ESTIMATES COMMITTEE
(1999-2000)

(THIRTEENTH LOK SABHA)

SECOND REPORT

MINISTRY OF PETROLEUM AND NATURAL GAS

[Action Taken by Government on the Recommendations contained in the Second Report of Estimates Committee (Twelfth Lok Sabha) <)n the Ministry of Petroleum and Natural Gas—Crude Oil—Indigenous Production and Imports]

Presented lo Lok Sabhu on 24.4.2000
LOK SABHA SECRETARIAT
NEW DELHI
April. 2OOQ/Chaitru, 1922 *(S)*

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(1999.2000)

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INTRODUCTION

I, the Chairman of the Estimates Committee, having been authoirsed by the Committee to submit the Report on this behalf, present this second Report on action taken by Government on the recommendations contained in the Second Report of Estimates Committee (Twelfth Lok Sabha) on the Ministry of Petroleum and Natural Gas—Crude Oil—Indigenous Production and Imports.

2. The Second Report (Twelfth Lok Sabha) was presented to Lok Sabha on 10th December, 1998. The Government furnished their replies indicating action taken on the recommendations contained in that Report on 7th September, 1999. The Draft Report was considered and adopted by the Estimates Committee (1999-2000) at their sitting held on 3rd April, 2000.

3. The Report has been divided into the following Chapters:—

I. Report;

II. Recommendations/Observations which have been accepted by Government;

III. Recommendations/Observations which the Committee do not desire to pursue in view of Government's replies;

IV. Recommendations/Observations in respect of which replies of Government have not been accepted by the Committee; and

V. Recommendations/Observations in respect of which final replies of Government are still awaited.

4. An analysis of action taken by Government on the recommendation's contained in the Second Report of Estimates Committee (12th Lok Sabha), is given in Appendix 1. It would be observed therefrom that out of 63 observations/recommendations made in the Report 46 recommendations *i.e.* 73% have been accepted by Government and the Committee do not desire to pursue 6 recommendations *i.e.* 9.5% in view of Government's replies. Reply of Government in respect of 11 recommendations' i.e. 17.5% has not been accepted by the Committee.

NEW DELHI;
April 18,2000
Chaitra 29, 1922 *(S)*

UMMAREDDY VENKATESWARLU,
Chairman,
Committee on Estimates.

CHAPTER I
REPORT

1.1 This Report of the Committee deals with action taken by Government on the recommendations contained in their Second Report (Twelfth Lok Sabha) on the Ministry of Petroleum and Natural Gas — Crude Oil — Indigenous Production and Imports.

1.2 The Committee's Second Report (Twelfth Lok Sabha) was presented to Lok Sabha on 10th December. 1998. It contained 63 observations/ recommendations. Action taken Notes on all these observations' recommendations have been received from the Ministry of Petroleum and Natural Gas.

1.3 Replies lo the observations and recommendations contained in the Report have broadly been categorised as under:

(i) Recommendations/observations which have been accepted by Government:
SI, Nos. 1, 2, 3. 4, 5, 9, 10, 12, 13. 17. 18, 19, 20, 21, 22, 23, 24, 25, 27, 28, 31, 32, 33, 34, 35, 36. 37, 38. 39, 40, 42, 44, 45, 46, 47, 48, 49, 55, 56, 57, 58, 59. 60, 61, 62 and 63

(Total 46, Chapter-II)

(ii) Recommendations/observations which the Committee do not desire to pursue in view of Government's replies:

SI, Nos. 6, 7, 11, 29, 30 and 43

(Total 6, Chapter-111)

(iii) Recommendations/observations in respect of which Government's replies have not been accepted by the Committee:

SI. Nos, 8, 14, 15. 16, 26, 41. 50 ……. 54

(Toinl II, Chapter-IV)

(iv) Recommendations/observations in respect of which final replies of Government are still awaited:

- Nil –

1.4 The Committee now deals with action taken by Government on some of the recommendations.

Need for technically qualified manpower for DGH

Observations/Recommendations (SI. No. 4, Para No. 1.22)

1.5 Stressing the urgency for provision of experienced and technically qualified manpower for DGH, the Committee recommended as follows:—

> "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 prerequisite 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."

1.6 In their action taken reply. Ministry of Petroleum and Natural Gas have stated as follows:—

> "Concerted efforts are being made by the Government to staff the DGH with educated and technically qualified manpower. As the Directorate of Hydrocarbons has an evolving role, the organisation is expected to grow in a gradual manner. Presently, 62 executives, largely drawn from ONGCL and OIL are manning various positions in DGH. Steps arc being taken for inducting additional staff on deputation from oil industry. Sincere efforts arc being undertaken by DGH towards world class competence building of its executives through training, exchange visits and work association with Indian and Foreign agencies and Regulatory bodies."

1.7 Noting that the Directorate General of Hydrocarbons (DGH), which had *inter alia* the responsibility of providing technical advice to the Ministry of Petroleum and Natural Gas in issues relevant to the exploration and optimal exploitation of hydrocarbons in the country, reviewing of exploration programmes of oil companies, reassessing of the availability of hydrocarbons, etc., was unable to perform its mandated task due to lack of experienced and trained technical manpower, the Committee desired that concerted efforts should be made with utmost urgency for providing adequate trained and technical manpower to DGH. DGH had issued an advertisement for filling up of posts on deputation basis. However, the

Government have not mentioned the number of officer – staff **taken on deputation in response to that advertisement. The Committee are constrained to note the casual approach of the Ministry in providing staff to DGH by stating "As the DGH had an evolving role, the organisation is expected to grow in a gradual manner... Steps are being taken for inducting additional staff on deputation from oil industry."**

The Committee would reiterate their earlier recommendations 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 objectives mandated to it.

The Committee would also like to be apprised of the progress made on the proposal to give statutory status to DGH under an Act of Parliament.

Exploration and operation of basins under category II, III and IV

Recommendations (SI. Nos. 6 and 7, Para Nos. 2.40 and 2.41)

1.8 Observing that adequate attention had not been given in the past for exploration of basins under category II, III and IV, the Committee recommended as follows:—

> "The Committee note that hydrocarbons arc generated and usually accumulated in sedimentary rocks. These sedimentary rocks arc 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 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."
>
> "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 ONGC and OIL have taken steps for exploration and operation of basins falling under category II, III and IV."

1.9 The Ministry of Petroleum and Natural Gas in their action taken reply have stated as under:—

"The steps taken by ONGC and OIL for exploration are given below:—

The Oil & Natural Gas Corporation Limited (ONGCL)

ONGCL established in 1956, started its systematic geo-scientific surveys in areas considered prospective on the basis of global nalogies. A major thrust in exploration was concentrated during the early years in the Himalayan Foothills and adjoining Ganga plains. Exploratory ctivities were collaterally extended to the large alluvial tracts of Gujarat, Upper Assam and Bengal Basin. Exploratory drilling activities were initiated in the Himalayan Foothills in 1957 with drilling of the first well Jwalamukhi-I in Himachal Pradesh. The year also saw drilling activities being taken up for the first time in Cambay Basin which ultimately resulted in the discovery of oil and gas in 1958, thus establishing a new hydrocarbon province in addition to the existing hydrocarbon provinces of Upper Assam and Assam Arakan in the north-east. Geo-scientific surveys and exploratory drilling activites were subsequently spread out to Himachal Pradc.sh (1957), U.P. (1962), Bihar (1963), Tamil Nadu (1964), Rajasthan (1964), J&K (J970), Kutch (1972) and Andhra Pradesh (1978). In spite of imited success in these areas, ONGC pursued with its exploratory efforts and were successful in establishing hydrocarbons in Cauvery Basin and Krishna-Godavari basins in the mid 80s.

Offshore exploration was initiated in 1962 through experimental seismic surveys in Gulf of Cambay. Regional seismic surveys carried out during 1964-67 in the western offshore were followed by detailed seismic surveys in 1972-73. As a result, a large structure in Bombay Offshore was identified and taken up subsequently for drilling in 1974 leading to India's biggest commercial discovery and thereby also establishing another new hydrocarbon province. Encouraged by the successes at Bombay Offshore, exploratory efforts were expanded systematically in the entire western offshore including Kerala-Konkan basin and the eastern offshore areas leading again to large discoveries in the western offshore (Neelam and Basscin) and substantial accumulations in the eastern offshore (Ravva).

From the above, it is evident that since its inception, ONGC has adopted an exploration strategy whereby exploratory efforts have been spread over different sedimentary basins in different parts of the country which have resulted in converting four earlier frontier areas into new hydrocarbon provinces and bringing on production six hydrocarbon provinces. Besides the existing producing basins ONGC has continued to expand its exploration activities in the frontier basins viz. Ganga Valley, Himalayan Foothills, Bengal Basin, Vindhyan Basin, Gondwana Basin, Kerala-Konkan, Kutch-Konkan, Kutch-Saurashtra and Jaisalmer Basin with an objective of establishing a reserve base.

Besides these onland frontier areas ONGC has also launched an ambitious deep sea exploration plan. Earlier two wells were drilled in the

deep water areas of K.G. Basin in the east coast offshore in early eighties. A few prospects have been prioritised to be taken up during the IX Plan, of these 2 prospects have already been drilled. Though commercial success in establishing hydrocarbons in deep water areas has still eluded ONGC, the process of acquiring the necessary technology and know-how for these ventures, possibly by forming joint ventures with companies having expertise in this area is under consideration. Exploratory efforts expended in each of these non producing frontier basins during the VII and VIII Five Year Plan period are given in Annexure (Page 11 of Action Taken notes). These frontier basins continue to be the focus of extensive exploration and the exploratory efforts planned in these basins during the IX Plan are also given in Annexure.

Oil India Limited (OIL)

So far as OIL is concerned, they have been operating in Category II/III areas since 1978 when it was first offered PEL outside North East. OIL has carried out exploratory work in category II as well as category III basin in addition to carrying out exploratory work in the category I basin in Assam & Arunachal Pradesh. The details of the exploratory work carried out by OIL in category II *&* category III basin are as under:—

Category II Basins

Rajasthan

OIL started exploratory work in Western Rajasthan in 1984. OIL has so far carried out about 11900 GLKM of 2D and 300 SQKM of 3D survey in the area. OIL started its exploratory drilling work in the area in 1988 and 30 exploratory wells and 14 development wells have been drilled, so far. OIL exploratory effort led to discovery of natural gas in the Jaisalmer basin and heavy oil in the Bikaner-Nagaur Basin.

OIL started production of natural gas from its gas fields in Rajasthan in July, 1996. OIL'S Baghewala block in Bikaner-Nagaur Basin, where heavy oil was discovered, was earlier awarded to *Ms.* Reliance Industries Limited (RIL) under Joint Venture Exploration Programme (JVEP'95) by Govt. of India. However, the block was reverted back to OIL recently by Govt. of India. OIL presently is on the look out for suitable technology for exploitation of heavy oil techno-economically. In addition, two exploration blocks in the area have been awarded to Ms. Essar Oil Limited (EOL) under the V round exploration bidding by Govt. of India. The Production Sharing Contract (PSC) and Joint Operating Agreement (JOA) in respect of these blocks were signed in October'96 and the Operator has completed the first phase of exploration in the two blocks.

Category III

Ganga Valley Basin

Oil is operating in the Ganga Valley Basin under its Kashipur PEL in U.P. since 1990. OIL has carried out 5007 GLKM of seismic survey in the area. The first exploratory well in the area is being drilled in the Bilaspur structure in Kashipur PEL.

Saurashtra Offshore

OIL was given PEL for the above area in 1989 and OIL started exploratory work in the area in 1990. OIL carried out 8767 LKM of 2D survey in the area. Based on the results of interpretation, few prospects were identified, out of which 3 prospects were drilled during the first phase. However, there was no commercial discovery of hydrocarbons. An integrated study is being carried out with all available data and presently efforts arc on to firm up the geological plays identified and to plan future course of exploration in the area.

Andaman Offshore

Three wells were drilled in the Andaman Offshore by OIL, without any success.

Mahanadi Basin

OIL started its exploratory work in the Mahanadi basin in 1978. OIL has carried out extensive exploratory work in Mahanadi Onshore, Mahanadi Offshore, and NEC offshore area under the Mahanadi Basin since 1978.

The details of exploratory work carried out by OIL in the area are as under:—

Seismic Survey	Mahanadi Onshore	3814 GLKM
	Mahanadi Offshore	3178 LKM
	NEC Offshore	10663 LKM
Exploratory Drilling	Mahanadi Onshore	4 wells
	Mahanadi Offshore	7 wells
	NEC Offshore	4 wells

However, there was no commercial discovery of hydrocarbon reserves.

1.10 The Committee had desired that ONGC and OIL should take steps for exploration and operation of basins falling under category, II, III and IV. From the action taken reply on their recommendation, the Committee

find that ONGC expanded its exploration activities in the frontier basins, viz. Ganga Valley, Himalayan Foothills, Bengal Basin, Vindhyan Basin, Gondwana Basin, Kerala — Konkan, Kutch-Saurashtra and Jaisalmer Basin with an objective of establishing a reserve base. ONGC is also stated to have launched an ambitious deep sea exploration plan and few prospects were prioritised to be taken up during the IX Plan. The Committee have been informed that commercial success in establishing hydrocarbons in deep water areas has still eluded ONCC and that the process of acquiring the necessary technology and know-how for these ventures possibly by forming joint ventures with companies having expertise in this area was under consideration. The Committee desire that formation of joint ventures with companies having expertise and technology for deep sea exploration for establishing hydrocarbons should be expedited so as to achieve the exploratory targets in the remaining two years of the Ninth Plan period. The Committee would also like to be apprised of the success achieved in the discovery of oil fields in the deep sea water areas.

The Committee also note that OIL has undertaken some exploratory works in Category II basins in Rajasthan and Category-III basins in Ganga Valley in U.P., Saurashtra Offshore, Andaman Offshore and Mahanadi basins. An integrated study is being carried out with all available data on exploratory works in Saurashtra Offshore with a view to firming up the geological plays identified and to plan future course of exploration in the area. The Committee would like to be apprised of the outcome of this study.

The Committee hope that ONGC and OIL will focus adequate attention and make efforts for exploration and operation of basins falling under Category II, III and IV:.

Private Sector Participation

Observation/Recommendation (SI.No. 8, Para No. 2.42)

1.11 Observing that the present efforts of national oil companies were not enough to reduce dependency of the country on imported crude oil the Committee recommended as under:—

> "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.* ONGOOIL 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".

1.12 The Ministry of Petroleum and Natural Gas in their action taken reply have stated as under:—

> "In order to augment the efforts of national oil companies, and also to introduce state-of-the-art technology available elsewhere, Government of India has been offering acreage to private companies for exploration, speculative surveys and discovered oil/gas fields development."

Exploration Bidding

So far, the Government of India has announced 8 Rounds of Exploration Bidding. Of these three Rounds have been completed No hydrocarbons were discovered under any of the contracts signed under First and Third Rounds of Exploration Bidding and the acreage awarded have since been relinquished. No contract was signed under Second Round of Exploration Bidding.

Starting from the Fourth (1991) to Eighth Exploration Bidding Round (1994) and Joint Venture Exploration Programmc'95 (JVEP'95), contracts have been signed for 23 blocks (20 of ONGC and e of OIL *i.e.* Oil India Limited). 12 blocks (10 of ONGC and 2 of OIL), starting from Sixth Round (1993) to JVEP-'95, arc approved for award. Out of these 12 blocks, for 7 blocks the companies, have either withdrawn or matter has been closed.

Small and Medium Sized Discovered Oil *&* Gas Fields

Under the Development offer of small and Medium sized discovered oil and gas fields (1992), contracts for 13 small-sized oil/gas fields of ONGC and 5 medium sized fields (4 of ONGC and 1 of OIL) have been signed. Additionally, I medium sized discovered oil fields and 11 small-sized discovered oil/gas fields (all of ONGC) have been approved for award.

Speculative Survey

The Government of India announced 2 Speculative Survey Rounds (in 1993 and 1994) and 1 Joint Venture Speculative Survey Round (1995) wherein acreage were offered for carrying out Speculative Geophysical and other types of surveys with a view to upgrade the available, information of the hydrocarbon potential of the unexplored sedimentary basins of ;hc country.

New Exploration Licensing Policy (NELP)

Further the Government of India has also recently announced the New Exploration Licensing Policy (NELP) with attractive fiscal terms and incentives. Under this policy, the upstream public sector companies *viz.* ONGC and OIL are to be provided level playing field by giving them the same fiscal and contract terms as are available to private companies. A total of 48 blocks (10 onland blocks, 26 shallow water blocks and *12* deep water blocks—beyond 400 m iso-bath) are on offer.

Efforts by **DGH**

One of the activities of DGH is to open up new areas for future exploration. Large unexplored/poorly explored area are required to be upgraded for undertaking systematic exploration. In addition to the efforts of operating companies, DGH is also carrying out mainly reconnitory type of surveys to open up hitherto unexplored areas for future exploration. The efforts of DGH are mainly in areas where the information is required to be upgraded and operating companies would normally not go for exploration in such areas on commercial consideration unless the information of these areas is adequate to develop the geological perception. The details of reconnitory surveys undertaken by DGH during the last few years are as under:—

(i) Satellite gravity studies (Reconnitory)—1.64 million sq. Kms. (under SIDA grant)

Over entire east coast, west coast and Andaman offshore including deeper offshore areas.

(ii) Seismic & G.M. Surveys—11,035 LKM under J.V. speculative survey programme plus 1450 LKM by DGH.

(iii) Seismic onland—1200 LKM in Ganga Valley and Vindhyan basin.

(iv) Aeromagnetic Surveys—23,730 LKM in Kutch onland areas.

(v) Magnetic Telluric Surveys—352 soundings in Nagpur-Wardha and Belgaon areas.

As a result of these, about 0.61 million sq. kms of the sedimentary area has been opened up for exploration. These opened up areas would be the future areas for exploration in the years to come. Twelve deep water blocks in the East Coast which have been identified as a result of surveys conducted by DGH have been offered under first round of NELP. This is the first time that deep water blocks have been offered in the country. During the remaining IX Plan period, DGH propose to conduct various geo-scientific studies in several other areas.

In addition, DGH has also planned the reconnitory exploration work in Ganga Valley, Himalayan Foothills, eastern Offshore, western offshore and Andaman offshore deep waters, Assam-Arakan fold belts and Kutch basins.

1.13 The Committee note that to augment the efforts of national oil companies and to introduce state-of-the-art technology, Government has been offering acreage to private companies for exploration, speculative surveys and discovering oil/gas fields for development. However, efforts made so far have not yielded the desired result. In exploration bidding, most of the companies who were given contracts have either withdrawn or no hydrocarbons have been discovered under the contracts signed. In small and medium sized discovered oil and gas fields alone have contracts been signed for development/approved for award. Further, under the New

Exploration Licensing Policy (NELP), a total of 48 blocks are also on offer for exploration. The Committee would like to be apprised of the latest position in the development of oil fields by these companies.

The Committee further note that DGH is carrying out reconnoitory surveys, to open up hitherto unexplored areas for future exploration as a result of which about 0.61 million sq. kms. of the sedimentary area have been opened up for exploration. Twelve deep water blocks in the East Coast identified as a result of survey conducted by DGH have also been offered under first round of New Exploration Licensing Policy (NELP). DGH also proposes to conduct various geoscientific studies in several areas and reconnoltory exploration work in future. The Committee would like to be apprised of the details of geoscientific studies and reconnoitory surveys undertaken and achievements in this regard.

Technology Induction

Observations/Recommendations (SI. Nos. 14, 15 & 16, Paras 2.48, 2.49 & 2.50)

1.14 Noting the huge variation in the estimates of inplace reserves of oil assessed by ONGCL and the contractor, the Committee recommended as under:—

> "In case of three medium sized fields *viz.* Panna, Rawa 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 was 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 those fields by carrying out 3D seismic survey and better data processing and interpretation facility, which were not done by ONGCL.
>
> 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, the reserves had almost doubled. The Committee feel that this should have been taken as a lesson by Ministry/ONGC and desired improvement incorporated in the system.
>
> 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."

1.15 In their action taken replies recommendation-wise the Ministry of Petroleum and Natural Gas have stated as follows:—

"Estimates of hydrocarbons for a field are based on the data available at that time. With availability of additional data the reservoir geometry as better defined leading to changes in the estimates of the hydrocarbons. Additional data is normally acquired through seismic survey specially high resolution 3D, drilling of new wells, recording of sophisticated new set of logs, re-interpretation of old seismic data through improved interpretation techniques and incorporation of the newly acquired data in the reservoir simulation data.

In Panna and Rawa fields, the enhancement has been a result of additional data acquired in the form of drilling of wells, pressure production history and re-evaluation of data. Similarly in the Tapti field based on a stochastic geological model put forth by the operator, the estimates have been revised and enhanced during 1998-99."

"The reserve estimate of an oil field are dependent upon the knowledge of subsurface, which is based on the data available, and exploitation technologies in vogue on a given date.

The growth in the reserves of a structure/field is mainly due to:

(i) Change in geological concept/model with time with the availability of additional data and better understanding of subsurface with induction of technology.

(ii) Discovery of new reservoirs at deeper stratigraphic levels.

(iii) Extension of the reservoirs, at time due to the exploratory efforts in the areas adjacent to the existing fields.

(iv) Re-evaluation of petrophysical parameters with the induction of advanced formation evaluation tools.

(v) Application of improved recovery techniques.

(vi) Most structures/fields have shown growth in reserves over time due to one or combination of the above factors. Some of the example's of reserve growth are Gandhar, Kalol, Bombay High and Geleki. The growth of reserves in the Ankaleshwar field are mainly due to development, change in the geological concept/ model, re-evaluation of petro-physical parameters."

"During IX plan ONGC will ensure sustained efforts technology induction and new technology inducted recently are:

Seismic

1. For seismic data acquisition, 19 new systems were procured with state-of-the art technology (Telemetry, 24 bit Delta Sigma technology 1996-97). Process for acquisition of 12 more state-of-the-art seismic acquisition systems is under way to replace non-telemetric/telemetric systems of early-mid eighties/early nineties vintages,
2. For processing of seismic data, acquisition of new processing systems having state-of-the-art teenology is in progress for SRBC, WRBC, ERBC, GEOPIC where as for MRBC, CRBC & IRS, it has already been installed.

3. The present number of interactive interpretation workstations is 21 which is planned to be augmented by 23 more systems during IX plan period. This is aimed at making a marked impact on '3D' interpretation cycle time.

Logging

1. For log data acquisition new EXCELL 2000 logging systems have been procured having state-of-the-art technology (Advanced operating system, work station environment. Networking capability) and with improved latest version down hole tools having Digital Interactive Telemetry. Downhold tools include the special tools like CAST. HFDT, LFDT, HRI, SFT, SNSG..
2. For log data processing, state-of-the-art work stations have been procured. With the use of the log processing software developed in-house, which are at par with those available with service companies, log data processing requirements are being met in-house."

1.16 The Committee had observed that mainly due to additional information acquired by contractors in 3D seismic survey and reinterpretation/revaluation of data, there was a huge variation in the estimates of inplace reserves of oil assessed by ONGCL and the contractor in the case of Panna, Rawa and Tapti oil fields. With the help of 3D seismic surveys, better data processing and interpretation facilities, reinterpretation of old seismic data through improved interpretation techniques and incorporation of newly acquired data in the reservoir simulation data, private companies have estimated more reserves of oil than ONGCL. It was also noted that after drilling of wells for doing larger surveys, more and more oil reserves were found and in the case of Ankaleshwar field the reserves had almost doubled.

The Committee, therefore, desired that ONGCL which had acquired new data acquisition equipment and was in the process of acquiring seismic data processing facilities for advance processing might do so expeditiously.

1.17 The Committee regret to note from the reply of the Government that ONGCL has yet to procure 12 more state-of-the-art seismic data acquisition systems to replace non-telemetric/telemetric systems of early eighties/early nineties vintage. Acquisition of new processing systems having the state-of-the-art technology for a processing of seismic data for use by SRBC, WRBC, ERBC and GEOPIC was also not yet complete and was still in progress. Further, a number of interactive interpretation work stations is also being planned to be augmented during IX Plan period.

1.18 ONGCL which is a premier oil exploration company in India and is striving to become a company of international repute should have set an example for others to follow. Unfortunately they still lag far behind. Any more delay in acquiring the state-of-the-art technology by ONGCL will

jeoparadise its exploration and development programmes leading to a situation wherein private companies with their technological advantage will earn profit at the expense of ONGCL. Faster and better development and exploration of oil fields by the private sector will thus deprive the ONGCL of the much needed revenue capital for expansion and development of its exploration projects. The Committee desire that ONGCL should expedite their efforts towards induction of the state-of-the-art technology for ifs various operational requirements.

Acquiring Exploration Blocks Abroad

Observations/Recommendations (SI. No. 26 and 41, Para No. 2.60 and 2.122)

1.19 The Committee in their earlier report made recommendations as follows:—

"The Committee observe that ONGCL 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. 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 reason 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."

"The Committee appreciate that the Government is giving higher focus to prospective basins/blocks outside India. ONGCL has received an exploration exploratory block in Kazakhastan. This is a step in the right direction, as making efforts outside the country may help in self sufficiency in the production of crude oil. The Committee desire that following the example of 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 recommend 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 block 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 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."

1.20 In their action taken replies on the recommendations. Ministry of Petroleum and Natural Gas have stated as follows:—

"Exploration ventures being governed by "Stochastic" model of probability has in-built risk of uncertainty regarding discovery of oil and gas. It is for this reason that the oil companies tend to share risks by taking part-stakes in any risk venture. This methodology also helps in spreading the same capital in different areas to obtain better chances of success. ONGC Videsh has been following the same course and took partial participating interest in the exploration projects *viz.,* Yemen, Egypt and Tunisia for which well known oil companies of international repute obtained the licence/contract. However, as it happens more often than not in the exploration industry, no commercial discovery was made. This does not reflect on the competence or the efforts made by the involved company in analysing the data before embarking on these projects. The available data on all these projects was analysed and the Board approved these projects on the basis of the said analysis. CMD, ONGC had indicated that the selection of the original licence area was not done by ONGC but it had farmed-in with the international companies of repute. However, this did not imply that no analysis was done before embarking on these projects. The statement that this is not a right approach has been made in the background that ONGC as a major oil company should try to obtain licence/contract ourselves and offer farm-out to others because this might give us a better deal. In the international scene, however it is extremely difficult to obtain such licence as they involve strong political and also strong financial muscle. The western oil companies have been preferred more by the host oil rich countries in view of their present image in respect of financial muscle, political strength and above all, technological strength. ONGC-VL would continue to attempt obtain such licences. It has already submitted a proposal to Govt. of Iraq for acquiring an exploration block.

The net outgo for exploration in Vietnam, Egypt, Yemen and

Tunisia is about Rs. 137 crores.

Exploration is a cyclic process with periodic success and a view taken on a small segment of time or a segment of few projects can give erroneous perception. The three exploration projects, Tunisia, Yemen and Egypt, were not with total ONGC-VL participation but the company had only a partial stake in each one of them. It would also be pertinent to mention that analysis of data for projects under taken by ONGC-VL is carried out by a joint team of ONGC and ONGC-VL and are approved by Director (Exploration) of ONGC before it is recommended by ONGC-VL Board for approval by an inter-Ministerial Empowered Committee. Thus, a proposal goes through adequate scrutiny before approval. The value of the Vietnam project is likely to pay far more than the net outgo on the exploration costs by ONGC-VL."

"The widening gap between demand and supply of oil and gas consequently increasing imports affects the economic developments of the country. In order to achieve oil security, acquisition of equity oil abroad is an important plank of the strategy. ONGC-Videsh Ltd. a wholly owned subsidiary of ONGC is active in exploration and development activity of oil and gas in Vietnam, Middle East and CIS countries. The objective of OVL is to acquire attractive overseas exploration acreages and producing properties to increase equity oil abroad. ONG-VL has a gas project in Vietnam and has been pursuing opportunity in Iraq, Iran, Russia (Udmurt, North Caspian Sea and Astrakhan) and is evaluating other opportunities.

OIL has also taken 20% participating interest in a block in OMAN with TOTAL of France for exploration of oil and gas.

There is a proposal for a corporate strategic alliance between IOC and ONGC.

The alliance would help synergise their operations for the common good of both and partake of current international trends of mutuallity in working in the hydrocarbon sector. It could be forerunner to possible vertical integration and help both companies to enhance their global standing and core competencies from "drilling to dispensing". While retaining focus on respective core business and competencies, both IOC and ONGC would explore investment options for securing assured growth and profitability."

1.21 The Committee feel that ONGC-VL need to make a serious introspection of its constraints in obtaining exploration contracts abroad and take corrective measures so that it does not hold a position of disadvantage *vis-a-vis* other premier western oil companies who grab licences anc) contracts in the international market.

1.22 **As the country is not self sufficient In the production of crude oil, the Committee desired that the country should strive hard to get exploratory work abroad with its friendly countries to spread the risk involved in the crude oil exploration work. The Government had also 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. ONGC-VL was primarily set up to take up exploration activities abroad so as to give a Fillip to India's exploration effort and earn revenue which could be ploughed back in the country to further expand the ONGCL's operations in the oil exploration and development sector. Unfortunately the company has so far not achieved any tangible results in exploration and development of oil fields abroad. The reason advanced by the Ministry of Petroleum and Natural Gas in their reply is that the western oil companies have been preferred more by the oil rich countries in view of their present financial muscle, political strength and above all, technological strength. The Ministry have added that ONGC-VL would continue its efforts to obtain licences and contracts for exploration block abroad.**

The Committee appreciate that OIL has now taken 20% participating interest in a block in OMAN with TOTAL of France for exploration of oil and gas. The Committee desire that the strategic alliance between IOC and ONGC which is proposed to be formed for synergising their operations and enhance their global standing and core competition from "drilling to dispensing" should be operationalised soon so as to obtain contracts for exploration of more and more Oil blocks outside the country and to contribute to the self sufficiency in the country's oil production.

Bombay High

Observation/Recommendation (SI. No. 34, Para No. 2.115)

1.23 Observing the declining trend of oil from Bombay High field the Committee observed as under:

> "The Committee note that the Director General of Hydrocarbons monitored the Bombay High field and gave suggestions to 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 develoment 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."

1.24 In their action taken reply Ministry of Petroleum and Natural Gas stated as under:—

Various rectificatory measures undertaken for revival and further development of Bombay High Field are:—

> "ONGC is continuing with their efforts in maintaining the production and health of the reservoir in terms of work-over, side tracking of wells, critical field data gathering and redistribution of water injection in Bombay High field.
>
> For improvement of the health of Bombay High reservoir, the Government had appointed a Committee headed by Dr. K. Narayanan. The Committee had submitted its report on Bombay High in September 1997. In order to implement the recommendations of the Committee, a monitorable action plan was drawn up for improving the reservoir health of Bombay High. The implementation of this action plan by ONGC is monitored in the Ministry on a continuous basis.
>
> As per the recommendations of the Narayanan Committee report, ONGC has engaged internationally reputed consultant M/s GCA in December 1997. The areas of activity of M/s GCA are (i) Reservoir studies and characterisation, (ii) Operational Approach and (iii) Strategic advice. They are in close interaction with the technical staff of ONGC and studies related to reservoir health are being firmed up with their advice.
>
> In addition one of the major efforts being pursued is WAG (Water Alternate Gas) as one of the' possible means to enhance oil recovery in future. A joint team of ONGC and DGH has held discussions with Norwegian companies. ONGC has also initiated laboratory investigations for assessing the efficacy of WAG in Bombay High. ONGC is also entering into collaborative study with University of Calgary for lab experiment on air injection.
>
> 3-D data has been acquired, processed and a preliminary interpretation report has been submitted by PGS in the first week of November, 1998. ONGC is reviewing the data for using the same for detailed reservoir characterisation of main producing reservoirs. This would lead to more accurate models for simulation studies for finalising the further development programme of the field."

1.25 In their original report, the Committee desired that proposal for revival/rectificatory measures and development of Bombay High field

should be implemented expeditiously to prevent further deterioration in the cumulative oil production from the field. As per a news report published in the Statesmen dated 25th March, 2000 the Union Minister for Petroleum and Natural Gas *inter alia* stated that the Bombay High exploration facility was operating at a lower capacity and Government had decided to revive the plant and improve gas production by investing Rs. 3000—4000 crore in the plant. The Committee are unhappy to note from the statement made by the Hoii'ble Minister that ONCC had neglected the plant for the last 10 years and they now propose to invest Rs. 4000 crore to revive the ailing oil exploration plant at Bombay High.

1.26 The Committee have been informed that ONGC was continuing with (heir efforts in maintaining the production and health of the reservoir in terms of workover, side tracking of wells, critical Field data gathering and redistribution of water injection in Mumbai High field. Internationally reputed consultant M/s GCA is stated to be in close interaction with the technical staff of ONGC and studies related to reservoir health are being firmed up with their advice. Besides ONGC has also initiated further steps *viz* laboratory investigation for assessing the efficacy of WAG in Mumbai High by entering into collaborative study with University of Calgary for lab experiment on air injection.

The Committee desire that expeditious steps be taken within a laid down timeframe for reviving the sagging unit optimal production of oil/gas.

Offering of Small and medium Sized Fields

Observations/Recommendations (SI. No. SO—54, Para Nos. 3.36—3.40)

1.27 As regards, offering of small and medium sized oil fields for development to private joint venture companies, the Committee recommended as follows:—

> "3.36 The Committee understand that one of the reasons for abnormal delay in award of contract for exploration blocks in 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 has 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 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.

3.38 The medium-sized fields awarded so far include Mid and South Tapti, Mukta and Panna, Ravva, Kharsang and Ratna-R-Scrics. Small-sized fields awarded are Hazira, Cambay, Bhandut, Matar, Sabarmati, Indora, Bakrol, Lohar, Dhoka, Wavel, Baola, VY-I 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 to 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 & Natural Gas that Panna and Mukta oild fields were discovered by ONGCL 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 & Natural Gas invited bids from foreign/ private companies to develop these fields. Against the bids received on 3L3.93, the Ministry in 1995 awarded the contracts of oilfields of proven reserve at Mukta, Panna and Tapti to Enrol-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.

3.39 The Committee arc 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 arc 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 ONGCL/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 prospectors should be utilised for exploring new areas for discovery of oil, rather than offering discovered fields for development and production."

1.28 In their action taken reply the Ministry of Petroleum and Natural Gas have stated as under:

"The Committee has commented on the policy being followed with regard to offer of discovered fields for development by private/ joint venture companies. In this connection it *is* stated that apart from Foreign exchange crunch some of the other reason for offering these fields for private participation are:—

(i) Lack of adequate resources with the National OIL Companies (NOCs) to develop such fields.

(ii) Lack of recoverable reserves.

(iii) Private participation would help augment oil/gas production by way of quickly putting these fields on production to meet the growing demand supply gap.

(iv) Application of enhanced oil recovery techniques.

Although the foreign exchange position improved subsequently, it was felt that in the context of the policy initiatives to attract foreign investment specially in the core sector, renegining on internationally invited bids and committed terms would undermine our credibility and would not have been in the national interest.

The continuance of the policy on discovered fields had been proposed for the following reasons:

(a) The NPV of the total Government take and ONGCs own rate of return were better secured under joint venture than through exclusive operation by ONGC on the same terms.

(b) The policy ensures development of the marginally viable small and medium sized fields which would otherwise remain undeveloped.

(c) In fiercely competitive international hydrocarbon scenario of depleting reserves, the offer is a potential inducement to companies to invest in exploration.

(d) Competition with other domestic players in the upstream sector has enhanced the capability of NOC.

The issue of whether this policy for offering discovered fields should continue or not was considered by the Government and the Government has approved the continuance of this policy. However it has been decided that in future the bids would be invited by the National Oil Companies (ONGC/OIL)."

1.29 The Committee observed that Government had offered discovered small and medium sized fields for development by private joint venture

participation on the ground that some of these fields were isolated, had marginal economics, low reserve and required considerable investments, etc, and that joint venture of foreign/private compaaies will develop these discovered fields at a much lower cost *vis-a-vis* ONGCL by using new technologies.

Disagreeing with the above contention of the Government before handing over of discovered fields to private companies for development the Committee desired 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. The Committee are not satisfied with the contention of Ministry for continuance of the present policy on discovered Fields which *inter alia* has been stated to be made in favour of joint venture exploration for better profits, development, and for offering potential inducement to companies to invest in exploration.

The Ministry in their reply have further stated that the issue of whether this policy of offering discovered Fields should continue or not was considered by the Goyernment and the Government has approved the continuance of this policy. However, it has been decided that in future, bids would be invited by the National Oil Companies (ONGC/OIL). The Committee do not approve of the policy of the Government and, therefore, reiterate their earlier recommendation 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.

Implementation of Recommendations

1.30 The Committee would like to emphasise that they attach the greatest importance to the implementation of the recommendations accepted by Government. They would, therefore, urge that Government should keep a close watch so as to ensure expeditious implementation of the recommendations accepted by them. Where it is not possible to implement the recommendations in letter and spirit for any reason, the matter should be reported to the Committee with reasons for non-implementation.

CHAPTER II
RECOMMENDATIONS/OBSERVATIONS WHICH HAVE BEEN ACCEPTED BY THE GOVERNMENT

Observation/Recommendation (SI. No. I, Para No. 1.19)

The Committee note that the Ministry of Petroleum & 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 Indian Limited under the Ministry of Petroleum & Natural Gas are playing a pivotal role in exploration and production of hydrocarbons in the country.

Reply of the Government

This is statement of facts.

[Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/ US(EO) dated 15-7-1999]

Observation/Recommendation (SI. No. 2, Para No. 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 *inier-alia* envisage providing technical advice to the Ministry of Petroleum & 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 hydrocarbons reserves proposed by the operating companies, etc.

Reply of the Government

This is a statement of facts.

[Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/US(EO) dated 15-7-1999]

(Observation/Recommendation (SI. No. 3, Para No. 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.

Reply of the Government

This is a statement of facts.

[Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/ US(EO) dated 15-7-1999]

Observation/Recommendation (SI No. 4, **Para** No. 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 avilable only by ONGCL arid 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 concreted efforts should be made with utmost urgency for adequate provision of experienced and trained technical manpower so as to enable DGH to fulfill the objective mandated for it.

Reply of the Government

Concerted efforts are being made by the Government to staff the DGH with educated and technically qualified manpower. As the Directorate of Hyderocarbons has an evolving role, the organisation is expected to grow in a gradual manner. Presently, 62 executive, largely drawn from ONGC and OIL, are manning various positions in DGH. Steps are being taken for inducting additional staff on deputation from oil industry. Sincere efforts are being undertaken by DGH towards world class competence building of its executives through training, exchange visits and work association with Indian, and Foreign agencies and Regulatory bodies.

[Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/ US(EO) dated 15-7-1999]

Observation/Recommendation (SI No. 5, Para No. 1.23)

The Committee need hardly emphasise that to give a boost to domestic oil production, it is impreative that more and more companies including those in public sector are encouraged to undertake the work of oil exploration, development and production. The Committee appreciated 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 UB 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.

Reply of the Government

This is a statement of fact.

[Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/ US(EO) dated 15-7-1999]

Observation/Recommendation (SI No. **9, Para** No. 2.43)

The Committee have been informed that ONGC is facing difficulties in exploiting basins in Ganga Valley, Himalayan foothills and those situated in cast and west coast 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.

Reply of the Government

ONGC initiated its exploratory activities in the form of geo-scientific surveys in 1956 in the Himalayan Foothills area and the adjoining Ganga plains. The first exploratory well Jwalamukhi-I drilled by ONGC in 1957 was also in the Himalayan Foothills. Over the past 4 decades ONGC has carried 9426 SLK & 4302 GLK of 2D seismic surveys and dulled 15 wells (since inception as on 01.04.99) in the Himalayan Foothills region. It has acquired 38683 SLK & 16644 GLK of 2D seismic data and drilled 14 wells (since inception as on 01.04.99) in the Ganga Basin. The Himalayan Foothills region is a geologically complex area and the situation is further compounded by adverse logistic making seismic imaging and interpretation difficult. Similarly in the Ganga plains the thick alluvial cover also affects seismic imaging. Notwithstanding the above ONGC has continued to expand its exploratory efforts in the Himalayan Foothills and has further planned to continue its extensive exploration programme in the area during the IX Plan by acquiring 860 GLK of 2D seismic data and drilling

3 exploratory wells.

Major part of Ganga basin in now under the jurisdiction of Oil India Limited or forms part of blocks which have been offered under the recently announced NELP round.

The western part of the country comprises Cambay basin, Kutch-Saurashtra basin and Deccan Syneclisc. Apart from Cambay Basin, which is fairly well explored the other basins are covered by a thick over of Deccan Trap Basalt's. Imaging of the sediments below the trap has been difficult as the seismic energy used for such imaging is lost within the trap and does not penetrate the sediments below. ONGC has been conducting experimental seismic surveys to over come these constraints.

The eastern part of the country comparises the Assam Arkan fold Belt and the Assam Shelf. This reagion has though been under focused exploration since the 1880's the Assam Arkan Fold belt area being a geologically complex area with adverse logistics has made acquisition as well as seismic imaging difficult. The Assam Shelf area though logistically easier, the preseat thrust is on the deeper prospects. Seismic imaging of these deeper propects though difficult, is being overcome deploying state of the art technology in the from of blanket 3D seismic data acquisition.

Apart from the own efforts ONGC hired the services of foreign experts to have an independent opinion on the prospectively of the different basins and to assess their year to find hydrocarbon potential. The experts engaged for the different basins were:

Name of the expert	Basins for which engaged
Mr.John Kingston:	West Bengal Basin Krishna Godavari Basin Cauvery Basin
Mr. Robert Stonely and Mr. R.C. Selley:	Gondwana Basins-South Rewa Satpura Basin Deccan Syneclise
Mr. V.B. Leviant and Prof. N. Kunine:	Mumbai Offshore
Dr. A.W. Bally	Ganga Basin Himalayan Foothills Assam Arkan
Dr. M.L. Bordenave	Cambay Basin

[Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/ US(EO) dated 15-7-1999]

Observation/Recommendation (SI No. **10 Para** No. 1.44)

The basins which are under study by different experts from UK, USA, Russia include Cauvery, Krishna Godavari, Bengal, Gondawan, 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 ONGC Ltd. to fully exploit the potential of these basins. The outcome of these studies and action taken thereon by ONGC may also be reported to the Committee.

Reply of the Government

The experts have completed their studies and submitted reports. ONGC, after studying the reports, has initiated a quick follow-up action of the major recommendations made by the experts as detailed below:

I, Follow-up action on the recommendations of Mr. John Kingston for West Bengal Basin, K.G. Basin and Cauvery Basin:

1.1 West Bengal Basin

Eocene Carbonate Prospects:

Recommendations:

- Amtala-3-D data be re-processed and re-interpreted.
- 72 sq.km. 3-D seismic survey be conducted to the South West in line with 3-D seismic survey at Amtala.

Follow-Up Action:

- The entire 3-D seismic data of Amtala area has been re-processed on priority. The data was re-interpreted after the processing of Golf-Green 3-D data.

Oligocene prospects:

Recommendations:

- A large sampling of Oligocene sand bodies be made by conducting a

72-square kilometres survey immediately to the south west of the Ichapur 3-D seismic survey block.

- An approximately 2500 square kilometres of 2-D seismic data be acquired along the Oligocene trend to the south.

Follow Up Action:

- Acquisition of additional 3-D data for an area of 72 sq.km. in South West of Ichapur has been completed in two field seasons *i.e.* 1996-97 and 1997-98. Processing of 1996-97 data has been completed; processing of 1997-98 data is under process. Integrated interpretation of the entire 3-D data volume will be taken up after completing the processing.

- Data acquisition in area South of Ichapur is in progress. The other identified area-northwest of Diamond Harbour-falls under NELP block.

Gondwana Prospects:

Recommendations:

- Seismic survey be conducted in the vicinity of the Gobindapur prospect to ensure that it is a valid Gondwana closure. After which a wild cat may be drilled. If closure is not very certain, the wild cat should not be drilled.

Follow-Up Action:

- The part of acquired geo-scientific data is under interpretation .

Drilling:

Recommendations:

- Further exploratory drilling may be taken up only after firming up of highest quality prospects.

Follow-up Action:

- Specific drilling programme in Bengal basin is dependent on generation of highest quality prospects if any, (consistent with experts recommendation) and based on the outcome of the ongoing exploratory activities.

1.2 Krishna-Godavari Basin

Recommendations:

- Teleseis survey in shallow water of Godavari delta.
- '3-D'seismic in Godavari delta (onshore) for Tertiary play.
- Offshore '3-D' seismic survey.
- '3-D' survey in deep water prospect.
- Priority of drilling in Godavari delta front area, linking with '3-D'.

Follow-up Action:

- '2-D' teleseis data acquired. Awaits processing.
- Acquisition/interpretation of '3-D' data completed in island land area (part of onshore Godavari delta). Acquisition in the contiguous Amalapuram area in progress.
- '3-D' data in GS-29 area partly acquired. Action on hand to acquire '3-D' data in GS-15/GS-23 area.
- '3-D' acquisition will be reviewed in case of discovery in deep water prospect.
- Based on '3-D' interpretation, area is under focus for drilling.

1.3 Cauvery Basin

Recommendations:

- Exploration around Karaikal High area, particularly '3-D' seismic and sequence stratigraphic studies.
- '3-D' seismic survey around Perungulam in Ramnad sub-basin.

•• Teleseis survey along Coromondal coast.

- Curtail exploratory drilling in favour of more geo-scientific studies.

Follow up Action:

- '2-D'/"3-D' seismic data has been acquired and interpreted. 13 wells drilled during 1997-1999. 12 more wells have been planned for drilling in IX Plan. Sequence stratigraphic studies completed.
- '3-D' data acquired, Data partly interpreted and partly under processing. Three finds made. Area under focus for appraisal drilling.
- Coromondal coast is partly in Bid block and partly in NELP block. Instead, '2-D' Teleseis is being acquired along the coast of Palk Bay and Gulf of Mannar.
- Focus on acquisition of more '3-D' data and integrated evaluation for prospect generation and improved success ratio. 63 exploratory wells planned in IX Plan against 128 wells drilled in VIII Plan.

2. Follow-up action on the recommendations of Mr. Robert Stoneley and Mr. Richard C. Selley for South Rewa, Satpura and Deccan Syneclise.

2.1 South Rewa (Gondwana Basins)

Recommendations:

- Experimental re-processing of seismic lines in South Rewa, and future drilling in S. Rewa to depend upon above re-processing.

Follow-up Action:

• The re-processing of lines are in progress.

2.2 Satpura:

Recommendations:

• Exploration in Satputa to be reviewed after drilling of Anhoni-I.

Follow-up Action.

• Anhoni-I has since been drilled, and was abandoned. Seismic data is under acquisition to decide about the further exploration programme in the basin.

2.3 Deccan Syneclise:

Recommendations;

• The prospectivity of Deccan Syneclise fe considered highly speculative.

Follow-up Action:

• it is proposed to acquire seismic data and drill one R&D well to review the sub-trap petroleum geology.

3. Follow-Up Action on the Recommendations of' Mr. V.B. Leviant and Prof. N. Kunine for Bombay Offshore Basin

3.1 Bombay Offshore Basin

Dr. V.B. Leviant and Prof. N. Kunine have completed their study of Bombay Offshore basin and the findings were presented in May, 1997*

Recommendations:

1. Exploration of Fractured Basement in Bombay High, Heera, B-119/121 area.
2. Exploration of Palaeocene and Miocene Prospects in Tapti-Daman area.
3. Exploration of Reefogenic objects and carbonate fans in shelf margin, DCS and north of Bombay platform.

Follow-up Action:

1. Identified one location for drilling in Bombay High area.
2. Drilled one location in East Daman area, which proved to be dry and two locations with objectives in Panna formation have been identified for drilling in Tapti-Daman area.
3. Geo-scientific studies in shelf margin in progress.
4. Follow-Up Action on the Recommendations of Dr. A.W. Bally for India's Tertiary Fold belts and Foreland Basins

4.1 Ganga Basin

Recommendations:

• Oveall low-ranking including moratorium of drilling. Meanwhile, the entire data of Ganga basin to be integrated & compiled.

Follow-up Action:

• A joint study team of ONGC, OIL and DGH are at present compiling all the data on Ganga Basin, and identify priority areas for deployment of DGH vibroseis crew.

4.2 **Himalayan Foothills**

Recommendations:

• Overall low ranking

Follow-up Action:

- Despite low ranking by consultant ONGC is acquiring seismic data and carrying out interpretation to model the structural complexities, stratigraphic sequences, continuity of Subathus and to generate drilling prospects.

4.3 Assam Arakan Basin

Recommendations:

* Extend 3-D seismic data over major hydrocarbon accumulations.

- Carry out modern sequence stratigraphic analysis for Paleogene and Neogene successi-ons of Assam shelf.
- Significantly improve acquisition and processing of seismic data in Tripura-Cachar area.
- Exploration in North-Bank, Assam.

Follow-up Action:

- 3-D seismic surveys have been planned over the major fields and acquisition is in progress.
- Study on Sequence Stratigrphic and petroleum systems of Assam shelf is in progress.

* Seismic survey in Tripura area has been undertaken by deploying a new seismic unit with new equipment and large channels and contract surveys is planned for enhanced coverage. In Cachar, 2 Seismic parties were fielded and new areas in North and NE were covered for improved understanding of sub-surface geology and structural style.

- Action has also been initiated to improve the acquisition and processing of seisimic data in Tripura-Cachar area.

5. Follow-Up Action on the Recommendations of Dr. M.L. Bordenave for Cambay Basin

Recommendations:

1. Seismic data acquisition in South of Padra, Gandhi Nagar, Linch area, Sarod Mahisagar and South of latitude 21 00'.
2. Project for improving seismic signals at deeper level for proper modelling and designing of parameters.
3. Detailed mapping of different play levels to study the concepts recommended.
4. Special Geological studies with reference to Global sequence stratigraphy.
5. Access to Geo-scientific mapping system of Data Base.
6. Drilling of recommended exploratory locations.

Follow-up Action

1. Data already acquired in South of Padra, Gandhinagar and Linch area and partly in Sarod-Mahisagar area. Data acquisition planned in Navsari west (South of Lat. 21* 00') and Sarod-Mahisagar in the year 2000-01.
2. The project has already been undertaken.
3. Detailed regional maps have already prepared and being updated and integrated for prospect generation.

4. Project to be firmed up.

5. Implementation of EPINET system is in progress.

6. Locations have been reviewed through comprehensive studies and number of locations are/being prioritised on merit.

[Ministry of Petroleum & Natural Gas No.—0-27012/11/98-ONG/ US(EO)dated 15-7-1999)

Observation/Recommendation (SI. No. 12 Para No.-2.46)

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

Reply of the Government

Intensive exploratory effort adjacent to the existing field areas are being expanded to understand and explore the extension of the discovered pools, target new structural plays at deeper stratigraphic levels, mapping of stratigraphic traps as additional plays etc. for accelerated accretion of hydrocarbon..

Understanding of the reservoir is also a key in increasing the recoverable reserve of a field. Towards this end ONGC has shifted its stress from conventional '2-D' seismic surveys to state of the art '3-D' for enhancing sub-surface imaging for better reservoir description with emphasis on identifying the missed target/new targets. State of the art processing systems have been/are being acquired for better processing and interactive interpretation work stations are being inducted for qualitative interpretation with improved interpretation cycle time. It is envisaged to acquire 186639LK/GLK '3-D' seismic data in the areas under ONGC's operational control during the IX plan period.

Technology induction in the field of logging for improved formation evaluation is also in progress.

Some of the major thrust areas for improved oil recoveries are:

- Infill drilling/drain-hole drilling, optimisation of artificial lift, pressure-maintenance by water injection, water gas shut off and sand control measures etc. which is being undertaken in most of the fields.

- Application of Enhanced Oil Recovery (EOR) processes.

  (a) *In-situ* combustion process in heavy belt of Mehsana *i.e.* Balol, Lanwa, Santhal and Bechraji.
  (b) Polymer flooding in Sanand field.
  (c) Microbial Enhanched Oil Recovery (MEOR) in Kosamba fields.

OIL has also intensified its work programme for exploratory drilling for additional hydrocarbon accretion. Additionally, in order to convert more and more of established reserves into recoverable reserves, OIL has adopted various pressure maintenance schemes, *vii.* Water/gas injection, water/polymer flooding etc., in many of the reservoirs from the very early stage of the development. Further, State-of-the-art techniques like *3t)* seismic for better reservoir delineation and other measures for better monitoring and effective management of the reservoir are also being practised which are expected to improve the recovery factor.

[Ministry of Petroleum & Natural Gas No.-0-27012/ll/98-ONG/ US(EO)dated 15-7-1999]

Observation/Recommendation (SI. No. 13 Para No. 2.47)

The Committee note that at the present estimated production rate, the recoverable reserves of oil are expected to last for another two decade only. Viewed in this context, the committee feels 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.

Reply of the Government

Normal life of an oil field depends upon its reserve potential. However, the reservoirs are managed in such a way so as to maximise the economic value of the reservoir by minimising the capital investment and operating expenses. Although the production level in the coming years is to be enhanced with improvement in recoverable oil of alrady discovered inplace oil reserves and putting up new discoveries on production, considering the current level of production the oil reserve is expected to last for about 22 years. It may be pointed out, no such approximation is valid as production of oil depends upon various factors, such as, strategic requirement, infrastructure for production, reservoir performance and technology.

ONGC has been making concerted efforts to increase the percentage of recoverable reserves (recovery factor) *vis-a-vis* established inplace hydrocarbon by carrying out studies for development of the fields and monitoring the performance. In order to improve the effectiveness of these studies ONGC has gone into upgradation of its capabilities.

- Reservoir Characterisation by data generation, evaluation of field data and detailed reservoir description.
- Preparation of technological schemes for optimum exploitation of oil and gas fields.
- * Periodic review of the performance of fields under production through reservoir simulation studies and other conventional methods.
- Reservoir management studies.
- Screening of EOR techniques. Laboratory evaluation of processed, optimization process parameters field pilot design, participation in

field 'pilot implementation, expansion of EOR processes on field scale.

- Well productivity enhancement techniques
- Field implementation of R&D studies.
- Infill driling/drain-hole drilling, optimisation of artificial lift, pressure-maintenance by water injection, water gas shut off and sand control measures etc.
- Application of Enhanced Oil Recovery (EOR) processes.
  (a) In-situ combustion process in heavy belt of Mehsana i.e. Balol, Lanwa, Santhal and Bechraji.
  (b) Polymer flooding in Sanand filed.
  (c) Microbial Enhanced Oil Recovery (MEOR) in Koshamba fields.
  (d) Alkaline Surfactant Polymer Flooding is planned in few fields like Viraj etc.

OIL has also intensified its work programme for exploratory drilling for additional hydrocarbon accretion. Additionally, in order to convert more and more of established reserves into recoverable reserves, OIL has adopted various pressure maintenance schemes, *viz.* Water/gas injection, water/polymer flooding etc., in many of the reservoirs from the very early stage of the development. Further, state-of-the-art techniques like 3D seismic for better reservoir delineation and other measures for better monitoring and effective management of the reservoir are also being practised which are expected to improve the recovery factor.

(Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/US (EO) dated 15-7-1999]

Observation/Recommendation (SI. No. 17 Para No. 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 assessement of the oil reserves in its dawitoya 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 been done to the adequate level in the past. The Committe desire that ONGC, in consultation with DGH, should take adequate corrective steps for monitoring the reservoir behaviour of various oil fields and to correctly assess their oil reserves.

Reply of the Government

In ONGC the reservior are management in such a way so as to maximise the economic values of the reservoir by minimising the capital investment and operative expenses. Reservior management in particular,

has been given very high priority by ONGC. Optimisation of production from and maintenance of health of reservoirs is monitored by a special executive committee to the CMD which reviews the reservoir of individual fields on the regional basis periodically.

ONGC has recently acquired latest software in the area of reservoir simulation, seismic processing and interpretation for better reservoir characterisation and simulation of major fields. By this technology now it will be possible to provide quick online assessment of the fields and associated remedial measures to improve recovery of the field.

In consultation with DGH the action plan for Bombay High field has already been prepared. Studies and actions identified are under various stages of implementation.

[Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/ US(EO) dated 15-7-1999]

Observation/Recommendation (SI. No. 18 Pare No. 2.52)

The Committee note the 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) Acquisation of acreages abroad.

Reply of the Government

This is a statement of facts.

(Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/US(EO) dated 15-7-1999]

Observation/Recommendation (SI. No. 19 Para No. 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 WOO 15 & 16, new pools and extension of pools in B-59, B-127, B-192 etc. in Bombay offshore.

Reply of the Government

The observations of the committee are a statement of facts. The enhanced exploratory inputs planned for Cambay, Bombay and Upper Assam basins were considered while framing the Annual Plans. Hence it had become an integral part of ONGC's Annual Plans. The physical inputs expended in these basins during the VIII Five Year Plan are given in Statement-1. As a result of these inputs the reserves accreted are given in Statement II.

STATEMENT-1

PHYSICAL INPUTS DURING VIII PLAN (1992-97)

Basin	Seismic		Exploratory Wells	
	2D SLK	2D GLK#	3D SSK/LK	
Cambay	45807	1684	1892*	447
Upper Assam	12163	43	745	62
Bombay offshore	39530	—	102678	162

Includes Kutch & Saurashtra
Contract Surveys

STATEMENT-II

RESERVES ACCRETION DURING 1992-97

OIL AND OIL EQUIVALENT OF GAS

UNIT:MMt

	INPLACE VOLUME OF HYDROCAR-BONS	ULTIMATE RESERVES	
Cambay	127.43	30.21	
Upper Assam	22.63	6.68	
Bombay Offshore	300.74	70.34	

NOTE: The figres against 1992 are for the period 1.1.92 to 31.3.93
(Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/ US(EO) dated 15-7-1999]

Observation/Recommendation (SI. No. 20, Para No. 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.

Reply of the Government

'3D' seismic survey began in 1985-86 in the onland and in 1987*88 in offshore areas. Since then '3D' seismic surveys have become an important part of ONGC's operational activities. In the IX. plan a major thrust is on '3D' data acquisition. During the IX plan ONGC envisages to acquire 186639LK/GLK of '3D' data in the areas under it's operational control.

Under intensive exploratory efforts in the prolific-producing basins viz. Bombay offshore, Cambay and Upper Assam, the pace of 3D API has been enhanced and a total quantum of 1,67,255 LKM/GLK 3D seismic acquisition has been planned during IX plan in these basins. The quantum of 3D seismic data acquired since inception till 1.4.99, the status of various 3D API campaigns, 3D seismic exploratory input planned during IX plan and achievement during the first two years of the IX plan are the following:

Basin	3D seismic Campaigns				3D	3D
Under Acquisition	Under Processing	Under Interpre-tation	Inter-preted	Acquisition since inception till 1.4.99	seismic coverage during 1997-98, 1998-99	
Upper Assam	4	3	4	6	8369 GLK	2823 GLK
15	27196 GLK	15024 GLK				

Bombay of tihore

10	305388 LKM	173439 LKM

3D seismic surveys have helped provide more detailed structural definition of the prospects, guided field delineation efforts, improved reservoir characterisation and field delineation efforts,

[Ministry of Petroleum and Natural Gas No. 0-27012/11/98-ONG/

Observation/Recommendetion (Sl.No. 21, **Para** No. 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.

Reply of the Government

The exploration programme for IX plan was originally formulated in 1995-96, based on the evaluation of petroleum systems at basinal level and hydrocarbon plays at sectoral level. This approach of forward modelling lead to quantification of the seismic survey requirements and exploratory drilling taking into account the results obtained during VIII plan vis-a-vis the need to achieve an economically pragmatic reserve accretion targets. Thrust areas for intensive and extensive exploration were identified for all basins. Value added exploratory inputs are envisaged for the following matured areas of exploration in other producing basins (apart from Cambay, Upper Assam, and Bombay offshore):

INTENSIVE **EXPLORATORY** EFFORTS:

KRISHNA-GODAVARI:

* Gondwana prospects west of Mandepeta.
* Paleogene prospects in and around Island block.
* Cretaceous plays in southern flanks of Tanuku Horst.
* Nandigama plays in the coastal tract of Bantumilli area.
* Ncogene prospects (Rawa plays) in Amalapuram offshore area.

CAUVERY BASIN:

* Cretaceous-Tertiary plays in Karaikal high flank area.
* Cretaceous plays on the flanks of Tranquebar sub-basin.
* Tertiary plays on the western flank of Madanam high.
* Perungulam plays in Ramnad sub-basin.

EXTENSIVE **EXPLORATORY** EFFORTS:

Moderate exploratory inputs will be expended in the following areas for assessing the hydrocarbon prospectivity:

ASSAM-ARAKAN FOLD BELT

- Up-thrust and sub-thrust prospects in Tipam, Barail and pre-Barail sequences in the brow zone of Naga Hill and Belt of Schuppen.
- Structural and Strati-structural prospects in Cachar and South Shillong Front.
- Structural prospects for the Neogene and Paleogene sequences in Eastern Tripura.

KRISHNA-GODAVARI;

* Mesozoic prospects in Krishna sub-basin.

CAUVERY

* Prospective flanks of Tanjore and Nagapattinam sub-basins.

The following strategy initiatives have been envisaged for the non producing/frontier basins.

- Intensifying exploration activities in logistically and environmentally difficult areas e.g. Assam Arakan Fold Belt and Himalayan Foot Hills.
- Adopting state-of-the-art technologies to enhance subsurface imaging in geologically complex areas like thrust fold belts, sub-trappean sequences and deeper prospects in known basins.
- Spreading exploration to acreage's where in spite of elusive commercial success, knowledge building through initial exploratory inputs needs continuation and enhanced physical inputs e.g. in Kerala-Konkan and Kutch offshore etc.
- Continued intellectual inputs in teaser basins like Bengal and Rajasthan.
- Continued exploration for knowledge building in frontier basins as long term strategy.

Thrust is being given by OIL also for intensive and extensive exploration of the areas of the other basins where OIL'S PEL areas exist.

[Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/ US(EO) dated 15-7-1999].

Observation/Recommendation (SI. No. 22, Para No. 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 geo-physical 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 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.

Reply of the Government

The geo-physical survey programme being essentially a reconnaissance and reference modelling programme is designed to enhance geological knowledge on habitat of oil in basins of less known or unknown potential and therefore an upgradation of lower category basins. No direct or tangible benefits in reserve accretion or financial terms are expected, but the programme is more than likely to open up new vistas of exploration and therefore, is a part of *l*ong' term initiative.

Proposal for funding the 1st phase (1995—98) of NSP to the tune of Rs. 440 Crores was submitted. Dockets and data packages of all identified 20 blocks for Phase-1 had been finalised. Necessary clearance has been given by the Ministry of External Affairs for NSP Blocks 2 to 16, 18 and 20. Boundaries of blocks 1, 17 and 19 were modified and submitted.

[Ministry of Petroleum and Natural Gas No. 0-27012/11/98-ONG/ US(EO) dated 15-7-1999]

Observation/Recommendation (SI. No. 23, (Para No. 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.

Reply of the Government

Please *see* replies to recommendation SI.No. 24 and 25.

[Ministry of Petroleum and Natural Gas No. 0-27012/11/98-ONG/ US(EO) dated 15-7-1999]

Observation/Recommendation (SI.No. 24, **Para** No. 2.58)

The Committee find that ONGC 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 appraised of the achievements in this regard.

Reply of the Government

Deep water areas for oil and gas exploration are defined as the sedimentary basinal areas falling beyond 400 m bathymetry. In India, such sedimentary tracts are available both off the western and eastern coasts falling within Arabian Sea and Bay of Bengal respectively.

Oil and Natural Gas Corporation Limited with initial success in its endeavour during eighties, has chalked out a comprehensive and definitive strategy for the Indian deep water exploration. ONGC has acquired in areas deeper than 400 m about 108495 LKM of 2D and 11336 LKM of 3D seismic data. In addition to seismic surveys, geochemical surveys have also been carried out in parts of western deep water offshore. Two wells have been drilled in deep water areas of Krishna-Godavari Basin in the east coast of India in early eighties, of which one is oil bearing (G-2-2).

Based on the interpretation carried out so far, many leads have been obtained for further analysis and evaluation. Four of these prospects, one each in Krishna-Godavari, Cauvery, Kutch and Kerala-Konkan basins have been prioritised for exploratory drilling of which the prospect in Kutch falls in a bid block under Joint Venture Exploration Block offered by GOI in 1995. Attempts to take up drilling on the prioritised prospects in the year 1997*98 were not successful due to enhanced global activities in deep water areas precluding availability of the suitable drilling rigs.

In order to take up deep water exploratory drilling, ONGC decided to upgrade its own drillship Sagar Vijay, to operate upto 900 m water depth. The drillship drilled the first exploratory well in Cauvery deep water offshore at CDW-I location in the year 1998-99. The water depth at the location was of the order of 772 m. The well proved to be dry and was abandoned. The second well G-I-AD in Krishna-Godavari basin was drilled in a water depth of 530 m. This well was abandoned dry.

Concurrent with the initiation of its Deep Water activities, ONGC has been in touch with several leading exploration and production companies, with adequate experience in exploration and exploitation in Deep Water areas, looking for opportunities of possible JV/strategic alliance not only to cut down the risk but also to have access to the relevant technologies in the shortest possible time. Many of these companies have expressed keenness to undertake the Deep Water exploration activities in Indian deep waters in association with ONGC.

In addition to ONGC, DGH has also acquired and processed about 12500 line kilometers of 2D Speculative Seismic Data in East Coast &

Andaman Offshore under a joint venture programme.

The regional interpretation of this data carried out jointly by Western Geophysical and Directorate General of Hydrocarbons has also incorporated data from sixteen wells drilled in the adjoining shallow offshore areas. Based on this new data acquired by DGH, data packages been prepared and 12 deep water blocks have- been offered under the NELP round for the first time. Regional gravity and magnetic data were also acquired along with 2-D seismic data.

[Ministry of Petroleum and Natural Gas No. 0-27012/11/98-ONG/ US(EO) dated 15-7-19993

Observation/Recommendation (SI. No. 25, Para No. 2.59)

The Committee note that data acquisition are in different stages in the frontier areas of exploration. Based on evaluation of data on hand, four exploratory locations were been prioritised for drilling in the VIII Plan, in the deep water areas of west and east coasts. ONGC 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.

Reply of the Government

Mesozoic Prospects In Kutch Offshore.

Exploration in Kutch Offshore is being pursued with objectives in Mesozoic and Tertiary sequences.

The first well with the objective of Mesozoic exploration was drilled in 1992 which established the occurrence of hydrocarbons in Mesozoic sequence. Another well drilled in 1994, however proved to be dry.

The inputs planned for exploration in Kutch Offshore during IX plan consist of 11000 LKM of '3D' seismic survey and 5 wells after the seismic data are interpreted to infer depositional, deformational and entrapment pattern.

About 1732 LKM of '2D' seismic data has been acquired in 1996-97 with specific objective to identify possible Mesozoic prospects. The data has been processed and currently under interpretation for prospects generation.

South Rewa Basin

ONGC initiated geological surveys in the basin in 1986-87. Since the most of the basinal areas have been covered by semi-detailed mapping along with reconnoitory traversing. These investigations have helped in establishing the stratigraphic and structural framework of the basin.

Ground gravity-magnetic surveys began in 1988-89 to provide a fair idea of the basement configuration. Based on the results 2D seismic surveys were conducted in the basin since 1990-91. Till date most of the basin has been covered by regional and semi-detailed seismic survey.

Analysis of the geo-scientific surveys has indicated presence of two lows *viz.* Khadda and Pather low separated by Tetka high. Two exploratory locations were released; one in each low to probe hydrocarbon prospects in the lower Gondwana plays. The first well Tihki-I was drilled in Khadda low. There was no hydrocarbon shows in the well. The data acquired in the basin are under review to firm up further exploration programme in the basin.

Satpura Basin

ONGC initiated geological surveys in the basin in 1983-84. Since then, the entire basin has been covered by semi-detailed mapping along with reconnoitery traversing.

Ground gravity magnetic surveys have been conducted in the basin since 1985-86. It has brought out the basement configuration in fair detail. The presence of intrusives in the basin has also been outlined. 2D seismic surveys were carried out in the last two field seasons, though a couple of refraction and reflection profiles were shot around Anhoni in 1986-87. One well Anhoni # I was drilled in 1997-98 to a depth of 4009m and was abandoned as dry.

Two R&D locations are available for exploration of CBM. Presently ONGC is acquiring '2D' seismic data in Satpura in the Gowadi-Delakhari area.

Gondwanic Reservoirs in K.G. Basin

Presence of Gondwana sediments has been proved both in K.G. and Pranhita-Godavari basins whihc lie orthogonal to each other *viz.* Pranhita-Godavari graben trends NW-SE and Gondwanic graben below the Tertiary cover of K.G. Basin trends almost NE-SW.

ONGC started its exploration activities for hydrocarbons in Gondwana areas of both K-G and Pranhita-Godavari basins during seventies with acquisition of seismic data. So far, for Gondwana play in the K-G basin,

4965 GLK of "2d' and 130 SSK of '3D' seismic data have been acquired. Similarly, in Pranhita-Godavari basin, 946 GLK of refraction & Single fold reflection seismic and 1100 GLK of multifold CDP seismic data have been acquired by ONGC.

Exploratory drilling for Gondwanic sediments started in the year 1986 which drilling of well Draksharama-I in the K-G basin. Subsequent drilling efforts led to the first hydrocarbon strike (gas) in the Gondwana sediments at Mandapeta in the year 1988.

With the discovery of gas at Mandapeta, exploration efforts for Gondwana play not only continued in K-G basin but also efforts were spread to Pranhita-Godavari graben with the drilling of well Aswaraopet-I in the year 1991. But, the well was found to be dry without presence of hydrocarbons. Subsequently, the Pranhita-Godavari area has been awarded as a exploration block (GN-ON-90/3) by Govt. of India under the 4th round of exploration bidding to a consortium led by HOEC.

However, exploration efforts continued for Gondwana play in the K-G basin and so far 15 prospects and 38 wells have been drilled of which 2 prospects and 12 wells are hydrocarbon bearing respectively.

Currently, two fields are under production from these reservoirs at an average daily production of about 0.6 MMSCM.

In addition to the efforts of ONGC and OIL under APEX, DGH also conducted reconnoitery exploratory surveys with the objective of opening up of hitherto unexplored areas for future exploration. The efforts of DGH were mainly in areas where the information was required to be upgraded and operating companies would normally not go for exploration in such areas on commercial consideration unless the information of these areas is adequate to develop the geological perception. Thus, DGH is creating minimum data base for National and Private oil companies to look into new areas. The details of surveys undertaken by DGH during the VIII Plan period are as under:

(i) Seismic and GM Surveys covering 11,035 LKM in deep waters East Coast, Andaman-Nicobar offshore (under JV Speculative Survey Programme).
(ii) Aeromagnetic Surveys covering 23,730 LKMs in Kutch onland areas.
(iii) Magnetic Telluric Surveys covering 211 surroundings in Nagpur-Wardha areas.

As a result of these efforts, DGH has opened up about 0.61

million sq. kms. of the sedimentary area. These opened up areas would be the future areas for exploration in the years to come. During the remaining IX Plan period, DGH proposed to conduct various geoscientific surveys in several other unexplored/poorly explored area.

[Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/ US(EO) dated 15-7-1999]

Observation/Recommendation (SI. No. 27 Para No. 2.108), SI. No. 28 (Para No. 2.109) and SI. No. 42 (Para No. 2.123)

SI. No. 27 (Para No. 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 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.

SI. No. 28 (Para 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.

SI. No. 42 (Para No. 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.

Reply of the Government

The observations of the Committee have been noted and will be complied with. Some of the steps which are alrady being taken to check the decling trend of crude oil production are enumerated below:—

Both short term and long term measures have been taken during last seven to eight years to improve the performance of the producing fields in western offshore. The actions taken/being taken are mentioned briefly as under:—

1. Bombay High

(i) Re-completion of poor/non-performing wells by side tracking which helps in relocation of an existing well in better producing part of the field. This type of completion on selective wells have given encouraging results in terms of improved production, reduction in Gas oil/water ratios.

(ii) Drain holes have also been drilled in selective wells to exploit the oil/gas from the area having poor petro-physical properties.

(iii) Horizontal wells have also been drilled on selective basis where the pay thickness meets the requirement for successful horizontal well drilling. The production from horizontal wells is generally 1.5 to 3 times the production from conventional wells.

(iv) Services of an international expert of "Gel" technology has been hired on long term basis and the implementation of this technology is planned to be tried on R&D basis on the wells already identified. This technology is planned to be used during the current calendar year for controlling excessive gas and water production in producers and water profile modification in water injection wells.

(v) In-fill development wells are being drilled to exploit the bypassed oil/ un-drained reserves till the full fledged additional development scheme is

finalised based on the new geological model incorporating the 3-D Seismic data recently acquired by ONGC. The revised model as well as .(development scheme will be finalised in association with the reservoir consultant of international repute hired by ONGC. This is expected to be finalised by mid 2000.

(vi) As most of the exisiting well slots on well platforms in offshore have already been used, an innovative concept of "add on slot" has been developed which is cost effective to drill additional wells to exploit the nearby areas from the existing well platforms. 14 such wells have already been drilled in Bombay High and around twenty more such wells are planned in 1999-2000.

2. Neelam

To arrest decline in production from Neelam field, following actions have been taken:—

* A multi-disciplinary team has been constituted to give focussed attention for future exploration of the field.
* Control of water production by redistribution of injection water.
* Closure of specific wells having high Gas Oil Ratio (GOR).
* Wells have been put/planned to be put on artificial lift through conventional and innovative techniques.

3. Heera

To improve the production from the field, new technology of drilling

"MULTILATERAL WELLS" has been used successfully with in-house expertise and the preliminary results are very encouraging. The reservoir management in particular has been given high priority.

4. Various other measures being taken to increase the production of crude oil are:

* Intensive and extensive exploration including in frontier areas and deep waters to augment reserve base.
* Increased private participation in Exploration and Production activities including under New Exploration Licensing Policy (NELP).
* Adoption of specialised technologies such as Extended Reach Drilling (ERD), horizontal and drain hole drilling, scale removal treatment jobs and long drift side tracking of wells.
* Implementation of new schemes of oil/gas development.
* Improving the recovery percentage from the producing fields.
* Reducing Reserve/Production (R/P) ratio of fields having high R/P.
* Better Reservoir management of oil fields.
* Acquisition of equity oil from overseas venture.

[Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/ US(EO) dated 15-7-1999]

Observation/Recommendation (SI. No. **31, Para** No. 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 31.39 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.

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 Rawa platform etc. The Committee have been informed that lesser gain from wells occurred due to unexpected reservoir behaviour of the existirig 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.

Reply of the Government

ONGC has developed capacity and expertise and is undertaking R&D activities related to following areas of reservoir management for various work centres.

* Reservoir characterisation by data generation, evaluation of field data and detailed reservoir description.
* Preparation of technological schemes for optimum exploitation of oil and gas fields.
* Periodic review of the performance of fields under production through reservoir simulation studies and other conventional methods.
* Reservoir management studies.
* Screening of EOR techniques, laboratory evaluation of processes, optimisation process parameters, field pilot design, participation in field pilot implementation expansion of EOR processes on field scale.

* Well productivity enhancement techniques.
* Fields implementation of R&D studies.
* Participation in specific operational activites involving reservoirs.

Institute of Reservoir Studies at Ahmedabad, ONGC, has been instrumental in suggesting/adopting and inducting the various st8te of art technologies in reservoir management. Since its inception, IRS has contributed effectively in the development of new concepts, technologies and innovative techniques besides adaptation of state-of-art technology advancement as a part of corporate concern.

Latest major software in the area ot Simulation (Eclipse), Reservoir Characterisation (RC2), Gridstat and Seismic Processing *and* Interpretation have been added. Intensive training has been provided to the officers for better understanding of reservoir characterisation.

Layer-wise reservoir management are being done for better performance fields and this will lead to enhance the production and recovery factor.

In order to meet the objectives drawn by IRS, multidisciplinary teams are created for online monitoring of major fields to upgrade the laboratory facilities, possible areas and collaborators have been identified. Studies on high 'pressure air injection is expected to begin shortly in association with University of Calgary in the field of EOR for light and medium oils. To further develop the human resources development extensive training work association and consultancy is' being planned. Extensive in house training is also planted.

IRS has entered into a Membership agreement with Computer Modelling Group Calgary, Canada, SSI for work bench simulator agreement is being, planned with IFF, France, NCL-Pune, TERI-Delhi, Alberta Economic Development, Canada and University of New South Wales, Australia.

(Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/ US(EO) dated 15-7-1999]

Observation/Recommendation (SI. No. 32, Para No. 2.113)

The Committee note that frequent power shutdown by State Electricity Board 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.

Reply of the Government

Loss of oil production due to power shut down is mainly from artificial lift well in ERBC (Assam) and WRBC (Gujarat) (expecially in North Gujarat area). Various actions taken by ONGC in EBRC and WRBC are:—

1. ERBC

(a) Laying of separate dedicated power feeder from ASEB wherever feasible. For example, latest action in hand is laying of a separate feeder from ASEB to Laxmijan, which is anticicpated to be completed by May, 99.

(b) Augmenting power supply through creation of captive power generation facilities im major fields. At present, ONGC in ERBC has following captive power plants:

1. Lakwa : 3x3 MW gas turbine generators
2. Geleki : 2x3 MW gas turbine generators
3. Rudrasagar : 1x3 MW gas turbine generators

(c) Almost all important installations in the above three fields are connected through captive power plants. Thus the region has been able to minimise the frequency of power shut downs thereby ensuring uninterrupted operations for longer periods.

(d) There is technical problem for connecting captive power to overhead feeders in Lakwa and therefore these feeders are fed through ASEB. A modification of switch gear of Lakwa Captive Power Plant, which is aimed at improving upon existing situation, has been taken up and is anticipated to be completed by Jun' 99.

II. WRBC

1. In WRBC (Gujarat), power supply position and availability has considerably improved. For the areas/wells where supply is from rural feeder, action is in hand to change the same to industrial feeder, wherever feasible, considering criteria of transmission line length and well potential. Some of these feeders has been changed and actiori for the remaining is expected to be completed by this year end.

2. The wells are scattered over in the various oil fields. The power is received from various feeders and there is no concentrated load. As such the captive power is not going to help. In view of this, facility for captive power plant is not considered necessary.

[Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/US (EO) dated 15.7.1999]

Observation/Recommendation (SI. No. 33, Para No. 2.114)

Deterioration in environmental conditions 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 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 ONGCL operations have been suitably beefed up. The Committee desires 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.

Reply of the Government

The Ministry of Petroleum and Natural Gas has been extending all possible assistance and cooperation to ONGC in arranging adequate security to maintain crude oil production as per target. The matter is also taken up with the Ministry of Home Affairs and concerned State Governments and other agencies whenever the situation so warrants.

[Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/US (EO) dated 15.7.99]

Observation/Recommendation (SI. No. 34, Para No. 2.115)

The Committee note that the Director General of Hydrocarbons monitored the Bombay High field and gave suggestions to 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 Bomaby 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.

Reply of the Government

Various rectificatory measures undertaken for revival and further development of Bombay High Field are:—

ONGC is continuing with their efforts in maintaining the production and health of the reservoir in terms of work-over, side tracking of wells, critical field data gathering and redistribution of water injection in Bombay High field.

For improvement of the health of Bombay High reservoir, the Government had appointed a committee headed by Dr. K. Narayanan. The Committee had submitted its report on Bombay High in September, 1997. In order to implement the recommendations of the Committee, a monitorable action plan was drawn up for improving the reservoir health of Bomaby High. The implementation of this action plan by ONGC is monitored in the Ministry on a continuous basis.

As per the recommendations of the Narayanan Committee report,

ONGC has engaged internationally reputed consultant *M/s* GCA in December, 1997. The areas of activity of M/s GCA are (1) Reservoir studies and characterisation, (II) Operational Approach and (III) Strategic advice. They are in close interaction with the technical staff of ONGC and studies related to reservoir health are being firmed up with their advice.

In addition one of the major efforts being pursued is WAG (Water Alternate Gas) as one of the possible means to enhance oil recovery in future. A joint team of ONGC and DGH has held discussions with Norwegian companies. ONGC has also initiated laboratory investigations for assessing the efficacy of WAG in Bombay High. ONGC is also entering into collaborative study with University of Calgary for lab experiment on air injection.

3-D data has been acquired, processed and a preliminary interpretation report has been susbrnitted by PGS in the first week of November, 98. ONGC is reviewing the data for using the same for detailed reservoir characterisation of main producing reservoirs. This would lead to more accurate models for simulation studies for finalising the further development programme of the field.

[Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/US (EO) dated 15.7.1999)

Observation/Recommendation (SI. No. 35, Para No. 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 offerd 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.

Reply of the Government

Recommendations of the Committee to take timely corrective measures to obviate delays in finalisation of the contracts/mobilisation of crew in respect of the achievements of targets pertaining to seismic survey has been noted for future guidance and all out efforts will be made sincerely to ensure to achieve the targets as stated out in the Annual Plan.

[Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/ US(EO) dated 15-7-99]

Observation/Recommendation (SI. No. **36, Para** No. 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 inachievement 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 ?re 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 recommended 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.

Reply of the Government

The recommendations of the Committee have been noted for future guidance However, constraints in achieving the targets are some time beyond the control of the company particularly when frequent bandhs and blockades with regard to environmental problems take place. Moreover, extremely poor road conditions in and around OIL'S oilfields in Assam affect movement of men and materials to a great extent. Apart from the above, the drilling programme is also effected to a great extent due to unprecedented floods affecting preparation of the well sites. Nevertheless, the company shall endeavour to ensure to meet the drilling target as set out in the Annual Plan.

[Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/ US(EO) dated 15-7-99]

Observation/Recommendation (SI. No. 37 (Para No. 2.118) and SI. No. 38 (Para No. 2.119)

SI. No. 37 (Para No. 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 improper etc. could have been avoided had OIL anticipated these problems and taken remedial measures in advance to overcome them. The Committee expect the 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.

SI. No. 38 (Para No. 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 production shall be taken with due promptitude so that actual achievement of crude oil production tally with the targets laid.

Reply of the Government

Various steps taken by Oil India Limited have resulted in increase in production of crude oil in the last two years and have surpassed the targets. The target *vis-a-vis* achievement of crude oil production from OIL'S fields in Assam during 1997-98 and 1998-99 (estimated) are as under:—

Year	Crude Oil Production (MMT)	
	Target	Achievement
1997-98	3.05	3.089
1998-99	3.20	3.272

The production of 3.27 MMT during 1998-99 is the highest ever crude oil production recorded by Oil India Ltd.

Oil India Limited expects to maintain the increasing trend of crude oil production through various steps taken for augmentation of production. The target for crude oil production during 1999-2000 has been kept at 3.30 MMT.

[Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/ US(EO) dated 15-7-1999]

Observation/Recommendation (SI. No. 39, Para No. 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 not 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 year.

The Committee are informed that ONGCL has invited McKinsey & Co., a consultancy firm to help organizing 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 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 lates technology in augmentation of crude oil production in various oil fields ofONGCL.

Reply of the Government

Various steps taken by ONGC for technological updation and restructuring are:—

Technology Induction:

Exploration of oil and natural gas involves acquisition, processing and interpretation of surface and subsurface geological and geophysical data leading to evolution of geological models using state of the art technologies.

Likewise, exploitation of hydrocarbons also is being revolutionized by use of innovative technologies like Extended Reach and Horizontal drilling, 4D seismic Crosswell, Tomography, Water Shut off using Gels and Polymers, Microbial EOR etc.

Seismic

1. For seismic data acquisition 19 new system were procured with state of the art technology (Telemetry, 24 bit Delta Sigma technology 1996-97).

2. For processing of seismic data, acquisition of new processing system having state of the art technology is in progress for SRBC, WRBC, ERBC, GEOPIC where as for MRBC, CRBC & IRS it has already been installed.

3. For seismic data interpretation state of the art Interactive work stations (19 Nos.) have been procured and are in use.

Logging

1. For log data acquisition new EXCELL 2000 logging systems have been procured having state of the art technology (Advanced operating system, work station environment. Networking capability) and with improved latest version down hole tools having Digital Interactive Telemetry. Down hole tools include the special tools like CAST, HFDT, LFDT, HRI, SFT, SNSG.

2. For log data processing state of the art work stations have been procured. With the use of the log processing software developed in house, which are at par with those available with service companies leg data processing requirements are being met in-house.

3. In addition to above, the latest technologies available with services companies are also being utilized through service contracts.

Following technologies were inducted last year:

(i) Logging
(A. Contractual: Platform Express, CMR & MDT.
B. 5 Nos. of Open Hole & 2 Production Logging units from Halliburton.
(ii) Interpretation & Processing work station for IRS.
(iii) Electronic Memory Gauges with in built & special software.
(iv) Ground electronics for 400 channel for SN-388 units in SRBC.

ONGC embarked upon Organisation Transformation Project (OTP) in association with McKinsey & Company, Inc., a leading international management consultant, in March, 1997.
Phase-1: Daignostic study and setting direction
Phase-II: Redesigning organisation structure and key business processes
Phase-III: Implementation of pilots and fine tuning of recommendations
Phase-IV: Roll out of recommendations across the organisation
Based on the initial diagnostics, it was decided to:
* Adopt asset based management structure with decentralised control closer to line managers
* Adopt Task oriented multi-disciplinary team working approach instead of functional business groups.
* Review of existing MM, finance, HR System and procedures, performance management system and
* Renew focus on exploration in India and overseas.

In view of the above, the concept developed for the new organisation has five components.
'Producing Assets-to focus on reservoir management in prouducing fields
+Exploratory Assets-to focus on reserve accretion
*Shared Services-to provide services to assets and other services
'Support functions like HR, Finance
'Corporate centre including corporate functions.

The concept is complemented by a new performance management system, which comprises of Performance Contracts between Assets/ Services and top management, Service Level Agreements between Assets/Services as users and service/support functions as service providers etc.

Further to this, it was decided to pilot asset based structure involving multi-disciplinary working approach. The new structure would be supported by redesigned systems and process and matching empowerment in areas of related activities.

First Pilot: Neelam

To simulate and demonstrate the new working approach, Neelam filed in the western offshore was indentified as the first pilot asset and its multi-disciplinary team has been handed over operational control of the field w.c.f. January 15, 1998. The comprehensive physical work programme for 1998-99 with economic justification presented to the Steering Committee of the OTP was agreed to. The data pertaining to Neelam spread over many ONGC departments have been collected and are being kept updated at a single location for access use and analysis by the team members.

The physical work programme of Neelam as mentioned above is a virtual performance contract between Neelam team and the top management. The first set of Service Level Agreements (SLAs) between the user group i.e. Neelam team and the providers for the work over and othe services have been signed. Subsequently, each service group will enter into performance contracts with top management based on their SLAs.

WRBC Pilot

The Neelam pilot initiative aimed at introducing and fine-tuning the asset bassed model in a producting field only. Western Region has been planned as the second OTP initiative which is an onshore area where all the four key elements of the structure viz. Producing and exploratory assets, centralized and regional services and support functions would be piloted. In principle approval of the executive Committee for the pilot implementation was accorded. Necessary instructions have been issued for placing the asset based management model into practice in WRBC. Preparatory work for initiation of the pilot implementation is currently in progress.

Review of Key decision making processes

Task forces in the following areas, sponsored by respective Directors, were formed to develop and help implement structure, systems and procedures aligning to asset based management model.

*Exploration
'Reservoir Management
•Drilling
•Materials Management
•Logistics
•Human Resource Management
•R&D and other institutes

Recommendations of these task forces would be piloted in above mentioned pilot locations viz. Neelam and WRBC.

(Ministry of Petroleum & Natural Gas No. 0-27012/II/98-ONG/ US(EO) dated 15-7-1999]

Observation/Recommendation (SI. No. 40, Para No. 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 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.

Reply of the Government

ONGC has chalked out a comprehensive and definitive strategy for the Indian deep water exploration. So far, ONGC has acquired in areas deeper than 400 m. about 108495 LKM of 2D and 11336 LKMof 3D seismic data. In addition to seismic surveys, geochemicals surveys have also been carried out in parts of western deep water offshore. Two wells have been drilled so far in deep water areas of Krishna-Godavari Basin in the east coast of India of which one in oil bearing (G-22).

During 1997-98, 1460 LKM of 2D seismic data has been acquired in the deep water areas of western offshore. In the Eastern Offshore, about 2000 LKM of 3D seismic data, of which a part falls in shallower shelf area was acquired. The acquired data are under various stages of processing and interpretation.

Based on the interpretation carried out so far, many leads have been obtained for further analysis and evaluation. Four of these prospects, one each in Krishna Godavari, Cauvery, Kutch and Kerala-Konkan basins have been prioritised for exploratory drilling of which the prospects in Kutch falls in the bid block under joint venture Exploration, Block offered by

Govt. of India in 1995. Attempts to take up drilling on the. prioritised prospects in the year 1997-98 were not successful due to enhanced global activities in deep water areas precluding availability of the suitable drilling rigs.

In order to take up exploratory drilling, ONGC decided to upgrade its own drillship SAGA VIJAY to operate upto 900 meter water depth. The drillship drilled the first exploratory well in Cauvery deep water offshore at CDW-I location. The water depth at the location was of the order of 760 m. The well, though proved to be dry and was abandoned. The second well G-IAD in Krishna-Godavari basin is under drilling currently.

Concurrent with the initiation of its Deep activities, ONGC has been touch with several leading exploration and production companies, with adequate experience in exploration and exploitation in Deep water areas, looking for opportunities of possible JV/strategic alliance not only to cut down the risk but also to have access to the relevant technologies in the shortest possible time. Many of these companies have expressed keenness to undertake the Deep water exploration activities in Indian deep waters in associations with ONGC.

{Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/ US/(EO) dated 15-7-1999]

Observation I ecommendation (SI. No. 42, Para No. 2.123)

The Committee would like the ONGC 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.

Reply of the Government

Some of the steps which are already being taken to check the declining trend of crude oil production are enumerated below:—

Both short term and long term measures have been taken during last seven to eight years to improve the performance of the producing fields in western offshore. The actions taken/being taken are mentioned briefly as under:—

1. Bombay High:

(i) Re-completion of poor/non performing wells by side tracking which helps in relocation of an existing well in better producing part of the field. This type of completion on selective wells have given encouraging results in terms of improved production, reduction in Gas oil/water ratios.

(ii) Drain holes have also been drilled in selective wells to exploit the oil/gas from the area having poor petro-physical properties.

(iii) Horizontal wells have also been drilled on selective basis where the pay thickness meets the requirement for successful horizontal well drilling. The production from horizontal wells is generally 1.5 to 3 times the

production from conventional wells.

(iv) Services of an international expert on "Gel" technology has been hired on long term basis and the implementation of this technology is planned to be tried on R&D basis on the wells already identified. This technology is planned to be used during the current calendar year for controlling excessive gas and water production in producers and water profile modification in water injection wells.

(v) In-fill development wells are being drilled to exploit the bypassed oil/ un-drained reserves till the full fledged additional development scheme is finalised based on the new geological model incorporating the 3-D Seismic data recently acquired by ONGC. The revised model as well as development scheme will be finalised in association with the reservoir consultant of international repute hired by ONGG. This is expected to be finalised by mid 2000.

(vi) As most of the existing well slots on well platforms in offshore have already been used, an innovative concept of "add on slot" has been developed which is cost effective to drill additional wells to exploit the nearby areas from the existing well platforms. 14 such wells have already been drilled in Bombay High and around twenty more such wells are planned in 1999-2000.

3. Neelam:

To arrest decline in production from Neelaro field, following action have been taken:

* A multi-disciplinary team has been constituted to give focussed attention for future exploration of the field.

• Control of water production by redistribution of injection water.

* Closure of specific wells having high Gas Oil Ratio(GOR).

* Wells have been put/planned to be put on artificial lift through conventional and innovative techniques.

3. **Heera:**

To improve the production from the field, new technology of drilling "MULTILATERAL WELLS" has been used successfully with in-house expertise and the preliminary results are very encouraging. The reservoir management in particular has been given high priority.

4. Various other measures being taken to Increase the production of crude oil are:

* Intensive and extensive exploration including in frontier areas and deep waters to augment reserve base.

* Increased private, participation in Exploration and Production activities including under New Exploration Licensing Policy (NELP).

* Adoption of specialised technologies such as Extended Reach Drilling (ERD), horizontal and drain hole drilling, scale removal treatment jobs and long drift side tracking of wells.

* Implementation of new schemes of oil/gas development.
* Improving the recovery percentage from the producing fields.
* Reducing Reserve/Production (R/P) ratio of fields having high R/P.
* Better reservoir management of oil fields.
* Acquisition of equity oil from overseas venture.

[Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/ US(EO) dated 15-7-1999.

Observations/Recommendations (SI. No. 44, Para No. 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.

Reply of the Government

The suggestions of the Committee have been noted. It has been the constant endeavour of ONGC/OIL to keep themselves abreast of the technological developments in the areas of exploration and exploitation.

[Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/ US(EO) dated 15-7-1999]

Observation/Recommendation (SI. No. 45, Para No. 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 sect,or 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 to 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, Governments have been inviting these bids on round-the-years basis.

Reply of the Government

The observation is a Statement of facts.

[Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/ US(EO) dated 15-7-1999]

Observation/Recommendation (SI. No. 46, Para No. 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.

Reply of the Government

The observation is a Statement of facts.

[Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/ US(EO) dated 15-7-1999]

Observation/Recommendation (SI. No. 47, **Para** No. 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 year 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 8 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, Cuvery 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 expl'oration 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.

Reply of the Government

As a step in this direction. Government has announced New Exploration Licensing Policy (NELP) which provides attractive incentives. These include:

(i) Freedom to market the crude oil and gas discovered in the blocks under the NELP in the domestic market.

(ii) No payment of signature, discovery or production bonuses under NELP.

(iii) Cess on crude oil has been completely abolished.

(iv) Royalty payments will be on ad-valorem basis (@ 12.5% for onland areas and 10% for offshore areas).

(v) Royalty will be charged at half rate for deep water offshore areas beyond 400 mts., bathymetry for first 7 years after commencement of commercial production.

(vi) F & P sector has been provided infrastructure status enabling Tax Holiday for seven years from the date of commencement of commercial

production.

(vii) Exemptions of import duty on imports of goods for petroleum operations.

(viii) Fiscal stability to be provided in the contract. A Petroleum Tax Guide will be made available for facilitating investors.

(ix) Contribution of site restoration fund is income tax deductable and cost recoverable.

(x) There will be no state participation or carried interest by the National oil companies.

The policy is now under implementation. First round under NELP offering 48 exploration blocks including 12 deep water blocks offered for the first time, has been announced.

(Ministry of Petroleum & Natural Gas No. 0-27012/IJ/98-ONG/US (EO) Dated 15-7-1999]

Observation/Recommendation (SI. No. 48 Para No. 3.34) and SI. No. 49 Para No. 3.35)

SI. No. 48 (Para No. 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, the Joint Venture Exploration, rounds have still not been signed. The delay in finalisation of bids have been a tributed to the time taken by bidders in responding to queries, negotiations with bidders, complex procedures involved in the negotiations and inadequate manpower/machinery in the Ministry of Petroluern & Natural Gas.

SI. No. 49 (Para No. 3.35) The Committee need hardly appreciate the number of years being taken in conclusion of agreements for commercial decision in oil exploration as compared to not more than three months elsewhere in the world. The Committee desire that Ministry should suitably strenthen its machinery dealing -with the work of inviting, finalizing 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 comract negotiations to obviate delay that may be caused due to cumbersome procedure involved in award of contracts to successful bidders.

Reply of the Government

Delays in finalising the award and contracts were mainly due to long time taken by bidders to respond to clarifications, protracted negotiations with the companies and multiple level of clearances and approvals. However, several steps have been taken by the Ministry to reduce the time in awarding contracts. To avoid protracted negotiations, the Model Production Sharing Contract has been revised. Some of the provisions of

MPSC have been made non-negotiable and there will be no negotiations on such provisions. There will be point based Bid evaluation criteria to evaluate bids quickly. Petroleum Tax Guide introduced to facilitate investors will also help in cutting down time as this will remove several doubts in the mind of investors relaing to levies and taxes. A detailed bid format has been prepared to avoid references to the bidders and minimize clarifications.

[Ministry of Petroleum & Natural Gas No. 0-27012 / II /98-ONG/US (EO) Dated 15-7-1999]

Observation/Recommendation (SI. No. 55 Para No. 3.41) and S1. No. 56 (Para No. 3.42)

SI. No. 55 (Para No. 3.41) The crude oil production with contributions from ONGCL, OIL and private/joint venture 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/joint venture companies, was 34.11 million tonnes and 30.78 milion 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 nealry 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/joint venture 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 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 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 areas of the economy so that dependence on imports to meet the growing demand for petroleum products can be reduced.

SI. No. 56 (Para No. 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 18th March, 1997 for participation of private sector in the areas of exploration and production of oil. The Committee hope that these measures would giv& 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.

Reply of the Government

The policy is reviewed from time to *time* depending upon the investment climate and opportunities prevailing in other parts of the world and also based on the experience gained in the past. Review process is thus dynamic in nature.

[Ministry of Petroleum & Natural Gas No. 0-27012 /11/98-ONG/ US (EO) Dated 15-7-1999]

Observation/Recommendation (SI. No. 57, Para No. 3.43)

For the expeditious completion of contracts under the New Exploration Licensing Policy, the Ministry of Petroleum & 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.

Reply of the Government

The Model Production Sharing Contract has already been finalised and is one of the bid documents for the bidding for New Exploration Licensing Policy (NELP), which is currently open.

(Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/US (EO) Dated 15-7-1999]

Observation/Recommendation (SI. No. 58, Para No. 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 been signed and enormous delay taking place on the part of the Ministry of Petroleum & 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 oil fields. 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 as a result of new policy cannot be sustained unless there is an urgency on the part of Government in implementing it. The Committee desired 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 all exploration business in the country.

Reply of the Government

During the months of June-July, 1998 and February, 1999, the MOP&NG have signed production sharing contracts for 14 more exploration blocks which were awarded during earlier rounds. Contracts for few more blocks are expected to be signed shortly.

Delays in implementing the New Exploration Licensing Policy were mainly due to the amendments required in the Oil Fields (Regulation & Development) Act in line with NELP provisions and also in finalising the Petroleum Tax Guide, which needed concurrence of Ministry of Finance. Several steps for operationalising of NELP had been completed long back like identification of blocks and preparing of data packages and information dockets, finalisation of bid documents etc. However, New Exploration Licensing Policy is now under implementation. In January, 1999, 48 blocks have been offered.

Global NIO has been issued. Road shows have been organised at London, Houston, Calgary, Singapore and Perth.

[Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/US (EO) Dated 15-7-1999]

ObservatioirRecommendation (SI. No. 59, Para No. 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.

Reply of the Government

This is an observation and does not require any action. However, it may kindly be noted that besides term contracts for import of crude oil from Saudi Arabia, Kuwait, Iran, UAE and Malaysia, since March, 1997 IOC have been importing crude oil from Iraq on term basis under the UN approved "Oil-for-Food" programmes.

(Ministry of Petroleum & Natural Gas No. 0-27012/98-ONG~US(EO) dated 15-7-1999]

Observation/Recommendation (SI. No. 60, Pare No. 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.

Reply of the Government

No action has been envisaged in this para. However, the above observation may be read alongwith further clarifications as given below:—

The imports through ipot purchases, as observed above, include purchases of additional cargoes from term suppliers at their Official Selling Prices. Considering the additional cargoes from term suppliers under term category instead of under spot category, the percentage of imports on term anfl spot basis would be as under:—

Year	Term %	Spot
1990-91	66	34
1991-92	66	34
1992-93	66	34
1993-94	67	33
1994-95	69	31
1995-96	75	25
1996-97	67	33
1997-98 (Prov.)	66	34

(%) **As can be seen above, over 65% of the purchases are on term basis.**

[Ministry of Petroleum & Natural Gas No. O-27012/1 /98-ONG/US(EO) dated 15-7-1999]

Observation/Recommendation (SI. No. 61 Para No. 4.21, SI. No. 62 Para No. 4.22 and SI. No. 63, Para No. 4.23)

SI. No. 61 (Para No. 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.

SI. No. 62 (Para No. 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.

SI. No. 63 (Para No. 4.23) In order to make crude oil imports cost-effective the Ministry of Petroleum & 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 & 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.

Reply of the Government

Our crude oil purchases are made through term contracts and through monthly tenders. Efforts are made to tie-up bulk of our crude oil import requirements through annual term contracts while leaving part of our requirements to be tied up through the monthly tenders so as to take care of operational requirements such as variations in refineries throughputs, indigenous crude oil production, domestic demand etc. The term contracts are made with National Oil Companies of producer countries having exportable surpluses and are purchased at Official Selling Prices (OSPs) which are uniformly applicable to a[1] customers in a particular region. The OSPs are based on prices of certain marker crude oils prevailing at the time of loading of the cargoes. Therefore, even the term purchases are based on market related prices.

Presently, about 90% of our imported crude oil requirement under the High Sulphur category is being tied up through annual term contracts with National Oil Companies of the Middle-East region.

Under the Low Sulphur (Sweet) category, crude oils of Nigerian and Malaysian origin arc found to be competitive in our refining system. However, under this category, we have a term contract only with Petronas, the National Oil Company of Malaysia. For the year 1998-99, our purchases through this term contract is expected to be about 14% of our sweet crude oil requirement. Therefore, bulk of the requirements under this category are being purchased through monthly tenders. In order to increase our purchases of sweet crude oil on term basis, we have been actively taking up with the Nigerian National Petroleum Corporation (NNPC), the National Oil Company of Nigeria for entering into a term contract. However, our efforts to enter into a term contract with NNPC, both directly as well as through diplomatic channels, have not been successful in the past. However, efforts in this direction are being continued.

(Ministry of Petroleum & Natural Gas No. 0-27012/ll/98-ONG/US(EO) dated 15-7-1999]

CHAPTER III

RECOMMENDATIONS/OBSERVATIONS WHICH THE COMMITTEE DO NOT DESIRE TO PURSUE IN VIEW OF GOVERNMENT'S REPLIES

Observation/Recommendation, (SI. No. 6 Para No. 2.40, and SI. No. 7 Para No. 2.41)

SI. No. 6 (Para No. 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 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.

SI. No. 7 (Para No. 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 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. The committee regret to find that adequate attention has not been given for exploration and it is only now that ONGC and OIL have taken steps for exploration and operation of basins falling under category II, III and IV.

Reply of the Government

The steps taken by ONGC and OIL for exploration are given below:—

1. The Oil & Natural Gas Corporation Limited (ONGC)

ONGC established in 1956, started its systematic geo-scientific surveys in areas considered prospective on the basis of global analogies. A major thrust in exploration was concentrated during the early years in the Himalayan Foothills and adjoining Ganga plains. Exploratory activities were collaterally extended to the large alluvial tracts of Gujarat, Upper Assam and Bengal Basin. Exploratory drilling activities were initiated in the Himalayan Foothills in 1957 with drilling of the first well Jwalamukhi-I in Himachal Pradesh. The year also saw drilling activities being taken up for the first time in Cambay Basin which ultimately resulted in the discovery of oil and gas in 1958, thus establishing a new hydrocarbon province in addition to the existing hydrocarbon provinces of Upper Assam & Assam Arakan in the north-east. Geo-scientific surveys and exploratory drilling activites were subsequently spread out to Himachal Pradesh (1957), U.P. (1962), Bihar (1963), Tamil Nadu (1964), Rajasthan (1964), J&K (1970), Kutch (1972) and Andhra Pradesh (1978). In spite of limited

success in these areas, ONGC pursued with its exploratory efforts and were successful in establishing hydrocarbons in Cauvery Basin and Krishna-Godavari basins in the mid 80s.

Offshore exploration was initiated in 1962 through experimental seismic surveys in Gulf of Carobay. Regional seismic surveys carried out during 1964*67 in the western offshore were followed by detailed seismic surveys in 1972-73. As a result, a large structure in Bombay Offshore was identified and taken up subsequently for drilling in 1974 leading to India's biggest commercial discovery and thereby also establishing another new hydrocarbon province. Encouraged by the successes at Bombay Offshore, exploratory efforts were expended systematically in the entire western offshore including Kerala-Konkan basin and the eastern offshore areas leading again to large discoveries in the western offshore (Neelam and Bassein) and substantial accumulations in the eastern offshore (Rawa).

From the above, it is evident that since its inception, ONGC has adopted an exploration strategy whereby exploratory efforts have been spread over different sedimentary basins in different parts of the country which have resulted in converting four earlier frontier areas into new hydrocarbon provinces and bringing on production six hydrocarbon provinces. Besides the existing producing basins ONGC has continued to expand its exploration activities in the frontier basins *viz.* like Ganga Valley, Himalayan Foothills, Bengal Basin, Vindhyan Basin, Gondwana Basin, Kerala-Konkan, Kutch-Saurashtra and Jaisalmer Basin with an objective of establishing a reserve base.

Besides these onland frontier areas ONGC has also launched an ambitious deep sea exploration plan. Earlier two wells were drilled in the deep water areas of K.G Basin in the east coast offshore in early eighties. A few prospects have been prioritised to be taken up during the IX Plan, of these 2 prospects have already been drilled. Though commercial success in establishing hydrocarbons in deep water areas has still eluded ONGC, the process of acquiring the necessary technology and know-how for these venture, possibly by forming joint ventures with companies having expertise in this area is under consideration. Exploratory efforts expended in each of these non *pro*ducing/frontier basins during the VII and VIII Five Year Plan period are given in statement at Annexure, These frontier

basins continue to be the focus of extensive exploration and the exploratory efforts planned in those basins during the IX Plan are also given in the annexure.

2. Oil India Limited (OIL)

So far as OIL is concerned, they have been operating in Category II/III areas since 1978 when it was first offered PEL outside North East. OIL has carried out exploratory work in category II as well as category III basin inaddition to carrying out exploratory work in the category I basin in Assam & Arunachal Pradesh. The details of the exploratory work carried out by OIL in category II & category III basin are as under:—

Category II Basins

Rajasthan

OIL started exploratory work in Western Rajasthan in 1984. OIL has so far carried out about 11900 GLKM of 2D and 300 SQKM of 3D survey in the area. OIL started its exploratory drilling work in the area in 1988 and 30 exploratory wells and 14 development wells have been drilled so far. OIL exploratory effort led to discovery of natural gas in the Jaisalmer basin and heavy oil in the Bikaner-Nagaur Basin.

OIL started production of natural gas from its gas fields in Rajasthan in July 1996. OIL'S Baghewala block in Bikaner-Nagaur Basin, where heavy oil was discovered, was earlier awarded to M~. Reliance Industries Limited (RIL) under Joint Venture Exploration Programme (JVEP'95) by Govt. of India. However, the block was reverted back to OIL recently by Govt. of India. OIL presently is on the look out for suitable technology for exploitation of heavy oil techno-economically.

In addition, two exploration blocks in the area have been awarded to M/s. Essar Oil Limited (EOL) under the V round exploration bidding by Govt. of India. The Production Sharing Contract (PSC) and Joint Operating Agreement (JOA) in respect of these blocks were signed in October'96 and the Operator has completed the first phase of exploration in the two blocks.

Category III

Ganga Valley Basin

OIL is operating in the Ganga Valley Basin under its Kashipur PEL in U.P. since 1990. OIL has carried out 5007 GLKM of seismic survey in the

area. The first exploratory well in the area is being drilled in the Bilaspur structure in Kashipur PEL.

Saurashtra Offshore

OIL was given PEL for the above area in 1989 and OIL started exploratory work in the area in 1990. OIL carried out 8767 LKM of 2D survey in the area. Based on the results of interpretation, few prospects were identified, out of which 3 prospects were drilled during the first phase. However, there was no commercial discovery of hydrocarbons. An integrated study is being carried out with all available data and presently efforts are on to firm up the geological plays identified and to plan future course of exploration in the area.

Andaman Offshore

There wells were drilled in the Andaman Offshore by OIL, without any success.

Mahanadi Basin

OIL, started its exploratory work in the Mahanadi basin in 1978. OIL has carried out extensive exploratory work in Mahanadi Onshore, Mahanadi Offshore, and NEC offshore area under the Mahanadi Basin since 1978. The details of exploratory work carried out by OIL in the area are as under:—

Seismic Survey	Mahanadi Onshore	3814 GLKM
	Mahanadi Offshore	3178 LKM
	NEC Offshore	10663 LKM
Exploratory Drilling	Mahanadi Onshore	4 wells
	Mahanadi Offshore	7 wells
	NEC Offshore	4 wells

However, there was no commercial discovery of hydrocarbon reserves.

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Annexure

Exploratory Results VII & VIII Plan and IX Plan Programme for non-producing areas

Basin	VII plan (1985—90)-ACTUALS			VIII Plan (1992—97)-ACTUALS			IX Plan (1997—2002) -INPUTS Planned		
	EXP. WELLS	2D	3D	EXP. WELLS	2D	3D	EXP. WELLS	2D	3D
ONLAND									
Bengal	10	8056 SLK +8 SSK 3012 GLK under IIEP		6	2757 SLK	269 SSK (2154 GLK) Eq	0	84	384
Himalayan Foothills & Ganga excluding Bihar	2	22166 SLK	—	2	8135 SLK + 110 GLK	—	3	6260	0
Ganga—Bihar	2	2267 SLK	—	1	2712 SLK	—			0
S. Rewa, Vindhyan, Satpura	—	—	—	—	10593 SLK + 687 GLK	—	13		—
Kutch—Saurastra	3	3693 SLK	—	1	—	—	0	0	—
Rajasthan	15	17544 SLK + 1702 GLK	—	14	15581 SLK	—	5	1750	—
OFFSHORE									
Kutch-Saurastra #	8	37712 LK	—	8	9739 LK	—	9		11000
Bengal	4	—	—	—	—	—	0	—	—
Kerala—Konkan #	2	14543 LK	—	—	43272 LK	9946	9	9000	—

During the VIII plan, under APEX (Accelerated Plan of Exploration), data for 600 MT soundings, 10000 Station of Gravity survey, 50 Station of Deep Resistivity survey and 800 LK of seismic survey have also been acquired in Saurashtra and Deccan Syncline areas.

Figures include surveys in deep water areas also.

Observation/Recommendation (SI. No. II, Para No. 2.45)

From the figures of geological reserves of oil and oil equivalent of gas (0 + OEG) established by ONGC and OIL as on 1.4.94 and the corresponding recoverable reserves, the Committee notes 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 notes 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 notes 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.

Reply of the Government

The inplace volume of hydrocarbons as on 1.4.96 was 5616.65 MMT of oil and oil equivalent gas (0+OEG) (including JVC and Private enterprises), while the ultimate (recoverable) reserves was 2031.81 MMT (0+OEG).

The percentage of ultimate reserves *vis-a-vis* established inplace volume of hydrocarbon for ONGC as on 1.4.94 was 35.2%, while as on 1.4.96 the percentage of ultimate reserves was 36.17% with reference to inplace

volume of hydrocarbons. As such there is no reduction in percentage of ultimate reserve (Recoverable) between 1994—96.

So far as Oil India Limited is concerned, the percentage of recoverable reserve of established reserve of oil and Oil+OEG as on 1.4.94, 1.4.96 and 1.4.98 are as under:—

	Oil	Oil+OEG
1.1.94	28.1%	37.9%
1.4.96	28.5%	38.5%
1.4.98	29.2%	39.0%

As can be seen from above, the recoverable reserve % has gone up gradually from OIL'S fields in Assam & Arunachal Pradesh and Rajasthan

[Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG US(EO) dated 15.7.1999]

Observation/Recommendation (SI. No. 29, Para No. 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.

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

Reply of the Government

Delay in finalizing the contracts in general and in particular for seismic -surveys has been causing shortfalls in achieving targets. ONGC is making an earnest effort to streamline bottlenecks.

(Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/ US(EO) dated 15.7.99]

Observation/Recommendation (SI. No. 30, Para No. 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 or 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.

Reply **of** the Government

Though ONGC has been processing and finalising tenders as per the norms, yet in the past delays have occurred in some cases either due to non-mobilisation or late mobilisation of rigs by the contractors as well as economic reasons i.e. re-tendering to get the advantage offeduced charter-hiring rates of rigs in international market.

The normal time for processing of tender has been cut short and as a step to avoid delays in the mobilisation of charter-hired rigs, action for processing tenders is initiated quite in advance to ensure timely mobilisation and availability of rigs.

(Ministry of Petroleum *&* Natural Gas No. 0-27012/11/98-ONG/ US(EO) dated 15.7.99]

Observation/Recommendation (SI. No. 43, Para No. 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, horizontdl 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.

Reply of the Government

Suggestions of the Committee have been noted. An R&D department has been set up at OIL'S headquarters, Duliajan and concerted efforts are put in to develop/upgrade technology. Various new techniques/tools have been adopted by OIL in recent years.

ONGC has in-house expertise in seismic data (2D & 3D) acquisition, processing and interpretation is available in ONGC. Efforts are being made to augment the existing technologies either through purchase or in-house R&D efforts. More advanced technologies (Ranked technology) in areas of exploration and development are planned to be inducted by becoming affiliate member of research consortiums. With the improvement in computer algorithms, shear wave exploration (P-SV converted wave) has become increasingly important in the area of lithology discrimination.

ONGC is planning to absorb this technology through collaboration with 'Consortium for Research in Elastic Wave Exploration Seismology' (CREWES Project) in University of Calgary, Canada and Stanford and Borehole Geophysics (SRB) at Stanford University. Re-processing of few seismic lines in Cachar and Himalayan foothill areas is being initiated using commercially available advanced processing software, to overcome the imaging problems in hilly areas.

To obtain additional oil from the existing reservoirs, enhanced oil recovery (EOR) schemes were drawn/being drawn in various fields. The insitu combustion in heavy oil belt and chemical flooding in Sanand field are under operation. Microbial enhanced oil recovery (MEOR) is in operation in one well in Kosamba field. Alkaline-surfactant-polymer flooding is planned in few fields.

Fourteen major producing fields have been analysed, inputs identified and being recommended for improved oil recovery (IOR). Layer wise reservoir management is being done for better performance for major fields.

[Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/ US(EO) dated 15.7.99].

CHAPTER IV

RECOMMENDATIONS/OBSERVATIONS IN RESPECT OF WHICH GOVERNMENT'S REPLIES HAVE NOT BEEN ACCEPTED BY THE COMMITTEE

Observatlon/Recommendaton (SI. No. 8, Para No. 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.* ONGC/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 dependency on imported crude.

Reply of the Government

In order to augment the efforts of national oil companies and also to introduce state-of-the-art technology available elsewhere, Govt. of India has been offering acreage to private companies for exploration, speculative surveys and discovered oil/gas fields development.

Exploration Bidding

So far, the Govt. of India has announced 8 Rounds of Exploration Bidding. Of these three Rounds have been completed. No hydrocarbons were discovered under any of the contracts signed under First and Third Rounds of Exploration Bidding and the acreage awarded have since been relinquished. No contract was signed under Second Round of Exploration Bidding.

Starting from the Fourth (1991) to Eighth Exploration Bidding Round (1994) and Joint Venture Exploration programme 95' (JVEP'95), contracts have been signed for 23 blocks (20 of ONGCand 3 of OIL *i.e.* Oil India Limited). 12 blocks (10 of ONGC and 2 of OIL), starting from Sixth Round (1993) to JVEP'95, are approved for award. Out of these 12 blocks, for 7 blocks the companies, have either withdrawn or matter has been closed.

Small and Medium Sized Discovered Oil *& Gas* Fields

Under the Development offer of small and Medium sized discovered oil and gas fields (1992), contracts for 13 small-sized oil/gas fields of ONGC and 5 medium sized fields (4 of ONGC and I of OIL) have been signed Additionally, I medium sized discovered oil field and II small-sized discovered oil/gas fields (all of ONGC) have been approved for award.

Speculative Survey

The Govt. of India announced 2 Speculative Survey Rounds (in 1993

and 1994) and I Joint Venture Speculative Survey Round (1995) wherein acreage were offered for carrying out Speculative Geophysical and other types of surveys with a view to upgrade the available information of the hydrocarbon potential of the unexplored sedimentary basins of the country.

New Exploration Licensing Policy (NELP)

Further, the Govt. of India has also recently announced the New Exploration Licensing Policy (NELP) with attractive fiscal terms and incentives. Under this policy, the upstream public sector companies *viz.* ONGC and OIL are to be provided level playing field by giving them the same fiscal and contract terms as are available to private companies. A total of 48 blocks (10 onland blocks, 26 shallow water blocks and 12 deep water blocks—beyond 400 m iso-bath) are on offer.

Efforts by DGH

One of the activities of DGH is to open up new areas for future exploration. Large unexplored/poorly explored area are required to be upgraded for undertaking systematic exploration. In addition to the efforts of operating companies, DGH is also carrying out mainly reconnitory type of surveys to open up hitherto unexplored areas for future exploration. The efforts of DGH are mainly in areas where the information is required to be upgraded and operating companies would normally not go for exploration in such areas on commercial consideration unless the information of these areas is adequate to develop the geological perception. The details of reconnitory surveys undertaken by DGH during the last few years are as under:—

(i) Satellite gravity studies (Reconnitory)—1.64 million sq. kms. (under SIDA grant Over entire East coast. West coast and Andaman offshore including deeper offshore areas.
(ii) Seismic and G.M. Surveys—11,035 LKM Under J.V. speculative survey programme plus 1450 LKM by DGH.
(iii) Seismic onland—1200 LKM in Ganga Valley and Vindhyan basin.

(iv) Aeromagnetic Surveys—23,730 LKM in Kutch onland areas.

(v) Magnetic Telluric Surveys—352 soundings in Nagpur-Wardha and Belgaon areas.

As a result of these, about 0.61 million sq. kms of the sedimentary area has been opened up for exploration. These opened up areas would be the future areas for exploration in the years to come. Twelve deep water blocks in the East Coast which have been identified as a result of surveys conducted by DGH have been offered under first round of NELP. This is the first time that deep water blocks have been offered in the country. During the remaining IX Plan period, DGH propose to conduct various geo-scientific studies in several other areas.

In addition, DGH has also planned the reconnitory exploration work in Ganga Valley, Himalayan Foothills, eastern offshore, western offshore and Andaman offshore deep waters, Assam-Arakan fold belts and Kutch basins.

[Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/ US(EO) dated 15-7-1999]

Observation/Recommendation (SI. No. **14, Para** No. 2.48)

In case of three medium sized fields *viz.* Panna, Rawa 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.

Reply of the Government

Estimates of hydrocarbons for a field are based on the data available at that time. With availability of additional data the reservoir geometry is better defined leading to changes in the estimates of the hydrocarbons. Additional data is normally acquired through seismic slirvey specially high resolution 3D, drilling of new wells, recording of sophisticated new set of logs, re-interpretation of old seismic data through improved interpretation techniques and incorporation of the newly acquired data in the reservoir simulation data.

In Panna and Rawa fields, the enhancement has been a result of additional data acquired in the form of drilling of wells, pressure production history and re-evaluation of data. Similarly, in the Tapti field based on a stochastic geological model put forth by the operator, the estimates have been revised and enhanced during 1998-99.

[Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/US(EO) dated 15-7-1999]

Observatton/Recoroinendation (SI. No. 15, Pare No. 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, the reserves had almost doubled. The Committee feel that this should have been taken as a lesson by Ministry/ ONGC and desired improvement incorporated in the system.

Reply of the Government

The reserve estimate of an oil field are dependent upon the knowledge of sub-surface, which is based on the data available, and exploitation technologies in vogue on a given date.

The growth in the reserves of a structure/field is mainly due to:

* Change in geological concept/model with time with the availability of additional data and better understanding of sub-surface with induction of technology.
* Discovery of new reservoirs at deeper stratigraphic levels.
* Extension of the reservoirs, at time due to the exploratory efforts in the areas adjacent to the existing fields.
* Re-evaluation of petro-physical parameters with the induction of advanced formation evaluation tools.
* Application of improved recovery techniques.
* Most structures/fields have shown growth in reserves over time due to one or combination of the above factors. Some of the example's of reserve growth are Gandhar, Kalol, Bombay High and Geleki. The growth of reserves in the Ankaleshwar field are mainly due to development, change in the geological concept/model, re-evaluation of petro-physical parameters.

[Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/ US(EO) dated 15-7-1999]

Observation/Recommendation (SI. No. 16, Para No. 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.

Reply of the Government

Technology Induction:

During IX plan ONGC will ensure sustained efforts towards technology induction and new technology inducted recently are:

Seismic

1. For seismic data acquisition, 19 new systems were procured with state-of-the art technology (Telemetry, 24 bit Delta Sigma technology 1996-97). Process for acquisition of 12 more state-of-the-art seismic acquisition systems is under way to replace non-telemetric/telemetric systems of early-mid eighties/early nineties vintages.
2. For processing of seismic data, acquisition of new processing systems having state-of-the art technology is in progress for SRBC, WRBC, ERBC, GEOPIC where as for MRBC, CRBC and IRS it has already been installed.
3. The present number of interactive interpretation work stations is 21 which is planned to be augmented by 23 more systems during IX plan period. This is aimed at making a marked impact on '3D' interpretation cycle time.

Logging

1. For log data acquisition new EXCELL 2000 logging systems have been procured having state-of-the art technology (Advanced operating system, work station environment. Networking-capability) and with improved latest version down hole tools having Digital Interactive Telemetry. Down hole tools include the special tools like CAST, HFDT, LFDT, HRI, SFT, SNSG.
2. For log data processing, state-of-the-art work stations have been procured. With the use of the log processing software developed in-house, which are at par with those available with service companies, log data processing requirements are being met in-house.

(Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/ US(EO) dated 15-7-1999]

Observation/Recommendation (SI. No. 26, Para No. 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. 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 ONGCL should be properly monitored so that it functions more as a commercial venture and contribute purposefully to the national oil requirement.

Reply of the Government

Exploration ventures being governed by "Stochastic" model of probability has in-built risk of uncertainty regarding discovery of oil and gas. It is for this reason that the oil companies tend to share risks by taking part-stakes in any risk venture. This methodology also helps in spreading the same capital in different areas to obtain better chances of success.

ONGC Videsh Limited has been following the same course and took partial participating interest in the exploration projects *viz.,* Yemen, Egypt and Tunisia for which well-known oil companies of international repute obtained the licence/contract. However, as it happens more often than not in the exploration industry, no commercial discovery was made. This does not reflect on the competence or the efforts made by the involved company in analysing the data before embarking on these projects. The available data on all these projects was analysed and the Board approved these projects on the basis of the said analysis. CMD, ONGC had indicated that the selection of the original licence area was not done by ONGC but it had farmed-in with the international companies of repute. However, this did not imply that no analysis was done before embarking on these projects. The statement that this is not a right approach has been made in the background that ONGC as a major oil company should try to obtain licence/contract ourselves and offer farm-out to others because this might give us a better deal. In the international scene, however it is extremely difficult to obtain such licence as they involve strong political and also strong financial muscle. The western oil companies, have been preferred more by the host oil rich countries in view of their present image in respect of financial muscle, political strength and above all, technological strength. ONGC-VL would continue to attempt obtain such licences. It has already submitted a proposal to Govt. of Iraq for acquiring an exploration block.

The net outgo for exploration in Vietnam, Egypt, Yemen and Tunisia

is about Rs. 137 crore.

Exploration is a cyclic process with periodic success and a view taken on a small segment of time or a segment of few projects can give erroneous perception. The three exploration projects, Tunisia, Yemen and Egypt, were not with total ONGC-VL participation but the company had only a partial stake in each one of them.

It would also be pertinent to mention that analysis of data for projects undertaken by ONGC-VL is carried out by a joint team of ONGC and ONGC-VL and are approved by Director (Exploration) of ONGC before it is recommended by ONGC-VL Board for approval by an inter-Ministerial Empowered Committee. Thus, a proposal goes through adequate scrutiny before approval.

The value of the Vietnam project is likely to pay far more than the net outgo on the exploration costs by ONGC-VL.

(Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/ US(EO) dated 15-7-1999)

Observation/Recommendation (SI. No. 41, Para No. 2.122)

The Committee appreciate the Government is also giving higher focus to prospective basins/blocks outside India. ONGC Ltd. has received an exploration exploratory block in Kazakhastan. This is a step in the right direction, as making efforts outside the country may help in self-sufficiency in the production of crude oil. Following the example of 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 ONGC Ltd. 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 desires 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.

Reply of the Government

Acquisition of Equity oil abroad

The Widening gap between demand and supply of oil and gas and consequently increasing imports affects the economic development of the

country. In order to achieve oil security, acquisition of equity oil abroad is an important plank of the strategy.

ONGC-Videsh Ltd. a wholly owned subsidiary of ONGC is active in exploration and development activity of oil and gas in Vietnam, Middle East and CIS countries. The objective of OVL is to acquire attractive overseas exploration acreages and producing properties to increase equity oil abroad. ONGC-VL has a gas project in Vietnam and has been pursuing opportunities in Iraq, Iran, Russia (Udmurt, North Caspian Sea and Astrakhan) and is evaluating other opportunities.

OIL has also taken 20% participating interest in a block in Oman with TOTAL of France for exploration of oil and gas.

There is a proposal for a corporate strategic alliance between IOC and ONGC. The alliance would help synergies their operations for the common good of both and partake of current international trends of mutuality in working in the hydrocarbon sector. It could be a forerunner to possible vertical integration and help both companies to enhance their global standing and core competencies from "drilling to dispensing". While retaining focus on respective core business and competencies, both IOC and ONGC would explore investment options for securing assured growth and profitability.

[Ministry of Petroleum & Natural Gas No. 0-27012/11/98-ONG/ US(EO) dated 15-7-1999]

Observation/Recommendation SI.No. 50 (Para No. 3.36), SI.No. 51 (Para No. 3.37), SI.No. 52 (Para No. 3.38), SI.No. 53 (Para No. 3.39) and SI.No. 54 (Para No. 3.40)

SI.No. 50 (Para No. 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.

SI.No. 51 (Para No. 3.37)—The Committee note that Government of India has 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 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.

SI.No. 52 (Para No. 3.38)—The medium-sized fields awarded so far

include Mid and South Tapti, Mukta and Panna, Rawa, Kharsang and Ratna-R-Series. Small-sized fields awarded are Hazira, Cambay, Bhandut, Matar, Sabarmati, Indora, Bakrol, Lohar, Dhoka, Wavel, Baola, PY-I 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 & Natural Gas that Panna and Mukta oil fields were discovered by ONGCL 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 & 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 Enrol-RIL, Rawa 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.

SI.No. 53 (Para No. 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 ONGCL/OIL been asked to acquire state-of-the-art technology and develop these fields themselves earlier.

SI.No. 54 (Para No. 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.

Reply of the Government

The Committee has commented on the policy being followed with regard

to offer of discovered fields for development by private/joint venture companies. In this connection it is stated that apart from foreign exchange crunch some of the other reasons for offering these fields for private participation are:—

(i) Lack of adequate resources with the NOCs to develop such fields.

(ii) Lack recoverable reserves.

(iii) Private participation would help augment oil/gas production b) way of quickly putting these fields on production to meet the growing demand supply gap.

(iv) Application of enhanced oil recovery techniques.

Although the foreign exchange position improved subsequently, it was felt that in the context of the policy initiatives to attract foreign investment specially in the core sector, renegining on internationally invited bids and committed terms would undermine our credibility and would not have been in the national interest.

The continuance of the policy on discovered fields had been proposed for the following reasons:—

(a) The NPV of the total Government take and ONGCs own rate *ol* return where better secured under joint venture than through explusive operation by ONGC on the same terms.

(b) The policy ensures development of the marginally viable small and medium sized fields which would otherwise remain undeveloped.

(c) In fiercely competitive international hydrocarbon scenario ol depeleting reserves, the offer is a potential inducement to companies to invest in exploration.

(d) Competition with other domestic players in the upstream sectoi has enhanced the capability of NOC.

The issue of whether this policy for offering discovered fields should continue or not was considered by the Government and the Government has approved the continuance of this policy. However it has been decided that in future the bids would be invited by the National Oil Companies (ONGC/OIL).

[Ministry of Petroleum & Natural Gas No. U-27012/11/98-ONG/US (EO) Dated 15-7-1999]

CHAPTER V

RECOMMENDATIONS/OBSERVATIONS IN RESPECT OF WHICH REPLIES OF GOVERNMENT ARE AWAITED

- NIL -

NEW DELHI;
April 18,2000

Chaitra 29, 1922(S)

UMMAREDDY VENKATESWARLU

Chairman,
Estimates Committee.

APPENDIX I

(Vide Introduction to Report)

Analysis of the action taken by Government on the recommendations contained in the Second Report of the Estimates Committee (Twelfth Lok Sabha)

I.	Total number of Recommendations/Observations	63
II.	Recommendations/Observations which have been accepted by Government (Nos. 1, 2, 3, 4, 5, 9, 10, 12, 13, 17, 18, 19, 20, 21, 22, 23, 24, 25, 27, 28, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 42, 44, 45, 46, 47, 48, 49, 55, 56, 57, 58, 59, 60, 61, 62, and 63)	46
	Percentage	73%
III.	Recommendations/Observations which the Committee do not desire to pursue in view of Governments' replies (Nos. 6, 7, 11, 29, 30, and 43)	6
	Percentage	9.5%
IV.	Recommendations/Observations in respect of which Government's replies have not been accepted by the Committee (Nos. 8, 14, 15, 16, 26, 41, 50, 51, 52, 53 and 54)	11
	Percentage	17.5%
IV.	Recommendations/Observations in respect of which final Replies of Government are still awaited	Nil

APPENDIX II

MINUTES OF SITTING OF THE ESTIMATES COMMITTEE

(1999-2000)

Fourth Sitting

The Committee sat on Monday, the 3rd April, 2000 from 1500 to 1600 hours.

PRESENT

Prof. Urnmareddy Venkateswarlu—*Chairman*

MEMBERS

2. Shri Girdhari Lal Bhargava
3. Shri Lal Muni Chaubey
4. Shri Aj.ay Singh Chautala
5.. Shrimati Sheela Gautam
6. Shri Shankar- Prasad Jaiswal
7. Shri Sarnik Lahiri
8. Shri Manjay Lal
9. Shri Shyam Bihari Mishra
10.. Shri Nagmani
11. Prof. Rasa Singh Rawat
12. Shri Abdul Rashid Shaheen
13. Shri Maheshwar Singh
14. Shri Lal Bihari Tiwari
15. Shri A.K.S. Vijayan

SECRETARIAT

1. Dr. A.K. Pandey
2. Shri John Joseph
3. Shri K.L. Narang
4. Shri N.C. Gupta

Additional Secretary
Joint Secretary
Director
Assistant Director

2. The Committee considered the Draft Report on action taken by Government on the recommendations contained in the Second Report *ot* the estimates Committee (Twelfth Lok Sabha) on the Ministry *ot* Petroleum and Natural Gas—"Crude Oil—Indigenous Production and Imports" and adopted the same with modifications as given in the Annexure.

3. The committee authorised the Chairman to finalise the Draft Report in the light of modifications as also to make verbal and other consequential changes in the Draft Report arising out of factual verification by the Ministry and present the same to the House.

The Committee then adjourned.

Modifications made by the Estimates Committee in their Draft Report on Action Taken by Government on the Recommendations contained in the Second Report (Twelfth Lok Sabha) on the Ministry of Petroleum and Natural Gas—Crude Oil—Indigenous Production and Imports.

Para No.	Line	Modifications
1.7	18	*For* 'world reiterate'. *Read* 'express their concern over the delay and reiterate'.
1.25	10	*Delete* 'from the statment made by the Hon'ble Ministry'.

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