr>
</tbody>
</table>

11. BONUS:

11.1 Signature: 12 million U.S. dollars.
11.2 Training: 200 thousand U.S. dollars per year.
11.3 Institutional: 50 thousand U.S. dollars per year.
11.4 Production:

a) Two million U.S. dollar at the initial production.
b) Two million U.S. dollar when the production reaches 25,000 barrels a day.
c) Four million U.S. dollar when the production reaches 50,000 barrels a day.
d) Six million U.S. dollar when the production reaches 1,00,000 barrels a day.
CHART - 6 : GOLDEN SPIKE ENERGY, BLOCK NO. 6, IRyan

1. NAME OF THE COMPANY : GOLDEN SPIKE ENERGY
3. OPERATIONAL AREA OF AGREEMENT : 3,224 Sq. Km.
4. PERIOD OF EXPLORATION :
   4.1 Initial Phase : 36 months.
   4.2 Second Phase : 36 months.
   4.3 Third Phase :
5. MINIMUM OBLIGATORY EXPENDITURE AND WORK PROGRAMME
   5.1 Initial Exploration Phase : Expenditure of 18 million U.S. dollars.
       Conducting, processing and interpretation of 1,500 Km. from seismic data.
       Drilling and evaluation of five exploration wells.
   5.2 Second Exploration Phase : Expenditure of 12 million U.S. dollars.
       Drilling and evaluation of three exploration wells.
   5.3 Third Exploration Phase :
6. DEVELOPMENT PERIOD : 20 years and extendable by another five years.
7. RELINQUISHMENT :
   7.1 Mandatory :
       25 per cent of the original agreement area at the end of the initial exploration phase.
       25 per cent at the end of the second exploration phase.
   7.2 Voluntary :
       The contractor may make voluntary relinquishment of all or part of the agreement area subject to fulfilling all of its obligation.
8. COST RECOVERY :
   25 per cent per quarter. The contractor shall recover all costs, expenses and expenditures incurred for all petroleum operation in the following manner.
   All operating expenses incurred and paid after the initial commercial production.
   All exploration expenditures including to those prior to the initial commercial production.
   All development expenditures including to those prior to the initial commercial production.
9. ROYALTY

10% from the total of crude oil production and saved from development area and not used in petroleum operations prior to the deduction of cost oil commencing from the first barrel of the initial production.

10. PRODUCTION SHARING OF THE REMAINDER AFTER DEDUCTION OF ROYALTY AND COST OIL

<table>
<thead>
<tr>
<th>Average daily sharing oil production in barrels</th>
<th>Percentage Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>upto 25,000</td>
<td>State 81.0</td>
</tr>
<tr>
<td>25,001 - 50,000</td>
<td>Contractor 19.0</td>
</tr>
<tr>
<td>50,001 - 75,000</td>
<td>State 85.0</td>
</tr>
<tr>
<td>75,001 - 1,00,000</td>
<td>Contractor 15.0</td>
</tr>
<tr>
<td>1,00,001 - 1,25,000</td>
<td>State 88.0</td>
</tr>
<tr>
<td>1,25,001 - 1,50,000</td>
<td>Contractor 12.0</td>
</tr>
<tr>
<td>1,50,001 and above</td>
<td>State 90.0</td>
</tr>
<tr>
<td></td>
<td>Contractor 10.0</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

11. BONUS:

11.1 Signature: 8 million U.S. dollars.
11.2 Training: 250 thousand U.S. dollars per annum.
11.3 Institutional: 150 thousand U.S. dollar per annum.
11.4 Production:

a) Two million U.S. dollar when the production reaches 25,000 barrels a day.
b) Two million U.S. dollar when the production reaches 50,000 barrels a day.
c) Two million U.S. dollar when the production reaches 75,000 barrels a day.
CHART - 7 : BP/FURNET, AMOCO, BLOCK NO. 7, AL-BARQA

1. NAME OF THE COMPANY : BP/FURNET, AMOCO


3. OPERATIONAL AREA OF AGREEMENT : 4,942 Sq.Km.

4. PERIOD OF EXPLORATION :
   4.1 Initial Phase : 48 months.
   4.2 Second Phase : 12 months.
   4.3 Third Phase : 12 months.

5. MINIMUM OBLIGATORY EXPENDITURE AND WORK PROGRAMME :
   5.1 Initial Exploration Phase : Expenditure of 27 million U.S. dollars.
      Drilling and evaluation of five exploration wells.
      Reviewing, reprocessing and reinterpretating the available seismic data.
      Conducting, processing and interpretation of 1,500 Km. from the seismic surveys.
      Magnetic surveys and gravity.
   5.2 Second Exploration Phase : Expenditure of 15.5 million U.S. dollars.
      Drilling and evaluation of three exploration wells.
      Conducting, processing and interpretation of 1,000 Km. from the new seismic survey.
   5.3 Third Exploration Phase : Expenditure of 6 million U.S. dollars.
      Drilling two exploration wells.

6. DEVELOPMENT PERIOD : 20 years and extendable by another five years.

7. RELINQUISHMENT :
   7.1 Mandatory :
      25 per cent of the original agreement area at the end of the initial exploration phase.
      25 per cent from the original agreement area at the end of the third year from the initial exploration period.
      At the end of sixth year, the contractor shall relinquish for the remainder of the agreement area which has then converted to development area.

   7.2 Voluntary :
      The contractor may make voluntary relinquishment of all or part of the agreement area subject to fulfilling all of its obligation.
8. **COST RECOVERY**:

27 per cent per quarter the contractor shall recover all cost, expenses and expenditures, in the following manner:

- **All operating expenses incurred after the initial commercial production**.
- **All exploration expenses including to those prior to the initial commercial production**.
- 25 per cent per annum from development expenses including to those prior to the initial commercial production.

9. **ROYALTY**:

<table>
<thead>
<tr>
<th>Average daily production in barrels</th>
<th>Royalty</th>
</tr>
</thead>
<tbody>
<tr>
<td>upto 50,000</td>
<td>5.0%</td>
</tr>
<tr>
<td>50,001 - 1,50,000</td>
<td>10.0%</td>
</tr>
<tr>
<td>1,50,001 - 2,50,000</td>
<td>15.0%</td>
</tr>
<tr>
<td>2,50,001 and above</td>
<td>20.0%</td>
</tr>
</tbody>
</table>

10. **PRODUCTION SHARING OF THE REMAINDER AFTER DEDUCTION OF ROYALTY AND COST OIL**

<table>
<thead>
<tr>
<th>Average daily sharing oil production in barrels</th>
<th>Percentage Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>upto 25,000</td>
<td>State  Contractor</td>
</tr>
<tr>
<td>25,001 - 50,000</td>
<td>73.0  27.0</td>
</tr>
<tr>
<td>50,001 - 1,00,000</td>
<td>75.0  25.0</td>
</tr>
<tr>
<td>1,00,001 - 1,50,000</td>
<td>78.0  22.0</td>
</tr>
<tr>
<td>1,50,001 - 2,00,000</td>
<td>80.0  20.0</td>
</tr>
<tr>
<td>2,00,001 and above</td>
<td>85.0  15.0</td>
</tr>
</tbody>
</table>

11. **BONUS**:

11.1 **Signature**

11.2 **Training**

11.3 **Institutional**

11.4 **Production**

   a) **One million U.S. dollar at the initial commercial production**.
   b) **Four million U.S. dollar when the production reaches 1,00,000 barrels a day**.
   c) **Six million U.S. dollar when the production reaches 2,00,000 barrels a day**.
CHART - 8 : BP / FURNET / AMOCO, BLOCK NO. 8, ASAKIR

1. NAME OF THE COMPANY : BP/FURNET/AMOCO
3. OPERATIONAL AREA OF AGREEMENT : 4,735 Sq.Km.
4. PERIOD OF EXPLORATION :
   4.1 Initial Phase : 48 months.
   4.2 Second Phase : 24 months.
   4.3 Third Phase : -
5. MINIMUM OBLIGATORY EXPENDITURE AND WORK PROGRAMME :
   5.1 Initial Exploration Phase : Expenditure of 12 million U.S. dollars.
   Reviewing, processing and interpreting of the available seismic data.
   Conducting, processing of 1,000 Km. from the new seismic data.
   Drilling to exploration wells.
   5.2 Second Exploration Phase : Expenditure of 14 million U.S. dollars.
   Conducting of 500 Km. from the seismic survey in the first year.
   Drilling three exploration wells, one in the first year and two in the second year.
   5.3 Third Exploration Phase : -
6. DEVELOPMENT PERIOD : 20 years and extendable by another five years.
7. RELINQUISHMENT :
   7.1 Mandatory :
   25 per cent at the end of the fifth year.
   At the end of sixth year, the contractor shall relinquish from the remainder of the original agreement area, not then converted to development area.
   7.2 Voluntary :
   The contractor may make voluntary relinquishment of all or part of the agreement area subject to fulfilling all of its obligation.
8. COST RECOVERY:
   30 per cent per quarter and its include.
   All operating expenses incurred after the initial commercial production.
   All exploration expenses including prior the commercial production.
   25 per cent per annum from development expenses, inclusive of those incurred prior to
   the commercial production.

9. ROYALTY:
   Average daily production in barrels : Royalty
   upto - 50,000 : 3.0%
   50,001 - 1,00,000 : 5.0%
   1,00,001 - 2,50,000 : 10.0%
   2,50,001 and above : 15.0%

10. PRODUCTION SHARING OF THE
    REMAINDER AFTER DEDUCTION
    OF ROYALTY AND COST OIL
    Average daily sharing oil production in barrels : Percentage Share
    upto - 50,000 : State  Contractor
    50,001 - 1,00,000 : 70.0  30.0
    1,00,001 - 1,50,000 : 75.0  25.0
    1,50,001 - 2,50,000 : 77.5  22.5
    2,50,001 and above : 82.5  17.5

11. BONUS:
   11.1 Signature : 1 million U.S. dollars.
   11.2 Training : 100 thousand U.S. dollars per annum.
   11.3 Institutional : 60 thousand U.S. dollars per annum.
   11.4 Production : -
1. NAME OF THE COMPANY : CRESCENT/BRITISH GAS
3. OPERATIONAL AREA OF AGREEMENT : 4,728 Sq.Km.
4. PERIOD OF EXPLORATION :
   4.1 Initial Phase : 48 months.
   4.2 Second Phase : 24 months.
   4.3 Third Phase : -
5. MINIMUM OBLIGATORY EXPENDITURE AND WORK PROGRAMME :
   5.1 Initial Exploration Phase : 10 million U.S. dollars.
      Drilling and evaluation of two exploration wells including voluntary third well.
      Reviewing, reprocessing and reinterpreting the available seismic data.
      Conducting, processing and interpretation of 1,000 Km. of new seismic surveys.
   5.2 Second Exploration Phase : Expenditure of 13 million U.S. dollars.
      Drilling and evaluation of three exploration wells.
      Conducting, processing and interpretation of 500 Km. of seismic surveys.
   5.3 Third Exploration Phase : -
6. DEVELOPMENT PERIOD : 20 years and extendable by another five years.
7. RELINQUISHMENT :
   7.1 Mandatory :
      25 per cent of the original agreement area at the end of the initial exploration phase.
      At the end of second exploration phase, the contractor shall relinquish all of the total agreement area, not then converted to development area.
   7.2 Voluntary :
      The contractor may make voluntary relinquishment of all or part of the agreement area subject to fulfilling all of its obligation.
8. COST RECOVERY:
27 per cent per month inclusive of all operating expenses before a commercial production.
25 per cent per annum from development expenses.
25 per cent per annum from exploration expenses inclusive of those incurred prior to commercial production.

9. ROYALTY:
Average daily production in barrels: Royalty
- up to 25,000: 2.5%
- 25,001 - 50,000: 5.0%
- 50,001 - 1,00,000: 10.0%
- 1,00,001 - 1,50,000: 15.0%
- 1,50,001 and above: 20.0%

10. PRODUCTION SHARING OF THE REMAINDER AFTER DEDUCTION OF ROYALTY AND COST OIL
Average daily sharing oil production in barrels: Percentage Share
- up to 25,000: State 78.0, Contractor 20.0
- 25,001 - 50,000: State 30.0, Contractor 22.0
- 50,001 - 75,000: State 82.0, Contractor 18.0
- 75,001 - 1,00,000: State 95.0, Contractor 15.0
- 1,00,001 - 1,25,000: State 90.0, Contractor 10.0
- 2,00,001 and above: State 92.0, Contractor 7.5

11. BONUS:
11.1 Signature: 1.5 million U.S. dollars.
11.2 Training: 150 thousand U.S. dollars per annum.
11.3 Institutional: 100 thousand U.S. dollars per annum.
11.4 Production:
   a) One million U.S. dollar at the initial commercial production.
   b) Two million U.S. dollar when the production reaches 50,000 barrels a day.
   c) Four million U.S. dollar when the production reaches 1,00,000 barrels a day.
   d) Six million U.S. dollar when the production reaches 1,50,000 barrels a day.
   e) Eight million U.S. dollar when the production reaches 2,00,000 barrels a day.
   f) Ten million U.S. dollar when the production reaches 2,50,000 barrels a day.
<table>
<thead>
<tr>
<th><strong>1. NAME OF THE COMPANY</strong></th>
<th>BIN HAM OIL GROUP COPLEX (YEMEN) LIMITED, TULLOW YEMEN OPERATION LIMITED.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2. EFFECTIVE / AWARDED DATE OF AGREEMENT</strong></td>
<td>November 17, 1990.</td>
</tr>
<tr>
<td><strong>3. OPERATIONAL AREA OF AGREEMENT</strong></td>
<td>14,000 Sq.Km.</td>
</tr>
<tr>
<td><strong>4. PERIOD OF EXPLORATION</strong></td>
<td></td>
</tr>
<tr>
<td>4.1 Initial Phase</td>
<td>42 months.</td>
</tr>
<tr>
<td>4.2 Second Phase</td>
<td>12 months.</td>
</tr>
<tr>
<td>4.3 Third Phase</td>
<td>18 months.</td>
</tr>
<tr>
<td><strong>5. MINIMUM OBLIGATORY EXPENDITURE AND WORK PROGRAMME</strong></td>
<td></td>
</tr>
<tr>
<td>5.1 Initial Exploration Phase</td>
<td>Expenditure of 11 million U.S. dollars. Conducting, geochemical and geological programme. Conducting, processing of 1,500 Km. from the new lines of magnetic survey. Reviewing, processing and interpreting the available seismic data. Conducting 750 Km. from the lines of magnetic survey. Drilling of two exploration wells.</td>
</tr>
<tr>
<td>5.2 Second Exploration Phase</td>
<td>Expenditure of 3 million U.S. dollars. Reviewing, processing and interpretation of the available seismic data. Drilling one exploration well.</td>
</tr>
<tr>
<td>5.3 Third Exploration Phase</td>
<td>Minimum expenditure of 6 million U.S. dollars. Drilling and evaluation of two exploration wells. Reviewing, processing and interpretation of the available seismic data.</td>
</tr>
<tr>
<td><strong>6. DEVELOPMENT PERIOD</strong></td>
<td>20 years and extendable by another five years.</td>
</tr>
<tr>
<td><strong>7. RELINQUISHMENT</strong></td>
<td>7.1 Mandatory: 30 per cent of the original agreement area at the end of the initial exploration phase.</td>
</tr>
</tbody>
</table>
25 per cent at the end of the second exploration phase.
The contractor shall relinquish from the remainder of the original agreement area,
not then converted to development area.

7.2 Voluntary:
The contractor may make voluntary relinquishment of all or part of the agreement
area subject to fulfilling all of its obligation.

8. COST RECOVERY:
30 per cent per quarter and its including:
All operating expenses incurred after the initial commercial production.
All exploration expenses including prior to the commercial production.
25 per cent per annum from development expenses inclusive of those incurred prior to
the commercial production.

9. ROYALTY:
10% from the total of crude oil produced and
saved from the development area and not used
in petroleum operations prior to the deduction
of cost oil commencing from the first barrel of
the initial production.

10. PRODUCTION SHARING OF THE
REMAINDER AFTER DEDUCTION
OF ROYALTY AND COST OIL

<table>
<thead>
<tr>
<th>Average daily sharing oil production in barrels</th>
<th>State</th>
<th>Contractor</th>
</tr>
</thead>
<tbody>
<tr>
<td>upto 25,000</td>
<td>72.5</td>
<td>27.5</td>
</tr>
<tr>
<td>25,001 - 50,000</td>
<td>75.0</td>
<td>25.0</td>
</tr>
<tr>
<td>50,001 - 75,000</td>
<td>77.5</td>
<td>22.5</td>
</tr>
<tr>
<td>75,001 - 100,000</td>
<td>80.0</td>
<td>20.0</td>
</tr>
<tr>
<td>100,001 - 150,000</td>
<td>82.5</td>
<td>17.5</td>
</tr>
<tr>
<td>150,001 - 200,000</td>
<td>85.0</td>
<td>15.0</td>
</tr>
<tr>
<td>200,001 - 250,000</td>
<td>87.5</td>
<td>12.5</td>
</tr>
<tr>
<td>250,001 and above</td>
<td>90.0</td>
<td>10.0</td>
</tr>
</tbody>
</table>

11. BONUS:
11.1 Signature: 3 million U.S. dollars.
11.2 Training: 60 thousand U.S. dollars per annum.
11.3 Institutional: 60 thousand U.S. dollar per annum.
11.4 Production:
a) One million U.S. dollar at the initial production.
b) Two million U.S. dollar when the production reaches 25,000 barrels a day.
c) Three million U.S. dollar when the production reaches 50,000 barrels a day.
d) Four million U.S. dollar when the production reaches 75,000 barrels a day.
e) Five million U.S. dollar when the production reaches 100,000 barrels a day.
f) Six million U.S. dollar when the production reaches more than 100,000
   barrels a day.

Source: Republic of Yemen production sharing agreement between Ministry of Oil and
Mineral Resources and Binham Oil Group Complex (Yemen) Limited / Tullow Yemen
CHART - 11: NIMIR PETROLEUM COMPANY QAMAR GULF LIMITED, BLOCK NO. 16, QAMAR

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. NAME OF THE COMPANY</td>
<td>NIMIR PETROLEUM COMPANY QAMAR</td>
</tr>
<tr>
<td>3. OPERATIONAL AREA OF AGREEMENT</td>
<td>10,404 Sq.Km.</td>
</tr>
<tr>
<td>4. PERIOD OF EXPLORATION</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Initial Phase</td>
</tr>
<tr>
<td>4.1 Initial Phase</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Second Phase</td>
</tr>
<tr>
<td>4.2 Second Phase</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Third Phase</td>
</tr>
<tr>
<td>4.3 Third Phase</td>
<td></td>
</tr>
<tr>
<td>5. MINIMUM OBLIGATORY EXPENDITURE AND WORK PROGRAMME</td>
<td></td>
</tr>
<tr>
<td>5.1 Initial Exploration Phase</td>
<td>30 million U.S. dollars.</td>
</tr>
<tr>
<td></td>
<td>Reprocessing and interpreting of previous seismic data.</td>
</tr>
<tr>
<td></td>
<td>Processing and interpretation of 1,000 Km. of new seismic data.</td>
</tr>
<tr>
<td></td>
<td>Drilling and evaluation of three wells.</td>
</tr>
<tr>
<td>5.2 Second Exploration Phase</td>
<td>Expenditure of 25 million U.S. dollars.</td>
</tr>
<tr>
<td></td>
<td>Processing and interpretation of 500 Km. of seismic data.</td>
</tr>
<tr>
<td></td>
<td>Drilling and evaluation of three wells.</td>
</tr>
<tr>
<td>5.3 Third Exploration Phase</td>
<td></td>
</tr>
<tr>
<td>6. DEVELOPMENT PERIOD</td>
<td>25 years and extendable by another five years.</td>
</tr>
<tr>
<td>7. RELINQUISHMENT</td>
<td></td>
</tr>
<tr>
<td>7.1 Mandatory</td>
<td>25 per cent of the original agreement area at the end of the initial exploration phase.</td>
</tr>
<tr>
<td></td>
<td>At the end of the second exploration period the contractor shall relinquish from the remainder of the original agreement area not then converted to development area.</td>
</tr>
<tr>
<td>7.2 Voluntary</td>
<td>The contractor may make voluntary relinquishment of all or part of the agreement area subject to fulfilling all of its obligation.</td>
</tr>
</tbody>
</table>
8. COST RECOVERY:
26 per cent per half the contractor shall recover all costs, expenses and expenditure incurred for all petroleum operations.
100 per cent from operating expenses, incurred and paid after the initial Production.
100 per cent per year from exploration expenditures, inclusive of those incurred prior to commercial production.
40 per cent per year from development expenditures, inclusive of those incurred prior to commercial production.

9. ROYALTY
10% from the total of crude oil produced and saved from the development area and not used in petroleum operations prior to the deduction of cost oil commencing from the first barrel of the initial production.

10. PRODUCTION SHARING OF THE REMAINDER AFTER DEDUCTION OF ROYALTY AND COST OIL

<table>
<thead>
<tr>
<th>Average daily sharing oil production (in barrels)</th>
<th>Percentage Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>state</td>
<td>Contractor</td>
</tr>
<tr>
<td>upto 25,000</td>
<td>76.0</td>
</tr>
<tr>
<td>25,001 - 50,000</td>
<td>78.0</td>
</tr>
<tr>
<td>50,001 - 75,000</td>
<td>80.0</td>
</tr>
<tr>
<td>75,001 - 1,00,000</td>
<td>82.0</td>
</tr>
<tr>
<td>1,00,001 - 1,25,000</td>
<td>84.0</td>
</tr>
<tr>
<td>1,25,001 - 1,50,000</td>
<td>86.0</td>
</tr>
<tr>
<td>1,50,001 - 1,75,000</td>
<td>88.0</td>
</tr>
<tr>
<td>1,75,001 and above</td>
<td>90.0</td>
</tr>
</tbody>
</table>

11. BONUS:
11.1 Signature                                  : 6 million U.S. dollars.
11.2 Training                                    : 150 thousand U.S. dollars per annum.
11.3 Institutional                               : 150 thousand U.S. dollars per annum.
11.4 Production:
   a) Two million U.S. dollar when the production reaches 50,000 barrels a day.
   b) Four million U.S. dollar when the production reaches 75,000 barrels a day.
   c) Six million U.S. dollar when the production reaches 1,00,000 barrels a day.
   d) Eight million U.S. dollar when the production reaches 2,00,000 barrels a day.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. NAME OF THE COMPANY</strong></td>
<td><strong>YEMEN HUNT OIL COMPANY/MARIB/JAWF</strong></td>
<td></td>
</tr>
<tr>
<td><strong>2. EFFECTIVE / AWARDED DATE OF AGREEMENT</strong></td>
<td><strong>September, 1981.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>3. OPERATIONAL AREA OF AGREEMENT</strong></td>
<td><strong>12,603 Sq.Km.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>4. PERIOD OF EXPLORATION</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>4.1 Initial Phase</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>4.2 Second Phase</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>4.3 Third Phase</strong></td>
<td></td>
</tr>
<tr>
<td><strong>5. MINIMUM OBLIGATORY EXPENDITURE AND WORK PROGRAMME</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>5.1 Initial Exploration Phase</strong></td>
<td>Minimum expenditure of 4 million U.S. dollars (During the first two years of the exploration period). The exploration programme will include surface geological field work, geophysical and seismic works.</td>
</tr>
<tr>
<td></td>
<td><strong>5.2 Second Exploration Phase</strong></td>
<td>Minimum expenditure of 7 million U.S. dollars (During the second two years of the exploration period) Drilling two wildcat wells. Minimum expenditure of 4 million. Drilling one well. Conduct necessary seismic surveys.</td>
</tr>
<tr>
<td></td>
<td><strong>5.3 Third Exploration Phase</strong></td>
<td>Drilling two wells. (During the period of 24 months of the third extension.)</td>
</tr>
<tr>
<td><strong>6. DEVELOPMENT PERIOD</strong></td>
<td></td>
<td><strong>20 years and extendable by another five years.</strong></td>
</tr>
<tr>
<td><strong>7. RELINQUISHMENT</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>7.1 Mandatory:</strong> The contractor shall surrender all agreement area at the end of two years from the effective date if decides to withdraw. 25 per cent of the original agreement area at the end of the first extension period of two years. 25 per cent of the original agreement area at the end of second extension phase.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>7.2 Voluntary:</strong> The contractor may make voluntary relinquishment of all or part of the agreement area subject to fulfilling all of its obligation.</td>
<td></td>
</tr>
</tbody>
</table>
8. COST RECOVERY:
Maximum 30 per cent per annum the contractor shall recover all costs expenses and expenditures incurred for all petroleum a operation.
20 per cent per annum from exploration expenses.
20 per cent per annum from development expenses.

9. ROYALTY: 10% when the production in excess of 1,00,000 barrels a day.

10. PRODUCTION SHARING OF THE REMAINDER AFTER DEDUCTION OF ROYALTY AND COST OIL

<table>
<thead>
<tr>
<th>Average daily sharing oil production in barrels</th>
<th>Tax</th>
<th>State Royalty</th>
<th>Total</th>
<th>Contractor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than - 1,00,000</td>
<td>30</td>
<td>40</td>
<td>70</td>
<td>30</td>
</tr>
<tr>
<td>Less than - 2,00,000</td>
<td>23</td>
<td>50</td>
<td>10,000</td>
<td>75+Royalty 25</td>
</tr>
<tr>
<td>Less than - 3,00,000</td>
<td>20</td>
<td>60</td>
<td>20,000</td>
<td>20+Royalty 20</td>
</tr>
<tr>
<td>Less than - 4,00,000</td>
<td>15</td>
<td>70</td>
<td>30,000</td>
<td>85+Royalty 15</td>
</tr>
<tr>
<td>More than - 4,00,000</td>
<td>10</td>
<td>80</td>
<td>40,000</td>
<td>90+Royalty 10</td>
</tr>
</tbody>
</table>

11. BONUS:
11.1 Signature: 100 thousand U.S. dollar per annum.
11.2 Training: 100 thousand U.S. dollar per annum.
11.3 Institutional:
11.4 Production:
a) One million U.S. dollar when production reaches 50,000 barrels a day.
b) Two million U.S. dollar when the production reaches 1,00,000 barrels a day.
c) Four million U.S. dollar when the production reaches 2,00,000 barrels a day.
d) Six million U.S. dollar when the production reaches 3,00,000 barrels a day.

Source: Republic of Yemen Production sharing agreement and Yemen Hunt Oil Company M`rth/Jawf, September 1981.
CHART - 13: NIMIR PETROLEUM COMPANY SOUTH SANAU LIMITED, BLOCK NO. 29, SOUTH SANAU

1. NAME OF THE COMPANY : NIMIR PETROLEUM COMPANY LIMITED.

2. EFFECTIVE / AWARDED DATE OF AGREEMENT : January 15, 1992

3. OPERATIONAL AREA OF AGREEMENT : 11,055 Sq.Km.

4. PERIOD OF EXPLORATION :
   4.1 Initial Phase : 30 months.
   4.2 Second Phase : 30 months.
   4.3 Third Phase : -

5. MINIMUM OBLIGATORY EXPENDITURE AND WORK PROGRAMME
   5.1 Initial Exploration Phase : Expenditure of 30 million U.S. dollars.
   Reprocessing and interpreting of previous seismic data.
   Processing, interpretation of 1,500 lines Km. of new seismic data.
   Drilling and evaluation of three exploration wells.
   5.2 Second Exploration Phase : Expenditure of 25 million U.S. dollars.
   Processing and interpretation of 500 lines Km. of seismic data.
   Drilling and evaluation of three exploration wells.
   5.3 Third Exploration Phase : -

6. DEVELOPMENT PERIOD : 25 years and extendable by another five years.

7. RELINQUISHMENT :
   7.1 Mandatory :
   25 per cent of the original agreement area at the end of the first exploration phase.
   At the end of the first exploration phase, the contractor shall relinquish the remain­der of the original agreement area, not then converted to development area.
   7.2 Voluntary :
   The contractor may make voluntary relinquishment of all or part of the agreement area subject to fulfilling all of its obligation.
8. **COST RECOVERY**:  
26 per cent per half a year, the contractor shall recover all costs, expenses and expenditure incurred for all petroleum operations. (all such costs, expenses and expenditures shall be recovered from cost, oil) in the following manner:  
- 100 per cent per year from operating expenses incurred and paid after the date of initial commercial production.  
- 25 per cent per annum from development expenditures including and not limited to those accumulated prior to the commencement of initial commercial production.  
- 100 per cent per year from exploration expenditures including to those prior to the initial commercial production.

9. **ROYALTY**:  
10% from the total of crude oil produced and saved from the development area and not used in petroleum operations prior to the deduction of cost oil commencing from the first barrel of the initial production.

10. **PRODUCTION SHARING OF THE REMAINDER AFTER DEDUCTION OF ROYALTY AND COST OIL**

<table>
<thead>
<tr>
<th>Average daily sharing oil production in barrels</th>
<th>Percentage Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to 25,000 barrels</td>
<td>76.0</td>
</tr>
<tr>
<td>25,001 - 50,000</td>
<td>78.0</td>
</tr>
<tr>
<td>50,001 - 75,000</td>
<td>80.0</td>
</tr>
<tr>
<td>75,001 - 100,000</td>
<td>82.0</td>
</tr>
<tr>
<td>100,001 - 1,25,000</td>
<td>84.0</td>
</tr>
<tr>
<td>1,25,001 - 1,50,000</td>
<td>86.0</td>
</tr>
<tr>
<td>1,50,001 - 1,75,000</td>
<td>88.0</td>
</tr>
<tr>
<td>1,75,001 and above</td>
<td>90.0</td>
</tr>
</tbody>
</table>

11. **BONUS**:  
11.1 Signature: 8 million U.S. dollars.  
11.2 Training: -  
11.3 Institutional: 300 thousand U.S. dollars per year.  
11.4 Production:  
- a) Two million U.S. dollar when the production reaches 50,000 barrels a day.  
- b) Four million U.S. dollar when the production reaches 75,000 barrels a day.  
- c) Six million U.S. dollar when the production reaches 1,00,000 barrels a day.  
- d) Eight million U.S. dollar when the production reaches 2,00,000 barrels a day.

**Source**: Republic of Yemen Production sharing agreement between Ministry of Oil and Mineral Resources and Nimir Petroleum Company South Sanau Limited, January 15, 1992.
CHART - 14 : CLYDE EXPRO PIC AND NORSK HYDRO YEMEN A. S. 
AND ORANJE NASSAUF / ANSAN WIKFS LIMITED,
BLOCK NO. 32, HOWARIN

1. NAME OF THE COMPANY : CLYDE EXPRO PIC AND NORSK HYDRO 
YEMEN A.S. & ORANJE NASSAUF/ANSAN 
WIKFS LIMITED.

2. EFFECTIVE / AWARDED 

3. OPERATIONAL AREA OF 
AGREEMENT : 6,924 Sq.Km.

4. PERIOD OF EXPLORATION :

<table>
<thead>
<tr>
<th>Phase</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial</td>
<td>30 months.</td>
</tr>
<tr>
<td>Second</td>
<td>30 months.</td>
</tr>
<tr>
<td>Third</td>
<td>-</td>
</tr>
</tbody>
</table>

5. MINIMUM OBLIGATORY 
EXPENDITURE AND WORK 
PROGRAMME

<table>
<thead>
<tr>
<th>Phase</th>
<th>Expenditure</th>
<th>Exploration Programme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Exploration</td>
<td>25 million U.S. dollars.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Drilling and evaluation of three wells.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Acquisition of 1,000 Km. of new seismic data.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Processing of 1,000 Km. of new seismic data.</td>
<td></td>
</tr>
<tr>
<td>Second Exploration</td>
<td>Expenditure of 1,95,00,000 U.S. dollars including the execution of the following exploration programme.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Acquisition, processing and interpretation of 250 Km. of new seismic data.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Drilling and evaluation of three wells.</td>
<td></td>
</tr>
<tr>
<td>Third Exploration</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

6. DEVELOPMENT PERIOD : 20 years and extendable by another five years.

7. RELINQUISHMENT :

7.1 Mandatory :

30 per cent of the original agreement area at the end of the initial exploration phase.

At the end of second exploration period, the contractor shall relinquish the whole of the agreement area, not then converted to development area.

7.2 Voluntary :

The contractor may make voluntary relinquishment of all or part of the agreement area subject to fulfilling all of its obligation.
8. COST RECOVERY:
Maximum 25 per cent per quarter of all the crude oil produced and saved from the agreement area and not used in petroleum operations and after royalty payments to the state. All such costs, expenses and expenditures shall be recovered from cost oil in the following manner:

25 per cent from exploration expenses inclusive of those incurred prior to the commercial production.

25 per cent per annum from development expenses inclusive of those incurred prior to the commercial production.

9. ROYALTY:
10% from the total of crude oil produced and saved from the development area and not used in petroleum operations prior to the deduction of cost oil commencing from the first barrel of the initial production.

10. PRODUCTION SHARING OF THE REMAINDER AFTER DEDUCTION OF ROYALTY AND COST OIL:

<table>
<thead>
<tr>
<th>Average daily sharing oil production in barrels</th>
<th>Percentage Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to - 25,000</td>
<td>77.0</td>
</tr>
<tr>
<td>25,001 - 50,000</td>
<td>79.0</td>
</tr>
<tr>
<td>50,001 - 75,000</td>
<td>81.0</td>
</tr>
<tr>
<td>75,001 - 1,00,000</td>
<td>83.0</td>
</tr>
<tr>
<td>1,00,001 - 1,25,000</td>
<td>85.0</td>
</tr>
<tr>
<td>1,25,001 - 2,00,000</td>
<td>87.0</td>
</tr>
<tr>
<td>2,00,001 and above</td>
<td>90.0</td>
</tr>
</tbody>
</table>

11. BONUS:

11.1 Signature: 7 million U.S. dollar
11.2 Training: 200 thousand U.S. dollars per year.
11.3 Institutional: 200 thousand U.S. dollars per year.
11.4 Production:
   a) Two million U.S. dollar at the initial commercial production.
   b) Four million U.S. dollar when the production reaches 50,000 barrels a day.
   c) Six million U.S. dollar when the production reaches 1,000,000 barrels a day.
   d) Eight million U.S. dollar when the production reaches 2,000,000 barrels a day.
   e) Eight million U.S. dollar when the production reaches 2,000,000 barrels a day

CHART - 15: NIMIR PETROLEUM COMPANY AL FURT LIMITED.
BLOCK NO. 33, AL-FURT

1. NAME OF THE COMPANY : NIMIR PETROLEUM COMPANY AL FURT LIMITED.


3. OPERATIONAL AREA OF AGREEMENT : 6,017 Sq Km.

4. PERIOD OF EXPLORATION :
   4.1 Initial Phase : 30 months.
   4.2 Second Phase : 30 months.
   4.3 Third Phase : -

5. MINIMUM OBLIGATORY EXPENDITURE AND WORK PROGRAMME :
   5.1 Initial Exploration Phase : Expenditure of 30 million U.S. dollars.
      Geophysical studies which include reprocessing and interpretation of previous seismic data.
      Processing and interpretation of 1,000 Km. of new seismic data.
      Mobilization, drilling and evaluation of three wells.

   5.2 Second Exploration Phase : Expenditure of 25 million U.S. dollars.
      Processing and interpretation of 500 Km. of seismic data.
      Drilling and evaluation of three exploration wells.

   5.3 Third Exploration Phase : -

6. DEVELOPMENT PERIOD : 25 years and extendable by another five years.

7. RELINQUISHMENT :
   7.1 Mandatory :
      25 per cent at the end of the second exploration phase.
      All the end of second exploration period, the contractor shall relinquish the remainder of the original agreement area, not then converted to development area.

   7.2 Voluntary :
      The contractor may make voluntary relinquishment of all or part of the agreement area subject to fulfilling all of its obligation.
8. COST RECOVERY:
26 per cent per half of the year the contractor shall recover all cost expenditures incurred for all petroleum operations.
100 per cent from operating expenses, incurred and paid after the initial production.
100 per cent per year from exploration expenditures, inclusive of those incurred prior to commercial production.
25 per cent per year from development expenditures inclusive of those incurred prior to commercial production.

9. ROYALTY
10% from the total of crude oil produced and saved from the development area and not used in petroleum operations prior to the deduction of cost oil commencing from the first barrel of the initial production.

10. PRODUCTION SHARING OF THE REMAINDER AFTER DEDUCTION OF ROYALTY AND COST OIL

<table>
<thead>
<tr>
<th>Average daily sharing oil production in barrels</th>
<th>Percentage Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>upto 25,000</td>
<td>State 76.0</td>
</tr>
<tr>
<td>25,001 - 50,000</td>
<td>Contractor 24.0</td>
</tr>
<tr>
<td>50,001 - 75,000</td>
<td>State 70.0</td>
</tr>
<tr>
<td>75,001 - 1,00,000</td>
<td>Contractor 20.0</td>
</tr>
<tr>
<td>1,00,001 - 1,25,000</td>
<td>State 82.0</td>
</tr>
<tr>
<td>1,25,001 - 1,50,000</td>
<td>Contractor 18.0</td>
</tr>
<tr>
<td>1,50,001 - 1,75,000</td>
<td>State 84.0</td>
</tr>
<tr>
<td>1,75,001 and above</td>
<td>Contractor 16.0</td>
</tr>
</tbody>
</table>

11. BONUS:
11.1 Signature: 7 million U.S. dollars.
11.2 Training: 300 thousand U.S. dollars per year.
11.3 Institutional: -
11.4 Production:
a) Two million U.S. dollar when the production reaches 50,000 barrels a day.
b) Four million U.S. dollar when the production reaches 75,000 barrels a day.
c) Six million U.S. dollar when the production reaches 1,00,000 barrels a day.
d) Eight million U.S. dollar when the production reaches 2,00,000 barrels a day.

Source: Republic of Yemen Production sharing agreement between Ministry of Oil and Mineral Resources and Nimir Petroleum Company AL-Furt Limited, January 13, 1992
CHART - 16: LASMO OIL LIMITED, BRITISH GAS EXPLORATION AND PRODUCTION LIMITED, LASMO OIL LIMITED, IDEMITSU OIL AND GAS COMPANY LIMITED, HOOD OIL LIMITED, BLOCK NO. 35, HOOD

1. NAME OF THE COMPANY : LASMO OIL LIMITED.


3. OPERATIONAL AREA OF AGREEMENT : 7,395 Sq. Km.

4. PERIOD OF EXPLORATION :
   4.1 Initial Phase : 30 months.
   4.2 Second Phase : 30 months.
   4.3 Third Phase :

5. MINIMUM OBLIGATORY EXPENDITURE AND WORK PROGRAMME :
   5.1 Initial Exploration Phase :
       Expenditure of 23 million U.S. dollars.
       Geophysical studies which including Conducting and compiling topographic and surface geological surveys.
       Conducting geochemical studies on rock samples taken from cutting or core samples from the exploratory wells.
       Aeromagnetic survey of 5,000 Km. gravity survey of the area 1,000 stations.
       Reviewing, reprocessing and reinterpreting the available seismic data.
       Acquisition, processing and interpretation of 1,000 line Km. of new seismic data.
       Drilling and evaluation of three exploration wells.

   5.2 Second Exploration Phase :
       Expenditure of 15 million U.S. dollars.
       Acquisition, processing and interpretation of 300 line Km. of new seismic data.
       Drilling and evaluation of three exploration wells.

   5.3 Third Exploration Phase :

6. DEVELOPMENT PERIOD : 25 years and extendable by another five years.

7. RELINQUISHMENT :
   7.1 Mandatory :
       25 per cent at the end of the second exploration phase.
       At the end of the second exploration phase, the contractor shall relinquish the remainder of the original agreement area, not then converted to development area.
7.2 Voluntary:
The contractor may make voluntary relinquishment of all or part of the agreement area subject to fulfilling all of its obligation

8. COST RECOVERY:
25 per cent per quarter of all crude oil produced and saved during that quarter from the agreement area and not used in petroleum operation.

100 per cent from operating expenditures inclusive of those incurred and paid after the initial production.

100 per cent from exploration expenditures inclusive of those incurred prior to commercial production.

25 per cent per year from development expenditure inclusive of those incurred prior to commercial production.

9. ROYALTY:
10% from the total of crude oil produced and saved from the development area and not used in petroleum operations prior to the deduction of cost oil commencing from the first barrel of the initial production.

10. PRODUCTION SHARING OF THE REMAINDER AFTER DEDUCTION OF ROYALTY AND COST OIL

<table>
<thead>
<tr>
<th>Average daily sharing oil production (in barrels)</th>
<th>Percentage Share of State</th>
<th>Percentage Share of Contractor</th>
</tr>
</thead>
<tbody>
<tr>
<td>upto 25,000</td>
<td>77.5</td>
<td>22.5</td>
</tr>
<tr>
<td>25,001 - 50,000</td>
<td>79.0</td>
<td>21.0</td>
</tr>
<tr>
<td>50,001 - 100,000</td>
<td>81.0</td>
<td>19.0</td>
</tr>
<tr>
<td>100,001 - 150,000</td>
<td>82.5</td>
<td>17.5</td>
</tr>
<tr>
<td>150,001 - 200,000</td>
<td>85.0</td>
<td>15.0</td>
</tr>
<tr>
<td>200,001 and above</td>
<td>90.0</td>
<td>10.0</td>
</tr>
</tbody>
</table>

11. BONUS:

11.1 Signature: 7 million U.S. dollars.

11.2 Training: 150 thousand U.S. dollars per annum.

11.3 Institutional: 150 thousand U.S. dollars per annum.

11.4 Production:

a) Two million U.S. dollars when the production reaches 25,000 barrels a day.
b) Four million U.S. dollars when the production reaches 50,000 barrels a day.
c) Six million U.S. dollars when the production reaches 75,000 barrels a day.
