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MINISTRY OF PETROLEUM AND NATURAL GAS

CRUDE OIL—INDIGENOUS PRODUCTION AND IMPORTS

ESTIMATES COMMITTEE

1998-99

SECOND REPORT

TWELFTH LOK SABHA

LOK SABHA SECRETARIAT
NEW DELHI

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MINISTRY OF PETROLEUM AND NATURAL GAS

CRUDE OIL — INDIGENOUS PRODUCTION AND IMPORTS

Presented to Lok Sabha on 10th December, 1998

LOK SABHA SECRETARIAT
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INTRODUCTION

I, the Chairman of the Estimates Committee having been authorised by the Committee to submit the report on their behalf present this Second Report on the Ministry of Petroleum and Natural Gas — Crude Oil — Indigenous Production and Imports.

2. The subject was selected for detailed examination by the Estimates Committee (1995-96). The Estimates Committee (1996-97 and 1997-98) continued with the examination of the subject. The Committee considered the replies furnished by the Ministry of Petroleum and Natural Gas on the subject from time to time and other material received from ONGCL and OIL during tours of study Groups of the Committee. The Estimates Committee took evidence of the representatives of the Ministry of Petroleum and Natural Gas, Directorate General of Hydrocarbons, ONGC Limited, Oil India Limited and Indian OIL Corporation on 22nd August, 1995, 11th September, 1995, 8th November, 1995 and 8th September, 1997. The Committee wish to express their thanks to the officers of the Ministry and other organisations for placing before them their considered views and perceptions and for furnishing the written replies and information desired in connection with the examination of the subject.

3. The Committee would also like to express their gratitude to the Estimates Committee (1995-96, 1996-97 and 1997-98) for able guidance and right direction provided by them in obtaining information and taking evidence for in-depth and comprehensive study of the subject.

4. The Report was considered and adopted by the Committee at their sitting held on 6th October, 1998.

5. The Report is divided into four chapters each devoted to specific aspects of the subject. The Committee have made the following important observations/recommendations:

(i) The Directorate General of Hydrocarbons is experiencing difficulties in the smooth performance of its functions due to lack of experienced and trained technical manpower. As the experienced and technically qualified manpower is the foremost and urgent pre-requisite for an organisation like DGH, the Committee desire that concerted efforts should be made with utmost urgency for adequate provision of experienced and trained technical manpower so as to enable DGH to fulfil the objective mandated for it.

(ii) In India 26 sedimentary basins occupying an area of 1.72 million sq. kms. have potential for oil and gas. Out of the 26 sedimentary basins discovered and geologically surveyed, only 15 basins have been under the focus of attention for exploration by ONGC and OIL. Out of these 15 basins, only 6

basins namely Cambay, Assam Shelf, Bombay Offshore, Krishna-Godavari, Cauvery and Assam Arakan Fold Belt have been brought under commercial production in a period of two and a half decades. In view of the wide gap between indigenous crude oil production, projected growth in requirement for petroleum products and the time taken in exploration and commercial production of oil, a concerted effort was required to survey and exploit all the 26 sedimentary basins in the country from the very beginning. The Committee, therefore, desire that efforts should be stepped up not only by the national oil companies but also by evolving strategies to encourage private participation for intensive and extensive survey, exploration and exploitation of oil from all identified sedimentary basins to reduce dependence on imported crude.

(iii) ONGCL, in consultation with DGH, should take adequate corrective steps for monitoring the reservoir behaviour of various oilfields and to correctly assess their oil reserves.

(iv) To enhance hydrocarbon reserves in the country, the Government have of late felt the need for launching exploration in deep waters and frontier areas and have thus included two programmes *viz.* 'Deep Water Exploration' and 'Exploration in Frontier Areas' in the Accelerated Programme of Exploration, to be carried out in the Eighth Five Year Plan. The Committee would like to be apprised of the achievements in this regard.

(v) Working of ONGC-VL should be properly monitored so that it functions more as a commercial venture and contribute purposefully to the national oil requirement.

(vi) Production of crude oil which was 34.09 MMT in 1989-90 declined to 27.02 MMT in 1993-94 and again from 35.16 MMT in 1995-96 to 32.92 MMT and 33.86 MMT in 1996-97 and 1997-98 respectively. To counter the declining production trend an action plan initiating various short-term and long-term measures to augment crude oil production, was formulated and implemented. The Committee desire that all steps aimed at optimising the crude oil production should be implemented in totality so that crude oil production could be increased during the coming years.

(vii) Proposals for revival/rectificatory measures and further development of Mumbai High field should be implemented expeditiously.

(viii) OIL should learn from their experience and anticipate all possible bottlenecks that may come in the way of achievement of targets and take necessary remedial measures well in advance so that targets laid down are fulfilled.

(ix) The Government of India have made changes in the oil exploration policy and have been inviting bids for offering blocks for exploration by foreign/Indian companies. Bids have been received mostly for Gujarat, Kutch onshore, Rajasthan onshore, Bombay offshore, Cauvery offshore and Cambay

onshore which too have rich deposits of oil. This only indicates that existing fiscal incentives need to be improved further for the risk and security of oil exploration investment so that the country can have the benefit of knowledge of exploration of diverse geological basins available with foreign companies and exploit many of its basins which remains to be explored.

(x) The Ministry should suitably strengthen its machinery dealing with the work of inviting, finalising and awarding of contracts for exploration blocks expeditiously so that the bids received could be analysed, evaluated and blocks offered with due promptitude.

(xi) By awarding discovered fields to private/foreign companies, Government have forfeited substantial amount of country's pro- fits, which could have accrued to the country, had ONGC/OIL been asked to acquire state-of-the-art technology and develop these fields themselves earlier. The Committee emphasise that in future experience, expertise and resources of foreign oil prospectors should be utilised for exploring new areas for discovery of oil, rather than offering discovered fields for development and production.

(xii) The Government have realised the necessity of substantial efforts to augment indigenous production of crude oil and have offered fiscal incentives in the New Exploration Licensing Policy (NELP) announced in the House on 18 March, 1997 for participation of private sector in the areas of exploration and production of oil. The Committee desire that the Exploration Licensing Policy may be reviewed from time to time for attracting adequate private investments into the hydrocarbon sector to meet the burgeoning demand for petroleum products in the country.

(xiii) The Government should have the flexibility to decide on the quantity of import of crude oil on term contracts as well as spot purchase basis to get the maximum advantage of any decline in price of crude oil in the international market and the continuity of supply taking into consideration not only indigenous production, domestic requirement, and availability of resources but also factors affecting the price of crude oil in the international market.

6. For facility of reference, the observations/recommendations of the Committee have been printed in thick type of the body of the Report and have been reproduced in a consolidated form in Appendix VI of the report.

NEW DELHI;
December 7, 1998
Agrahayana 16, 1920(S)

MADHUKAR SIRPOTDAR,
Chairman,
Estimates Committee.

CHAPTER I

INTRODUCTORY

Historical Background

1.1 The history of oil exploration in India is more than hundred years old. The earliest record of petroleum exploration dates back to 1825 when soldiers of the 46th Regiment during their military reconnaissance mission rowed up the Burhi Dihing river in Upper Assam and came across oil seepages at Supkhong village.

Systematic efforts to locate the seepages were conducted by H.P. Medlicott in 1865 who reported oil seepages in Makum area while investigating the coal fields of Upper Assam. Based on his recommenda- tions, the first mechanically drilled well in Asia was bored at Makum. This well yielded 300 gallons of oil from a depth of 118 ft. before ceasing to flow. The credit for exploration and exploitation of oil in this area goes to Assam Railway & Trading Co. Ltd. (AR&T), who in 1882 acquired a concession covering the petroleum rights at Makum and additional acreage over what came to be known as Digboi area in 1888 and it is here that the history of systematic exploration based on geological considerations and then available drilling technology were initiated.

1.2 Soon after the independence of India, the activities of Assam Oil Company and that of the Burmah Oil Company operating under the aegis of Shell Oil were merged to form a semi-government and private equity partnership company known as Oil India Limited. The activities of this company were extended to the Assam plains and as a consequence of which large accumulations first at Nahorkatiya and then at Moran were located by systematic exploration efforts. These discoveries represent some of the best known oil and gas accumulations in the north eastern sector which continue to contribute significantly to the country's oil production till date.

1.3 Consequent upon the establishment of the Indian Republic and the realisation of strategic role of petroleum in national development, Govt. of India constituted the Oil and Natural Gas Commission (ONGC) as the country's foremost exploration and exploitation company. The establishment of the Commission followed an Act of Parliament that gave the ONGC far-reaching powers to assess and explore the various sediment cover areas of the country. Consistent with this national mandate and the need to supplement indigenous oil production, ONGC undertook systematic geo-scientific surveys in most areas considered prospective on the basis of global analogies. As a result of these efforts, the myth that "there is no oil outside the limits of northeastern India" as was perpetuated by the colonial rulers was broken with commercial discoveries in the area of Cambay (Gujarat). This discovery at Cambay well No. 1 and subsequently at Ankleshwar giant oil field, also in Gujarat, set the tempo of petroleum exploration and gave a tremendous impetus to the indigenous effort in exploration and exploitation of oil areas in India.

1.4 Given the uncertainties involved in exploration and the urgency to fulfil national requirements, ONGC's exploratory activities started with areas that were considered as being analogous to the Arabian platform. Thus, a major thrust in exploration was concentrated during early years in the Himalayan foothills and the adjoining Ganga plains. Exploratory activities were collaterally extened to large alluvial tracts of Gujarat, Upper Assam and West Bengal of which significant discoveries leading to substantial augmentation of production potential were made during sixties in Ankleshwar, Cambay, Kalol, Nawagam, North Kadi, Sobhasan, Sanand, etc. in Cambay basin (Gujarat) and Rudrasagar, Lakwa, Geleki and Upper Assam in addition to ongoing geo-scientific surveys in other parts like sediment cover areas of Tamil Nadu (1964), Rajasthan (1964), J&K (1970) and Andhra Pradesh (1978). As a result of these efforts, small but significant discoveries were made in Karaikal (Cauvery basin) and Narsapur (A.P.) and Manhera Tibba (Rajasthan).

1.5 The first step towards offshore exploration was taken in 1964-67, when regional seismic surveys in selected parts of western offshore were conducted. As a result, a large structure at Bombay offshore was identified and taken up subsequently for drilling in 1974 leading of India's biggest commercial discovery.

Encouraged by the success at Bombay High, exploratory efforts were expanded systematically in the entire western and eastern offshore areas leading again to giant discoveries like Neelam Basin etc. in western offshore and substantial accumulation at Ravva, PY-3, etc. in eastern offshore.

Role and Functions of Ministry and its Agencies

(a) Ministry of Petroleum and Natural Gas

1.6 The Ministry of Petroleum and Natural Gas is responsible for all policies relating to exploration and production of hydrocarbons, refining, marketing and conservation of petroleum products.

(b) Oil and Natural Gas Commission and Oil India Limited

1.7 Oil and Natural Gas Commission (ONGC) was established as a statutory body under an Act of Parliament entitled "The Oil and Natural Gas Commission Act, 1959". Oil India Limited (OIL) was established in the year 1959. These are the two public sector undertakings under the administrative control of the Ministry of Petroleum and Natural Gas which are primarily engaged in exploration of crude oil and natural gas, development of petroleum reserves, production of crude oil and natural gas and transportation of crude oil from oil fields to the refineries.

1.8 On January 24, 1992, the Government of India appointed a Committee headed by Shri P.K. Kaul, IAS(Retired) to examine all aspects of ONGC's existing organisation with a view to examining the need for its restructuring. Kaul Committee submitted its first report on 10.9.92 and final report on 15.11.92.

A new company named Oil and Natural Gas Corporation Limited(ONGCL) was incorporated on 23rd June, 1993. The new company received the Certificate of Commencement of Business on 10.8.93. Both the Houses of Parliament passed the Bill "Oil and Natural Gas Commission (Transfer of Undertaking and Repeal) Act,

1993" in Augut, 1993. The Bill received the assent of the President of India on 4.9.93 and the corresponding Act was published in the Gazette of India, (Extraordinary) as Act No. 65 of 1993.

Following the notification issued by the Government of India, the undertaking of the Commission was formally transferred to and vested in the new company *i.e.* Oil and Natural Gas Corporation Limited *w.e.f.* 1.2.1994.

(c) Directorate General of Hydrocarbons (DGH)

1.9 DGH was set up in April 1993 under the administrative control of the Ministry of Petroleum and Natural Gas to promote sound management of the Indian Petroleum and Natural Gas resources having a balanced regard for the environment, safety, technological and economic aspects of the petroleum activity.

1.10 Functions and responsibilities of the Directorate General are as under:—

(a) to provide technical advice to the Ministry of Petroleum and Natural Gas on issues relevant to the exploration and optimal exploitation of hydrocarbons in the country and on the strategy of taking up exploration and exploitation of oil and gas reserves abroad by the national oil companies;

(b) to review the exploration programmes of companies operating under Petroleum Exploration Licences granted under the Oilfields (Regulation and Development) Act, 1948 and the Petroleum and Natural Gas Rules, 1959 with a view to advising Government on the adequacy of these programmes;

(c) to reassess the hydrocarbon reserves discovered and estimated by the operating companies in discussion with them;

(d) to advise the Government on the offering of acreage for exploration to companies as well as matters relating to relinquishment of acreage by companies;

(e) to review the development plans for commercial discoveries of hydrocarbon reserves proposed by the operating companies and advise Government on the adequacy of such plans and the exploitation rates proposed and matters relating thereto;

(f) to review and audit concurrently the management of petroleum reservoirs by operating companies and advise on any mid course correction required to ensure sound reservoir management practices in line with the optimal exploitation of reserves and the conservation of petroleum resources;

(g) to regulate the preservation, upkeep and storage of data and samples pertaining to petroleum exploration, drilling, production of reservoirs etc. and to cause the preparation of data packages for acreage on offer to companies;

(h) to advise Government on the laying down of safety norms and framing regulations on safety in oilfield operations, prescribe pollution control measures and assist in inspection and periodic safety audit; and

(i) all other matters incidental thereto and such other functions as may be assigned by the Government from time to time.

1.11 As one of the objective of DGH is to review the exploration programme of companies operating under Petroeum Exploration Licences (PEL), the Committee desired to know as to whether DGH has initiated such an exercise. In reply, the Ministry have stated in a note that the review of exploration programme of the companies operating under PEL has been initiated by DGH, to start with at macro level only. Initially the exploration plans of the two national oil companies is being reviewed. It was observed that the exploration programme of these companies needed a thrust during the remaining years of the VIIIth Plan to accrete the desirable quantum of reserves to sustain production in future years. With this objective in mind an Accerlerated Plan of Exploration (APEX) was formulated by national oil companies in consultation with DGH. The same is under implementation.

1.12 Asked further as to whether the DGH had started the process of reassessing the hydrocarbon reserves estimated by national oil companies, the Ministry stated that the task of reassessment of hydrocarbons reserves of national oil companies can be undertaken only after placement of adequate trained manpower and establishment of required infrastructure including computer hardware and related softwares for which the action is in an advanced stage. However from a subsequent note furnished in June, 1997 DGH has initiated studies to review and reassess the reserves of several oil fields.

1.13 To another query as to how far the DGH has been successful in achieving the objectives laid down for it the Ministry of Petroleum and Natural Gas stated as under:—

> DGH has been successful in achieving the various objectives as set out above by undertaking the activities on the related aspects.

1.14 Giving details of work done by DGH, future plans of DGH for increasing the oil production and the problems faced by it in performing its role efficiently, the Director General of Hydrocarbons during his evidence before the Committee stated as under:

> "DGH has opened 25 per cent of unexplored area in the last two years. Last year alone by doing seismic survey in deep water areas, DGH has opened eight per cent of unexplored area. The data is very interesting. There are some large structures, mapped and very interesting geological plays observed. Our data has already been sold at an enormous price of one million US $ just for seismic survey, more and more companies are lining up to buy data. We are now opening more and more new areas. ONGC has been working in deep water areas and we would be able to add more reserves.
>
> Our manpower resource is very low. Right now we have only 50 executives. NPD employs about 600 people right now. The U.K. counterpart employs about 450 people and my other counterpart in the USA, the Mineral

Management Services, employs 1705 full- time people and they have access to the best computers, best terminals and software packages in the world. In comparison with them our manpower is very little.

We have said that the ONGC and *i.e.* are the national companies are taking into consideration the national interests and the national policies. Some very well known private companies will certainly follow the good international practices. However, smaller ones may or may not follow the good international practices. Therefore, we picked up only the private sector fields and we have done a study. It is a very complicated process. It takes minimum of six months to do detailed studies for each field. Due to our very small strength we picked up Panna field and carried out a simulation study. We had access to some new data, which was processed in computer acquired by DHG.....

.....We have now drafted our Act. We find without our Act, we are totally helpless. We do not get information from private sector. Without that, we cannot perform well. Without that Act, I cannot even gather all the people. we train them extensively because I have contract with NPD, Norway, MMS in America and Oil and Gas Directorate of DTI in U.K. These agencies are training our people. We send our people to get trained at their sites. We are trying to create a world class organization. 50 experts are no match to 1705 MMS of USA. We have to have more trained staff. Then we can do more monitoring and better guideline preparation."

1.15 Asked why DGH had not been able to staff itself adequately, the Ministry in a note stated:

"In terms of Government of India's resolution No. O-20013/2/92- ONG/DO. III dated 8th April, 1993, the Directorate General of Hydrocarbons would be manned by such staff as the Ministry in consultation with Director General decide and shall also be drawn from the oil industry on deputation/tenure basis.

The current practice is to draw the manpower from oil industry particularly from ONGC & OIL who have the requisite experi- enced manpower. In the past, however, DGH has faced constraints in drawing the experienced and trained technical manpower from ONGC/OIL because requisite staff needed could only be partly made available by ONGC/OIL and thus DGH has not been able to adequately staff itself. Recently, DGH has also advertised for filling of posts on deputation basis. There is, however, no budgetary constraint from the Ministry in this regard.

A proposal to give DGH statutory status under an Act of Parliament is actively under consideration of Government. Among other things, this should enable DGH to draw requisite experienced manpower from oil companies and also create its own cadre."

(d) Joint Company

1.16 Indian Oil Corporation Ltd. (IOC), Hindustan Petroleum Corporation Limited (HPCL) and Bharat Petroleum Corporation Limited (BPCL) jointly propose to set up a new company for carrying out exploration and production activities. After careful consideration these Companies have been advised to submit individual proposals for setting up JVS after obtaining clearance from their Boards.

1.17 The Government have approved a proposal to form a joint venture company under HPCL for exploration and Production of hydrocarbons in India and abroad.

(e) Laws governing Mining Operations

1.18 The laws governing mining operations consist of the Oilfields (Regulation and Development) Act, 1948 and the Petroleum and Natural Gas Rules, 1959.

Observations/Recommendations

1.19 The Committee note that the Ministry of Petroleum and Natural Gas is entrusted with the responsibility of exploration and production of oil and natural gas, their refining, distribution and marketing, import, export and conservation of petroleum products.

Two national oil companies, *viz.* Oil and Natural Gas Corporation Limited and Oil India Limited under the Ministry of Petroleum and Natural Gas are playing a pivotal role in exploration and production of hydrocarbons in the country.

1.20 The Committee note that the Directorate General of Hydrocarbons has been set up with the laudable objective of promoting sound management of the Indian petroleum and natural gas resources having a balanced regard for the environmental, safety, technological and economic aspects of the petroleum activity. Various functions and responsibilities of DGH *inter-alia* envisage providing technical advice to the Ministry of Petroleum and Natural Gas on issues relevant to the exploration and optimal exploitation of hydrocarbons in the country, reviewing of exploration programme of companies, reassessing of the availability of hydrocarbons, advising the Government on the offering of acreage for exploration, reviewing the development plans for commercial discoveries of hydrocarbon reserves proposed by the operating companies, etc.

1.21 The Committee appreciate that to fulfil the objectives mandated to it, DGH has reviewed the exploration programme of ONGCL and OIL, which resulted in the formulation of Accelerated Plan of Exploration (APEX) to provide a thrust to exploration activities and to accrete the desirable quantum of reserves to sustain production in future. Besides, the DGH has also taken steps to fulfil its other objectives which are under various stages of implementation.

1.22 The Committee note that DGH is experiencing difficulties in the smooth performance of its functions due to lack of experienced and trained technical manpower. Adequately experienced manpower can be made available only by ONGCL and OIL. DGH has also issued an advertisement for filling of posts on

deputation basis. A proposal to give statutory status to DGH under an Act of Parliament is stated to be under consideration of the Government which will enable it to draw the requisite experienced manpower from oil companies and also create its own cadre. The Government is also trying to develop DGH as a world class organisation by getting their manpower trained and experienced through oil giants abroad. As the experienced and technically qualified manpower is the foremost and urgent pre-requisite for an organisation like DGH, the Committee desire that concerted efforts should be made with utmost urgency for adequate provision of experienced and trained technical manpower so as to enable DGH to fulfil the objective mandated for it.

1.23 The Committee need hardly emphasise that to give a boost to domestic oil production, it is imperative that more and more companies including those in public sector are encouraged to undertake the work of oil exploration, development and production. The Committee appreciate that the Government have advised the Indian Oil Corporation (IOC), HPCL and BPCL to submit their proposals after taking clearance from their respective Boards for setting up of new Joint Venture Companies for exploration and production of hydrocarbons in the country and abroad. This is a step in the right direction and would provide competitive impetus for production of crude oil in the country.

CHAPTER II

EXPLORATION AND PRODUCTION

A. Exploration

Sedimentary Basins

2.1 Hydrocarbons (oil and gas) are generated and usually accumulated in 'sedimentary rocks'. These are rocks that have been deposited in large water mass, like lakes and seas, which from sedimentary basins. These sedimentary basins are, therefore, the target areas for exploration. In India, 26 sedimentary basins, upto the water depth of 200 meters, have been recognised and occupy an area of about 1.785 million sq. kms.

2.2 The Committee desired to know the details about the potential of hydrocarbon generation and accumulation in different sedimentary basins. A representative of ONGC stated during evidence:

> "India is a vast country having near about 26 sedimentary basins. In these basins the geological mappings have been completed by the Geological Survey of India, by the British Geologists and the Indian Geologists. When the Oil and Natural Gas Commission was formed, a band of Geologists were appointed and they surveyed the country. All the 26 sedimentary basins of our country have totally been geologically surveyed as to whether the basin will hold oil or not.
>
> Firstly, we do the geological mapping to find out the thickness and whether the type of rock is capable of holding hydrocarbon structures that are contained in that area. This part of the survey has been completed by ONGC. They have done the next stage called gravity magnetics to find out the magnetic and gravity anomalies present in a particular region. Then, seismic survey is also done in some of the basins to measure the time taken for the rays to travel and hit the rock and come back. This is measured on the surface. Through this time taken, we can calculate the thickness of sediments which are present below and map the structures which will hold hydrocarbon. We have more or less done that part also.
>
> Then, if the structure is discovered we do detailed mapping. Now-a-days, the latest technology of 3D is used through which you can view the picture of the sub-surface. That is being done in many parts of the country. In the globe they have taken it for exploration also. In India, we are going to do maximum work through 3D technology in the Ninth Five Year Plan.
>
> Out of the 26 sedimentary basins which we have, 15 sedimentary basins are under the focus of attention of the ONGC and the OIL. In these 15 basins, in a period of about two-and-a-half decades we could bring 6 sedimentary basins under production which are, Upper Assam, Assam- Arakan, Bombay, Cambay, Cauvery and Krishna-Godavari."

2.3 Explaining the position in detail, the Ministry in a note stated that 26 sedimentary basins of India were grouped into four categories depending on the petroleum potential and the present status of exploration and exploitation, as follows:

"*Category I* basins are proved petroliferous basins with commercial production (Cambay, Upper Assam Platform, Bombay Offshore, Cauvery, Krishna-Godavari, and Assam-Arakan Fold Belt).

Category II basins have known occurrences of hydrocarbons but from which no commercial production has yet been obtained (Rajasthan, Kutch- Saurashtra and Andaman).

Category III basins are those in which significant shows by hydrocarbons have not yet been found, but which on general geological consideration are assumed to be prospective (Kerala-Lakshadweep, Mahanadi, Himalayan foreland, Ganga, Vidhyan, Saurashtra and Bengal).

Category IV basins are poorly explored frontier basins with uncertain prospects, which on analogy with geologically similar producing basins in the world may be prospective (Vindhyan, Pranhita-Godavari, Damodar, Deccan Syneclise, Kerewa, Narmada, Son-Satpura-South Rewa-Mahanadi and Tectonised Zones of Himalayas, Spiti/Zanskar).

There has been greater concentration of exploratory inputs in Category I & II basins and comparatively lesser concentration in Category III basins and very little has been made in Category IV basins."

Basins under Exploration of ONGC

2.4 ONGC has established commercial production from 6 basins namely Cambay, Assam Shelf, Bombay Offshore, Krishna-Godavari, Cauvery and Assam Arakan Fold Belt. In addition, minor quantity of gas is being produced in Rajasthan for supply to RSEB.

In addition, non-exploitable hydrocarbon accumulations have also been established in Kutch and Andaman & Nicobar basins by ONGC.

During the last 40 years, 6 of the 7 category-III basins (Himalayan foreland, Ganga, Vindhyan, Saurashtra, Kerala-Konkan-Lakshadweep, Mahanadi and Bengal) have been under exploration by ONGC. Hydrocar- bon indications have been obtained in Himalayan foreland, Ganga, Vindhyan and Bengal.

In addition, based on maiden strike of Gondwanic gas in the Krishna- Godawari basin the Gondwana basins with similar prospectivity, namely, Satpura, South Rewa, Damodar and Pranhita-Godavari basins have been taken up for exploration where the Government of India has awarded a major part of exploration acreages to the Indian and/or foreign private companies, while ONGC has initiated exploratory drilling in South Rewa basin and R&D well for coal bed methane in Damodar.

ONGC's efforts of exploration including drilling in Karewa basin (Kashmir Valley) proved unsuccessful. In large parts of western a'.d central onland a thick over burden of volcanic rock conceal the basins prospectivity in Deccan Syneclise/Saurashtra

Onland. ONGC has resorted to state-of-the- art data acquisition in the form of MT (Magnetic Telluric) and TEM (Transient Electro-Magnetic) surveys in such areas.

The Spiti Zanskar and other time equivalent basins concealed or otherwise in Himalayan region remain a future area of ONGC's option for hydrocarbon exploration which has not received adequate attention due to adverse logistics.

The four basins Bhima-Kaladgi, Bastar, Chattisgarh and Cuddapah are geologically ancient basins and posses indeterminate potential. ONGC does not have any exploration plan as yet for these basins.

Apart from these producing basins reserves have been established only in two, namely Kutch Offshore and Andaman-Nicobar. The reserve base, reservoir characterisation and production potential do not permit envisaging any production from these finds at this stage. However, future larger discoveries may lead to commercial production particularly from Kutch Offshore. Estimatable hydrocarbon reserves have not been found so far in the remaining basins of activity.

Future programme of production can be planned from the remaining basins only after discovery of producible reserves.

Para 2.5 *Basins under Exploration of OIL*

Oil India Limited (OIL) from its inception has been producing oil and gas from Upper Assam Basin. Subsequently, OIL has extended its exploration activities to some parts of other basins. Status of exploration in these areas is summarised below:—

Rajasthan

OIL's exploratory efforts led to discovery of gas in the Jaisalmer basin and heavy oil in the Bikaner-Nagaur basin in Rajasthan. OIL has started production of natural gas from its gas fields in Jaisalmer basin since July 1996 which is being supplied to Rajasthan Electricity Board's Power Plant. The current average supply is about 0.40 MMSCMD as per the requirement of power plant. As regards heavy oil in Rajasthan, because of crude characteristics and inadequate in-house technology production has not started yet. OIL is in look out either to develop this field by itself using suitable technology or through joint venture effort. Additionally, exploration in two blocks in Rajasthan are in progress under Production Shairing Contract.

Mahanadi Onshore/Offshore & North East Coast

A total of 15 wells have been drilled in these areas. However, no commercial discovery has so far been made. The area has since been relinquished by OIL. Few blocks in these areas are proposed to be offered under NELP.

Saurashtra Offshore

The exploratory work in Saurashtra Exploration Project was started in 1989 and seimsmic data was acquired alongwith Gravity and Magnetic data. Subsequently, three exploratory wells as first phase of exploratory drilling were completed without any discovery.

Andaman Offshore

Three wells have so far been drilled in OIL's PEL area in Andaman Offshore. No commercial discovery has been made. The area has since been relinquished by OIL.

Ganga Valley

In the PEL area in Ganga Valley in U.P. initial phase of seismic survey has been completed. Some additional Survey has also been planned. The exploratory drilling in the area has started recently.

2.6 In this connection, when enquired about the exploitation of basins in Himalayan foothills, Ganga Valley offshore basins in east and west and efforts made to penetrate the sedimentary zone present below the hard rocks in Maharashtra region, the representative of ONGC during evidence stated:

"We are also working in the Himalayan foothills but because of the complexities of nature we are not getting much success in the Himalayan hills. Similarly, in the Ganga Valley thick alluvial cover is posing greater problems. To exploit these basins we are trying to seek help from our foreign collaborators and they are also ready to help us.

The area towards the east is rugged and we are trying to get relevant information about it. Towards the western part of our country, we have Maharashtra. Here the sedimentary rock is present below the hard rocks. Modern technology is necessary to penetrate the sedimentary zone present below. We are asking our foreign counterparts to come and help us in order to discover hydrocarbon from there. We have invited foreign counterparts for operation in the east coast and in the west coast. In the east coast we are operating in the offshore. We are also operating in Bombay offshore. Our operation is in progress in south Kerala which is called Kerala-Konkan area."

2.7 Asked to indicate the collaborators from whom technical knowhow for exploitation of basins was being sought and the latest position about discovery of hydrocarbons from the above basins, the Ministry in a note informed that independent opinion of renowned international experts in petroleum exploration has been sought by ONGC regarding yet to find potential of the basins under exploration of ONGC and orientation in exploration strategy/policy to harness foreseeable potential and established reserves. A number of experts have been approached to undertake the above work on mutually agreed terms and conditions. The current status (August, 1996) is given below:

(1) Dr. John Kingston of USA has submitted his report on Krishna- Godawari, Cauvery and Bengal basins to ONGC on 14.1.1996. The report has been studied by ONGC and follow up actions are in hand.

(2) Dr. R.C. Selly and Prof. R. Stonely of UK, who are studying Gondwana, Satpura and Deccan Syneclise basins, have sought extension and their report is now scheduled to be submitted in October, 1996.

(3) Dr. V.B. Leviant and Prof. N. Kunine of Russia have partly completed their study of Bombay Offshore basin and extension has been given. They are expected to resume their study in August, 1996 and submit the report by January, 1997.

(4) Dr. A.W. Bally and associate of USA are studying Ganga, Himalayan Foothills and Assam-Arakan basins. Their report is scheduled to be submitted in January, 1997.

(5) Dr. M.L. Bordenave of France is studying Cambay basin. He has started work in March, 1996 and his report is scheduled to be submitted by February, 1997.

Reserves

Prognostic Reserves

2.8 The prognosticated resource-base of oil and gas is an assessment of the quantity of hydrocarbons that are considered to have been generated and accumulated in the different sedimentary basins. These include both- reserves that have been discovered and proven, as also the reserves that are sepculative and are yet to be discovered. Such assessments are made for different sedimentary basins, time and again, as exploration progress and more information is obtained. As such, these estimates unbdergo changes with time and progress of work.

The prognosticated resource-base in the sedimentary basins of India are about 21.38 billion tonnes of oil and oil equivalent of gas.

Geological and Recoverable Reserves

2.9 Geological Reserves are estimates of volumes of oil and gas that have been located through exploration in the underground reservoirs. As such, these are also called in place reserves. In general only about 25% of such in place reserves are recoverable under primary, natural energy drive. Energy can be supplemented by injection of water/gas/chemicals etc. leading to enhancement of recoverable quantities. As a result of exploratory activities in terms of geoscientific surveys and exploratory drilling, carried out so far ONGC and OIL have been able to establish about 6.0 billion tonnes of hydrocarbons reserves out of the total prognotsticated resources of about 21.38 billion tonnes in various categories of sedimentary basins. Volume of reserves which is available at any time for exploitation under the then existing technological conditions is called Recoverable Reserve.

The geological reserves of oil and oil equivalent of gas (O+OEG) established by ONGC and OIL as on 1.4.94 were 5350.36 MMT and 738.10 MMT respectively. The corresponding figures of recoverable (proven) reserves of O+OEG of ONGC & OIL as on 1.4.94 were 1884.72 MMT and 145.35 MMT. The geological reserves and recoverable reserves of oil and oil equivalent of gas (O+OEG) for fields operation by ONGC, JVC and private enterprises as on 1.4.96 were 5615.65 and 966.13 MMT, respectively. In case of Oil India Limited geological reserves and recoverable reserves as on 1.4.96 were 772.71 and 293.45 MMT respectively.

The reserves position is estimated/reviewed every year by ONGC/OIL as on 1st April/1st January. The estimated balance of recoverable reserves of oil in the country on 1.4.1996 were of the order of 738.92 million tonnes.

Although the production level in the coming years is to be enhanced with improvement in recoverable oil of already discovered in place oil reserves and by putting up new discoveries on production, considering the production level of 1995-96 this oil reserves are expected to last for about 21 years.

Inplace Oil Reserves of Panna, Mukta, Ravva, Mid and South Tapti and Ankaleshwar Fields

Panna Field

2.10 The total inplace reserves of oil of both "A" and "B" zones of Panna field were indicated by ONGC as 92.05 MMT and subsequently by the contractor as 151.97 MMT. Of this, reserves of Panna "B" zone accounted for 62.23 MMT in case of ONGC and 106.7 MMT in case of contractor's assessment.

The difference between ONGC and contractor's estimation was attributed mainly due to the additional information acquired by the contractor in terms of 3D seismic surveys.

In order to firm up its own assessment DGH undertook a joint project with ONGC's Institute of Reservoir Studies (IRS) at Ahmedebad for study of Panna "B" zone which is the main producing zone. The results of the study by IRS estimated the inplace reserves of Panna "B' zone as 70 MMT as against ONGC's estimates of 62.23 MMT and contractor's earlier estimates of 106.7 MMT.

The reserves including recoverable components are, however, under review by the contractor through simulation studies.

2.11 The Committee wanted to know whether ONGC proposed to make a reassessment of Panna oilfields by undertaking 3D seismic surveys. In reply, the Ministry stated that 3D seismic survey is primarily a tool for better reservoir characterisation which leads to improved reservoir management. The increase in Panna inplace of oil was not due to 3D seismic survey as the contractor had estimated similar value of IOIP on the basis of 2D seismic data itself. ONGC was utilising the 3D data acquired by EOGIL for interpretation. After completion of interpretation reassessment of reserves of Panna field would be done by ONGC. There was no specific proposal at that stage in ONGC to make reassessment of reserves of all the oilfields by undertaking 3D seismic survey. However, in and around any field whenever 3D seismic survey was carried out this data was taken into account while assesssing/reassessing the reserves of these fields.

2.12 The reasons for increase in estimates of inplace reserves of Panna B Zone made by DGH-IRS *vis-a-vis* that of ONGC estimates made earlier were stated to be follows:

— Consideration of interval 2209.5—2228 m. of PA-5 as oil bearing which was earlier considered to be gas bearing.

— Increase in oil saturations and porosities.

— Volumetric estimates were done with probability factor of 90%, 50% and 10% and the reserves estimates were 63.69 MMT, 75 MMT and

88.83 MMT respectively. However, the mean oil reserves was estimated to be 75.76 MMT.

— The reserves were also estimated by reservoir simulation studies as 70.15 MMT. Considering it to be the most reliable estimates, this estimate is taken as the representative initial oil inplace reserves for B-Zone of Panna field.

— The reserves estimated earlier by ONGC were 62.23 MMT.

Mukta Field

2.13 The inplace reserves estimated by ONGC were 107.72 MMT as against contractor's estimates of 88.9 MMT. However, the contractor has completed the 3D seismic surveys after approval of work programme by DGH and reserves are under review by the contractor.

Ravva Field

2.14 The inplace reserves of oil of block 10 and 17 of Ravva field estimated by ONGC were of the order of 31.51 MMT. These reserves were upgraded to 37.28 MMT, as on 31.3. 1996 by the contractor. This increase in reserves was probably due to better than expected development of reservoir stands in these two blocks. In order to firm up its own assessment DGH has undertaken a joint study with ONGC's IRS at Ahmedabad for detailed analysis of Ravva field and simulation studies. The studies were likely to be completed by the end of 1997.

Mid and South Tapti

2.15 ONGC had assessed in place gas reserves of the field at 67.02 MMMm3 and recoverable reserves of 31.162 MMMm3. The contractor, in their initial assessment on the basis of the same data and information estimated inplace reserves of 48.37MMMm3 and Recoverable reserves of 29.373 MMMm3.

In reply to an Unstarred Question answered on 2nd June, 1998 regarding estimation of recoverable reserves from the Tapti gasfields, the Minister of State for Petroleum and Natural Gas stated that private operator was expecting higher reserves than those estimated by ONGC after drilling of additional wells in Tapti field, which was yet to be confirmed.

After acquiring new geological and geophysical data the contractor is doing some reassessment, the result of which had not yet been finalised and communicated to DGH.

2.16 DGH also undertook a joint study alongwith ONGC's Institute of Reservoir Studies (IRS) at Ahmedabad for detailed assessment of South Tapti field, which is likely to be completed by mid 1998. For mid Tapti, DGH proposed to take up the studied subsequently.

Ankaleshwar Field

2.17 During evidence, Director General of Hydrocarbons informed:

"Ankaleshwar field was discovered in the 60s. What happens is when you discover an oilfield, we make certain estimates of reserves. As we go on drilling more wells, we get more data and we upgrade the reserves. So Ankaleshwar was an upward story. For example, in 1965 the reserves were estimated 46.3 million tonnes. This went through various changes and as on 1990 quite a large number of wells were drilled. The same field reserves went up to 71.18 million tonnes. This is a normal phenomenon and this could be both positive and negative..... Same is the case in the Panna fields."

2.18 Enquired as to that what would be the benefit in doing studies so late after having offered the fields, the DGH stated as follows:

"The benefit is like in the case of Panna, the contractor earlier felt that inplace reserves were 106 million tonnes of oil in B Zone whereas later DGH studies estimated these inplace reserves as 70 MMT. This can change the economics of the project."

2.19 In another note, the Ministry informed:

"DGH alongwith IRS and KDMIPE is in the process of reviewing/ reassessing the inplace reserves of 13 small sized fields (Dhalka, Wavel, Indrora, Bakrol, Lohar, Hazira, Sabarmati, Bhandut, Matar, Cambay, PY-1, Baola, Asjol), which are likely to be completed by the end of 1997. DGH shall also take up the other fields for such studies subsequently."

2.20 During oral evidence of representatives of Ministry of Petroleum and Natural Gas, the Committee expressed their concern over wide variations in the initial and final assessments of oil reserves of Panna and Mukta oil fields and asked the Secretary of the Ministry of Petroleum and Natural Gas to explain the reasons for such variations. In reply, he stated:

"It is true; and it happens all over the world. It happens every day with the ONGC when some new information about some reservoir comes. It is all based on the estimates. What happens is that every time, we are working on a reservoir, we are collecting more data based on the seismological environment. Now we have a new technology of 3D whereby we get many more information about the same block. Based on the latest information, we have to revise the estimates because basically estimates are based on information. This is one element.

The second element is a very interesting one. On the same information different geologists give different interpretations. The Venezuelan example is a good one here, where they offered similar kind of an oil field, as we did. For the same block, same information was given to the different oil companies. When we saw the evaluation made by them, they differed ten times. So, there is an uncertainty in terms of information; and there is also an uncertainty in terms of interpretation of the same information by different geologists.

What has happened in Mukta and Panna was, we had given some docket information and after that, the contractors collected some more data. It was because their assessment was different every time. Compared to the assessment or the data collected by the ONGC, in some cases, it decreased or increased."

2.21 On being asked as to whether such a huge variation in the quantum of oil reserve was desirable the Secretary, Ministry of Petroleum and Natural Gas stated:

"It can vary for the same data. It can have a different interpretation in terms of quantum of reserves between different geologists and different companies and it can also vary as you get more data also. The same data can be interpreted differently by different geologists. That is why, competition is very important. It can also vary as time goes on. As you get more data, you will get better information about the reserves.

The value may vary from one to even 100 times of the ratio. It may happen sometimes, it depends on various things. There is a lot of uncertainty about the reservoirs and the value of the reservoirs .....The position may vary between two different companies and it is happening not only in this country today but over the world. Variations can be ten times different than the value of the reservoir and results are manifold."

2.22 Explaining the reasons for large scale variations in inplace reserves, the Ministry in a note have stated as follows:

"In certain fields there is a lot of variation in inplace reserves of oil as estimated by the contractor *vis-a-vis* that of ONGC's estimates. The main reason of this variation is acquiring of additional data through:

— Seismic Surveys specially 3D work

— Drilling of new wells

— Recording of sophisticated new set of logs

— Re-interpretation of old seismic data through improved interpretation techniques.

— Incorporation of newly acquired data in the reservoir simulation models."

2.23 The Committee enquired whether data acquisition and upgradation facility in line with modern technology was available with ONGC and the reasons for not acquiring technologies for 3D and 4D Seismic Surveys earlier. In reply, the Chairman, ONGC stated:

"We have already obtained new data acquisition equipment last year. We are in the process of buying seismic data processing facilities for advance processing, but we can always get the work done through contracts. Today, what we are doing is that whatever extra work we cannot do, we get it done from outside. But we are buying our own equipment so that we can do processing. The acquisition equipment which is more important and which was of old vintage was upgraded last year."

2.24 As regards the reasons for delay, the Chairman, ONGC added:

"There were certain delays. There were some constraints of funds."

2.25 In regard to results of reassessment of oil reserves, DGH during evidence stated as under:

".....we will have to have a better management, reservoir management of our field, which requires a constant check and then counter-

check. We also try to match the data over our wells, what has happened each year and how the reservoir is behaving.

This, we feel, has not been done to the adequate levels in the past. Now for small size field, it is being done. We are on the management committee."

Accelerated Programme of Exploration (APEX)

2.26 In order to intensify exploration efforts and enhance hydrocarbon reserves the Government directed the national oil exploration companies namely ONGC and OIL to draw up an Accelerated Programme for Exploration in 1994 for the remaining three years of the 8th Plan (1994-97).

Components of APEX was as under:—

(a) Enhanced Exploratory Inputs

This include exploratory programmes for Bombay offshore, Cambay and Upper Assam basins.

(b) National Seismic Programme

To study the configuration of some of the less known and new sedimentary basins in the country.

(c) Deep Water Exploration

Special surveys would have to be carried out in deep sea (beyond 200 meters of water depth) to find drillable prospects.

(d) Exploration in Frontier Areas

A number of frontier areas hitherto not explored owing to hostile environment, geological problems, lack of technology, etc. will be subjected to intensive attention through efforts to overcome these problems.

(e) Overseas Activities

Acquisition of acreage/reserves abroad. The oil sector would be encouraged to acquire acreage in prospective areas abroad either on their own or by taking a farm in share in exploration/development blocks abroad.

(a) Enhanced Exploratory Inputs

2.27 ONGC has identified thrust areas both for intensive and extensive exploration in these three basins. Intensive exploratory efforts are being expanded in the following sectors:

Cambay Basin	:	Gandhar and adjoining areas, areas east of Kalol field, Eastern margin of Cambay basin, areas north of Kalol.
Upper Assam	:	Structural plays skirting Nazira low, extension areas of Geleki, Lakwa and Rudrasagar.
Bombay Offshore	:	Carbonate wedge outs skirting Bombay High. Palaeogene clastics and carbonates in Heera-Panna-Neelam sector. Palaeogene clastics in Tapti-Daman area.

These efforts have resulted.

(i) in the extension of the discovered pools and new pools in Cambay basin (Gandhar, Jambusar, Limbodra, Linch, Nandasan, Kalol, etc.);

(ii) establishment of new pools south west of Geleki, north of Rudrasagar and deeper reservoirs in Lakwa and Geleki in Upper Assam; and

(iii) oil/gas finds in Woo 15 & 16, new pools and extension of pools in B-59, B-127, B-192 etc. in Bombay offshore.

2.28 According to the Ministry, in view of the importance of these areas, 3D seismic data have been acquired and used and/or under acquisition. Wherever data have been acquired interpretations have been and/or is being carried out with IIWS (Intensive Interpretation through Work Station) both at Headquarters and Workcentres.

(b) National Seismic Programme (NSP)

2.29 The objective of this programme is to develop regional scale understanding of the tectonic framework, sedimentary fill mechanism and stratigraphy of various important sedimentary basins of India employing seismic and non-seismic integrated surveys. To meet this objective, a multidisciplinary and multipronged geo-scientific programme is proposed involving aerial, remote-sensing, field geological and geophysical surveys. Although data is available through such survey in the past, there remains a conspicuous gap in regional geophysical surveys which is required for specific problems of tectonic framework, stratigraphy and sedimentary fill mechanisms to provide improved focus on prospective zones.

2.30 According to the Ministry of Petroleum and Natural Gas there are several blocks to be offered under National Seismic Programme, Dockets and data packages are under preparation. Documents were submitted to the Ministry of Petroleum and Natural Gas to obtain clearance from the Ministry of Defence and Ministry of Home Affairs. As per their guidelines, maps have been submitted to the Survey of India and Naval Hydrographic Office for authentication of international boundaries of India with neighbouring countries and coastal lines and to ensure that offshore blocks lie within India's exclusive economic zone. Further, in selecting the blocks falling in J&K State it is to be ensured that these lie on the Indian side of LOC with Pakistan.

2.31 Elaborating on the utility of National Seismic Programme and the present position of its implementation, a representative of ONGC during evidence stated:—

> "We have envisaged a programme known as National Seismic Programme. This programme is a mammoth programme. It is going to last for at least five to six years. We are inviting the tenders; it can be a joint venture and it can be done by others. The data generated will be of greater use to understand the basin and to provide more inputs in the future."

(c) Deep Water Exploration

2.32 Deep Water Exploration Programme, a component of APEX envisages carrying out of special surveys in deep sea (beyond 200 meters of water depth) to find drillable prospects.

2.33 When enquired about the details of launching of Deep Water Exploration a

representative of ONGC during evidence stated as under:

> "Now the Government of India as well as the national organisations have thought why we cannot move deeper as the world is doing. The basic requisite for this is seismic survey. In regard to seismic survey, we have already done 20,000 line kilometers of work. We had mapped some large structures..... Five to six locations have already been identified from prospect of 50 to 100 square kilometers or even more. So, we are going to launch a deep water exploration by this year end or early next year. If a breakthrough takes place then we will be able to understand the sedimentary features of the basin formation, the thickness of sediments etc."

2.34 As regards the exploratory drillings taken up or proposed to be taken up in deep waters by ONGC, the Ministry of Petroleum & Natural Gas in a note furnished to the Committee stated:

> "There are two small fields (G-1 & G-2) discovered in the deep waters of Krishna-Godavari offshore. Both of them were not developed due to non-viable techno-economics. These fields were offered by the Government of India under small fields dispensation to private entrepreneurs. There are presently no plans with ONGC for development of these two fields.
>
> Seismic data acquisition in deep water areas have been/are being carried out by ONGC's departmental vessel. Data processing and interpretation have also been carried out by ONGC. Based on the available data and their interpretation, four exploratory locations have been prioritised for exploratory drilling within the VIII Plan period itself. The exploratory drilling in such deepwaters in bathymetry beyond 200 m will have to be taken up by a charter hired rigs.
>
> Oil India Limited has not planned for deep water exploration."

(d) Frontier Areas of Exploration

2.35 The frontier areas of exploration include deep water areas of west and east coasts, Kutch-Mesozic prospects, Gondwana sediments, pretrap pean sediments below Deccan Trap and vindhyans. Under APEX, these frontier areas are slated for exploration to assess their hydrocarbon potentiality.

2.36 Asked to spell out the perspective plans of ONGC and OIL for assessing the hydrocarbon potential of these areas, the Ministry in a note stated as follows:

> "Data acquisitions are in different stages in the frontier areas of exploration.
>
> (i) Based on the evaluation of data on hand, four exploratory locations have been prioritised for drilling in the VIII Plan period itself in the deep water areas of west and east coasts.
>
> (ii) As a thick volcanic sequence of rocks overlie the prospective messozoic sediments in the Kutch offshore, acquisition of seismic data of the pretrappean sediments has become the prime objective. The required additions to the hardware of the departmental vessel for undertaking the surveys have been made so that the seismic surveys can be carried out by ONGC's vessel itself. In addition successful drilling of a parametric test site in Saurashtra onland has established the continuity of prospective sequence southward.

(iii) Based on the significant lead obtained from Gondwanic reservoirs in Krishna-Godavari basin, ONGC took up exploratory drilling in Pranhita-Godavari graben; a major part of this basin has been awarded to a consortium of Private Companies for exploration by Govt. of India.

Seismic data acquisition and interpretation has led to exploratory drilling in south Rewa and the well is under drilling at present. Also R&D well is under drilling in Damodar graben for coal bed methane.

Based on the acquired data an exploratory location and two locations for coal bed methane has been firmed up in Satpura basin."

(e) Overseas Activities

2.37 Oil and Natural Gas Corporation-Videsh Ltd. (OVL), a wholly owned subsidiary of Oil and Natural Gas Corporation Ltd. (ONGCL), is engaged in exploration overseas. OVL has signed MOUs with a number of international companies for taking up exploration/development projects abroad. Besides OVL, Oil India Ltd. (OIL) is also exploring possibilities for acquisition of hydrocarbon acreages abroad.

2.38 Details of few Exploration projects in various countries and the activities undertaken by ONGC-VL are given below:—

Vietnam

A large discovery of gas was made in block 6, Offshore Vietnam. To exploit the gas find commercially, an area of 955 square kilometers was retained for development. The major terms and conditions of exploiting the gas discovery except the gas price and the transportation tariff to take the gas at delivery point, have mutually been agreed to among the contract partners and petro Vietnam. The negotiations for determination of gas price is in progress.

Egypt

Based on a viable techno-economic situation of the prospect in proved petroliferous areas, ONGC-VL signed FOA and JOA and one well was drilled in North Zafrana Offshore Concession of Egypt in partnership with British gas E&P with 50% participation interest. The well was found to be dry and as such abandoned in June, 1996.

The post well evaluation of data revealed non-entrapment in the area due to communicating fault system.

Yemen

With 30% participating interest in block-38, Sacotra Offshore, Yemen, two wells namely Phoenixx-I and Rukh-I were drilled by ONGC-VL in partnership with British Gas. Both the wells were found to be dry and therefore, abandoned.

Both BG and ONGC-VL held hopes from the large structural area. However, the post drilling evaluation of the data indicated poor prospectivity and hopes of rich source facies development proved otherwise.

Tunisia

The technical data obtained from the well Ben-Hassine-1 drilling in Fejaj permit area of Tunisia with 40% participating interest was not found to be of any commercial interest. The well was therefore declared dry and abandoned.

Other Active Areas

ONGC-VL is at present exploring possibilities of oil exploration in Kazakhstan, Iraq, Australia, Russia & Azerbaijan.

2.39 The Committee pointed out that the Ministry in their note about their activities abroad had only said except Vietnam, there was no reserve. Their note made a very pessimistic picture. However, during evidence the Chairman, ONGC was optimistic about activities of ONGC Videsh, Explaining the position, the Chairman, ONGC submitted:—

> "In those two or three cases, we took the exploration, not on our own initiative, but selection was made by somebody else. We have decided that that was not a right approach. We have to analyse the data instead of somebody else trying to make the selection for us."

Observations/Recommendations

2.40 The Committee note that hydrocarbons are generated and usually accumulated in sedimentary rocks. These sedimentary rocks are the target areas for exploration for discovery of oil and gas. In India 26 sedimentary basins occupying an area of 1.72 million sq. kms. have potential for oil and gas. These 26 basins have grouped into four categories depending on their hydrocarbons potential *viz.* (i) basins with commercial production; (ii) basins with known occurrence of hydrocarbons but from which no commercial production has yet been obtained; (iii) basins geologically considered prospective and (iv) basins with indeterminate potential but which may be prospective on analogy with similar basins in the world.

2.41 The Committee note that out of the 26 sedimentary basins dicovered and geologically surveyed, only 15 basins have been under the focus of attention for exploration by ONGCL and OIL; out of these 15 basins, only 6 basins namely Cambay, Assam Shelf, Bombay Offshore, Krishna-Godavari, Cauvery and Assam Arakan Fold Belt have been brought under commercial production in a period of two and a half decades. The Committee regret to find that adequate attention has not been given for exploration and it is only now that ONGCL and OIL have taken steps for exploration and operation of basins falling under Category II, III and IV.

2.42 In view of the wide gap between indigenous crude oil production, projected growth in requirement for petroleum products and the time taken in exploration and commercial production of oil, the Committee consider that a concerted effort was required to survey and exploit all the 26 sedimentary basins in the country from the very beginning. The Committee feel that had the national oil companies *i.e.* ONGCL/OIL concentrated at least on all the 15 basins earmarked for the purpose, the dependence of the country on imported crude would have been reduced considerably, thereby saving substantial outgo of

precious foreign exchange. The Committee, therefore, desire that efforts should be stepped up not only by the national oil companies but also by evolving strategies to encourage private participation for intensive and extensive survey, exploration and exploitation of oil from all identified sedimentary basins to reduce dependence on imported crude.

2.43 The Committee have been informed that ONGCL is facing difficulties in exploiting basins in Ganga Valley, Himalayan foothills and those situated in east and west coasts due to complexity of the nature of these basins as also due to lack of availability of modern technology. Opinion of renowned international experts in petroleum exploration is stated to have been sought by ONGCL regarding the yet to be found potential of the basins under its exploration.

2.44 The basins which are under study by different experts from U.K. USA, Russia include Cauvery, Krishna, Godavari, Bengal, Gondwana, Satpura, Deccan Syncelise, Ganga, Himalayan foothills, Assam Arakan and the basins in the western offshore. In this connection, the Committee note that only the Study on Krishna Godavari, Cauvery and Bengal basins conducted by Dr. John Kingston of USA has been completed so far and the Report submitted by him is being studied by the ONGCL. The Committee expect that studies on other basins which were earlier scheduled to be completed by February, 1997 must have been completed and reports submitted to the Government. The Committee desire that on the basis of the outcome of these studies appropriate measures should be taken urgently by ONGCL to fully exploit the potential of these basins. The outcome of these studies and action taken thereon by ONGCL may also be reported to the Committee.

2.45 From the figures of geological reserves of oil and oil equivalent of gas (O+OEG) established by ONGCL and OIL as on, 1.4.94 and the corresponding recoverable reserves, the Committee note that only 30.3% of established reserves had been converted into recoverable reserves. However, from the subsequent figures of established and recoverable reserves furnished by the Ministry the Committee note that as on 1.4.96, the percentage of recoverable reserves *vis-a-vis* established reserves had further come down to 20.0%. In the case of ONGCL the Committee note that while percentage of recoverable reserves *vis-a-vis* established reserves was 35.2% as on 1.4.94, this percentage came down to 17% as on 1.4.96, thereby indicating that the procedure of assessment of oil reserves is not foolproof and is fraught with loopholes. The Committee would like to be apprised of the reasons due to which percentage of recoverable reserves as on 1.4.94 was reduced to meagre 17% as on 1.4.96 even though the figure of established reserves as on 1.4.96 increased *vis-a-vis* figures on 1.4.94.

2.46 In view of the wide gap between established and recoverable reserves, the Committee would also like the ONGCL and OIL to accelerate and strengthen their exploratory efforts so as to convert more and more of established reserves into recoverable reserves.

2.47 The Committee note that at the present estimated production rate, the recoverable reserves of oil are expected to last for another two decades only.

Viewed in this context, the Committee feel that it becomes all the more imperative on the part of ONGCL and OIL to make concerted efforts for increasing the percentage of recoverable reserves so as to offset the depletion of hydrocarbon reserves in the country.

2.48 In case of three medium sized fields viz. Panna, Ravva and Tapti explored by ONGC and offered to Indian and foreign private companies for development, the Committee find a huge variation in the estimates, of inplace reserves of oil assessed by ONGC and the contractor. According to the Ministry, the difference between ONGCL and contractor's estimation has been attributed mainly due to additional information acquired by contractor in terms of 3D seismic survey and interpretation of data by different geologists.

The Committee feel that the same fields which were considered uneconomical for development by ONGCL would now be developed profitably by private companies as they have estimated more inplace reserves of oil in these fields by carrying out 3D seismic survey and better data processing and interpretation facility, which were not done by ONGCL.

2.49 The Committee note that in some cases when a number of wells were drilled for doing larger surveys in the fields, it witnessed an upgraded trend of development beyond expectation and more and more oil reserves were found. In the Ankaleshwar field, reserves had almost doubled. The Committee feel that this should have been taken as a lesson by the Ministry/ ONGC and desired improvement incorporated in the system.

2.50 The Committee note that ONGCL has acquired new data acquisition equipment and is in the process of acquiring seismic data processing facilities for advance processing. The Committee desire that this exercise may be completed expeditiously.

2.51 The Committee hope that ONGCL, after acquiring new data acquisition equipment and technology for upgrading of data and reinterpretation of data through improved interpretation techniques would be able to make a better assessment of the oil reserves in its developing and developed oilfields. DGH which is also assessing the reserves of various oilfields has found that better management, reservoir management, constant check and countercheck of the oilfields are required, but these have not been done to the adequate level in the past. The Committee desire that ONGCL, in consultation with DGH, should tank adequate corrective steps for monitoring the reservoir behaviour of various oilfields and to correctly assess their oil reserves.

2.52 The Committee note that Government had initiated a number of specific measures to increase the pace of exploration and to augment the production of crude oil in the country. The Government approved and launched an Accelerated Programme of Exploration (APEX) in 1994 for implementation during the remaining three years of the Eighth Plan, *i.e.* 1994-97 involving an estimated expenditure of approx. Rs. 6500 crores. APEX has the following components:—

(i) Enhanced Exploratory Inputs.

(ii) National Seismic Programme.

(iii) Deep Water Exploration.

(iv) Exploration in Frontier Areas.

(v) Acquisition of acreages abroad.

2.53 One of the components of APEX *i.e.* Enhanced Exploratory Inputs envisaged intensive and extensive exploratory programmes for identified thrust areas of three basins, *viz.* Bombay Offshore, Cambay and Upper Assam which still hold a larger yet to find oil and gas potential.

The Committee note that under the Enhanced Exploratory Inputs, the exploratory efforts in these three basins have resulted in extension of discovered pools and new pools in the Cambay basin, establishment of new pools in south west of Geleki, north of Rudrasagar and deeper reservoirs in Lakwa & Geleki in Upper Assam, oil/gas finds in W00 15 & 16, new pools and extension of pools in B-59, B-127, B-192, etc. in Bombay offshore.

2.54 The Committee also appreciate that in view of the importance of the above basin areas 3D seismic data have been acquired and used or are under acquisition and interpretation of the data so acquired/under acquisition is being carried out with Intensive Interpretation through work stations both at headquarters and work centres. The Committee desire that this exercise should be completed expeditiously so that oil and gas potential existing in these three basins could be exploited to the optimum level.

2.55 The Committee also desire that thrust areas for intensive and extensive exploration in other producing basins should also be identified and their exploratory programmes formulated and implemented with due promptitude so as to enhance the recoverable reserves from other untapped basins as well.

2.56 The Committee note that a multi-disciplinary and multi-pronged geoscientific programme called National Seismic Programme under APEX has been taken up to study the configuration of some of the less known and new sedimentary basins in the country. This programme involves aerial, remote sensing, field geological and geophysical surveys to develop regional scale understanding of the tectonic framework, sedimentary fill mechanisms and stratigraphy of various important sedimentary basins of India to provide improved focus on prospective zones.

The Committee, however, find that this programme is at a very nascent stage, as the process of authentication of international boundaries of India with neighbouring countries and coastal lines ensuring that offshore blocks lie within India's exclusive economic zone and preparation of dockets and data packages are still going on. They, therefore, desire that this exercise be completed at the earliest and blocks on which data are to be generated may be offered for surveys with due urgency so that conspicuous gap in regional geophysical surveys of various important sedimentary basins of India could be removed and these basins be explored to achieve the maximum level of accretion of oil and gas reserves from them.

2.57 To enhance hydrocarbon reserves in the country, the Government have of late felt the need for launching exploration in deep waters and frontier areas and have thus included two programmes *viz.* 'Deep Water Exploration' and 'Exploration in Frontier Areas' in the Accelerated Programme of Exploration, to be carried out in the Eighth Five Year Plan. Deep Water Exploration programme envisages carrying out of special surveys in deep sea (beyond 200 meters of water depth) to find drillable prospects. Further a number of frontier areas hitherto not explored owing to hostile environment, geological problems, lack of technology, etc. were proposed to be subjected to intensive attention under the programme of Exploration in Frontier Areas for exploration to assess their hydrocarbon potentiality.

2.58 The Committee find that ONGCL's departmental vessels have carried out/carrying out seismic data acquisition in deep water areas. Based on the available data and their interpretation four exploratory locations have been prioritised for exploratory drilling, within the VIII Five Year Plan period. The Committee would like to be apprised of the achievements in this regard.

2.59 The Committee note that data acquisitions are in different stages in the frontier areas of exploration. Based on evaluation of data on hand, four exploratory locations have been prioritised for drilling in the VIII Plan, in the deep water areas of west and east coasts. ONGCL has also taken up steps for undertaking exploratory drillings in the frontier areas of Mesozoic sediments in the Kutch offshore, Gondwanic reservoirs in Krishna-Godavari basin, South Rewa and Satpura basin. The Committee hope that exploration in these frontier areas would also have been completed and progress achieved in this regard be reported to the Committee.

2.60 ONGC Videsh Limited was formed to take up exploration operation abroad, have *inter-alia* undertaken exploration activities in various countries viz. Egypt, Yemen, Tunisia but without success. Ozy in Vietnam discovery of gas in block 6 has been reported.

The Committee have been given to understand that ONGC-VL did not take exploration at its own initiative and selection was made by somebody else due to which its performance has been so tardy in so far as discovery of oil is concerned. They would like to know the reasons due to which ONGC Videsh Limited without properly analysing the data and arriving at a conclusion regarding availability of oil undertook the exploration work. The Committee would also like to be apprised of the amount of expenditure involved in the exploration work undertaken by it so far.

The Committee also desire that working of ONGC-VL should be properly monitored so that it functions more as a commercial venture and contribute purposefully to the national oil requirement.

B. Production

Demand Projections during Eighth Plan

2.61 The estimated demand of petroleum products in India during the Eighth Five Year Plan was as under:—

(Figures in MMT)

Year	*Quantity*
1992-93	60.71
1993-94	63.82
1994-95	68.72
1995-96	74.11
1996-97	79.37

2.62 As against the above demand of petroleum products total indigenous production of crude oil *vis-a-vis* MOU targets laid since 1989-90 was as under:—

Production of Crude Oil

(Figures in MMT)

Year	Target	Actual
1989-90	34.31	34.09
1990-91	35.90	33.02
1991-92	31.80	30.35
1992-93	28.46	26.35
1993-94	27.17	27.02
1994-95	32.29	32.22
1995-96	36.29	35.167
1996-97	*34.11	32.90
1997-98	*30.78	33.86

Import

2.63 The shortfall arising due to lower production of crude oil and more demand of petroleum products is being met through imports of crude oil.

2.64 Total quantum of crude oil imported and the amount incurred thereon during the years 1991-92 till 1997-98 was as under:—

Year	Quantity (figures in MMT)	Value (Rs. crores)
1991-92	23.994	7820.05
1992-93	29.247	10685.86
1993-94	30.822	10668.52
1994-95	27.349	10316.00
1995-96	27.342	11517.00
1996-97	33.906	18538.10
1997-98prov.	34.494	15897.15

*In respect of ONGCL and OIL only.

Review by Planning Commission

2.65 VIII Plan target of 197.32 MMT, as recommeded by the Planning Commission, was fixed in September, 1991. This target was arrived at taking into account the ground realities existing at that time and with the anticipation that the situation in Assam would improve to permit normal working conditions.

Taking into account the changed project completion schedules, implementation of BHRC recommendations in Bombay High, the offer of medium sized fields for joint venture development, reservoir behaviour of fields in north Gujarat and continuing law and order situation in Asam, the VIII plan target was re-estimated to be 163.97 MMT at the time of Mid-Tera Appraisal in October, 1994.

Measures initiated for Production

2.66 Giving reasons for continuous decline in the production of crude oil, 34.09 MT in 1989-90 to 26.95 MT in 1992-93 and measures initiated for enhancement of production, the Ministry in a note stated that the decline in indigenous production of crude oil since 1991 was due to various reasons like, closure of high GOR wells in Bombay High as per recommendations of the Bombay High Review Committee, slippages of some projects, foreign exchange crunch, environmental constraints in the Eastern Region, unpredicted reservoir preformance in the oil fields of western region. To counter the declining production trend, an action plan for enhancement of production was formulated to identify certain short-term and medium-term measures to optimise crude oil production and to improve the reservoir health. These measures were aimed at augmenting crude oil production during the years 1992-93 and 1993-94 before the implementation of most of the major schemes for additional development of the existing fields/ development of some new fields which were scheduled to be commissioned by 1994-95. These measures included:—

- — Early production from Satellite fields like Neelam, Panna and CA in BRBC through innovative and unconventional methods.
- — Introduction of state-of-the-art technologies *viz.* Drain Hole drilling, Ultra short redius radial drilling, side tracking of existing wells and drilling of horizontal wells.
- — Consultancy from internationally reputed agencies to:
  - * repair to wells like water shut-off & gas shut-off.
  - * improve the productivity/injectivity by massive hydrofracturing.

Most of the aforementioned measures have since been implemented and have contributed to additional oil production during 1992-93 and 1993-94. The declining trend in crude oil production was arrested in 1993-94.

Oil and Natural Gas Corporation Limited

Seismic Surveys

2.67 Actual achievements *vis-a-vis* target laid for seismic survey carried out by

ONGC during the years 1989-90 to 1995-96 is given below:—

Parameter (Unit)		MOU Target	Actual Achieved
1989-90			
1. Surveys			
(a) Seismic Onshore			
— Departmental	2D(SLK)	28120	49523
	3D(SSQ)	300	423
— Contractual	2D(SLK)	6125	3771
	3D(SSQ)	50	8
(b) Seismic Offshore	(LK)	35000	39271
(c) Gravity Magnetic	(No. Stns.)	7000	12503
(d) Geological	(Sq. Kms.)	9025	14870
1990-91			
1. Seismic Survey	(SLK)	61484	87992
1991-92			
1. Seismic Survey	(SLK)	52634	78221

Activity	Unit	Target	Actual Achieved
1992-93			
Seismic Survey	(SLK)	61034	71531
1993-94			
Seismic Survey	(SLK)	59977	73449
1994-95			
Seismic Survey Onshore			
2D Survey	(SLK)	21590	31523
2D Survey Contract	(GLK)	1550*	581
3D Survey	(SSK)	702	1002
2D/3D Survey Offshore	(LK)	34300	40054
1995-96			
Seismic Survey Onshore			
2D Survey	SLK	21943	29432
3D Survey	SSKM	718	986
2D/3D Survey Offshore	LK	28000	33732

** net included MoU*

Activity	Unit	Target	Actual Achieved
1996-97			
Seismic Survey			
2D Survey	SLK	20046	27782
3D Survey	SSK	809	1139
Offshore			
2D+3D Survey	LK	49925	81800
1997-98			
Onshore			
2D Survey	GLK	3970	4568
3D Survey	GLK	3914	11743
Offshore			
2D/3D Survey	LK	73925	86154

2.68 During the year 1989-90, targets for contract surveys were not achieved. The reasons advanced for non achievement of targets were nonavailability of sufficient JVC party and late start of field staff of Soviet party with one unit instead of the 2 units as per the targets. Target for the years from 1990-91 to 1993-94 were more than achieved. During the year 1994-95, percentage achievement of targets of 2D onshore survey was 37.4% only. The reasons stated were due to poor response in competitive bidding from operaters in view of logistically difficult, terrain conditions/ technology requirements.

Drilling

2.69 The details of MoU targets and actual achievements from 1989-90 to 1995-96 in exploratory drilling & development drilling by ONGCL are stated to be as follow:—

Year	Parameter	MoU Target	Actual Achieved
1989-90	*Exploration Drilling*		
	(a) Meterage ('000 M)	703.80	605.20
	(b) Wells (Nos.)	274	253
	(c) Rig Years	102.13	84.45
1990-91	*Drilling*		
	Meterage ('000 M)	1217.97	1053.26
	Wells (Nos.)	537	508
1991-92	*Drilling*		
	Meterage ('000 M)	1058.67	952.55
	Wells (Nos.)	463.00	426.00

Year	Parameter	MoU Target	Actual Achieved
1992-93	*Drilling*		
	Meterage ('000 M)	1123.90	1006.14
1993-94	-do-	1202.78	1137.13
1994-95	*Drilling*		
	Meterage (Expl. Dev.)	1005	981.67
1995-96	*Drilling*		
	Meterage (Expl. Dev.)	1007	890.87
	(00M)		
1996-97	(Exp. Drilling)	706.94BE	441.49
	Dev. Drilling	364.99BE	343.33
1997-98	(Exp. Drilling)	347.607	297.520
	Dev. Drilling	367.463	347.342

2.70 Targets were not achieved fully due to shortfall in the availability of rig as also effective utilisation of rig months. The factors responsible for shortfall in actual availability/effective utilisation of rig months were beyond the control of ONGCL as is evident from the details given below:—

1989-90	Shortfall in rig months
Onland	
— Bandhs/barricades etc. in Eastern Region	36.0
— Delay in supply of BHEL rigs	35.0
— Delay in availability of charter hired rigs	63.0
	134.0
Offshores	
— Delay in supply of Sagar Uday by MDL	2.0
— Delay in availability of charter hired rigs	37.4
	39.4
Total ONGC	173.4
1990-91	
Onland	
— Bandhs/barricades etc. in Eastern Region	11.0

— Diversion of drilling rigs for workover jobs due to shortage of casings on account of foreign exchange constraints	34.2
— Waiting of a rig for environmental clearance for Kadmaha in Bihar	5.5
— Non-availability of rig due to blowout in Tichna	12.0
— Delay in mobilisation of charter hired rigs by private contractors	139.6
— Loss due to major repairs etc.	8.8
	315.1
Offshore	
— Non-availability of charter hired rigs by contractors	63.8
Total ONGC	378.9
1991-92	
Onland	
— Bandhs/barricades etc. in ERBC	33.5
— Delay in availability of charter hired rigs	14.1
— Delay in supply of BHEL rigs	6.0
	53.6
Offshore	
— Delay in availability of charter hired rigs/dehiring of rigs earlier than planned	27.4
Total ONGC	81.0
1992-93	
Onland	
— Bandhs/barricades etc. in ERBC and law and order problem in Nagaland	27.23
— Delay in supply of BHEL rigs	16.61
— Delay in availability of charter hired rigs	10.69
	54.53
Offshore	
— Delay in availability of charter hired rigs	22.59
Total ONGC	77.12
1993-94	
Onland	
— Bandhs/barricades etc. in Eastern Region	25.92
— Delay in availability of charter hired rigs	19.60
	45.52

—Excess availability from owned rigs through delayed laid off/transfer to other region	- 43.53
Net shortfall	2.14
Offshore	
—Dry docking of rig Sagar Prabhat	3.00
—Damage of rig due to cyclone in Madras	1.90
—Delay in availability of charter hired rigs	19.20
	24.10
Total	26.24

1994-95

— Bandhs/barricades, natural calamity, environmental problems in Assam and Nagaland and non-availability of CH/BHEL rigs in ERBC.

— Heavy rains in Gujarat.

— Damage of rig E-1400-18 in fire at Pasarlapudi-19 in SRBC and shortage of charter-hired rigs.

— Diversion of rigs to workover including side tracking, non-availability of one charter-hired rig and deployment of rigs for extended reach drilling in BRBC.

1995-96

Factors influencing the drilling performance during the year 1995-96 were as follows:—

— Insurgency problems in Nagaland, bandhs, barricades, natural calamities and deployment of drilling rigs for work-over operations in ERBC due to land acquisition problems and subsequently waiting for ready sites.

— Deteriorating law and order problems and waiting for completion of civil works in Baramura area of Tripura CRBC.

— Non availability of specific exploration acreages in WRBC due to earmarking of some areas for exploration by private parties under round of bidding for exploration and JVC causing delay in land acquisition and civil works shortage in availability of rig input on charter-hired basis.

— Diversion of rigs for development drilling and deployment of rigs for extended reach drilling in BRBC for enhancing oil and gas production.

2.71 The reasons advanced by the Ministry for loss of rig months due to delay in availability/commissioning/supply of charter hire rigs during last five years are as under:

— Delay in mobilization of rigs by the contractors.

— Delay in foreign exchange release by the Govt.

— Dehiring of rigs earlier than planned due to resource crunch.

— Non-deployment of rigs due to earmarking of the area to JVC.

2.72 In this connection, the Committee desired to know as to what penalties were imposed on the suppliers of rigs for causing delays. The Ministry in their reply stated that bid bonds have been invoked where rigs were not mobilized by contractor and liquidated damages were levied for delayed mobilization.

2.73 When enquired about the steps taken to ensure timely supply/ availability of rigs, the Ministry in a note have stated that according to the policy of ONGC, rigs are charter hired in addition to the owned rigs as per the firm programme of drilling onshore and offshore which assure availability of locations in different basins/areas with required details. For timely supply of rigs to meet the plan requirement, action for sanction and tendering of charter hired rigs is taken one year in advance. In the past, the required input of charter hired rigs could not be made available in time due to delay on the part of the contractors to mobilize rigs, non availability of suitable rigs for a particular area (*e.g.* North Eastern Sector).

2.74 Following steps are stated to have been taken by the ONGC to increase drilling productivity:—

— Microplanning & intensifying monitoring of operations.

— Use of premium bits on performance basis to improve rig productivity and optimise drilling cost.

— Use of quality expandables to generate optimum performance in line with the bit life.

— Use of efficient and cost effective system recommended for high pressure wells in KG basin and deep wells in ERBC.

— Operational audit of drilling rigs with a view to enhancing the operational safety.

— Well control education at drillsites/Projects.

— Bench marking of drilling operations.

— Carrying out applied R&D in drilling technology, drilling fluid engineering, cement and cementing materials.

— Optimizing hydraulic parameters for improving bit performance and reduction in drilling time.

— Steps to improve quality of cementation by adopting latest technologies in the areas.

— Upgrading the rigs and keeping them in the best maintained condition with the help of technical audits of rigs.

— Augmenting logistic support for drilling operations.

— Improving systems and procedures and monitoring of operations.

— Intensifying efforts to minimize complications in wells with the expertise of Institute of Drilling Technology.

— Motivation to field personnel.

— Training and retraining of field personnel for acquisition of technical skill in emerging technologies.

Production

2.75 Actual production of crude oil *vis-a-vis* targets laid by ONGC from the years 1990-91 to 1997-98 was as under:—

(Figures in MMT)

Year	MoU Target	Actual achieved	% age
1990-91	33.0	30.35	92.5
1991-92	29.0	27.82	96
1992-93	25.54	24.43	96
1993-94	24.42	24.215	99
Year	MoU Target	Actual achieved	% age
1994-95	29.34	29.34	100
1995-96	33.31	31.63	94.95
1996-97	31.092	28.685	92.25
1997-98	27.73	28.25	101.9

Reasons for Shortfall and Remedial Measures

2.76 Reasons for shortfall in achieving the targets include slippages in projects beyond ONGC control, lesser gain from development wells, lesser intake of crude oil by refineries in WRBC & ERBC. ONGC employees strike in Sept. 1991, decline/ ceasure of wells, increased water cut in WRBC power shut-downs by State Electricity Boards, deterioration of environmental conditions, delays in the completion of Ravva platform, etc. Details are as follows:—

(i) *Lesser Gain from Wells*

— Lesser gain from wells was due to unexpected reservoir behaviour of the existing fields by way of pressure depletion, increase in water cut and GOR.

— Unexpected adverse mobility ratio noticed in some fields of North Gujarat.

— Poor reservoir characteristics of new fields/developments.

— Adverse impact of prevailing environmental conditions (like frequent Bandh, Barricade, Sabotage etc.) in North-Eastern Sector resulting in subdued activities of oil exploration/exploitation.

(ii) *Lesser intake of crude by refineries in WRBC and ERBC during 1990-91*

Less production of 0.168 MMT from WRBC was due to closure of many wells to regulate production to match intake of Koyali refinery which was reduced due to LSHS evacuation problem at their end.

Less production of 0.1MMT from WRBC was due to *non-revival of wells* closed for above reason even after normalisation of refinery intake.

Less production of 0.07 MMT from ERBC due to restricted production to match intake of refinery due to problems regarding evacuation of petroleum products.

Diversion of the crude oil could be possible if there is more than one refinery in the region connected with the same pipeline network. This does not exist in all the areas and as such diversion of crude oil is not feasible, except resorting to tanker transportation which is cost prohibitive.

(iii) *Power shutdowns by State Electricity Boards*

Loss of Production

Loss of crude production due to frequent power shutdowns by State Electricity Boards affecting operations of artificial lift wells:—

1990-91	WRBC	0.023 MMT
	ERBC	0.040 MMT (Incl. environment problem)
1991-92	WRBC	0.017 MMT
	ERBC	0.054 MMT
1992-93	WRBC	0.006 MMT
	ERBC	0.45 MMT
1993-94	WRBC	0.022 MMT
	ERBC	0.017 MMT
1994-95	WRBC	0.033 MMT
	ERBC	0.0086 MMT
1995-96	WRBC	0.027 MMT
	ERBC	0.0098 MMT

2.77 ONGC has taken up the issue of frequent power shutdowns with the respective State Electricity Board for improving the supply position. Additionally, steps have been taken to augment the captive power generation facility at various fields. Other steps taken to remove the problem were as under:—

(i) Combined Cycle Power Plant (CCPP) of 28.3 MW capacity is being installed at Gandhar CFP in WRBC under Gandhar Ph. II development scheme and is likely to be completed by September, 1996.

(ii) Additional Co-generation facilities of 19.2 MW capacity at Hazira Shoro Terminal in BRBC. The scheme is presently under execution under Hazira

Terminal Expansion Project Phase-III and is likely to be completed by September, 1996.

(iii) In ERBC, all the three major oil fields *viz.* Lakwa, Geleki and Rudrasagar, have captive power plants. ONGC is installing/planning to instal additional gas turbine generator sets for augmenting captive power generation capacity for operations in Assam fields.

(iv) Additional Co-generation facilities of 19.6 MW capacity at Urban Plant in BRBC.

(iv) *Deterioration in Environmental Conditions*

Nagaland

2.78 ONGC operations had to be suspended since 11.5.94 due to militant activities and severe threats from militant groups like National Socialist Council of Nagaland (NSCN) and Naga Student Federation (NSF). The following important steps have been taken by ONGC for early solution to the problem:—

(i) ONGC released to Govt. of Nagaland, payment of Rs. 33.29 crores towards accrued royalty for the period from 1980 to March, 1994 as demanded by the Government of Nagaland.

(ii) ONGC officials held meetings with the Chief Minister and senior State Government officials of Nagaland on 2.5.94 and 16.5.94 to resolve the issue. Periodic meetings and discussions are being held by ONGC with the concerned State Government officials from time to time. Apart from this, the Ministry of Petroleum & Natural Gas have also taken up the matter with the Union Home Ministry and the State Government for early resolution to the problem.

(iii) With a view to look after the security problems in Nagaland, an Onshore Security Coordination Committee has been set up by the Government of India in Dec. 1994 under the Chairmanship of DG Police, Nagaland State comprising of top level police and Civil officials and representatives from ONGC, Ministry of Petroleum & Natural Gas, Intelligence Bureau, etc.

(iv) The existing security arrangements of ONGC installations in the area have been suitably beefed up.

Assam

2.79 ONGC operations in Assam were affected due to militant activities, including kidnapping and killing of ONGC officers by the United Liberation Front of Assam (ULFA). The following important steps are stated to have been taken to control the situation:—

(i) An Onshore Security Coordination Committee has been set up by the Central Government in August 1993 under the Chairmanship of DG Police. Assam State with representatives from Police and Civil Departments of the State, ONGC, Central Intelligence Bureau, CISF etc.

(ii) The existing security arrangements in the areas have been beefed up and the strength of CISF has also been increased to cover all the vital installations of ONGC in the State.

Delay in the completion of Ravva Platform

2.80 Award of fabrication & installation of 2 well platforms RV-10 and RV-17 was given to M/s. HSL on 20.3.89. Initial plan was to put the field on production by pre-monsoon'91.

Foreign Exchange (FE) Proposal for offshore installation works contract was submitted to Government on 26.12.90. M/s. HSL place conditional LOI for offshore works contract on M/s. Essar Offshore in March'91, subject to foreign exchange release. However, as foreign exchange was not released, the validity of Essar's offer expired. Revised bids were invited by M/s. HSL and foreign exchange proposal was submitted to Government on 3.12.91. The validity of bidders offers was again extended due to foreign exchange release not coming through.

FE release was accorded on 17.1.92. However, as the working season availability in East Coast is only upto April, 92, the offshore works were rescheduled to execute in two working seasons extending upto April. 93.

RV-17 was commissioned and put on production on 3.3.93. RV-10 could not be commissioned by April, 93 due to frequent failure of barge of M/s. Essar, the offshore contractor. Balance works were completed and RV-10 commissioned on 2.2.94.

Crude oil production of ONGC during 1995-96 fell short of the corresponding MoU targets. Most of the main reasons for shortfall in targets and the remedial measures taken to augment/maintain production level and to achieve the target are the same as enumerated for the earlier issues.

Decline in Production of Bombay High and Measures Initiated

2.81 Bombay High, accounts for around 70 per cent of the production. Bombay High field, after maintaining a plateau production of 18-19 MMTPA (peak production of about 20.1 MMT in 1989-90) for almost 7 years between 1984-85 to 1990-91, entered into its declining phase from 1991-92 onwards.

The oil production from Bombay High field showed an upward trend from the year 1994-95 onwards as a result of implementation of development schemes in Bombay High *viz.* Additional L-III development development in Bombay High South and Additional L-II development in Bombay High North.

Decline in oil production from Bombay High again started from 1996-97, when most of the additional development was completed, due to increase in water cut. However, the decline in oil production from Bombay High has lately been arrested by taking various steps. The oil production level in March/April, 1997 is almost the same as it was in March/April, 1996.

The main reasons for declining production from Bombay High field were production of large volumes of gas from high GOR wells and premature production

of water from oil wells while water is being injected into the reservior for maintaining the reservoir pressure.

2.82 Giving his assessment about decline of production from Bombay Highfield, Director General of Hydrocarbons during evidence stated:

> ".....at one stage, Bombay High has produced as much as 70 per cent of our domestic crude oil in the country and that field has declined now. We have engaged international consultants. In the last five years we have been studying this field. It is not a very general report. We go well by well, sector by sector and we give our recommendation for the consideration of the ONGC. The ONGC has the entire data. We can only sit with ONGC and work out. Now we have come out with the plan in regard to Bombay High. Right now, our consultation are going on with ONGC. We are sure that Bombay High will be revived in the Ninth Plan itself. We are hopeful that in the Ninth Plan itself, our oil and gas targets will increase further.....We have found in the case of Bombay Highfield that there are possibilities of improving the performance of the field. We have already prepared the guidelines for the consideration of the ONGC.

.....Bombay High is one of the most complex fields in the world. Dr. Van Poolen has got 14 years of experience. He told us that Bombay High is one of the most complex fields. This is a multilayer field. The character of the pay zones keep on changing within every hundred meters. In some places, oil cannot flow. In some places, water moves very fast. It creates some problem. Well-wise we have prepared our guidelines in consultations with the ONGC. Data is only with them. With my very small staff, we cannot work. Even to obtain the data, it took two years."

2.83 As a result of monitoring by DGH, the Ministry furnished details of the remedial action taken by ONGCL in order to arrest, declining trend of production from Bombay Highfield. The remedial measures in brief are as follows:

— Modification/redistribution of current water injection programme.

— 3D/4D seismic survey.

— Control of excessive gas production.

— Sub-zone redevelopment programme.

— Data acquisition.

— EOR Pilot Projects.

— Increasing workover efforts for water and gas shut off jobs.

2.84 In regard to impact of these measures in augmenting the production from Bombay High, the Ministry of Petroleum and Natural Gas in their note have stated:—

> "Measures as mentioned above and many others rectifactory steps are normally taken by all operators based on the performance of the fields and problems encountered during the production life of the field so as to control

the decline, optimize production and recovery. Success of such measures are reviewed and mid course corrections made from time to time as per requirement.

The crude oil production from Bombay High started increasing from October, 1996 with additional production coming from new wells drilled as part of the programme to exploit from undrained and bypassed areas of the reservoir. Till the month of July, 1997 about 26 wells have been put on production. Without these wells the production level would have gone down as the field is under declining phases of production since 1990-91. It has been observed that the production which was declining at a steady rate till September, 1996 picked up after the addition of new development wells in phases and by the end of the year (*i.e.*, March, 1997) the production rate had reached the same levels as that of the beginning of the year April, 1996. In the past also when the input in terms of requisite no. of new wells were not added in Bombay High the production went down and the decline because more apparent."

2.85 In 1996, Government constituted a Committee headed by Shri K. Narayanan to go *inter alia* into the causes leading to decline in production from Bombay Highfield during the year 1996-97 and suggest remedial measures.

2.86 Pointing out that ONGC had meanwhile initiated steps for reviving Bombay High, Committee asked whether in such a situation, Narayanan Committee Report would not be redundant. In reply, Secretary, Ministry of Petroleum and Natural Gas stated:

"The Narayanan Committee has been continuously interacting with ONGC. In fact, there is a full consultation. ONGC on its own has started work on rectification of Bombay High. They have also said that both the efforts are parallel. The Narayanan Committee report is expected this week (September, 1997) and that will be given to ONGC for immediate implementation. Full report of the Committee will come three months from now."

Oil India Limited (OIL)

Seismic Surveys

2.87 Actual achievement *vis-a-vis* targets laid for seismic surveys carried out by OIL during the years 1989-90 to 1997-98 is given below:—

	Target	Achievement
1	2	3
1989-90		
(i) Assam & Arunachal Pradesh		
2D Dept. (SLKM)	2400	2507
2D Cont. (GLKM)	1500	—

1	2	3
1990-91		
(i) Assam & Arunachal Pradesh		
2D Dept. (SLKM)	2400	3825
(ii) Rajasthan		
2D Cont. (GLKM)	1000	—
3D Cont. (Sq. Km.)	125	—
(iii) Ganga Valley		
2D Cont. (GLKM)	200	352
(iv) Saurashtra offshore		
2D Cont. (LKM)	5000	2544
1991-92		
(i) Assam & Arunachal Pradesh		
2D Dept. (SLKM)	2400	4211.2
2D Cont. (GLKM)	1500	—
(ii) Rajasthan		
2D Cont. (GLKM)	1750	2407.15
3D Cont. (Sq. Km.)	300	300
(iii) Ganga Valley		
2D Cont. (GLKM)	300	545.7
(iv) Saurashtra Offshore		
2D Cont. (GLKM)	3000	6222
1992-93		
(i) Assam & Arunachal Pradesh		
2D Dept. (SLKM)	2800	2900.2
2D Cont. (GLKM)	—	—
3D Cont. (Sq. Km.)	100	3.49
2D Cont. (GLKM)	750	1112.97
(iii) Ganga Valley		
2D Cont. (GLKM)	500	910
1993-94		
(i) Assam & Arunachal Pradesh		
2D Dept. (SLKM)	3000	2230.4
3D Cont. (Sq. Km.)	—	218.67
2D Cont. (GLKM)	1200	1754
(ii) Ganga Valley		
2D Cont. (GLKM)	1200	951.7

	1		2	3
1994-95				
	2D	SLKM	3000	1865.3
	2D	GLKM	950	746.5
	3D	Sq. Km.	30	151.21
1995-96				
	2D	SLKM	1800	2276.5
	2D	GLKM	1700	990.60
	3D	Sq. Km.	200	120.91
1996-97				
(i) Assam & Arunachal Pradesh				
	2D	SLKM	1800	1,016.60
	2D	GLKM	1000	—
	3D	Sq. Km.	100	82.96
(ii) Ganga Valley				
	2D	GLKM	900	—
1997-98				
	2D	SLKM	1050	1112
	2D	GLKM	1000	359.6
	2 — 3D	SLKM/GLKM	2050	1,471.6
	3D (i + ii)	Sq. Km.	150	166

2.88 Mostly due to delays in finalisation of contracts the targets for contracts surveys were not achieved.

2.89 As regards delay in finalisation of contracts the Ministry gave following reasons:

"(1) The bids were invited under financing through World Bank Loan and the lowest offer was received from a French Company who also offered funding through French Protocol which was cheaper. Accordingly, French authorities were approached but by that time the old protocol terms had lapsed and new terms were under finalisation. Meanwhile the validity of the bids lapsed and the contractors did not agree to extend validity in view of the then prevailing law and order condition. Bids were reinvited. However, due to devaluation and the prevailing law and order situation the quotations were way beyond the budget, as such programmes were deferred.

(2) Bids were invited under World Bank Loan for undertaking both 2D and 3D programmes by the same party. Due to prolonged deliberations in obtaining Essentiality Certificates for concessional duty imports the programme was delayed.

(3) The mobilisation time quoted by contractor coincided with monsoon and high turbulent seas as such programme was delayed.

(4) In 1992-93 Programme was aborted due to force majeure conditions (law

and order problems) in Assam, Contractors crews were demobilised and under their skeletol supervision in 1993-94 two departmental crews out of 5 in-house crews were diverted to undertake the 3D jobs."

2.90 Asked to give the reasons for deferring the deployment of additional crew for Ganga Valley operations, the Ministry in a note stated that deployment of second crew was deferred as a cost control measure apart from technological reasons as the company had undertaken cheaper alternative of aeromagnetic surveys and geo chemical surveys in 1993-94.

2.91 Giving reasons for shortfall in the achievement of targets during the years 1994-95 and 1995-96, Ministry stated as under:—

"As regards 2D SLKM in-house survey in 1994-95, two out of the five available in-house seismic crews in Assam were engaged to undertake 3D survey introduced in the Company. Hence though there was apparent shortfall in-house 2D survey, the 3D survey target was exceeded by about 121 Sq. Km. In the subsequent year 1995-96, the 2D in-house survey target was exceeded by 477 Sq. Km.

As regards the contract 2D GLKM survey, there was a delay in mobilisation of the crew by the contractor at the Ganga Valley Project in UP and hence there was a certain shortfall in meeting the target in 1994-95. This was however made up in the subsequent year 1995-96 and the target set for the Ganga Valley project was exceeded by about 291 GLKM.

The shortfall in 3D survey in 1995-96 was mainly due to water logging of the areas earmarked for the survey and because of the same, the 3D survey operation had to be suspended before time. As regards 2D contract survey in Assam in 1995-96, 1000 GLKM was planned to be carried out in the Brahmaputra River bed. As the same area was also offered in the VII/ VIII exploration rounds of bidding, OIL's plan was later deleted pending outcome of the bids received against that area."

Drilling

2.92 Actual achievements vis-a-vis the targets laid down by Oil India Limited for Exploratory/Development Drilling from 1989-90 to 1997-98 are given below:—

Drilling ('000 M)

Year	Description	Target	Achievement
1	2	3	4
1989-90	Assam/Arunachal Pradesh		
	(i) Exploratory Drilling ('000M)	60.00	44.67
	(ii) Development Drilling ('000M)	70.00	77.87
Rajasthan			
	Exploratory Drilling	10.00	7.84
	ME Coast (offshore)	2.5	—

1	2	3	4
1990-91	*Assam/Arunachal Pradesh*		
	Exploratory Drilling	52.0	24.84
	Development Drilling	98.0	75.70
Rajasthan			
	Exploratory Drilling	13.0	11.4
	ME Coast Offshore		
	Exploratory Drilling	5.0	—
1991-92	*Assam/Arunachal Pradesh*		
	Exploratory Drilling	30	36.75
	Development Drilling	98.0	67.36
Rajasthan			
	Exploratory Drilling	8.00	6.26
1992-93	Assam/Arunachal Pradesh		
	Exploratory Drilling	32.0	21.87
	Development Drilling	98.0	74.24
Rajasthan			
	Exploratory Drilling	8.0	3.06
1993-94	*Assam/Arunachal Pradesh*		
	Exploratory Drilling	24	31.59
	Development Drilling	96.0	67.55
Rajasthan			
	Exploratory Drilling	7.7	6.54
1994-95	Exploratory Drilling	33	26.818
	Development Drilling	84	60.889
1995-96	Exploratory Drilling	73.5	31.530
	Development Drilling	49.0	51.452
1996-97	Exploratory Drilling	70.7	45.14
	Development Drilling	69.30	59.93
1997-98	Exploratory Drilling	58.50	49.56
	Development Drilling	65.70	60.57

2.93 The following reasons were cited by the Ministry for shortfalls in achievement of drilling targets by Oil India Limited:

(i) Shortage of experienced drillers caused by exodus of drillers to private drilling companies resulted in sub-optimal utilisation of drilling rigs.

(ii) Acquisition of drilling location—This has become problematic as locations are either in low lying flood prone areas or in forest land needing environmental clearance. Normal farm land price is determined by the Government and is below the expectation of sellers.

(iii) (a) Surface/downhole problems —These are due to poor quality indigenous equipment and tools for example unreliability/non-availability of various spares in BHEL rigs coupled with their poor after sale service.

(b) There is no interchargeability of spares in domestic equipment.

(c) Indigenous power transmission chains caused serious problem in drilling operations and is scheduled.

(d) Oil India is spreading out into newer and unknown areas where downhole drilling probems are being encountered. These problems are due to unknown pressure, less circulation and continuously varying drillability of newer formations etc.

(iv) Delay in mobilisation of the Chartered hire drilling rigs/diversion of chartered hire rigs — 2 Nos. of rigs contracts had to be cancelled due to non-mobilisation. Another had been delayed due to pre-engagement with ONGC.

There is a general resistance to the charter hire operation in the North East particularly in Upper Assam.

2.94 The reasons for shortfall in drilling meterage in 1994-95 and 1995-96 were as follows:

(i) There was a loss of a charter hire drilling rig at a drilling location in Assam in early 1994-95 and the replacement of the rig could not be made possible even after prolonged deliberations with the contractor.

(ii) Environmental problems like bandhs, interruptions during preparation of drilling sites, theft of drilling derric matericals by miscreants, etc. in Assam.

(iii) Progress of drilling the deep well at Kumchai in Arunachal Pradesh was very slow because of sever surface and downhole problems.

(iv) Unexpected breakdown of drawworks and control panels in certain ageing rigs.

(v) Drilling in the Saurashtra offsore areas could not be initiated in 1994-95 because of delay in finalisation of the drilling contract due to reasons beyond OIL's control.

(vi) Delay in mobilisation of man management services due to adverse environmental factors in Assam also affected the drilling activities in Assam in 1995-96.

2.95 As regards removing the bottlenecks, the Ministry has informed that following steps have been taken by OIL:—

"(i) Various incentives for drillers are being worked out. The headman of a rig from workman cadre is being promoted as Asst. Driller. Allowances etc. have increased. Efficacy of these incentives are being watched.

(ii) Land prices have been increased by the Govt. Cluster drilling, deviated drilling etc. have been resorted to cut down the acquisition of land.

(iii) (a) With the liberalisation of import policy dependence on indigenous equipments is being reduced, adequate spares are being stocked for the existing ageing rigs.

(b) Modified mud and power system are being introduced for faster rig move.

(c) Steps have been taken to buy new electrical control systems for ageing electrical rigs. Proper functioning AC/SCR rig modules is being ensured by servicing them frequently.

(iv) (1) In order to avoid delay in charter hire rig acquisition rigid terms have been incorporated in the tenders.

(2) Gradually we are switching over to man management contract. One charter hire was in operation Another charter hire is being planned.

As regards drilling in Assam and Arunachal Pradesh, one charter hire rig has since been inducted in Assam. Additionally two man management services for operating two of OIL's rigs have also been hired. Possibility of introducing management of certain drilling operations including system, man power and equipment is being studied. Engagement of an internationally reputed consultant/firm to manage further drilling operations of the deep well being drillied at Kumchai, Arunachal Pradesh is being pursued. Vigilance/Security and liaisoning with the local people in Assam have been enhanced to obtain a congenial atmosphere for drilling operations."

2.96 Asked as to what extent the above steps had helped in removing the bottlenecks, the Ministry stated:

"These measures take a lead time about 3 to 4 years to show results. Additionally newer problems crop up requiring additional solutions which will again take 3 to 4 years again to bear fruits. Even though problems were perceived earlier and steps taken accordingly immediate benefits are yet to be available."

Production

2.97 Actual achievement of OIL in crude oil production *vis-a-vis* targets laid from the years 1989-90 to 1997-98 was as under:—

(*Figures in MMT*)

Year	MOU Targets	Actuals Achievement
1989-90	2.70 Annual Plan	2.70
1990-91	2.90 Target	2.65
1991-92	2.80	2.52
1992-93	2.92	2.52
1993-94	2.75	2.81
1994-95	2.95	2.88
1995-96	2.98	2.88
1996-97	3.02	2.863
1997-98	3.05	3.102

2.98 In regard to non-achievement of targets in crude oil production from the year 1990-91 to 1992-93, the Ministry of Petroleum and Natural Gas gave the following reasons (year-wise):

1990-91

Crude oil production was lesser due to bandhs, road blockades, agitations and army operations. Also, the contribution from drilling and workover operations was less than planned.

1991-92

(a) Unusually heavy pre-monsoon rains and flooding of operational areas.

(b) Loss due to bandhs force majeure conditions, Fire in EPS-5 at hapjan.

(c) Less than planned contribution from drilling and workover.

(d) Shortfall in pressure maintenance targets due to non-availability of high pressure gas inadequacy of compression effect and other mechanical reasons.

(e) Snapping of despatch lines.

1992-93

(a) Built-in loss due to lower level of terminal production rate in 1991-92.

(b) Blow out in April, 1992 in a newly drilled well in Dikom areas.

(c) Sporadic and unscheduled bandhs in flied areas.

(d) Low, upliftment by hired bowzers from remote areas.

(e) Loss due to fire in EPS at Shalmari.

(f) Disruption due to rupture of gas distribution line.

(g) Delay in commissioning of Dikom-Duliajan pipeline.

(h) Problem of crude delivery in pipeline of Jaipur OCS due to incompatible flow improver.

(i) Intimidation/obstruction by local people in field areas.

1994-95

(i) Loss of a well at the very beginning of the year because of blow-out at a

location in a high productive structure, *viz.* Kathaloni in Upper Assam which resulted in losing the charter hired rig also engaged for drilling. Because of the loss of the well and consequent curtailment of the original planned development drilling activities due to non-availability of this particular rig, a severe loss of crude oil production occurred during the subsequent period.

(ii) Operational disruption because of external factors (floods/bandhs and damage/theft of various production equipment, etc.) leading to loss in crude oil production.

(iii) Unexpected adverse production behaviour of a few crude oil reservoirs.

(iv) Congealing of flow lines/tubing and fluctuation in production in gas lift wells due to input gas problems of hydrants/condensate formation.

1995-96

(i) Severe floods in OIL's operational areas in Assam during August and September, 1995.

(ii) Continued disruption in operations because of bandhs, damage/theft to oilfield equipment and closure of wells by miscreants.

(iii) unexpected production behaviour of a few oil reservoirs/wells.

2.99 Various steps taken/proposed to be taken by OIL to remove the bottlenecks due to which production of oil was lesser are as under:

(i) As regards crude oil production, installation of early production systems to obtain quick production from the newly discovered oil reserves is being continued. Gas lift facilities are being extended to the wells needing artificial lift facilities for optimum production.

(ii) Reservoirs/wells exhibiting adverse production behaviour are being studied for taking remedial measures to retrieve production.

(iii) Certain measures like gravel pack completion of wells having sand production problems, repair of wells having isolation failures are being extended to additional number of wells.

(iv) Security/vigilance in the field areas are being strengthened to reduce the effect of miscreant activities and efforts are being made to minimise the losses during any bandhs, rasta rokos, etc. District authorities for law and order are constantly liaised with.

Decline in the Production of ONGC during Eighth Five Year Plan

2.100 The committee enquired about the reasons for decline in the production of ONGC *vis-a-vis* MoU targets during the Eighth Five Year Plan. The Secretary Ministry of petroleum and Natural Gas while admitting decline in production stated:

"It is ture. In the Eighth Five Year Plan we had set targets for new reserves. Our target for the Eighth Five Year Plan was not met. Similarly, in the case of production also, the target was not met. Last year, we had problems in both Neelam and Bombay High. For Bombay High ONGC had programmes for

production based on early data on reserves. However, gas oil ratio which is much higher than what is expected and this led to a loss of production of two million tonne per year. unfortunately, Neelam has got similar kind of problem.

The report of the Dasgupta Committee was implemented by the ONGC as far as reservoir is concerned. But it did made research around the gas area. The total liquid production was going on and it is better than the assumed target. But the oil production could not be sustained. Then, we had more set backs in Eastern region. As also we could not sustain earlier anticipated reserves.

So, these were historical difficulties which came up in the last Eighth Five Year Plan plus there are other problems. We did not have the structure to know as to which is the best suited for our new challenges of producing more oils. Implementing certain kind of things may not be the best one when you are trying to manage different kind of problems.

ONGC has invited MC Kinsey, a Consultancy firm which is completely organising and setting up decision-making process, which will hopefully help to meet the challenges.....

Structure has become counterproductive. Structure perhaps has since become dysfunctional and perhaps is hampering the production. That is why Chairman, ONGC has taken initiative on making a number of changes and the same is initiated in what they call the pilot programme in Gandhar, Neelam and even in Lakwah where new structure can make up for this.

Lastly, I think, one of the reasons is that we had a bit of a set back. We are not keeping pace with the information technology. This is the reasons I would like to argue with. We are lagging behind in this area all these three years. Chairman, ONGC and his colleagues are now taking specific steps in terms restructuring of the new technology, the entire strategy on technology."

2.101 He further added:

"As I mentioned, the Bombay High reservoirs are very complex reservoirs. This is the time we have to show a lot of understanding in regard to the problem of ONGC. We have to do so because practically this is a great organisation, it has tremendous capabilities. It has gone through a lean patch. But I think we are crossing the hump. We are, now going for deeper water exploration. We are also restructuring ONGC."

2.102 Explaining the reasons for decline in production of ONGCL during Eighth Five Year Plan, Chairman ONGC stated as under:

"With regard to ONGC, we had a lean period. In the Eighth Plan, our reserves had fallen mainly because our exploration was confined mainly to producing basins. Additional discovery of commercial reserves of gas had been smaller."

ONGC Production during Ninth Five Year Plan

2.103 In regard to production of crude oil by ONGC during Ninth Five Year Plan, the Chairman, ONGC stated as follow:

"..... In the Ninth Plan, our main focus is to find base which includes deep water exploration. We undertake the first deep water exploration well by

December this year. Our plan is to attack three deep water exploration areas. One is, Kerala-Konkan region. Second is Cauvery basin and the third is Krishna-Godavari basin. We have identified a number of structures exploration, we will go to the next phase. Simultaneously under the new exploration licensing policy, DGH is offering more deep water blocks for exploration. We, ONGC because of its expertise, knowledge, experience of work in various basins in India have been approached by a number of class I companies around the world to join us in the deep water programme because in the new exploration licensing policy, ONGC would share the risk with them and also take advantage of the knowledge, expertise gained. Those companies have agreed to our terms and conditions at least informally that these will not be operated solely by foreign companies but by joint ventures with ONGC, in the sense, our people will be actively involved in all facets of operations. There would not be cost recovery by foreign company and the equity will be on 50 : 50 basis.

We have also acquired new seismic data acquisition equipment. We are also upgrading our seismic data processing centre, even at the region. To look at subtle prospects even at the producing basins, we have to look at reinterpretation of the data. The idea is to find certain leads so that we can find new reserves of oil and gas. For example, in Krishna-Godavari basin and in Cauvery basin, we have made some discoveries which have given new leads. We are undertaking a large 3D seismic survey at Bombay High commencing from the post-monsoon, which is supposed to start operations from the end of this month or early next month. It will cover not only commercial producing areas of Bombay High but also extension of Bombay High so that we find information about oil and gas in and around the Bombay High. This, I am sure, will help us in optimally developing Bombay High and also to develop potential in the areas by way of exploration.

We have also given higher focus to what we call, prospective or quality basins or blocks outside India. We have received an exploration block in Kazakhasthan. We are going to sign contract in a few months. In Iraq, we have made some contact and we should be able to clinch some contract by the end of this year. This, in fact, will be a necessity for ONGC. We could spread our risks. It is better to spilt the risks to not only basins within India but also outside India, if other multinationals can come to India for operations, why should we not go outside? If we are able to share the risks with other companies, we should be able to do more operations from out of the money we can allocate for exploration. In some countries we have higher prospects and high acceptance of Indians for the political and historical relations we have with those countries. This should be the basis of our focus area. For example, France, Malaysia have done this. Chinese CNPC is going in a big way for oil exploration outside China. Some of the big oil companies from some other countries like Japan, South Korea, Taiwan a big way for oil exploration outside. Since we are having friendly relations with a number of countries, since we have the expertise

within ONGC, we should try to spread the risk if we are lucky in getting more oil in India it does not mean, we should lose sight of other places. Most of the countries around us have opened up and that will be our focus area in the near future."

2.104 It has been reported in the press that the Government have set up a high-level independent group to enable the public sector oil companies to enter into contracts abroad for exploration and production of oil.

Technology Constraints and Self Reliance in Technology

2.105 A major part of the exploratory input prior to drilling is in the form of seismic surveys. There has been rapid technological development both in acquisition and processing. According to the Ministry:

— "The technical expertise available inhouse for 2D data acquisition, processing and interpretation is adequate. In the field of further sophisticated 3D data acquisition processing and interpretation, latest technologies have been inducted in the recent past and the quality is of international standard. To keep pace with the development continuous exposure and interaction with the outside expertise is necessary. For data acquisition in logistically difficult and geologically complex terrains, services of outside agencies with required expertise are being continuously obtained. Similarly, for interpretation of data with shearwave propagation analysis is not adequate inhouse and appropriate expertise is being sought after.

— In order to improve efficiency and productivity, technology upgradation is considered necessary in certain areas. Acquisition of new technology assumes importance in the areas of exploration and exploitation. While through inhouse R&D effort, ONGC/OIL are endeavouring to find solutions to many of the problems, it is considered necessary to futher upgrade the technology and seek external assistance/consultancy to meet the objective of short, medium and long term gains.

— New technology is proprietary in nature, at least for first few years of its commercialization. It would, therefore, be essential at times to buy such know-how on proprietary basis, from well established R&D centres or even operating oil companies."

2.106 The Ministry of Petroleum and Natural Gas stated that ONGC recently introduced/Planned to introduce some of the state-of-the-art technologies for exploiting its oil reserves in difficult areas as per details given below:—

(1) Commercialization of Thermal Enhanced Oil Reserve (EOR) techniques: For exploiting the heavy oil reserves in Santhal, Balol and Lakwa fields of North Gujarat, application of various EOR techniques were studied and after the success of pilot projects of *in-situ* combustion EOR technique, the commercialization of the same at the field scale is being expeditiously

implemented. The incremental oil recovery (over and above the primary recovery) from these *in-situ* combustion projects is of the order of 1525%.

(2) Cyclic steam stimulation in heavy oil field of Lanwa in Mehsana project through Alberta Research Council, Canada. Work awarded for preparation of feasibility report.

(3) Horizontal drilling: This technology is ideally suited for thin bed/light/ heavy oil reservoirs, this improves well productivity by opening more area of the reservoir for production. Productivity of a horizontal well is about 1.5-2 times of that of a conventional well, with a marginally increased cost. More than 30 horizontal wells have already been drilled in Western offshore.

(4) Drain hold drilling: This involves drilling of a horizontal drain hole in an existing well. This technique has been successfully used in reviving/ improving the productivity of sick wells in Western offshore. 9 wells have already been completed in Western offshore and a programme for drilling 7 wells in Kalol onshore field is in hand.

2.107 Asked as to what steps have been initiated by ONGC for promoting indigenous efforts to achieve self-reliance in oil and gas related equipments, materials and services, the Ministry in a note have stated that ONGC has laid great emphasis on indigenisation of oil field equipment material and services. In 1982 focus shifted from import substitution to indigenuisation. In 1985 a thrust was given on indigenisation of services and in 1988 a dedicated group, INDEG, was set up for simplifying procedures for the same. ONGC provided long term demand projections, technical brochures, exhibitions and arranged seminars and exhibitions, supply order placed to indigenous firms cumulatively rose to Rs. 12,700 crores by March, 1994 from a figure of Rs. 380 crores in 1983. Percentage of indigenisation in terms of value of orders placed on Indian firms was 60% in 1993-94.

The promotion of Indian companies for playing due role in offshore is emphasized and has been a thrust area. Opportunities have been given to MDL, HSL, BSCL, ESSAR and L&T etc. to diversify in offshore construction/modification. New coating yards *viz.* M/s. PSL and Otoklin have been developed. As a result 80 out of 153 platforms have been indigenously built till date. As far as self reliance in technology is concerned, engineering firms like EIL, JBEL, MECON, TRIUNE have developed expertise to cater to offshore construction needs in the area of conceptual studies, basic/ detailed engineering, review, construction supervision, etc. These companies are self sufficient in above areas.

Observations/Recommendations

2.108 The Committee note that production of crude oil which was 34.09 MMT in 1989-90 declined to 27.02 MMT in 1993-94 and again from 35.167 MMT in 1995-96 to 32.92 MMT and 33.86 MMT in 1996-97 and 1997-98 respectively. The stagnating crude oil productionnecessitated substantial increase in import of crude oil to meet the growing domestic requirement and outgo of huge amount of precious foreign exchange year after year on account of higher imports.

The production of crude oil since 1991 was stated to be lower due to closure of high GOR wells in Mumbai High, slippages in execution of some projects, foreign exchange crunch, environmental constraints in the eastern region and unpredictable reservoir performance in the oil fields of western region.

2.109 The Committee note that to counter the declining production trend an action plan initiating various short-term and long-term measures to augment crude oil production was formulated and implemented. Short-term measures included early production from satellite fields Neelam, Panna and CA in BRBC, introduction of state-of-the-art technologies viz. Drain Hole Drilling, Ultra Short radius radial drilling, side tracking of existing wells and drilling of horizontal wells, consultancy from internationally reputed agencies for repair of wells and to improve the productivity. Long-term measures included development of new fields, additional development of existing fields and enhanced oil recovery. Implementation of these measures have contributed to the additional production of crude oil and thus helped in overcoming the declining trend in crude oil production.

The Committee desire that all these steps aimed at optimising the crude oil production should be implemented in totality so that crude oil production could be increased during the coming years. The Committee also desire that there should be continuous formulation and implementation of such measures to enhance crude oil production in the country for improving the extent of self-sufficiency in this area.

2.110 The Committee apppreciate that actual achievement for seismic survey by ONGC exceeded the targets during the years from 1990-91 to 1993-94 and during the year 1996-97. However, achievement for contract surveys during the year 1989-90 was not upto the targets. During 1994-95, there was shortfall in achievement of targets for 2D onshore survey. The reasons for non-achievement of targets during 1989-90 and 1994-95 inter alia were non-availability of sufficient JVC, poor response in competitive bidding from operators in view of logistically difficult terrain conditions and technology requirements.

The Committee hope that ONGC would in future visualise all the impediments that could come in the way of achievement of targets laid down to avoid any shortfalls.

2.111 The Committee are constrained to note that in regard to exploratory drilling and development drilling by ONGC the actual achievements have been less than the targets laid during each of the years from 1989-90 to 1997-98, as there were losses of rig months due to various reasons viz. delay in mobilization of rigs by the contractors, delay in supply of BHEL rigs, delay in foreign exchange release by Govt., dehiring of rigs earlier than planned due to resource crunch, non-deployment of rigs due to earmarking of the area to JVC, bandh/barricades, natural calamity, environmental problems in Assam and Nagaland, delay in availability of charter hired rigs, diversion of rigs to workover including side tracking/development drilling, deployment of rigs for extended reach drilling in BRBC, etc.

The Committee are deeply concerned over the loss of rig months mainly due to delay in non-availability of charter hired rigs recurring year after year and yet the Ministry/ONGC did precious little for taking remedial measures in preventing/stopping loss of rig months in order to achieve drilling targets fully. Of late, the Ministry of Petroleum and Natural Gas has taken specific steps to increase drilling productivity.

To avoid delay in mobilisation of rigs the Committee desire that ONGC must revamp the planning and monitoring of drilling operations and improve their system and procedure for taking steps well in advance to hire rigs for their timely availability.

The Committee also hope that with the improvement in foreign exchange reserves, release of foreign exchange for ONGC requirement will no longer be any problem now.

2.112 The Committee are constrained to note that actual production of crude oil by ONGC from the years 1990-91 to 1997-98 with the exception of the years 1994-95 and 1997-98 have been less than the targets laid down, even though MoU targets have been gradually scaled down during each of the years after 1990-91 till 1994-95. What is more intriguing is that as against expected targets of 33.31 million tonnes in 1995-96 actual productions was only 31.89 million tonnes. The production targets were further reduced to 27.73MMT in the year 1997-98. The continuous decline in actual production vis-a-vis the targets is not only a matter of serious concern but also amply demonstrates the unsatisfactory state of affairs of oil sector management.

The decline in production has been reported due to various reasons viz. slippages in execution of projects, lesser gain from developed wells than anticipated, ONGC employees strike in September, 1991, lesser intake of crude by refineries in WRBC & ERBC, power shut downs by State Electricity Boards, deterioration of environmental conditions, delay in the completion of Ravva platform, etc. The Committee have been informed that lesser gain from wells occurred due to unexpected reservoir behaviour of the existing fields, unexpected adverse mobility ratio in some fields of North Gujarat, poor reservoir characteristics of new fields/developments. The Committee, however, desire that ONGC should acquire and use the stateof-the-art technology to realistically assess and exploit the true potential of the oil wells and reservoirs so that production from these wells/reservoirs are in keeping with the target laid.

2.113 The Committee note that frequent power shutdowns by State Electricity Board have also resulted in loss of production to ONGC during the years 1990-91 to 1995-96. ONGC apart from taking up the issue of frequent power shutdowns with the State Electricity Boards for improving the supply position, have initiated additional measures for augmenting power supply through development of additional captive power generation facilities at various fields/installations. The Committee would like to be apprised of the impact of these measures in improving the power supply position for crude production.

2.114 Deterioration in environmental conditions like frequent bandh, barricade, sabotage, etc. in North-Eastern sector had adverse impact on activities of ONGC of oil exploration/exploitation. To look into the security problems of ONGC's operations Onshore Security Coordination Committee had been set up by the Government of India each under the chairmanship of DIG, Police, Nagaland State and Assam State and the existing security arrangements in the areas of ONGC operations have been suitably beefed up. The Committee desire that Ministry of Petroleum and Natural Gas should continue to extend full cooperation and help in getting adequate security arrangements to maintain crude oil production as per target and take up the matter with the Ministry of Home Affairs and State Government concerned whenever considered necessary.

2.115 The Committee note that the Director General of Hydrocarbons monitored the Bombay High field and gave suggestions to ONGC to arrest the declining trend of production, on which action has been initiated by ONGC. DGH also engaged international consultants to study Bombay High field and has prepared guidelines for revival of Bombay High field. The Committee desire that proposals for revival/rectificatory measures and further development of Bombay High field should be implemented expeditiously, as they feel that any delay in their implementation would cause further deterioration in the cumulative oil production from the field.

2.116 Actual achievements vis-a-vis the targets laid in the case of seismic surveys by Oil India Limited in some cases have either been nil or low year after year from 1989-90 to 1997-98. According to the Ministry, mostly due to delays in finalisation of contracts, the targets for contract surveys were not achieved. From the statement of reasons furnished by OIL for delay in finalisation of the contracts, the Committee feel that OIL did not effectively pursue the matter with the French authorities to complete the negotiations in time, which resulted in the loss of validity of bids and subsequent loss of contract offered by the French Company. The Committee are also unaware of the circumstances due to which prolonged deliberations took place in obtaining essentiality certificate for concessional duty imports, which further affected the seismic survey work. On perusal of the position explained by the Ministry, the Committee do not feel satisfied with the reasons advanced for delays in finalisation of the contracts and deployment of crew for undertaking seismic surveys as per the target. The Committee desire that OIL should gear up the machinery and take timely corrective measures to obviate such delays in the finalisation of the contracts/mobilisation of crew.

2.117 Actual achievements in exploratory drilling in each of the years from 1989-90 to 1997-98 and development drilling in 1990-91, 1992-93 and from 1994-95 till 1997-98 by Oil India Limited have been much lower than the targets fixed. This is not a satisfactory state of affairs. On perusal of the position submitted by the Ministry, the Committee feel that the most of the problems pointed out for shortfall in achievement of targets laid down for exploratory

drilling and development drilling were not at all unsurmountable. Even then no concrete action appear to have been initiated to overcome the difficulties coming in the way of achieving the targets year after year. The Committee have been informed that OIL has recently taken certain measures to overcome the bottlenecks which are expected to bear fruit in the next 3 to 4 years. The Committee, however, are surprised as to why the Ministry/OIL did not anticipate the constraints and take these remedial measures much in advance to achieve the targets in drilling operations. The Committee recommend that the Ministry/ OIL should strengthen its planning/monitoring machinery so as to anticipate the constraints that might come in the way of future exploration programme and take timely corrective measures accordingly.

2.118 The Committee find that in case of Oil India Limited also there has been shortfall in the actual production of crude oil vis-a-vis the targets laid down during the years 1990-91 to 1992-93 and 1994-95 to 1996-97. They also note that shortfall in production of crude oil occurred largely due to bandhs, roadblocks, flooding, fire, loss of well due to blow out, which were beyond the control of OIL. The Committee, however, regret to note that shortfalls which occurred due to reasons like less than planned contribution from drilling, delay in commissioning of Duliajan pipeline, problem of crude delivery in pipeline of Jaipur OCS due to incompatible flow improver etc. could have been avoided, had OIL anticipated these problems and taken remedial measures in advance to overcome them. The Committee expect that OIL would learn from their experience and anticipate all possible bottlenecks that may come in the way of achievement of targets and take necessary remedial measures well in advance so that targets laid down are fulfilled.

2.119 The Committee find that of late Oil India Limited has taken certain steps like installation of early production systems to obtain quick production from the newly discovered oil reserves, study of behaviour of Reservoirs/wells exhibiting adverse production behaviour, repair of wells, strengthening of security vigilance in the field areas to minimise losses during bands, etc. The Committee desire that all these steps aimed at increasing the crude oil production should be taken with due promptitude, so that actual achievement of crude oil production tally with the targets laid.

2.120 The Committee note that in the Eighth Five Year Plan, the Government had set target for new reserves. The Committee are deeply perturbed to note that the target was not met. Similarly in case of production also, the target was not met. According to the Secretary, Ministry of Petroleum and Natural Gas, the Government did not have the structure to know as to which was the best suited for their new challenges of producing more oils. The other reason was that they were not keeping pace with the information technology. They were lagging behind in this area all these three years.

The Committee are informed that ONGC has invited Mckinsey & Co., a consultancy firm to help organising and setting up decision making process to

enable it to meet the challenges and overcoming the problems coming in the way of achieving of production of crude oil in its various fields. Further, ONGCL is now taking specific steps in terms of restructuring of the new technology to overcome the problems arising out of inadequate and outdated technology which was one of the major cause for poor estimation of oil reserves as also for lower yields from oil fields. The Committee would like to be apprised of the recommendations made by the Mckinsey consultancy firm and impact of implementation of their suggestions and introduction of latest technology in augmentation of crude oil production in various oil fields of ONGCL.

2.121 During the Eighth Five Year Plan, ONGC's production was confined mainly to producing basins only. ONGCL has chalked out a plan to attack deep water exploration in the Ninth Five Year Plan in Kerala-Konkan region, Cauvery and Krishna Godavari basins. The Committee are hopeful that with all the logistic support and experience gained, ONGCL is certainly in a position to drill deep water wells. Simultaneously, ONGCL on account of its expertise , knowledge and experience of work in various basins in India has been approached by a number of joint venture companies to help them in the deep water exploration programme. As deep water exploration is a risky venture, the Committee suggest that ONGCL should share the risk with private/foreign oil companies and also take advantage of their knowledge and expertise gained thus far.

2.122 The Committee appreciate that Government is also giving higher focus to prospective basins/blocks outside India. ONGCL has received an exploration block in Kazakhasthan. This is a step in the right direction, as making exploratory efforts outside the country may help in self- sufficiency in the production of crude oil. Following the example of other countries India should also strive hard to get exploratory work abroad with its friendly countries to spread the risk involved in the crude oil exploration work. The Committee commend the Government's decision to set up a high level independent Group to enable the public sector oil companies to enter into contracts abroad for the exploration and production of crude oil in a quick and transparent manner. They expect that it will further boost the efforts of ONGCL for obtaining exploratory blocks outside India as its expertise is recognised in many developing countries. The Committee also desire that not only ONGCL but also OIL which has vast experience and expertise in exploration and production of crude oil should also be encouraged to make efforts to acquire such exploration ventures abroad. The Committee however also desire that the public sector oil companies should utilise all the resources available at their disposal for exploration and augmentation of indigenous production of Crude Oil in the country.

2.123 The Committee would like the ONGCL to make concerted efforts to implement its proposals during Ninth Five Year Plan for augmentation of crude oil production in the country in right earnest so that the targets laid down for crude oil production during the Ninth Five Year Plan are achieved fully and our dependence on crude oil imports is reduced considerably.

2.124 The Committee are happy to note that in the field of surface geological survey, gravity magnetic surveys and surface geochemical prospecting a high level in-house expertise is available with ONGCL and Oil India Limited. The technical expertise available in-house for 2D and 3D data acquisition, processing and interpretation is also stated to be adequate. The Committee, however, note that ONGCL and OIL do not have expertise for data acquisition in logistically difficult & geologically complex terrains and basins for interpretation of data with shearwave propagation analysis for which services of outside agencies with appropriate expertise is being obtained. State-of-the-art technologies viz. commercialization of thermal EOR techniques, cyclic steam stimulation in heavy oilfields, horizontal drilling, drain hole drilling, etc. have also been introduced/ planned to be introduced to fully exploit the heavy oil reserves. The Committee desire that ONGC and OIL should also be encouraged to make concerted efforts to develop and upgrade technologies through in-house R & D efforts so as to minimise dependence of the country on im-ported technology.

2.125 The Committee also desire that ONGCL and OIL should keep abreast of technological development in the areas of exploration and exploitation and continue to acquire state-of-the-art technologies whenever considered essential to perform their role of leading oil giants not only in India but also abroad.

CHAPTER III

OIL EXPLORATION POLICY

Liberalisation of Industrial Policy

3.1 The Industrial Policy Resolution, 1948, placed "mineral oil" among the list of industry for which the State was made exclusively responsible for the establishment of new undertakings, except where, in the national interest, the State itself finds it necessary to secure co-operation of private enterprises subject to such control and regulation as the Central Government may prescribe. The Industrial Policy Resolution of 1956 place "mineral oil" in Schedule A industries, the future development of which will be exclusive responsibility of the State. It, however, does not preclude the exploration of the existing privately owned units or the possibility of the State securing co-operation of private enterprises in the establishment of new units when the national interest so require.

3.2 In the 1992 Policy Resolution, the economy has been opened up and exploration for the mineral oils has been selectively opened up to foreign and Indian companies. The two national oil companies, namely, ONGCL and OIL continue to operate in their respective positions. Towards this effort Government of India has, so far invited 9 rounds of bids for block explorations in addition to offering small and medium sized oil and gas fields for development under joint venture/private arrangement with Indian companies.

3.3 The necessity for such a change in the oil exploration policy of the Government of India was essentially:—

(a) To establish crude oil and natural gas reserves with a view to making the country self sufficient and also to reducing imports.

(b) To augment the risk capital and allow inflow of foreign investment in the petroleum sector in India.

(c) To bring into India the technological advancements in the areas of exploration and production.

3.4 Explaining the basic objectives of opening up of oil sector to the private companies, the Secretary, Ministry of Petroleum and Natural Gas stated as follows:—

> "Currently our oil consumption rate is growing at roughly seven to eight per cent per annum. Now, our consumption is 80 million tonnes per year. In the case of natural gas, our production is only one-third of what the market wants. There is a growing demand for energy in this country. It is essential for modernisation, for general economic growth and for improving the quality of life. It is important to produce the required energy within our country within

the shortest possible time and at a minimum possible cost. It requires a lot of venture capital and a lot of technology. So, it is important for us to mobilise resources not only from the Public Sector but also from other sources. This is being done not only in India but also in other countries.

We require more resources. In the oil business, there are risky investments. The approach we have adopted in inviting venture capital or risk capital from good oil companies to explore the reserves was an approach which was adopted by many other countries both developed and developing".

Offering Blocks for Exploration

3.5 The details of blocks offered, bids received from domestic and foreign companies and blocks awarded in the 9 rounds of bids for block exploration invited so far are stated to be as under:—

Round	Blocks offered	Bids received	No. of blocks for which bids received	No. of Cos.		Blocks awarded/approved for awarding	Contract signed	Pending	Awards closed
				Indian	foreign				
1	2	3	4	5	6	7	8	9	10
First (1980)	32	4	—3	—	8	1	1	—	1
Second (1982)	50	—	—	—	—	NIL	—	—	—
Third (1986)	27	12	—	—	8	8	9	—	9
Fourth (1991)	72	24	13	10	21	5	5	—	—
Fifth (1993)	45	15	10	6	5	6	6	—	—
Sixth (1993)	46	20	12	11	10	5	3	2	—
Seventh (1994)	45	12	10	7	5	7	4	3	—
Eighth (1994)	34	33	18	11	6	7	3	2	2
Joint Venture Exploration	28	22	7	—	—	5	1	2	2

3.6 Explaining the gap ranging between 2-6 years in invitation of bids in 1st to 4th round of bidding, the Ministry of Petroleum and Natural Gas stated that initially the participation of private companies in exploration was intended to supplement the exploration activities of ONGC and OIL and was limited to those areas where ONGC/OIL had no firm, programme of work. Accordingly, as and when the blocks were identifies, private companies where invited to participate. With the growing demand for petroleum products in the country and the consequent pressure on foreign

exchange reserves as also the need to accelerate the pace of investment in the sector, it has been decided to attract private investment to accelerate the pace of exploration and reserve accretion in the country.

3.7 From the details of blocks offered and bids received it was also observed that response of bidders in 1st and 2nd round was extremely poor and a little better in third round. The bidders response increased from fourth round onwards.

While pointing out that in the seventh round, out of 45 blocks offered, only 12 bids had been received, the Committee enquired as to whether Ministry analysed the reasons for such a poor response. In reply, Ministry stated:

> "The response in a particular round depend on many factors. Some of the factors are perceived hydrocarbon prospectivity of the blocks on offer, fiscal and contractual terms, the regional preference of oil companies, operating environment in a country and the degree of competition amongst countries for the limited exploration risk capital of international companies. The response received in the Seventh Round has to be seen in the context of the prevailing low oil prices and opportunities for exploration in a number of countries, including CIS countries.
>
> The main reason for delay in finalisation of bids has been the time taken by the bidders in responding to queries and negotiations with the bidders. In order to maintain competition in the bidding round, all the bidders were given opportunity and time to respond on various issues and discussions were held with them. This led to delay in finalisation of bids. Every effort is being made to reduce the lead time in finalisation of bids."

3.8 The Ministry furnished the statement regarding the basins for which bids have been received from fourth round of bidding to 8th round and joint venture exploration programme. The bids have been received mostly in respect of Gujarat Kutch onshore, Rajasthan onshore, Bombay offshore, Cauvery offshore, Bengali, Cambay onshore, Assam Arakan basins.

3.9 Elaborating on the subject of terms and conditions for certain rounds of bidding, the Ministry in a note stated that the terms and conditions were more or less the same for the First Round (1980) and Fourth Round (1982). However, in the Third Round (1986) and Fourth Round (1991), substantial changes were made with a view to improve the attractiveness of the fiscal regime. This included elimination of signature bonus and discovery bonus, reduction in Government participating interest from 50% to 40%, seismic option in the first phase of the exploration period, increase in the cost recovery limit from 20% to 100%, increase in duration of contract and provision for international arbitration. Starting with the Fifth Round in 1993, exploration blocks were being offered to private companies on a continuous round the year basis.

3.10 In a note furnished in August, 1996 Ministry of Petroleum and Natural Gas elaborated the major terms and conditions of exploration bidding rounds as under:—

(i) The contracts would be Production-Sharing Contracts, with a contract period, in case of crude oil and associate gas, of upto 25 years, with a

possibility of extension for another five years. The contract period for nonassociated gas would extend upto maximum of 35 years, taking into consideration the longer gestation period for gas projects.

(ii) The exploration period could be for a maximum of 7 years, comprising between one to three commitment phases. A purely seismic option is provided for in the first phase of exploration.

(iii) The companies would have to bid for the minimum work commitment to be fulfilled by them in each phase of exploration. However, there would be no minimum commitment regarding expenditure.

(iv) The Companies would have to relinquish 25% of the contract area at the end of the first phase of exploration, and a further 50% of the original contract area at the end of the second exploration phase. However, this would be negotiable particularly for blocks requiring greater exploration input. Only producing and producible areas for which a mutually agreed work programme has been drawn up can be retained by companies at the end of the exploration period.

(v) Companies would not be liable for payment for signature of production bonus or for any royalty or cess payments, with the latter being picked up by the national oil companies.

(vi) Contracting companies would be fully exempted from payment of customs duties and other taxes on imports.

(vii) The contracting companies would be obliged to offer the entire share of oil accruing to them as cost oil or profit oil to the Govt. of India till India attains self efficiency.

(viii) The stage of production at which the operatorship of the venture would be transferred from the contracting company to ONGC/OIL would be negotiated on a case-by-case basis.

(ix) Assignments would be permitted with the consent of the Government, with consents for such assignments not being withheld unreasonably.

(x) Separate provisions have been made for the development of commercially exploitable natural gas resources. Priority would be given to development of natural gas for the rapidly expanding domestic market, and the contracting companies would be encouraged to participate in the development of natural gas reserves.

3.11 The Committee pointed out that considerable time is consumed in analysing and finalisation of bids received for exploration block and enquired about the reasons for long delays. The Secretary, Ministry of Petroleum and Natural Gas stated in evidence as follows:

"In my view there are 2 or 3 reasons as to why it takes more time. In many number of cases the reason is that lot of Indian companies have made bids. They take time to respond to questions and lot of procedures are to be followed. Time

taken by the bidders themselves in replying to queries or local point is to be added.

The second reason is all these are under some complex negotiation because it involves both legal and financial aspects. The number of entities involved are also very large. The contract is between the Government of India and ONGC and Indian foreign companies. The procedure takes time.

The third reason is within the Government, we have machinery which is not adequate. We are now augmenting it. We are making it full time. All negotiations are conducted by representatives of the Ministry. Many times, we do not have adequate resources within the Ministry. They come with at least ten lawyers. Those are very very legal-oriented documents. We do not have adequate legal resources within the Department."

3.12 As reported in the media that only one Deputy Secretary was looking after the entire work of analysis of bids and award of contracts, the Committee enquired about the reasons for not deputing more officers for dealing with this important work. In reply, the representative of the Ministry further stated:

"We have been handicapped. We have now learnt from experience and we are now setting up a dedicated team to contract negotiations. We hope they will reduce the time under the new procedure. This is also the price for transparency. If we want transparency, we will have delays."

3.13 Enquired what procedural modifications were proposed to be made to minimise delays in analysis and finalisation of bids, responding to queries and negotiations with bidders. In response the Ministry in their note stated that for expeditious completion of contracts under NELP in the future, the model PSC was being revised to minimise points of negotiations. A revised draft model PSC had been prepared by the Ministry of Petroleum and Natural Gas after taking into account observations of Indian and foreign companies. This draft had been circulated to other Ministries and would be finalised after consultation with them. It was also proposed to eventually adopt a time limit within which awarded contracts have to be concluded or else the award would stand cancelled.

3.14 Details of work carried out in some of the exploration blocks awarded for which contract have been signed are as under:—

	Block Name	Progress in Exploration after award
1.	GN-ON-90/3	128 1km 2-D Seismic data acquired:
	Fourth	Operator has requested to terminate PSC
2.	RJ-ON-90/1	— 1285 1km 2-D Seismic data acquired and data processing in progress. 3400 km Gravity magnetic survey carried out. Preparation of Geological model and landsat data processing in progress.
3.	KG-OS-90/1 (fourth)	500 1km 2-D seismic data acquired in Phase I

Block Name	Progress in Exploration after award
4. CY-OS-90/1 (Fourth round)	— Reprocessing of 55 1km 2-D seismic data completed and reassessment of 3-D seismic data for development of PY-3 field is in progress. Well PD-1 abandoned as dry. Drilling contract for reentry & completion of PY- 3-3 awarded.
5. RJ-ON-90/4 (Fifth)	Work to commence in Sept./Oct., 1997
6. RJ-ON-90/5 (Fifth)	Work to commence in Sept./Oct., 1997
7. BB-OS/5 (Fifth)	Work to commence in April, 1997
8. CB-OS/1 (Fifth)	Work yet to commence
9. CY-OS/2 (Fifth)	Work yet to commence

3.15 As per a subsequent note furnished by Ministry of Petroleum and Natural Gas contracts for another 13 blocks were signed on June 30 and July 16, 1998.

Offering of Discovered Fields for Development

3.16 For increasing indigenous crude oil production Govt. has initiated action by offering small and medium sized fields for development by private/joint venture participation. The main medium sized fields offered to JVC for development are as follows:—

(i) Additional development of Mukta
(ii) Additional development of Panna
(iii) Additional development of Ravva

In August 1992, Government of India invited bids from foreign and Indian private companies to participate in the development of small and medium-sized oil and gas fields. 31 small and 12 medium-sized fields were offered.

3.17 Against the bids received on 31.3.93 Government of India has awarded the following contracts:—

Name of company/consortium	Fields
1	2
Medium-sized Fields:	
Enron, USA-Reliance Industries, India	Mid & South Tapti, Mukta and Panna (Contracts signed)
Command Petroleum, Australia-Videocon, India-Marubeni, Japan	Ravva (Contracts signed)
Compagnie Geofinanciere, France-Services, India	Enpro Kharsang (Contracts signed)
Small-sized fields:	
Name of company/consortium	*Fields*

1	2
Gujarat State Petroleum Corporation Limited (GSPC), Ahmedabad	Hazira, Cambay,
Niko Resources, Canada.	Bhandut, Matar Sabarmati (Contracts signed)
Selan Exploration Technology Ltd., New Delhi	Indrora, Bakrol & Lohar (Contracts signed)
Larsen & Toubro, Bombay-Joshi Technologies, USA	Dholka, Wavel (Contracts signed)
Interlink Petroleum Ltd., Baroda	Baola (Contracts signed)
Hindustan Oil Exploration Company (HOEC), Baroda-Mosbacher Energy Co., USA-Petrodyne Inc., USA	PY-1 (Contract to be signed shortly)
HOEC, Baroda-GSPC, Ahmedabad	Asjol
Petrodyne Inc. USA	(Contracts signed)

3.18 According to the Annual Report for 1996-97, under the second offer of discovered fields made in October, 1993 Government of India has approved award of contracts for the following nine small sized and one medium sized field so far:

Name of Company/Consortium	Small Sized Fields
Gujarat State Petroleum Corporation Limited—Hindustan Oil Exploration Company—AMEC—Hydrocarbon Resource Development Company(P) Ltd.	North Balol, Kanwara, Allora, Unawa, Kathana, Dholasan Sanganpur
Selan Exploration Technologies	Ognaj
Assam Company Ltd., & Joshi Technologies Inc., USA	Amguri
Name of Company/Consortium	**Medium Sized Fields**
Essar Oil India Ltd. & Premier Oil Pacific, UK	Ratna -R Series

3.19 As regards the development of these fields, the Ministry stated that the medium-sized fields would be developed through joint ventures between Oil and Natural Gas Commission Limited (ONGCL)/Oil India Ltd. (OIL) on the one hand and private companies on the other. These joint ventures could be either incorporated or unincorporated ventures. Where they are incorporated, ONGCL/OIL would have a 49% share in the equity of the venture. In unincorporated ventures, ONGCL/OIL would take a 40% share in the venture. The small-sized fields would be developed

by companies on their own, with no participation by ONGCL/OIL, under production sharing contracts to be signed by the companies with the Government of India. In both cases, companies would also be required to bear their share of statutory levies like royalty, cess, etc. Companies are required to pay signature/production bonuses to the national oil companies. Foreign companies involved would be levied income-tax at a fixed rate of 50% while Indian companies would be governed by the relevant provisions of the Income Tax Act. The Government of India has the first right to purchase the entire crude oil produced, with international market price being payable. Companies have been exempted from payment of customs duty on goods imported for use in petroleum operations.

3.20 The Ministry in a note enumerated the main rationale behind offering discovered fields for development to private/foreign companies as under:

(i) Some of the fields are isloated and have marginal economics.

(ii) Low reserves.

(iii) Some of the fields require considerable investment, and hence private investment to augment investment by the national oil companies is envisaged.

(iv) This is likely to help augment oil/gas production by way of quickly putting these fields on production.

(v) The private companies, through use of upto date menagerial and technical practices, would devlop these fields at a lower cost than if developed by the national oil companies, thereby creating additional value to the country from the project.

(vi) For application of enhanced oil recovery (EOR) processes.

(vii) Some of these fields like Mukta, Panna and Tapti have not been developed since the late 1970s on account of the marginal economics of these fields.

(viii) In an international scenario where countries are competing for exploration risk capital, the offer of discovered fields serves as an inducement to companies to invest in a particular country, since these companies derive a cash flow from operations in that country which they can plough back into exploration activities.

3.21 Elaborating, the Ministry stated that the national oil companies would also be able to work out strategic alliances with international companies operating in India to take up ex;oration and production opportunities in other countries. Exposure to managerial practices and technologies of international companies would enable the national oil companies to use their resources more efficiently, thereby yielding a better return on investment. The development of the 13 small-sized and 5 medium-sized fields awarded so far is expected to yield about 36 million tonnes of oil and about 45 billion cubic meters of gas over a 15 year period. The joint venture development arrangement yields greater benefits to ONGC and the Government as

compared to a situation where the fields are developed by ONGCL, alone. The economic analysis of the projects developed under joint venture arrangements *vis-a-vis* if developed by ONGCL itself under various scenarios is given at Annexure I. According to the Ministry from the analysis, it would be seen that the highest project returns and maximisation of value to the country is achieved where the fields are developed under production sharing contract arrangements by the private companies and ONGCL.

3.22 Pointing out that Panna & Mukta oil fields were discovered in late 1970's but these fields were not developed since then and finally handed over to foreign/ private companies for exploitation, the Committee enquired about the reasons for awarding these two oilfields to foreign/private companies, the Secretary of the Ministry in his reply stated as follows:

> "They have been discovered in 1976. They were not developed. They were not attractive enough for various reasons. When ONGC prepared this project, the rate of return was not very attractive in developing these fields. The most important element of cost comes after discovery. If you take the total project cost as Rs. 100 crore, then Rs. 80 crore is to be spent on development. That is the reason why they do not develop it.
>
> In 1990, we had a major foreign exchange crisis which further created the problem for the development of fields. So, these two fields were chosen for inducting fresh capital, both internal as well as foreign. That is how it is done throughout the world. Given our galloping demand for oil, Government felt that it is important that all resources are mobilised. Now, the point is how to develop the domestic oil industry. All over the world, if you look at the development of oil, foreign companies are invited in order to reduce the risk factor. ONGC being a very large company, its major advantage is in producing in the areas where the requirements are very very large, both in terms of technology as well as manpower. Smaller fields are not very attractive for them. At Mukta and Panna, the development cost would have been $1.075 million and the operating cost would have been $895 million. So they floated an international tender in which everybody could make the bids. The bid which has been chosen is the one in which the cost of development involves only about $580 million and $710 million as operating cost. Because of new technology input, they have increased the oil recovery by about 40 million barrels. So, the country has saved 500 million dollars because both the initial as well as the running cost will be less. They have brought new technology which reduces the cost in comparatively small fields.
>
> If ONGC would have developed this field, it turns out that the rate of return would have been only 4.7 per cent, but through this joint venture the rate of return has increased to thirteen per cent. So, both, the ONGC and the country, have got more money through taxes, through cess, through reduced cost and through more output."

3.23 To a query as to how many oilfields with proven reserves had been handed over to foreign/private companies, the Secretary of the Ministry stated:

"There have been two rounds of international bidding. One was awarded a joint venture between Command Petroleum, Australia and an Indian company called Videocon on the East Coast. On the West Coast, we have offered one for a joint venture between Reliance and Enron. These are the two. Our analyses show that through these, the country has gained substantially in terms of additional oil and also reduced costs. It has also enabled ONGCL to concentrate on other areas. This is done all over the world."

3.24 On exloitation of proven reserves, the Committee desired to know whether the ONGCL and OIL with provision of adequate funds for capital investment were not fully capable of exloiting areas of proven oil reserves. In reply, the Ministry of Petroleum and Natural Gas in a note have stated that exploration and development of hydrocarbons is a capital intensive activity. At present the country is meeting only about 50% of its domestic requirements of petroleum products. To quickly augment the domestic availability of petroleum, large investments require to be made in exploration and development activities. In this regard, Government has approved an accelerated exploration programme which would require funds to the tune of about Rs. 6500 crores in next two or three years. In addition, exploration and exploitation of hydrocarbons are specialised areas where different oil companies may have different perceptions. To bring in new ideas and the latest state-of-the-art technologies as well as increased resources, it is considered necessary to encourage private companies to supplement the efforts of the national oil companies *viz.* ONGC and OIL in exploration and exploitation of the hydrocarbon reserves in the country.

3.25 Planning Commission has suggested desirability of a review of the decisions to offer discovered fields to private sector, made earlier in the context of inadequate availability of investible resources of NOCs as well as foreign exchange scarcity, in view of the fact that the situation has vastly improved on both these courts.

ANNEXURE I

(*Para* 3.21)

FINANCIAL ANALYSIS OF MEDIUM-SIZED FIELDS DEVELOPED UNDER JOINT VENTURE ARRANGEMENTS VIS-A-VIS DEVELOPED BY ONGC ITSELF

The financial analysis for Panna, Mukta, Tapti and Ravva fields based on the development of fields under joint venture arrangements *vis-a-vis* development of fields by ONGC itself has been carried out. The financial analysis has been carried out under the following four scenarios:

(i) Case where ONGC is given international price for oil and gas and shares profit with Government as per the profit sharing formula given by the successful bidder for the individual fields.

(ii) Case where ONGC is given international price and does not share any profit with Government. This is the best case for ONGC from the point of view of its, obtaining maximum returns.

(iii) Case where ONGC is given administered price as per existing system.

(iv) Case where ONGC field is developed by the joint venture under the production sharing contract system.

Panna-Mukta field:

Awarded to: Enron—RIL

Costs and production profile of the field:

	Development Cost ($MM)	Operating Cost ($MM)	Recov. Oil (MMBBL)	Gas (BCM)
ONGC	1075	895	107	14.9
Enron-Rll-ONGC (JV)	580	710	146	10.3

Project Profitability

(i) If ONGC given international price and shares profit as per the profit sharing given by the successful bidder:-

Project IRR : 4.71%

(ii) If ONGC given international price and does not share any profit with Government:—

Project IRR : 5.05%

(iii) If ONGC given administered price as per existing provision:—

Project IRR : (-ve)

(iv) Field development by JV under Production Sharing Contract (PSC):—

Project IRR : 13.44%

Tapti Field

Awarded to : Enron-RIL

Costs and production profile of the field:—

	Development cost ($MM)	Operating Cost ($MM)	Recov. Oil (MMBBL)	Gas (BCM)
ONGC	587.2	473.7	12.2	22.7
Enron-RIL-ONGC (JV)	542	295	12.4	29.1

Project Profitability

(i) If ONGC given international price and shares profit as per the profit sharing given by the successful bidder:—

Project IRR : 8.71%

(ii) If ONGC given international price and does not share any profit with Government:—

Project IRR : 10.22%

(iii) If ONGC given administered price as per existing provision:—

Project IRR : 0.58%

(iv) Field development by JV under (PSC):—

Project IRR : 16.76%

Ravva Field

Awarded to : Command consortium

Costs and production profile of the field:

	Development Cost ($MM)	Operating Cost ($MM)	Recov. Oil (MMBBL)	Gas (BCM)
ONGC	279	182	89.1	3.2
	227	165	100.8	2.6

Comand-Videocon-Marubeni-ONGC (JV)

Project profitability

(i) If ONGC given international price and shares profit as per the profit sharing given by the successful bidder:-

Project IRR : 20.81%

(ii) If ONGC given international price and does not share any profit with Government:—

Project IRR : 22.84%

(iii) If ONGC given administered price as per existing provision:—

Project IRR : 7.8%

(iv) Field development by JV under (PSC) :—

Project IRR : 27.94%

Field	Development Scenario	Shares in Govt. share $ mm(%)	project ONGC share $mm(%)	NPV Comp. share $mm(%)
Panna & Mukta	(i) If developed by ONGC with international prices for Oil & gas and sharing profit petroleum with Government	517	(-) 131 (IRR: 4.71%)	—
	(ii) If developed by ONGC at international prices payable for oil and gas	510	(-) 124 (IRR: 5.05%)	—
	(iii) If developed by ONGC under administered price scheme.	442	(-) 449 (IRR negative)	—
	(iv) Development of field under PSC by JV	640 (88%)	34 (4.7%)	50(7.3%)

Implications of loading of ONGC past cost

Past cost of ONGC: US $ 218 million

Project return to JV after past cost loading : 7.8%

Field	Development Scenario	Shares in Govt. Share $ mm(%)	Project ONGC Share $ mm(%)	NPV Comp. Share $ mm(%)
Ravva	(i) If developed by ONGC with international prices for oil & gas and sharing profit petroleum with Government	192	106 (IRR: 20.81%	—
	(ii) If developed by ONGC at international prices payable for oil and gas	163	135 (IRR: 22.84%)	—
	(iii) If developed by ONGC under administered price scheme.	154	(-) 7 (IRR: 7.8%)	— —

(iv)	Development of field under PSC by JV	410 (83%)	56 (11)%	31 (6%)

Implication of loading of ONGC past cost

Past cost of ONGC: US $ 90 million

Project return to JV after past cost loading : 24%

Field		Development Scenario	Shares in Govt. Share $ mm(%)	Project ONGC Share $ mm(%)	NPV Comp. Share $ mm(%)
Tapti	(i)	If developed ONGC with international prices for oil & gas and sharing profit petroleum with Government	152	(-)26.2 (IRR: 8.71%)	—
	(ii)	If developed by ONGC at international prices payable for oil and gas	121	5 (IRR: 10.22%)	—
	(iii)	If developed by ONGC under administered price scheme	13.5	(-) 161.7 (IRR:) 0.58%)	—
	(iv)	Development of field under PSC by JV	478 (80%)	66(11%)	54(9%)

Implications of loading of ONGC past cost

Past cost of ONGC: US $ 46 million

Project return to JV after past cost loading: 14.02%

Assumptions:

(i) Capital expenditure (CAPEX), operating expenditure (OPEX) and production profile taken for ONGC as per ONGC estimates (without customs duty) and as per bid of successful bidder in case of development by JV under production sharing contract mechanism.

(ii) *International Price:*

Oil Price (assumed) : US$ 18/bbl (without escalation during project life)

Gas price : US$ 2.11/MMBTU (without escalation)

Administered Price:

Oil Price : Rs. 3122/MT (or US$ 13.58/bbl) without escalation

Gas price : Rs. 1650/1000 cubic meter (or US$ 1.49/ MMBTU)

Exchange Rate : US$ 1 =Rs. 31.50

One metric tonne crude = 7.30 bbl

(iii) Figures (NPVs) based on 10% discounting rate.

(iv) Royalty for crude oil : Rs. 481/MT

Cess for crude oil : Rs. 900/MT

Royalty for gas : 10% of gas price

New Exploration Licensing Policy

3.26 The Minister of Finance in his Budget speech for the year 1997-98 expressed concern that demand for Petroleum products was exceeding the growth of domestic supply and that just 6 of the 26 basins that have potenial for oil and gas in India have been explored and that too partially. To reduce dependence on imported petroleum products and attract large investment (both foreign and Indian in Hydrocarbon Sector, he announced certain fiscal incentives in the budget.

3.27 The Ministry of State for Petroleum and Natural Gas announced in Parliament on 18th March, 1997 the New Exploration Licensing Policy (NELP) approved by Government. Broad features of the policy are as under:—

(1) The upstream Public Sector companies namely ONGCL and OIL are to be provided a level playing field by giving them the same fiscal and contract terms as are available to private companies. This will, *inter-alia*, imply that oil companies including ONGCL and OIL will be paid international prices of oil for discoveries made in the blocks offered under the new policy. They will however, also have to compete with the private sector for obtaining petroleum exploration licences instead of getting them on a nomination basis at present.

(2) Exploration blocks under the new policy will be allotted on the basis of an open acreage system which means that companies can apply for exploration blocks at any time and not necessarily be restricted to bidding rounds.

(3) A new comprehensive fiscal package has been proposed to provide adequate incentive for attracting investment capital in this critical area. Some elements of this package have already been announced by the Finance Minister in his Budget Speech. This package includes:—

(a) Royalty payments at the rate of 12.5% for the on land areas and 10% for offshore areas.

(b) Half of the royalty from the offshore area will be credited to a Hydrocarbon Development Fund to promote and fund exploration related activities such as acquisition of geological data on poorly unexplored basins, promotion of investment opportunity in the upstream sector, institution building etc.

(c) To encourage exploration in deep water and frontier areas, royalty will be charged at half the rate for offshore for deep water areas beyond

400 mere bathymetry for the first 7 years after commencment of commercial production.

(d) It is proposed to completely abolish cess payments for blocks offered under the new policy.

(e) ONGC and OIL will also be exempted from payment of customs duty on import of goods required for petroleum operations on exploration and exploitation under new policy to bring them on par with private companies who presently enjoy this facility.

(f) A special thrust is to be given to boost exploration and production of petroleum in the North Eastern region and for this purpose the Finance Minister has already announced a tax holiday for seven years after commencement of commercial production from fields situated in this region.

(g) A separate petroleum tax code is to be put in place to facilitate investments in this sector. Some of the other features of the new policy are:—

(i) There will be no compulsory State participation through ONGC and OIL and it will be upto the private companies to form strategic alliances with these companies if they so wish to do.

(ii) there will be freedom to the contractors to market the crude oil and gas discovered in the blocks under the new policy in the domestic market.

(iii) There will be no payments of signature, discovery or production houses under the new policy.

(iv) Exemption from payment of petroleum exploration license fee/ area rentals.

Impact of Participation by Private Companies

3.28 The Committee pointed out that production of ONGCL during all the five years of Eighth Plan remained equal/below what was agreed to in the MoU. ONGCL could not achieve a higher production. In these five to six years of liberalisation and entry of private companies in the exploration and development of oil fields, the Committee enquired what according to them were the reasons for low performance of the Oil Sector. In response, the Secretary of the Ministry stated as follows:—

"We opened up only in 1991-92. We opened our exploration sector and not producing units."

"In 1984-85 we awarded only the first round. As I mentioned, today we are getting about 34 million tonnes of output from vast fields and we expect that in the Ninth Plan period our production will go up. Although we have about eight rounds, we have not been able to sign all the contracts of different rounds

and there has been enormous amount of delay on our part and I can give reasons for the delay. This is one reason why there was no exploration by the private companies. I hope that the Ninth Plan would be different because the new licencing policy, which the Government has announced this year, is far more liberal. I am hopeful that this will be implemented at a much faster rate than in the past. I am confident that the producing efforts will be much more during the coming years than what happened in the last five years....."

3.29 When the Committee enquired about the major international oil companies coming for exploration the Secretary of the Ministry stated:

"A number of majors are coming. Shell has come for a major work in Rajasthan. Now we are going to offer more areas in deep waters. We are getting enquiries from international oil companies everyday. They are trying to find ways of coming here. We are going to create tremendous excitement, tremendous interest in oil companies to look for oil in this country."

3.30 The Committee pointed out that ground realities were quite different. The Government had offered a number of blocks but the response that they had got was five out of 20, that is one-fourth in the year 1995-96. In response, the Secretary of the Ministry stated:—

"Our policies in themselves are problematic. Our policies need to be imporved. Our implementation needs to be improved. We had delays in decision-making. We have to improve upon that. That is what I want this Committee's support for. I want this Committee's support to have a policy by which we can attract more people to exploration business."

Observations/Recommendations

3.31 The Committee note that unfortunately the country is not self-sufficient in the production of oil and is heavily dependent on imports. With a view to establishing crude oil and natural gas reserves for making the country self-sufficient, the Government have been making policy changes from time to time in the oil exploration policy. A major policy initiative was taken in the 1992 Policy Resolution, when the economy was opened up and exploration for the mineral oils was thrown open to foreign and Indian companies. To establish crude oil and natural gas reserves with a view to making the country self-sufficient, to augment the risk capital and permit inflow of foreign investment in the petroleum sector and to bring technological advancements in the area of exploration and production, the Government of India have made changes in the oil exploration policy and have been inviting bids for offering blocks for exploration by foreign/Indian companies. So far Government have invited 8 rounds of bids for block exploration and one round under the Joint Venture Exploration Programme offering small and medium sized oilfields for development as joint venture operations with Indian companies. While the 1st to 4th rounds of bids were invited in 1980, 1982, 1986 and 1991, after a gap of 2-6 years, since 1992, Government have been inviting these bids on round-the-year basis.

3.32 The Committee note that response of bidders in 1st and 2nd round was very poor. It improved from1986 round of bidding onward when changes were made in the terms and conditions for exploration to attract the entry of foreign/ private companies.

3.33 So far only six out of the total of 26 basins that have potential for oil and gas have been explored and that too only partially with the result that it is not yet possible to come to any conclusion about the potential of oil production in the country. A salient feature of Eighth Round of bid is that out of 18 blocks offered in this round, bids were received for all ten blocks offered in the Assam-Arakan basin, which has rich deposits of oil. In respect of other rounds also, it is noted that bids have been received mostly for Gujarat, Kutch onshore, Rajasthan onshore, Bombay offshore, Cauvery offshore and Cambay onshore which too have rich deposits of oil. This only indicates that existing fiscal incentives need to be improved further for the risk and security of oil exploration investment so that the country can have the benefit of knowledge of exploration of diverse geological basins available with foreign companies and exploit many of its basins which remain to be explored.

3.34 The Committee find that Government of India take considerable time in awarding contract for exploration blocks. Most of the blocks offered from Fourth to Eighth rounds—(*i.e.* from 1991-1994) were signed in June-July, 1998 *i.e.* after a lapse of 4-5 years. Some of the blocks offered in Sixth, Seventh, Eighth and Joint Venture Exploration, rounds have still not been signed. The delay in finalisation of bids have been attributed to the time taken by bidders in responding to queries, negotiations with bidders, complex procedures involved in negotiations and inadequate manpower/machinery in the Ministry of Petroleum and Natural Gas.

3.35 The Committee need hardly appreciate the number of years being taken in conclusion of agreements for commercial decisions in oil exploration as compared to not more than three months elsewhere in the world. The Committee desire that Ministry should suitably strengthen its machinery dealing with the work of inviting, finalising and awarding of contracts for exploration blocks expeditiously so that the bids received could be analysed, evaluated and blocks offered with due promptitude. The Ministry should also simplify the procedure of contract negotiations to obviate delay that may be caused due to cumbersome procedures involved in award of contracts to successful bidders.

3.36 The Committee understand that one of the reasons for abnormal delay in award of contract for exploration blocks is the system which required national oil companies to participate at every stage. Obviously, their response mainly depend upon availability of resources, manpower, technical as also financial at their disposal.

3.37 The Committee note that Government of India have offered small and medium sized fields for development by private/joint venture participation. While medium-sized fields would be developed through joint ventures between ONGCL/

OIL and private companies, the small-sized field would be developed by companies on their own with no participation by ONGCL/OIL, under production sharing contract by the company with Govt. of India. In case of medium-sized fields joint ventures could be either incorporated or unincorporated. The share of ONGCL/OIL in the equity of the centre would be 49% in case of incorporated and 40% in case of unincorporated ventures.

3.38 The medium-sized fields awarded so far include Mid and South Tapti, Mukta and Panna, Ravva, Kharsang and Ratna-R series. Small-sized fields awarded are Hazira, Cambay, Bhandut, Matar, Sabarmati, Indora, Bakrol, Lohar, Dhoka, Wavel, Baola, PY-1 and Asjol. Under the second offer of discovered fields made in October, 1993 (as per Annual Report for 1996-97) the Government have approved award of contract for nine more small-sized fields. The Ministry of Petroleum and Natural Gas has justified awarding of these discovered fields to private/foreign companies on the grounds that some of these fields are isolated, have marginal economics, low reserves and require considerable investments, etc. Private companies through use of up-to-date managerial and technical practices could develop these fields at a lower cost than developed by national oil companies. The Committee are also informed by the Ministry of Petroleum and Natural Gas that Panna and Mukta oilfields were discovered by ONGC as back as in 1976 but did not develop them due to large investment required, rate of low return in developing these fields as also due to foreign exchange crisis. In August, 1992, the Ministry of Petroleum and Natural Gas invited bids from foreign/private companies to develop these fields. Against the bids received on 31.3.93, the Ministry in 1995 awarded the contracts of oilfields of proven reserve at Mukta, Panna and Tapti to Enron-RIL, Ravva to Command Consortium. In this connection, the Committee have been informed that joint venture of foreign/ private companies will develop these discovered fields at a much lower cost vis-a-vis ONGCL by using new technologies, which reduce the cost in comparatively small fields.

3.39 The Committee are informed that besides rate of return not being attractive for development of above fields, the major foreign exchange crisis in 1990 was another factor for not taking up development of these fields and subsequently awarding them to foreign/private companies. The Committee, however, feel that of late foreign exchange position has considerably eased and at the time of awarding of Panna and Mukta fields in 1995 there was hardly any foreign exchange problem in the country.

The Committee, therefore, do not find any justification behind the foreign exchange crisis being cited as a reason for awarding these fields to private/ foreign companies. They are of the view that by awarding these fields to private/ foreign companies, Government have forfeited substantial amount of country's profits, which could have accrued to the country, had ONGC/OIL been asked to acquire state-of-the-art technology and develop these fields themselves earlier.

3.40 The Committee emphasise that in future experience, expertise and resources of foreign oil prospectous should be utilised for exploring new areas for discovery of oil, rather than offering discovered fields for development and production.

3.41 The crude oil production with contributions from ONGCL, OIL and private/JV companies during 1995-96 had gone up to 36.29 million tonnes which is the highest level reached so far. The crude oil production for the years 1996-97 and 1997-98 including production from private/JV companies, was 34.11 million tonnes and 30.78 million tonnes respectively. With the decline in indigenous production of crude oil, import of crude oil was 33.906 and 31.778 MMT respectively during 1996-97 and 1997-98, which is nearly half of India's oil requirement of around 66 million tonnes. The country has not had any major oil find in over a decade. Despite contribution from private/JV companies from small and medium-sized oil fields offered to them under Modified Exploration Policy, the production of crude oil in the country is stagnating below 35 MMTs. In this situation the task facing the country is to discover, explore and produce more oil in the country even to maintain the current level of self-sufficiency of around 50 per cent. For this accelerated exploration efforts are required to be made by the national oil companies. There should also be efforts, with substaintial increase in the investment in the upstream hydrocarbon sector, to arrest the declining reserve accretion to production ratio with the participation of private sector. The Government had already approved finalisation of contracts for a number of blocks for which bids were received in the eight round of bidding and one round under the Joint Venture Exploration Programme. These exploration efforts need to be further intensified and accelerated through the national oil companies and participation of private capital by offering fiscal incentives for investment in this critical area of the economy so that dependence on imports to meet the growing demand for petroleum products can be reduced.

3.42 The Committee note that the Government have realised the necessity of substantial efforts to augment indigenous production of crude oil and have offered fiscal incentives in the New Exploration Licensing Policy (NELP) announced in the House on 18 March, 1997 for participation of private sector in the areas of exploration and production of oil. The Committee hope that these measures would give the necessary boost to domestic production of crude oil and reduce dependence on import.

The Committee desire that the Exploration Licensing Policy may be reviewed from time to time for attracting adequate private investments into the hydrocarbon sector to meet the burgeoning demand for petroleum products in the country.

3.43 For expeditious completion of contracts under the New Exploration Licensing Policy, the Ministry of Petroleum and Natural Gas has revised the model Production Sharing Contract (PSC) and the revised model PSC draft is stated to have been circulated to other Ministries. The Committee desire that the revised draft be finalised expeditiously.

3.44 The Committee find that entry of private companies in production of crude oil has not so far helped in augmenting the crude oil production, mainly because all the contracts of blocks awarded in 8 rounds of bid have not been signed and enormous delays taking place on the part of the Ministry of Petroleum and Natural Gas in processing, analysing and finalisation of bids. Lack of complete freedom of right to market oil, compulsion of taking Indian companies as their partners, etc. have also been attributed as other causes due to which private/foreign companies have not shown much interest in the exploration of oilfields. However, these restrictions have now been removed in New Exploration Licensing Policy announced by Government of India in March, 1997.

The Committee are constrained to note that though the New Exploration Licensing Policy providing more incentives and removing bottlenecks for participation by private companies in the field of oil exploration was announced some time ago yet no new exploration blocks have been put up for bidding by the Government and all the existing blocks have also not been signed and this laxity is taking place when the country is striving to achieve higher crude oil production targets.

The Committee feel that the interest generated among private investors both in India and abroad a result of new policy cannot be sustained unless there is an urgency on the part of the Government in implementing it. The Committee desire that Ministry of Petroleum and Natural Gas should remove all the bottlenecks that discourage private companies in undertaking exploration work in the country. They should also take all possible steps for speedy implementation of New Oil Exploration Policy with a view to attracting more private companies to participate in oil exploration business in the country.

CHAPTER IV

IMPORT OF CRUDE OIL

Demand Projections

4.1 Based on the trends in the growth of consumption of crude oil in the past few years, and estimation of indigenous crude oil production as per advice from ONGCL and OIL the Ministry of Petroleum and Natural Gas makes the demand projections every year and estimation of crude oil imports.

Imports

4.2 The quantum and value of crude oil imported from 1990-91 to 1994-95 was stated to be as under :

	Quantity (Million MTs)	Value (Rs. in Crores)
1990-91	20.699	6118.42
1991-92	23.994	7820.05
1992-93	29.247	10685.86
1993-94	30.822	10688.52
1994-95	27.349	10316.00
1995-96	27.342	11517.00
1996-97	33.906	18538.10
1997-98 (provisional)	34.494	15897.15

Markets

4.3 Given the geographical location of India, the major crude oil markets are the Middle East and Far East regions. The other markets for crude oils like Venezuela, Mexico, North Sea, etc. are not very competitive for import of crude oil mainly due to freight diseconomy considering that crude oil has to be moved over long distances. Therefore, most of our crude oil imports are of Middle East origin. However, some portion of our requirements are met from Far East and West African region which provides security of supplies.

In the Middle East region, IOC have term contracts with national oil companies of Saudi Arabia, Kuwait, Iran and UAE for import of crude oil. IOC also have a term contract with Malaysia for import of crude oil. Since March, 1997, IOC has also been importing crude oil from Iraq under the UN approved oil for food programme.

In addition to import of crude oil from the above countries, on spot basis crude oil is being imported from Egypt, Australia, Nigeria, etc. A number of crude oils produced in North Sea, West Africa, Indonesia, Australia, Middle-East and

Mediterranean region are suitable for processing in the Indian refining system and are included in spot tender list.

Systems of Purchase

4.4 The Ministry of Petroleum and Natural Gas informed that crude oil is purchased either through term contracts with national oil companies at their official selling price or through spot purchases on competitive tender basis. There is provision also for purchase of crude oil through term tender by inviting offers from parties registered on the mailing list. A brief on the term contracts and spot contracts is given below :

Term Contracts

4.5 After obtaining Government approval for import of crude oils from various countries and the quantity to be imported thereof, IOC enters into term contracts with national oil companies of the respective countries for import of crude oil at their official selling prices. The official selling price is generally market related and is applicable for the month of the loading of the cargo. The major suppliers of the Middle East region *viz.* Saudi Arabia, Iran, Kuwait, etc. price their crude oils on the basis of official selling prices which are linked to average of Oman and/or Dubai crude oils for the month of loading with a premium/discount declared by them. The quantity of crude oil contracted on term basis is evenly lifted during the delivery period agreed while a major share of the crude oil on term basis is imported on the basis of official selling prices, a small volume of crude oil *viz.* Lavan Blend of Iranian origin is purchased with mutual agreement on price. The price of Lavan Blend crude oil is also linked to the official selling price of Iranian Light with a discount which is mutually agreed upon.

Spot Contracts

4.6 As the demand for imported crude oil varies from month to month depending upon the refinery throughout, variation in indigenous production, the inventory position etc. the balance quantities of crude oil (not tied up on term basis) are covered through spot imports. Similarly, spot imports are also resorted to for covering the requirements of such grades of imported crude oils which are not available on term basis through national oil companies. Imports of crude oil on spot basis are done through tendering system. The offers received against spot tenders are evaluated by IOC and put up to the Empowered Standing Committee which decides on the awards on the basis of competitiveness of the offers taking into account the requirements of various grades of crude oils indicated by OCC. Arab Mix crude oil is also being imported through British Petroleum International Ltd. at a level of 1 Million MTs/ annum at a discount to the official selling price of Saudi Aramco since May, 1989 to December, 1996.

Term Tender

4.7 Though the Government approval provides for import of crude oil on term basis through tender system by inviting offers from parties registered in the mailing list, IOC have not imported crude oil on term basis through tender system recently.

4.8 According to the Ministry of Petroleum and Natural Gas the percentage of import of crude oil by IOC made on term and spot basis from 1990-91 till 1994-95 was as follows :—

Year	Term %	Spot* %
1990-91	61.0	39.0
1991-92	44.1	55.9
1992-93	48.9	51.1
1993-94	54.0	46.0
1994-95(P)	61.5	38.5

P=Provisional

*Spot includes additional cargoes from term suppliers at official selling prices.

4.9 Comparative figures showing actual production *vis-a-vis* targets and the imports of crude oil made during the five years were as under:—

Figures (in MMT)

Year	Target of Production	Actual Production	Import of Crude Oil
1990-91	35.90	33.02	20.669
1991-92	31.80	30.35	23.99
1992-93	28.50	26.95	29.247
1993-94	27.17	27.02	30.822
1994-95	32.29	32.22	27.349
1995-96	36.29	34.56	27.342

4.10 On being asked as to why IOC made purchases through spot contracts when annual contracts had also been made by it, the representative stated as under :—

> "Our preference is for term contract. We go in for spot contracts as it enables us to have maximum flexibility. For instance, we used to have very large imports mostly on term contract from the USSR. That source is no more available now. We would also like to import from Nigeria on term contract basis but that is also not possible, another reason is, we want some amount of flexibility. It is because our domestic need changes from time to time. That is why, we cannot forecast with certainty all our demands. Similarly, we also cannot forecast with certainty our domestic production and monthly refining throughout. For all these reasons it is advantageous for us to have that flexibility."

4.11 Giving further justification for making purchases on spot basis, the Secretary of the Ministry elaborated as under :—

"Term contract is what we prefer. It does not always happen that the crude oil which we prefer is available with the seller country. Maximum oil is purchased through term contract. The remaining which could not be covered by term contract, only for that amount we go in for spot purchases, it gives us flexibility.

For arguments sake, say, I tie-up with a country for buying oil on term contract basis. Next year it so happens that my domestic production increases, what do I do then? I would be forced to buy the crude which I do not need. Even domestic crude production also varies by some million tonnes up and down from time to time. This year it so happened that we had to close down the Mathura unit for safety reasons. This procedure of acquiring the crude through spot purchases gives us some flexibility. I think, it is good for us because that helps to minimise the total cost of purchase. If we go in for term contract for everything then we might end up in a situation where we have to buy the crude which we do not need.

Secondly, there are four different types of crude oil. The relative prices of these crude oil keep on changing. I want to use to my advantage the marginally cheaper crude. Everyday the officials of the Indian Oil Corporation are studying the relative profitability of different kinds of crude, the relative benefits and the refining capabilities of different kinds of crude. We try to minimise the cost in terms of crude purchase. So, having some purchase on tender basis gives us certain flexibility and there also exists a possibility for minimising the cost. By going in for annual contracts for the whole purchase of crude oil, we could miss the chance of a possible reduction in the prices of crude oil."

4.12 Observing that it might be necessary to make purchases of crude oil through spot contract basis occasionally, the Committee enquired about the justification in making purchases through this system on a regular basis. In reply, Secretary of Ministry stated:—

"The percentage of spot purchases and long term purchases is roughly constant over the last four-five years because the pricing is almost the same. The prices of term and spot purchases are market related. In the current scene when there is abundant crude this method allows some flexibility in market related purchases in getting better bargaining power which is one of the greatest advantages. You keep the market guessing and you make only a part of your intensions known to the market. The amounts involved in this are very high. The advantage I get by keeping my information to myself is quite important. Keeping the markets guessing goes to my advantage and I get a better price. Flexibility of operation, minimising the cost of acquisition of crude and maximising our bargaining power, are the things which suggest that we should have a mix of term contract and spot purchase.

The last point I would like to make is, it also enable us to enlarge into new types of crude. Over a period of time we increased the flexibility of our purchases, over the last four-five years we have done spot purchases from countries like Australia which is a totally new source of crude for India."

4.13 In this connection, the Committee desired to know was to whether the spot contracts for purchase of crude oil was generally disadvantageous to the country. In reply, the Secretary of the Ministry stated:—

"It is not necessary because sometimes it could be sellers' market and sometimes it could be buyers' market. Currently the market is soft. Ours is a growing market. Our consumption is high. On a number of occasions we do get better advantages. So, it depends on the situation."

Prices in International Market

4.14 Crude oil prices in the international market are driven by global market forces. International publications like Platt's give the daily price assessments of various major crude oils traded in the market. In the crude oil trade, the transactions are generally done on the basis of market related pricing linked to price quotation of market crudes published as mentioned above. Therefore, imports of crude oil done both on term and spot basis are generally with the pricing linked to the prevailing international price for crude oil during the month of loading as per periods mutually agreed to in advance.

Purchases of crude oil by IOC on both term and spot basis are generally at market related prices, in line with the market trend.

4.15 The average prices of imported crude oil during the year 1990-91 till 1994-95 were as under:—

Year	Average crude oil import price US $/bbl
1990-91	21.38
1991-92	17.06
1992-93	17.88
1993-94	14.65
1994-95 (P)	16.00

P=Provisional

(Prices for crude oils are on FOB basis except that where the imports are contracted on C&F basis, C&F prices have been taken).

4.16 Asked as to what steps had been taken by Ministry of Petroleum and Natural Gas to ensure that crude oil imports are made cost effective, the Ministry in its note have explained as follows :—

(a) A large share of the requirements of imported crude oil is procured from the Middle-east region which given its proximity to our country, is cost effective.

(b) Finalising bulk of the imported crude oil requirement through term contracts with national oil companies with pricing basis as per the official selling price. Term contracts with various countries ensure diversification of supply sources and provide security of supplies.

(c) Uplifting additional cargoes from the term suppliers at their official selling prices, subject to such purchases being economical.

(d) Spot purchases are made on a competitive tender basis by inviting offers from registered parties.

(e) Continuous efforts are made to expand the basket of crude oils by including new grades found suitable in our refining system in order to increase competitiveness.

The loading of crude oil tankers are carried out generally in line with mutually agreed loading periods and the pricing basis is linked to international market prices applicable during the periods of the months of loading, mutually agreed to, in advance.

There have been no major disruptions in supplies nor was there any need to incur additional costs over and above the pricing terms as per contracts.

The prices of crude oil in the international oil market are volatile and depending upon various factors prevailing at a given point of time, the prices vary from time to time. Hence, the strategy is to maintain the inventory for imported crude oil at a desired level and to arrange imports regularly on a monthly basis, from term and spot sources, to meet the estimated consumption.

Given the above, in order to make crude oil imports cost effective, a major share of imported crude oil requirement is tied-up on term basis with national oil companies at their official selling prices. The balance quantities of crude oils are imported for delivery as required by the refining system on the basis of competitive tenders on spot basis. Spot tenders are floated well in advance of the month of requirement as this ensures that large volumes of the required grades of crude oil are available with different suppliers. This helps in ensuring competitiveness.

System of Transportation of Crude Oil

4.17 The total tonnage of crude oil tanker for each plan period has been assessed by Tonnage Acquisition Committee chaired by Director General (Shipping), Ministry of Surface Transport. In the Meeting the approximate Import requirement of crude is tabled and in consultation with the ship owner, total crude tonnage required for each year of the plan period is assessed. At the time of signing the Contract of Affreightment (CoA) with SCI for transportation of crude the tonnage requirement for a particular year is re-assessed considering crude import/coastal movement as per OEB. For the Ninth Five Year Plan (1997—2002) no separate Tonnage Acquisition Committee has been constituted for the assessment of tonnage for crude and product carrier. A Sub-Group of the Working Group on shipping has been constituted by MoST to cover acquisition requirement for all categories of ships including crude oil and product carrier for IX Plan period.

4.18 When enquired about the bottlenecks in the transportation of crude oil and steps taken to remove these bottlenecks, the Ministry of Petroleum and Natural Gas informed the Committee that due to lack of port infrastructure and high jetty occupancy at Bombay, Vadinar and Haldia, tankers had to wait thereby causing detention and affecting timely input of crude to the refineries. In case of product tanker movement also, lack of port infrastructure facilities results in higher detention of tankers. The actions with regard to night navigation, pilot problems at various ports, increase of the port draft by dredging operations at Goa and Cochin, replacement of the old dock line at Bombay, etc. are being carried out by port authorities/Ministry of Surface Transport.

Recommendations/Observations

4.19 The Committee note that based on projection of consumption, indigenous production and availability of refining capacity, the Government make assessment of the crude oil imports every year. Most of crude oil imports are made from Saudi Arabia, Kuwait, Iran, UAE and Malaysia. In addition imports are also made from Egypt, Australia and Nigeria. Crude oil is purchased either through term contracts or through spot purchase or done through term tender. The Committee have been informed that a major portion of imports of crude oil are made in term contracts with national oil companies of producer countries at their official selling price and the balance quantities of crude oil (not tied upon on term basis) are covered through spot purchases.

4.20 However, from the break up of term and spot purchases made during the years 1990-91 to 1994-95, the Committee find that in the years 1991-92 and 1992-93, percentage of import of crude oil made through spot purchase was 55.9% and 51.1% as against purchases through term contract basis which accounted for 44.1% and 48.9% respectively. In other years the Committee find that bulk of imports have been made through spot purchases, their percentage being 39.0%, 46.0% and 38.5% respectively during the years 1990-91, 1993-94 and 1994-95.

4.21 Justifying the purchases made on spot the Ministry of Petroleum and Natural Gas has explained that such purchases are made on spot basis on the contention that such purchases provide more flexibility of operations, not only because of changes in domestic requirement, indigenous production and monthly refining throughout but also better bargaining power and minimise the cost of acquisition of crude oil in the current scenario where there is abudance of crude in the international market.

4.22 According to the Ministry the purchases on term contract basis provide security and ensure regular supply of crude. The Committee do appreciate that Government should have the flexibility to decide on the quantity of import of crude oil on term contracts as well as spot purchase basis taking into consideration not only indigenous production, domestic requirement, and availability of resources but also factors affecting the price of crude oil in the international market. The Committee therefore desire that purchases through both the systems be so rationalised as to get the maximum advantage of any

decline in price of crude oil in the international market and the continuity of supply.

4.23 In order to make crude oil imports cost-effective the Ministry of Petroleum and Natural Gas is stated to have adopted a strategy which include procuring a large share of the requirements of imported crude oil from the Middle East region, finalization of bulk of imported crude oil requirements through term contracts with national oil companies, uplifting of additional cargoes from the term suppliers at their official selling prices, spot purchases on a competitive tender basis, etc.

The Committee desire that in order to make imports of crude oil cost-effective the Ministry of Petroleum and Natural Gas/IOC should exercise the option judiciously through both the systems in such a way so as to get the maximum advantage of decline in price of crude oil in the international market from time to time.

NEW DELHI;
December 7, 1998
Agrahayana 16, 1920*(S)*

MADHUKAR SIRPOTDAR,
Chairman,
Estimates Committee.

4136/LS—F-7b

APPENDIX I

MINUTES OF SITTING OF THE ESTIMATES COMMITTEE (1995-96)

Sixth Sitting

The Committee sat on Tuesday, the 22nd August, 1995 from 1500 to 1730 hours.

PRESENT

Shri S.B. Sidnal — *Chairman*

MEMBERS

2. Shri Narain Singh Chaudhari
3. Shri Ram Tahal Chaudhary
4. Shri Anadi Charan Das
5. Shri Shrish Chandra Dikshit
6. Shri Anand Ratna Maurya
7. Shri B.P. Mehta
8. Shri Ajoy Mukhopadhyay
9. Shri Hari Kewal Prasad
10. Shri S. Raychandhuri
11. Shri A. Venkata Reddy
12. Shri D.M. Sadul
13. Shri Chattrapal Singh
14. Kum. Frida Topno
15. Shri Shankersinh Vaghela
16. Shri Bhawani Lal Verma
17. Maj. Gen. R.G. Williams
18. Shri Devendra Prasad Yadav

SECRETARIAT

1. Smt. Roli Srivastava — *Joint Secretary*
2. Shri K.L. Narang — *Deputy Secretary*
3. Shri Raj Shekhar Sharma — *Under Secretary*

WITNESSES

Ministry of Petroleum and Natural Gas

1. Dr. Vijay L. Kelkar — *Secretary*
2. Shri Nirmal Singh — *Joint Secretary (Refineries)*

3.	Dr. A.N. Saxena	— *Joint Secretary and Financial Adviser*
4.	Shri V. Ramani	— *Director (E&C)*

Oil Coordination Committee

5.	Shri D.C. Lahiri	— *Executive Director*
6.	Shri A.K. Mishra	— *Director (Technical)*

Oil and Natural Gas Corporation Ltd.

7.	Dr. S. Srinivasan	— Director (Exploration)

Indian Oil Corporation Ltd.

8.	Shri R.K. Narang	— *Chairman*
9.	Shri Suresh Chand Mathur	— *Director (Finance)*

2. At the outset the Chairman welcomed the representatives of the Ministry of Petroleum and Natural Gas and representatives from other Public Sector Undertakings attached to the Ministry *viz.* Oil and Natural Gas Corporation Ltd., Indian Oil Corporation Ltd. and Oil Coordination Committee to the sitting of the Committee.

3. The Committee took oral evidence of the representatives of the Ministry of Petroleum and Natural Gas and others present on the subject of Crude Oil-Indigenous Production and Imports.

4. The evidence was not concluded.

5. A verbatim record of proceedings was kept.

The Committee adjourned to meet again on 11th September, 1995.

APPENDIX II

MINUTES OF SITTING OF THE ESTIMATES COMMITTEE (1995-96)

Eighth Sitting

The Committee sat on Monday, the 11th September, 1995 from 1500 to 1730 hours.

PRESENT

Shri S.B. Sidnal — *Chairman*

MEMBERS

2. Shri Narain Singh Chaudhari
3. Shri Ram Tahal Chaudhary
4. Shri Anadi Charan Das
5. Shri Shriah Chandra Dikshit
6. Shri Suraj Mandal
7. Shri K.M. Mathew
8. Shri Anand Ratna Maurya
9. Shri Ajoy Mukhopadhyay
10. Shri Rameshwar Patidar
11. Shri Hari Kewal Prasad
12. Shri S. Raychaudhuri
13. Shri A. Venktata Reddy
14. Shri D.M. Sadul
15. Shri Chattrapal Singh
16. Shri B.K. Tripathy
17. Shri Shankersinh Vaghela
18. Shri B.L. Verma
19. Maj. Gen. R.G. Williams
20. Shri Devendra Prasad Yadav

SECRETARIAT

1. Smt. Roli Srivastava — *Joint Secretary*
2. Shri K.L. Narang — *Deputy Secretary*
3. Shri Raj Shekhar Sharma — *Under Secretary*

WITNESSES

Ministry of Petroleum and Natural Gas

1.	Dr. Vijay L. Kelkar	— *Secretary*
2.	Shri Nirmal Singh	— *Joint Secretary (Refineries)*
3.	Dr. A.N. Saxena	— *Joint Secretary and Financial Adviser*
4.	Shri V. Ramani	— *Director (E&C)*
5.	Dr. Avinash Chandra	— *Director General* (Hydrocarbons)

Oil and Natural Gas Corporation Ltd.

6.	Shri B.C. Bora	— *Chairman and Managing Director*
7.	Dr. S. Srinivasan	— *Director (Exploration)*
8.	Shri A.S. Soni	— *Director (Operations)*

Oil India Ltd.

9.	Shri N.N. Gogoi	— *Director (Operations)*
10.	Shri P. C. Chandra	— *Director (Finance)*

Indian Oil Corporation Ltd.

11.	Shri Suresh Chand Mathur	— *Director (Finance)*
12.	Shri A. Chandrasekharan	— *General Manager (IT)*

Oil Coordination Committee

13.	Shri D.C. Lahiri	— *Executive Director*

2. The Committee resumed evidence of the representatives of the Ministry of Petroleum and Natural Gas and other Public Sector Undertakings of the Ministry *viz.* Oil and Natural Gas Corporation Ltd., Indian Oil Corporation Ltd., Oil India Limited on the Subject and discussed matters concerning development of oilfields by ONGC and OIL, handing over of Panna and Mukta oilfield to private/joint venture companies for development, payment of international price for oil produced by ONGC and OIL in connection with the examination of the subject of Crude Oil-Indigenous Production and Imports.

3. The evidence was not concluded.

4. A verbatim record of proceedings was kept.

The Committee then adjourned.

APPENDIX III

MINUTES OF SITTING OF THE ESTIMATES COMMITTEE (1995-96)

Tenth Sitting

The Committee sat on Wednesday, the 8th November, 1995 from 1500 to 1730 hours.

PRESENT

Shri S.B. Sidnal — *Chairman*

MEMBERS

2. Shri Ram Tahal Chaudhary
3. Shri Anadi Charan Das
4. Shri Shrish Chandra Dikshit
5. Shri Suraj Mandal
6. Shri Anand Ratna Maurya
7. Shri C.P. Mudalagiriyappa
8. Shri Ajoy Mukhopadhyay
9. Shri P.G. Narayanan
10. Shri Hari Kewal Prasad
11. Shri D. M. Sadul
12. Shri B.K. Tripathy
13. Maj. Gen. R.G. Williams
14. Shri Ram Sharan Yadav

SECRETARIAT

1. Shri S.N. Mishra — *Additional Secretary*
2. Smt. Roli Srivastava — *Joint Secretary*
3. Shri K.L. Narang — *Deputy Secretary*
4. Shri Raj Shekhar Sharma — *Under Secretary*

WITNESSES

Ministry of Petroleum and Natural Gas

1. Dr. Vijay Kelkar — *Secretary*
2. Shri Nirmal Singh — *Joint Secretary (Refineries)*
3. Dr. A.N. Saxena — *Joint Secretary and Financial Adviser*

4. Dr. A. Chandra — *Director-General (Hydrocarbons)*

Indian Oil Corporation Ltd.

5. Shri R.K. Narang — *Chairman*
6. Shri Suresh Chand Mathur — *Director (Finance)*

Oil and Natural Gas Corporation Ltd.

7. Dr. S. Srinivasan — *Director (Exploration)*

2. The Committee took evidence of the representatives of the Ministry of Petroleum and Natural Gas and others on the subject of Import of Crude Oil. The main issues of discussion were methodology of estimating the requirements of imported crude oil, various systems of Import of crude oil from international companies, difficulties faced in importing of crude oil and steps taken to restrict oil imports.

3. The evidence was not concluded.

4. The verbatim record of proceedings was kept.

The Committee then adjourned.

APPENDIX IV

MINUTES OF SITTING OF THE ESTIMATES COMMITTEE (1997-98)

Sixth Sitting

The Committe sat on Monday, the 8th September, 1997 from 1500 to 1750 hours.

PRESENT

Shri Rupchand Pal — *Chairman*

MEMBERS

2. Shri G.M. Banatwalla
3. Shri Pradeep Bhattacharya
4. Shri P.C. Chacko
5. Shri Ram Tahal Chaudhary
6. Shri Udaysingrao Gaikwad
7. Shri Bijoy Krishna Handique
8. Shri Bhupinder Singh Hooda
9. Shri Sanat Mehta
10. Shri Nitish Kumar
11. Shri Sarat Patnayak
12. Shri Ramendra Kumar
13. Shri Kashiram Rana
14. Shri Basavaraj Rajareddi
15. Shri Mahadeepak Singh Shakya
16. Col. Rao Ram Singh
17. Shri Chun Chun Prasad Yadav
18. Shri Dinesh Chandra Yadav

SECRETARIAT

1. Shri K.L. Narang — *Deputy Secretary*
2. Shri Raj Shekhar Sharma — *Under Secretary*
3. Shri N.C. Gupta — *Committee Officer*

WITNESSES

Ministry of Petroleum and Natural Gas

1.	Dr. V.L. Kelkar	—	*Secretary*
2.	Shri Sanjiv Mishra	—	*Joint Secretary (Exploration)*
3.	Shri Nirmal Singh	—	*Joint Secretary (Refineries)*
4.	Shri Ravi Saxena	—	*Joint Secretary and Financial Adviser*
5.	Shri K.P. Shahi	—	*Advisor (Refineries)*

Directorate General of Hydrocarbon

Dr. Avinash Chandra — *Director General of Hydrocarbon.*

Oil and Natural Gas Corporation

Shri B.C. Bora — *Chairman*

Oil India Limited

Shri N.N. Gogoi — *Chairman*

Indian Oil Corporation Limited

Shri M.A. Pathan — *Chairman*

Oil Industry Development Board

Shri Ardhendu Sen — *Secretary*

2. ** ** ** **

** ** ** **

3. The Committee then took further evidence of the representatives of the Ministry of Petroleum and Natural Gas on the subject of Crude Oil—Indigenous Production and Imports and discussed various matters such as offering discovered oil fields to private and foreign companies, variation in assessment of estimates of oil reserves made by ONGC, private contractors and DGH and the measures taken by ONGC Ltd. to acquire technological capabilities for additional data acquisition.

4. The evidence was concluded.

5. A verbatim record of proceedings was kept.

The Committee then adjourned.

APPENDIX V

MINUTES OF SITTING OF THE ESTIMATES COMMITTEE (1998-99)

Third Sitting

The Committee sat on Tuesday, the 6th October, 1998 from 1100 to 1330 hours.

PRESENT

Shri Madhukar Sirpotdar — *Chairman*

MEMBERS

2. Shri Rajendra Agnihotri
3. Dr. Shakeel Ahmad
4. Shri G.M. Banatwala
5. Shri V.K. Chinnasamy
6. Shri Bikram Keshari Deo
7. Shri A. Ganeshamurthi
8. Shri Satya Pal Jain
9. Shri Arvind Tulsiram Kamble
10. Shri Rama Chandra Mallick
11. Shri Abdul Fazal Golam Osmani
12. Shri Uttamsingh Pawar
13. Shri Khagapati Pradhani
14. Shri Ajay Kumar S. Sarnaik
15. Dr. Chhattrapal Singh
16. Dr. Mahadeepak Singh Shakya
17. Shri Rampal Upadhyay
18. Shri Ritlal Prasad Verma
19. Prof. (Smt.) Rita Verma
20. Shri Sushil Chandra Verma

SECRETARIAT

1. Shri K.L. Narang — *Director*
2. Shri Raj Shekhar Sharma — *Under Secretary*
3. Shri N.C. Gupta — *Assistant Director*

2. The Committee considered their draft Report on Ministry of Petroleum and Natural Gas—Crude Oil—Indigenous Production and Imports and adopted the same with some modifications/amendments as indicated in the Annexure.

3. The Committee authorised the Chairman to finalise the Report in the light of verbal and consequential changes, if any, arising out of factual verification by the Ministry and to present the same to Lok Sabha.

** ** **

The Committee then adjourned.

ANNEXURE

AMENDMENTS/MODIFICATIONS MADE BY THE ESTIMATES COMMITTEE IN THE DRAFT REPORT ON CRUDE OIL—INDIGENOUS PRODUCTION AND IMPORTS

Para	Sentence	Amendment/Modification
2.53	Second	*For:* "The Committee are happy to note" *Substitute:* "The Committee note"
2.57	First	*Delete:* "the remaining three years of"
2.109	First	*For:* "The Committee are satisfied to note" *Substitute:* "The Committee note"
2.120	Second	*For:* "The target was not met." *Substitute:* "The Committee are deeply perturbed to note that the target was not met."
2.122		*Add:* last subpara "The Committee, however, also desire that the public sector oil companies should utilise all the resources available at their disposal for exploration and augmentation of indigenous production of crude oil in the country."
3.31	First	*Insert:* "unfortunately" in between that and the
3.40	First	*For:* "desire" *Substitute:* "emphasise"
3.44	First sentence in second sub-para	*For:* "one and half years" *Substitute:* "some time"
4.23	sub-para	*For:* "rationalise purchases" *Substitute:* "exercise the option judiciously"

APPENDIX VI

STATEMENT OF OBSERVATIONS/RECOMMENDATIONS

Sl. No.	Para No.	Observations/Recommendations
1	2	3
1	1.19	The Committee note that the Ministry of Petroleum and Natural Gas is entrusted with the responsibility of exploration and production of oil and natural gas, their refining, distribution and marketing, import, export and conservation of petroleum products. Two national oil companies, *viz.* Oil and Natural Gas Corporation Limited and Oil India Limited under the Ministry of Petroleum and Natural Gas are playing a pivotal role in exploration and production of hydrocarbons in the country.
2	1.20	The Committee note that the Directorate General of Hydrocarbons has been set up with the laudable objective of promoting sound management of the Indian petroleum and natural gas resources having a balanced regard for the environmental, safety, technological and economic aspects of the petroleum activity. Various functions and responsibilities of DGH *inter-alia* envisage providing technical advice to the Ministry of Petroleum and Natural Gas on issues relevant to the exploration and optimal exploitation of hydrocarbons in the country, reviewing of exploration programme of companies, reassessing of the availability of hydrocarbons, advising the Government on the offering of acreage for exploration, reviewing the development plans for commercial discoveries of hydrocarbon reserves proposed by the operating companies, etc.
3	1.21	The Committee appreciate that to fulfil the objectives mandated to it, DGH has reviewed the exploration programme of ONGCL and OIL, which resulted in the formulation of Accelerated Plan of Exploration (APEX) to provide a thrust to exploration activities and to accrete the desirable quantum of reserves to sustain production in future. Besides, the DGH has also taken

1	2	3
		steps to fulfil its other objectives which are under various stages of implementation.
4	1.22	The Committee note that DGH is experiencing difficulties in the smooth performance of its functions due to lack of experienced and trained technical manpower. Adequately experienced manpower can be made available only by ONGCL and OIL. DGH has also issued an advertisement for filling of posts on deputation basis. A proposal to give statutory status to DGH under an Act of Parliament is stated to be under consideration of the Government which will enable it to draw the requisite experienced manpower from oil companies and also create its own cadre. The Government is also trying to develop DGH as a world class organisation by getting their manpower trained and experienced through oil giants abroad. As the experienced and technically qualified manpower is the foremost and urgent pre-requisite for an organisation like DGH, the Committee desire that concerted efforts should be made with utmost urgency for adequate provision of experienced and trained technical manpower so as to enable DGH to fulfil the objective mandated for it.
5	1.23	The Committee need hardly emphasise that to give a boost to domestic oil production, it is imperative that more and more companies including those in public sector are encouraged to undertake the work of oil exploration, development and production. The Committee appreciate that the Government have advised the Indian Oil Corporation (IOC), HPCL and BPCL to submit their proposals after taking clearance from their respective Boards for setting up of new Joint Venture Companies for exploration and production of hydrocarbons in the country and abroad. This is a step in the right direction and would provide competitive impetus for production of crude oil in the country.
6	2.40	The Committee note that hydrocarbons are generated and usually accumulated in sedimentary rocks. These sedimentary rocks are the target areas for exploration for discovery of oil and gas. In India 26 sedimentary basins occupying an area of 1.72 million sq. kms. have potential for oil and gas. These 26 basins have been grouped into four categories depending on their hydrocarbons potential *viz.* (i) basins with commercial production; (ii) basins with known occurrence of hydrocarbons

1	2	3
		but from which no commercial production has yet been obtained; (iii) basins geologically considered prospective; and (iv) basins with indeterminate potential but which may be prospective on analogy with similar basins in the world.
7	2.41	The Committee note that out of the 26 sedimentary basins discovered and geologically surveyed, only 15 basins have been under the focus of attention for exploration by ONGCL and OIL. Out of these 15 basins, only 6 basins namely Cambay, Assam Shelf, Bombay Offshore, Krishna-Godavari, Cauvery and Assam Arakan Fold Belt have been brought under commercial production in a period of two and a half decades. The Committee regret to find that adequate attention has not been given for exploration and it is only now that ONGCL and OIL have taken steps for exploration and operation of basins falling under Category II, III and IV.
8	2.42	In view of the wide gap between indigenous crude oil production, projected growth in requirement for petroleum products and the time taken in exploration and commercial production of oil, the Committee consider that a concerted effort was required to survey and exploit all the 26 sedimentary basins in the country from the very beginning. The Committee feel that had the national oil companies i.e. ONGCL/OIL concentrated at least on all the 15 basins earmarked for the purpose, the dependence of the country on imported crude would have been reduced considerably, thereby saving substantial outgo of precious foreign exchange. The Committee, therefore, desire that efforts should be stepped up not only by the national oil companies but also by evolving strategies to encourage private participation for intensive and extensive survey, exploration and exploitation of oil from all identified sedimentary basins to reduce dependence on imported crude.
9	2.43	The Committee have been informed that ONGCL is facing difficulties in exploiting basins in Ganga Valley, Himalayan foothills and those situated in east and west coasts due to complexity of the nature of these basins as also due to lack of availability of modern technology. Opinion of renowned international experts in petroleum exploration is stated to have been sought by ONGCL regarding the yet to be found potential of the basins under its exploration.
10	2.44	The basins which are under study by different experts from

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		U.K. USA, Russia include Cauvery, Krishna-Godavari, Bengal, Gondwana, Satpura, Deccan Syncelise, Ganga, Himalayan foothillls, Assam Arakan and the basins in the western offshore. In this connection, the Committee note that only the study on Krishna-Godavari, Cauvery and Bengal basins conducted by Dr. John Kingston of USA has been completed so far and the Report submitted by him is being studied by the ONGCL. The Committee expect that studies on other basins which were earlier scheduled to be completed by February, 1997 must have been completed and reports submitted to the Government. The Committee desire that on the basis of the outcome of these studies appropriate measures should be taken urgently by ONGCL to fully exploit the potential of these basins. The outcome of these studies and action taken thereon by ONGCL may also be reported to the Committee.
11	2.45	From the figures of geological reserves of oil and oil equivalent of gas (0 + OEG) established by ONGCL and OIL as on 1.4.94 and the correspond-ing recoverable reserves, the Committee note that only 30.3% of established reserves had been converted into recoverable reserves. However, from the subsequent figures of established and recoverable reserves furnished by the Ministry the Committee note that as on 1.4.96, the percentage of recoverable reserves *vis-a-vis* established reserves had further come down to 20.0%. In the case of ONGCL the Committee note that while percentage of recoverable reserves *vis-a-vis* established reserves was 35.2% as on 1.4.94, this percentage came down to 17% as on 1.4.96, thereby indicating that the procedure of assessment of oil reserves is not foolproof and is fraught with loopholes. The Committee would like to be apprised of the reasons due to which percentage of recoverable reserves as on 1.4.94 was reduced to meagre 17% as on 1.4.96 even though the figure of established reserves as on 1.4.96 increased *vis-a-vis* figures on 1.4.94.
12	2.46	In view of the wide gap between established and recoverable reserves, the Committee would also like the ONGCL and OIL to accelerate and strengthen their exploratory efforts so as to convert more and more of established reserves into recoverable reserves.
13	2.47	The Committee note that at the present estimated production

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		rate, the recoverable reserves of oil are expected to last for another two decades only. Viewed in this context, the Committee feel that it becomes all the more imperative on the part of ONGCL and OIL to make concerted efforts for increasing the percentage of recoverable reserves so as to offset the depletion of hydrocarbon reserves in the country.
14	2.48	In case of three medium sized fields *viz.* Panna, Ravva and Tapti explored by ONGCL and offered to Indian and foreign private companies for development, the Committee find a huge variation in the estimates of inplace reserves of oil assessed by ONGCL and the contractor. According to the Ministry, the difference between ONGCL and contractor's estimation has been attributed mainly due to additional information acquired by contractor in terms of 3D seismic survey and interpretation of data by different geologists. The Committee feel that the same fields which were considered uneconomical for development by ONGCL would now be developed profitably by private companies as they have estimated more inplace reserves of oil in these fields by carrying out 3D seismic survey and better data processing and interpretation facility, which were not done by ONGCL.
15	2.49	The Committee note that in some cases when a number of wells were drilled for doing larger surveys in the fields, it witnessed an upgraded trend of development beyond expectation and more and more oil reserves were found. In the Ankaleshwar field, reserves had almost doubled. The Committee feel that this should have been taken as a lesson by the Ministry/ONGCL and desired improvement incorporated in the system.
16	2.50	The Committee note that ONGCL has acquired new data acquisition equipment and is in the process of acquiring seismic data processing facilities for advance processing. The Committee desire that this exercise may be completed expeditiously.
17	2.51	The Committee hope that ONGCL, after acquiring new data acquisition equipment and technology for upgrading of data and reinterpretation of data through improved interpretation techniques would be able to make a better assessment of the oil reserves in its developing and developed oilfields. DGH which is also assessing the reserves of various oilfields has found that better management, reservoir management, constant check and counter-check of the oilfields are required, but these have not

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		been done to the adequate level in the past. The Committee desire that ONGCL, in consultation with DGH, should take adequate corrective steps for monitoring the reservoir behaviour of various oilfields and to correctly assess their oil reserves.
18	2.52	The Committee note that Government had initiated a number of specific measures to increase the pace of exploration and to augment the production of crude oil in the country. The Government approved and launched an Accelerated Programme of Exploration (APEX) in 1994 for implementation during the remaining three years of the Eighth Plan, *i.e.* 1994—97 involving an estimated expenditure of approx. Rs. 6500 crores. APEX has the following components:— (i) Enhanced Exploratory Inputs. (ii) National Seismic Programme. (iii) Deep Water Exploration. (iv) Exploration in Frontier Areas. (v) Acquisition of acreages abroad.
19	2.53	One of the components of APEX *i.e.* Enhanced Exploratory Inputs envisaged intensive and extensive exploratory programmes for identified thrust areas of three fasins, *viz.* Bombay Offshore, Cambay and Upper Assam which still hold a larger yet to find oil and gas potential. The Committee note that under the Enhanced Exploratory Inputs, the exploratory efforts in these three basins have resulted in extension of discovered pools and new pools in the Cambay basin, establishment of new pools in south west of Geleki, north of Rudrasagar and deeper reservoirs in Lakwa & Geleki in Upper Assam, oil/gas finds in Woo 15 & 16, new pools and extension of pools in B-59, B-127, B-192, etc. in Bombay offshroe.
20	2.54	The Committee also appreciate that in view of the importance of the above basin areas 3D seismic data have been acquired and used or are under acquisition and interpretation of the data so acquired/under acquisition is being carried out with Intensive Interpretation through work stations both at headquarters and work centres. The Committee desire that this exercise should be completed expeditiously so that oil and gas potential existing in these three basins could be exploited to the optimum level.

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21	2.55	The Committee also desire that thrust areas for intensive and extensive exploration in other producing basins should also be identified and their exploratory programmes formulated and imple-mented with due promptitude so as to enhance the recoverable reserves from other untapped basins as well.
22	2.56	The Committee note that a multi-disciplinary and multi-pronged geo-scientific programme called National Seismic Programme under APEX has been taken up to study the configuration of some of the less known and new sedimentary basins in the country. This programme involves aerial, remote sensing, field geological and geophysical surveys to develop regional scale understanding of the tectonic framework, sedimentary fill mechanisms and stratigraphy of various important sedimentary basins of India to provide improved focus on prospective zones. The Committee, however, find that this programme is at a very nascent state, as the process of authentication of international boundaries of India with neighbouring countries and coastal lines ensuring that offshre blocks lie within Indian's exclusive economic zone and preparation of dockets and date packages are still going on. They, therefore, desire that this exercise be completed at the earliest and blocks on which data are to be generated may be offered for surveys with due urgency so that conspicuous gap in regional geo-physical surveys of various important sedimentary basins of India could be removed and these basins be explored to achieve the maximum level of accretion of oil and gas reserves from them.
23	2.57	To enhance hydrocarbon reserves in the country, the Government have of late felt the need for launching exploration in deep waters and frontier areas and have thus included two programmes *viz.* 'Deep Water Exploration' and 'Exploration in Frontier Areas' in the Accelerated Programme of Exploration, to be carried out in the Eighth Five Year Plan. Deep water Exploration Programme envisages carrying out of special surveys in deep sea (beyond 200 meters of water depth) to find drillable prospects. Further a number of frontier areas hitherto not explored owing to hostile environment, geological problems, lack of technology, etc. were proposed to be subjected to intensive attention under the programme of Exploration in Frontier Areas for exploration to assess their hydrocarbon potentiality.

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24	2.58	The Committee find that ONGCL's departmental vessels have carried out/carrying out seismic data acquisition in deep water areas. Based on the available data and their interpretation for four exploratory locations have been prioritised for exploratory drilling, within the VIII Five Year Plan period. The Committee would like to be apprised of the achievements in this regard.
25	2.59	The Committee note that data acquisitions are in different stages in the frontier areas of exploration. Based on evaluation of data on hand, four exploratory locations have been prioritised for four drilling in the VIII Plan, in the deep water areas of west and east coasts. ONGCL has also taken up steps for undertaking exploratory drillings in the frontier areas of Messozoic sediments in the Kutch offshore, Gondwanic reservoirs in Krishna-Godavari basin, South Rewa and Satpura basin. The Committee hope that exploration in these frontier areas would also have been completed and progress achieved in this regard be reported to the Committee.
26	2.60	ONGC Videsh Limited was formed to take up exploration operation abroad, have *inter-alia* undertaken exploration activities in various countries *viz.* Egypt, Yemen, Tunisina but without success. Only in Vietnam discovery of gas in block 6 has been reported. The Committee have been given to understand that ONGC-VL, did not take exploration at its own initiative and selection was made by somebody else due to which its performance has been so tardy in so far as discovery of oil is concerned. They would like to know the reasons due to which ONGC Videsh Limited without properly analysing the data and arriving at a conclusion regarding availability of oil undertook the exploration work. The Committee would also like to be apprised of the amount of expenditure involved in the exploration work undertaken by it so far. The Committee also desire that working of ONGC-VL should be properly monitored so that it functions more as a commercial venture and contribute purposefully to the national oil requirement.
27	2.108	The Committee note that production of crude oil which was 34.09 MMT in 1989-90 declined to 27.02 MMT in 1993-94 and again from 35.167 MMT in 1995-96 to 32.92 MMT and 33.86 MMT in 1996-97 and 1997-98 respectively. The stagnating crude oil production necessitated substantial increase in import of crude oil to meet the growing domestic requirement

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		and outgo of huge amount of precious foreign exchange year after year on account of higher imports. The production of crude oil since 1991 was stated to be lower due to closure of high GOR wells in Mumbai High, slippages in execution of some projects, foreign exchange crunch, environmental constraints in the eastern region and unpredictable reservoir performance in the oil fields of western region.
28	2.109	The Committee note that to counter the declining production trend an action plan initiating various short-term and Long-term measures to augment crude oil production, was formulated and implemented. Short-term measures included early production from satellite fields Neelam, Panna and CA in BRBC, introduction of state-of-the-art technologies *viz.* Drain Hole Drilling, Ultra Short radius radial drilling, side tracking of existing wells and drilling of horizontal wells, consultancy from internationally reputed agencies for repair to wells and to improve the productivity. Long-term measures included development of new fields, additional development of existing fields and enhanced oil recovery. Implementation of these measures have contributed to the additional production of crude oil and thus helped in overcoming the declining trend in crude oil production. The Committee desire that all these steps aimed at optimising the crude oil production should be implemented in totality so that crude oil production could be increased during the coming years. The Committee also desire that there should be continuous formulation and implementation of such measures to enhance crude oil production in the country for improving the extent of self-sufficiency in this area.
29	2.110	The Committee appreciate that actual achievement for seismic survey by ONGCL exceeded the targets during the years from 1990-91 to 1993-94 and during the year 1996-97. However, achievement for contract surveys during the year 1989-90 was not upto the targets. During 1994-95, there was shortfall in achievement of targets for 2D onshore survey. The reasons for non-achievement of targets during 1989-90 and 1994-95 *inter-alia* were non-availability of sufficient JVC, poor response in competitive bidding from operators in view of logistically difficult terrain conditions and technology requirements.

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		The Committee hope that ONGCL would in future visualise all the impediments that could come in the way of achievements of targets laid down to avoid any shortfalls.
30	2.111	The Committee are constrained to note that in regard to exploratory drilling and development drilling by ONGCL the actual achievements have been less than the targets laid during each of the years from 1989-90 to 1997-98, as there were losses of rig months due to various reasons *viz.* delay in mobilization of rigs by the contractors, delay in supply of BHEL rigs, delay in foreign exchange release by Govt., dehiring of rigs earlier than planned due to resource crunch, non-deployment of rigs due to earmarking of the area to JVC, bandh/barricades, natural calamity, environmental problems in Assam and Nagaland, delay in availability of charter hired rigs, diversion of rigs to workover including side tracking/development drilling, deployment of rigs for extended reach drilling in BRBC, etc. The Committee are deeply concerned over the loss of rig months mainly due to delay in non-availability of charter hired rigs recurring year after year and yet the Ministry/ONGCL did precious little for taking remedial measures in preventing/ stopping loss of rig months in order to achieve drilling targets fully. Of late the Ministry of Petroleum and Natural Gas has taken specific steps to increase drilling productivity. To avoid delay in mobilisation of rigs the Committee desire that ONGCL must revamp the planning and monitoring of drilling operations and improve their system and procedure for taking steps well in advance to hire rigs for their timely availability. The Committee also hope that with the improvement in foreign exchange reserves, release of foreign exchange for ONGCL requirement will no longer be any problem now.
31	2.112	The Committee are constrained to note that actual production of crude oil by ONGCL from the years 1990-91 to 1997-98 with the exception of the years 1994-95 and 1997-98 have been less than the targets laid down, even though MOU targets have been gradually scaled down during each of the years after 1990-91 till 1994-95. What is more intriguing is that as against expected targets of 33.31 million tonnes in 1995-96 actual production was only 31.89 million tonnes. The production targets were further reduced to 27.73 MMT in the year 1997-98. The continuous decline in actual production *vis-a-vis* the targets is not only a matter of serious concern but also amply demonstrates the unsatisfactory state of affairs of oil sector management.

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		The decline in production has been reported due to various reasons *viz.* slippages in execution of projects, lesser gain from developed wells than anticipated, ONGCL employees strike in September, 1991, lesser intake of crude by refineries in WRBC & ERBC, power shut downs by State Electricity Boards, deterioration of environmental conditions, delay in the completion of Ravva platform, etc. The Committee have been informed that lesser gain from wells occurred due to unexpected reservoir behaviour of the existing fields, unexpected adverse mobility ratio in some fields of North Gujarat, poor reservoir characteristics of new fields/developments. The Committee, however, desire that ONGCL should acquire and use the state-of-the-art technology to realistically assess and exploit the true potential of the oil wells and reservoirs so that production from these wells/reservoirs are in keeping with the target laid.
32	2.113	The Committee note that frequent power shutdowns by State Electricity Boards have also resulted in loss of production to ONGC during the years 1990-91 to 1995-96. ONGCL apart from taking up the issue of frequent power shutdowns with the State Electricity Boards for improving the supply position, have initiated additional measures for augmenting power supply through development of additional captive power generation facilities at various fields/installations. The Committee would like to be apprised of the impact of these measures in improving the power supply position for crude production.
33	2.114	Deterioration in environmental conditions like frequent bandh, barricade, sabotage, etc. in North Eastern sector had adverse impact on activities of ONGCL of oil exploration/exploitation. To look into the security problems of ONGCL's operations Onshore Security Coordination Committees had been set up by the Government of India each under the chairmanship of DIG, Police, Nagaland State and Assam State and the existing security arrangements in the areas of ONGCL operations have been suitably beefed up. The Committee desire that Ministry of Petroleum and Natural Gas should continue to extend full cooperation and help in getting adequate security arrangements to maintain crude oil production as per target and take up the matter with the Ministry of Home Affairs and State Government concerned whenever considered necessary.
34	2.115	The Committee note that the Director General of Hydrocarbons monitored the Bombay High field and gave suggestions to

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		ONGCL to arrest the declining trend of production, on which action has been initiated by ONGCL. DGH also engaged international consultants to study Bombay High field and has prepared guidelines for revival of Bombay High field. The Committee desire that proposals for revival/rectificatory measures and further development of Bombay High field should be implemented expeditiously, as they feel that any delay in their implementation would cause further deterioration in the cumulative oil production from the field.
35	2.116	Actual achievements *vis-a-vis* the targets laid on the case of seismic surveys by Oil India Limited in some cases have either been nil or low year after year from 1989-90 to 1997-98. According to the Ministry, mostly due to delays in finalisation of contracts, the targets for contract surveys were not achieved. From the statement of reasons furnished by OIL for delay in finalisation of the contracts, the Committee feel that OIL did not effectively pursue the matter with the French authorities to complete the negotiations in time, which resulted in the loss of validity of bids and subsequent loss of contract offered by the French Company. The Committee are also unaware of the circumstances due to which prolonged deliberations took place in obtaining essentiality certificate for concessional duty imports, which further affected the seismic su vey work. On perusal of the position explained by the Ministry, the Committee do not feel satisfied with the reasons advanced for delays in finalisation of the contracts and deployment of crew for undertaking seismic surveys as per the target. The Committee desire that OIL should gear up the machinery and take timely corrective measures to obviate such delays in the finalisation of the contracts/mobilisation of crew.
36	2.117	Actual achievements in exploratory drilling in each of the years from 1989-90 to 1997-98 and development drilling in 1990-91, 1992-93 and from 1994-95 till 1997-98 by Oil India Limited have been much lower than the targets fixed. This is not a satisfactory state of affairs. On perusal of the position submitted by the Ministry, the Committee feel that the most of the problems pointed out for shortfall in achievement of targets laid down for exploratory drilling and development drilling were not at all unsurmountable. Even then no concrete action appear to have been initiated to overcome the difficulties coming in the way of achieving the targets year after year. The Committee have been informed that OIL has recently taken certain measures to overcome the bottlenecks which are expected to bear fruit in

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		the next 3 to 4 years. The Committee, however, are surprised as to why the Ministry/OIL did not anticipate the constraints and take these remedial measures much in advance to achieve the targets in drilling operations. The Committee recommed that the Ministry/OIL should strengthen its planning/monitoring machinery so as to anticipate the constraints that might come in the way of future exploration programme and take timely corrective measures accordingly.
37	2.118	The Committee find that in case of Oil India Limited also there has been shortfall in the actual production of crude oil *vis-a-vis* the targets laid down during the years 1990-91 to 1992-93 and 1994-95 to 1996-97. They also note that shortfall in production of crude oil occurred largely due to bandhs, roadblocks, flooding, fire, loss of well due to blow out, which were beyond the control of OIL. The Committee, however, regret to note that shortfalls which occurred due to reasons like, less than planned contribution from drilling, delay in commissioning of Duliajan pipeline, problem of crude delivery in pipeline of Jaipur OCS due to incompatible flow improver etc. could have been avoided, had OIL anticipated these problems and taken remedial measures in advance to overcome them. The Committee expect that OIL would learn from their experience and anticipate all possible bottlenecks that may come in the way of achievement of targets and take necessary remedial measures well in advance so that targets laid down are fulfilled.
38	2.119	The Committee find that of late Oil India Limited has taken certain steps like installation of early production systems to obtain quick production from the newly discovered oil reserves, study of behaviour of Reservoirs/wells exhibiting adverse production behaviour, repair of wells, strengthening of security vigilance in the field areas to minimise losses during bandhs, etc. The Committee desire that all these steps aimed at increasing the crude oil produciton shall be taken with due promtitude, so that actual achievement of crude oil production tally with the targets laid.
39	2.120	The Committee note that in the Eighth Five Year Plan, the Government had set target for new reserves. The Committee are deeply perturbed to note that the target was not met. Similarly in case of production also, the target was not met. According to the Secretary, Ministry of Petroleum and Natural

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		Gas, the Government did not have the structure to know as to which was the best suited for their new challenges of producing more oils. The other reason was that they were not keeping pace with the information technology. They were lagging behind in this area all these three years. The Committee are infomed that ONGCL has invited Mekinsey & Co., consultancy firm to help organising and setting up decision making process to enable it meet the challenges and overcoming the problems coming in the way of achieving of production of crude oil in its various fields. Further, ONGCL is now taking sepecific steps in terms of restructuring of the new technology to overcome the problems arising out of inadequate and outdated technology which was one of the major cause for poor estimation of oil reserves as also for lower yields from oil fields. The Committee would like to be apprised of the recommendations made by the Mckinsey consultancy firm and impact of implementaion of their suggestions and introduction of latest technology in augmentation of crude oil production in various oil fields of ONGCL.
40	2.121	During the Eighth Five Year Plan, ONGCL's production was confined mainly to producing basins only. ONGCL has chalked out a plan to attack deep water exploration in the Ninth Five Year Plan in Kerala Konkan region, Cauvery and Krishna Godavari basins. The Committee are hopeful that with all the logistic support and experience gained, ONGCL is certainly in a position to drill deep water wells. Simultaneously, ONGCL on account of its expertise, knowledge and experience of work in various basins in India has been approached by a number of joint venture companies to help them in the deep water exploration programme. As deep water exploration is a risky venture, the Committee suggest that ONGCL should share the risk with private/foreign oil companies and also take advantage of their knowledge and expertise gained thus far.
41.	2.122	The Committee appreciate that Government is also giving higher focus to prospective basins/blocks outside India. ONGCL has received an exploration block in Kazakhasthan. This is a step in the right direction, as making exploratory efforts outside the country may help in self sufficiency in the production of crude oil. Following the example of other countries India should also strive hard to get exploratory work abroad with its friendly countries to spread the risk involved in the crude oil exploration work. The Committee commend

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		the Government's decision to set up a high level independent Group to enable the public sector oil compaines to enter into contracts abroad for the exploration and production of crude oil in a quick and transparent manner. They expect that it will further boost the efforts of ONGCL for obtaining exploratory blocks outside India as its expertise is recognised in many developing countries. The Committee also desire that not only ONGCL but also OIL which has vast experience and expertise in exploration and production of crude oil should also be encouraged to make efforts to acquire such exploration ventures abroad. The Committee however also desire that the public sector oil companies should utilise all the resources available at their disposal for exploration and augmentation of indigenous production of crude oil in the country.
42.	2.123	The Committee would like the ONGCL to make concerted efforts to implement its proposals during Ninth Five Year Plan for augmentation of crude oil production in the country in right earnest so that the targets laid down for crude oil production during the Ninth Five Year Plan are achieved fully and our dependence on crude oil imports is reduced considerably.
43	2.124	The Committee are happy to note that in the field of surface geological survey, gravity magnetic surveys and surface geochemical prospecting, a high level in-house expertise is available with ONGCL and Oil India Limited. The technical expertise available in-house for 2D and 3D data acquisition, processing interpretation is also stated to be adequate. The Committee, however, note that ONGCL and OIL do not have expertise for data acquisition in logistically difficult & geologically complex terrains and basins for interpretation of data with shearwave propagation analysis for which services of outside agencies with appropriate expertise is being obtained. State-of-the-art technologies *viz.* commercialization of thermal EOR techniques, cycle steam stimulation in heavy oilfields, horizontal drilling, drain hole drilling, etc. have also been introduced/planned to be introduced to fully exploit the heavy oil reserves. The Committee desire that ONGCL and OIL should also be encouraged to make concerted efforts to develop and upgrade technologies through in-house R&D efforts so as to minimise dependence of the country on imported technology.

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44	2.125	The Committee also desire that ONGCL and OIL should keep abreast of technological development in the areas of exploration and exploitation and continue to acquire state-of-the-art technologies whenever considered essential to perform their role of leading oil giants not only in India but also abroad.
45	3.31	The Committee note that unfortunately the country is not self-sufficient in the production of oil and is heavily dependent on imports. With a view to establishing crude oil and natural gas reserves for making the country self-sufficient, the Government have been making policy changes from time to time in the oil exploration policy. A major policy intiative was taken in the 1992 policy Resolution, when the economy was opened up and exploration for the mineral oils was thrown open to foreign and Indian companies. To establish crude oil and natural gas reserves with a view to making the country self-sufficient, to augment the risk capital and permit inflow of foreign investment in the petroleum sector and to bring technological advancements in the area of exploration and production, the Government of India have made changes in the oil exploration policy and have been inviting bids for offering blocks for exploration by foreign/ Indian companies. So far Government have invited 8 rounds of bids for block exploration and one round under the Joint Venture Exploration Programme offering small and medium sized oilfields for development as joint venture operations with Indian companies. While the 1st to 4th rounds of bids were invited in 1980, 1982, 1986 and 1991, after a gap of 2—6 years, since 1992, Government have been inviting these bids on round-the-years basis.
46	3.32	The Committee note that response of bidders in 1st and 2nd round was very poor. It improved from 1986 round of bidding onward when changes were made in the terms and conditions for exploration to attract the entry of foreign/private companies.
47	3.33	So far only six out of the total of 26 basins that have potential for oil and gas have been explored and that too only partially with the result that it is not yet possible to come to any conclusion about the potential of oil production in the country. A salient feature of Eighth Round of bid is that out of 18 blocks offered in this round, bids were received for all ten blocks offered in the Assam-Arakan basin, which has rich deposits of oil. In respect of other rounds also, it is noted that bids have

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		been received mostly, for Gujarat, Kutch onshore, Rajasthan onshore, Bombay offshore, Cauvery offshore and Cambay onshore which too have rich deposits of oil. This only indicates that existing fiscal incentives need to be improved further for the risk and security of oil exploration investment so that the country can have the benefit of knowledge of exploration of diverse geological basins available with foreign companies and exploit many of its basins which remain to be explored.
48.	3.34	The Committee find that Government of India take considerable time in awarding contract for exploration blocks. Most of the blocks offered from Fourth to Eighth round—(*i.e.* from 1991—1994) were signed in June-July, 1998 *i.e.* after a lapse of 4-5 years. Some of the blocks offered in Sixth, Seventh, Eighth, and Joint Venture Exploration, rounds have still not been signed. The delay in finalisation of bids have been attributed to the time taken by bidders in responding to queries, negotiations with bidders, complex procedures involved in negotiations and inadequate manpower/machinery in the Ministry of Petroleum and Natural Gas.
49	3.35	The Committee need hardly appreciate the number of years being taken in conclusion of agreements for commercial decisions in oil exploration as compared to not more than three months elsewhere in the world. The Committee desire that Ministry should suitably strengthen its machinery dealing with the work of inviting, finalising and awarding of contracts for exploration blocks expeditiously so that the bids received could be analysed, evaluated and blocks offered with due promptitude. The Ministry should also simplify the procedure of contract negotiations to obviate delay that may be caused due to cumbersome procedures involved in award of contracts to successful bidders.
50	3.36	The Committee understand that one of the reasons for abnormal delay in award of contract for exploration blocks is the system which required national oil companies to participate at every stage. Obviously, their response mainly depend upon availability of resources, manpower, technical as also financial at their disposal.
51	3.37	The Committee note that Government of India have offered small and medium sized fields for development by private/ joint venture participation. While medium-sized fields would

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		be developed through joint ventures between ONGCL/OIL and private companies, the small-sized field would be developed by companies on their own with no participation by ONGCL/ OIL, under production sharing contract by the company with Government of India. In case of medium-sized fields joint ventures could be either incorporated or unincorporated. The share of ONGCL/OIL in the equity of the venture would be 49% in case of incorporated and 40% in case of unincorporated ventures.
52	3.38	The medium-sized fields awarded so far include Mid and South Tapti, Mukta and Panna, Ravva, Kharsang and Ratna-R series. Small-sized fields awarded are Hazira, Cambay, Bhandut, Matar, Sabarmati, Indora, Bakrol, Lohar, Dhoka, Wavel, Baola, PY-1 and Asjol. Under the second offer of discovered fields made in October, 1993 (as per Annual Report for 1996-97) the Government have approved award of contract for nine more small-sized fields. The Ministry of Petroleum and Natural Gas has justified awarding of these discovered fields to private/ foreign companies on the grounds that some of these fields are isolated, have marginal economics, low reserves and require considerable investments, etc. Private companies through use of up-to-date managerial and technical practices could develop these fields at a lower cost than developed by national oil companies. The Committee are also informed by the Ministry of Petroleum and Natural Gas that Panna and Mukta oilfields were discovered by ONGCL as back as in 1976 but did to develop them due to large investment required, rate of low return in developing these fields as also due to foreign exchange crisis. In August, 1992, the Ministry of Petroleum and Natural Gas invited bids from foreign/private companies to develop these fields. Against the bids received on 31.3.93, the Ministry in 1995 awared the contracts of oilfields of proven reserve at Mukta, Panna and Tapti to Enron-RIL, Ravva to Command Consortium. In this connection, the Committee have been informed that joint venture of foreign/private companies will develop these discovered fields at a much lower cost *vis-a-vis* ONGCL by using new technologies, which reduces the cost in comparatively small fields.
53	3.39	The Committee are informed that besides rate of return not being attractive for development of above fields, the major foreign exchange crisis in 1990 was another factor for not taking

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		up development of these fields and subsequently awarding them to foreign/private companies.The Committee, however, feel that of late foreign exchange position has considerably eased and at the time of awarding of Panna and Mukta fields in 1995 there was hardly any foreign exchange problem in the country. The Committee, therefore, do not find any justification behind the foreign exchange crisis being cited as a reason for awarding these fields to private/foreign companies. They are of the view that by awarding these fields to private/foreign companies, Government have forefeited substantial amount of country's profits, which could have accrued to the country, had ONGCL/ OIL been asked to acquire state-of-the-art technology and develop these fields themselves earlier.
54	3.40	The Committee emphasise that in future experience, expertise and resources of foreign oil prospectors should be utilised for exploring new areas for discovery of oil, rather than offering discovered fields for development and production.
55	3.41	The crude oil production with contributions from ONGCL, OIL and private/JV companies during 1995-96 had gone up to 36.29 million tonnes which is the highest level reached so far. The crude oil production for the years 1996-97 and 1997-98 including production from private/JV companies, was 34.11 million tonnes and 30.78 million tonnes respectively. With the decline in indigenous production of crude oil, import of crude oil was 33.906 and 31.778 MMT respectively during 1996-97 and 1997-98, which is nearly half of India's oil requirement of around 66 million tonnes. The country has not had any major oil find in over a decade. Despite contribution from private/JV companies from small and medium-sized oil fields offered to them under Modified Exploration Policy, the production of crude oil in the country is stagnating below 35 MMTs. In this situation the task facing the country is to discover, explore and produce more oil in the country even to maintain the current level of self-sufficiency of around 50 per cent. For this accelerated exploration efforts are required to be made by the national oil companies. There should also be efforts, with substantial increase in the investment in the upstream hydrocarbon sector, to arrest the declining reserve accretion to production ratio with the participation of private sector. The Government had already approved finalisation of contracts for a number of blocks for which bids were received in the eighth

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		round of bidding and one round under the Joint Venture Exploration Programme. These exploration efforts need to be further intensified and accelerated through the national oil companies and participation of private capital by offering fiscal incentives for investment in this critical area of the economy so that dependence on imports to meet the growing demand for petroleum products can be reduced.
56	3.42	The Committee note that the Government have realised the necessity of substantial efforts to augment indigenous production of crude oil and have offered fiscal incentives in the new Exploration Licensing Policy (NELP) announced in the House on 18 March, 1997 for participation of private sector in the areas of exploration and production of oil. The Committee hope that these measures would give the necessary boost to domestic production of crude oil and reduce dependence on import. The Committee desire that the Exploration Licensing Policy may be reviewed from time to time for attracting adequate private investments into the hydrocarbon sector to meet the burgeoning demand for petroleum products in the country.
57	3.43	For expeditious completion of contracts under the New Exploration Licensing Policy, the Ministry of Petroleum and Natural Gas has revised the model Production Sharing Contract (PSC) and the revised model PSC draft is stated to have been circulated to other Ministries. The Committee desire that the revised draft be finalised expeditiously.
58	3.44	The Committee find that entry of private companies in production of crude oil has not so far helped in augmenting the crude oil production, mainly because all the contracts of blocks awarded in 8 rounds of bid have not been signed and enormous delays taking place on the part of the Ministry of Petroleum and Natural Gas in processing, analysing and finalisation of bids. Lack of complete freedom of right to market oil, compulsion of taking Indian companies as their partners, etc. have also been attributed as other causes due to which private/ foreign companies have not shown much interest in the exploration of oilfields. However, these restrictions have now been removed in New Exploration Licensing policy announced by Government of India in March, 1997.

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		The Committee are constrained to note that though the new Exploration Licencing Policy providing more incentives and removing bottlenecks for participation by private companies in the fields of oil exploration was announced some time ago yet no new exploration blocks have been put up for bidding by the Government and all the existing blocks have also not been signed and this laxity is taking place when the country is striving to achieve higher crude oil production targets. The Committee feel that the interest generated among private investors both in India and abroad as a result of new policy cannot be sustained unless there is an urgency on the part of the Government in implementing it. The Committee desire that Ministry of Petroleum and Natural Gas should remove all the bottlenecks that discourage private companies in undertaking exploration work in the country. They should also take all possible steps for speedy implementation of New Oil Exploration Policy with a view to attracting more private companies to participate in oil exploration business in the country.
59	4.19	The Committee note that based on projection of consumption, indigenous production and availability of refining capacity, the Government make assessment of the crude oil imports every year. Most of crude oil imports are made from Saudi Arabia, Kuwait, Iran, UAE and Malaysia. In addition imports are also made from Egypt, Australia and Nigeria. Crude oil is purchased either through term contracts or through spot purchase or done through term tender. The Committee have been informed that a major portion of imports of crude oil are made in term contracts with national oil companies of producer countries at their official selling price and the balance quantities of crude oil (not tied upon on term basis) are covered through spot purchases.
60	4.20	However, from the break up of term and spot purchases made during the years 1990-91 to 1994-95, the Committee find that in the years 1991-92 and 1992-93, percentage of import of crude oil made through spot purchase was 55.9% and 51.1% as against purchases through term contract basis which accounted for 44.1% and 48.9% respectively. In other years the Committee find that bulk of imports have been made through spot purchases, their percentage being 39.0%, 46.0% and

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		38.5% respectively during the years 1990-91, 1993-94 and 1994-95.
61	4.21	Justifying the purchases made on spot the Ministry of Petroleum and Natural Gas has explained that such purchases made on spot basis on the contention that such purchases provide more flexibility of operations, not only because of changes in domestic requirement, indigenous production and monthly refining throughout but also better bargaining power and minimise the cost of acquisition of crude oil in the current scenario where there is abundance of crude in the international market.
62	4.22	According to the Ministry the purchases on term contract basis provide security and ensure regular supply of crude. The Committee do appreciate that Government should have the flexibility to decide on the quantity of import of crude oil on term contracts as well as spot purchase basis taking into consideration not only indigenous production, domestic requirement, and availability of resources but also factors affecting the price of crude oil in the international market. The Committee therefore desire that purchases through both the systems be so rationalised as to get the maximum advantage of any decline in price of crude oil in the international market and the continuity of supply.
63	4.23	In order to make crude oil imports cost-effective the Ministry of Petroleum and Natural Gas is stated to have adopted a strategy which include procuring a large share of the requirements of imported crude oil from the Middle East region, finalization of bulk of imported crude oil requirements through term contracts with national oil companies, uplifiting of additional cargoes from the term suppliers at their official selling prices, spot-purchases on a competitive tender basis, etc. The Committee desire that in order to make imports of crude oil cost-effective the Ministry of Petroleum and Natural Gas/ IOC should exercise the option judiciously through both the systems in such a way so as to get the maximum advantage of decline in price of crude oil in the international market from time to time.

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