C. P. U. No. 57

COMMITTEE ON PUBLIC UNDERTAKINGS

(THIRD LOK SABHA)

THIRTY-SIXTH REPORT

INDIAN OIL CORPORATION LTD.
(REFINERIES DIVISION)

MINISTRY OF PETROLEUM AND CHEMICALS
(DEPARTMENT OF PETROLEUM)

LOK SABHA SECRETARIAT
NEW DELHI

March, 1967
Phalguna, 1888 (Saka)

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COMMITTEE ON PUBLIC UNDERTAKINGS

(THIRD LOK SABHA)

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*Appointed as Chairman w.e.f. 24-1-66 *vice* Shri Panampilli Govinda Menon ceased to be a member of the Committee on his appointment as Minister.

**Elected w.e.f. 23-2-1966 in the vacancy caused by apppointment of Shri Panampilli Govinda Menon Minister.

†Elected with effect from 7-8-66 in the vacancy caused by the demise of Shri S.V. Ramaswamy. Shri S. V. Ramaswamy was elected w.e.f. 23-2-66 in the vacancy caused by the resignation of Shri Harish Chandra Mathur.

††Elected w.e.f. 7-5-66 on the retirement of Shri Lokanath Mishra from Rajya Sabha on 2-4-1966.

‡Elected w..e.f. 7-5-66 on the retirement of Shri T.S. Pattabhiraman from Rajya Sabha on 2-4-66.

§Elected w.e.f. 18-5-66 in the vacancy caused on the resignation of Shri Abid Ali on 6-5-66.

¶ Elected w.e.f. 18-5-66 in the vacancy caused on the resignation of Shri M.N. Govindan Nair on 6-5-66.

@ Elected w.e.f. 18-5-66 in the vacancy caused on the resignation of Shri M. Govinda Reddy on 6-5-66.

INTRODUCTION

I, the Chairman, Committee on Public Undertakings, having been authorised by the Committee to submit the Report on their behalf, present this Thirty-sixth Report on the Indian Oil Corporation Ltd. (Refineries Division).

2. This Report is based on the examination of the working of the Indian Oil Corporation upto the year ending 31st March, 1966. The Committee took the evidence of the representatives of the Refinery Division of the Corporation on the 24th and 25th, November, 1966 and of the Ministry of Petroleum and Chemicals on the 20th December, 1966.

3. The Report was finally adopted on the 3rd March, 1967.

4. The Committee wish to express their thanks to the officers of the Ministry of Petroleum and Chemicals and the Indian Oil Corporation for placing before them the material and information that they wanted in connection with their examination. They also wish to express their thanks to the non-official organisations/individuals who, on request from the Committee, furnished their views on the working of the I.O.C.

5. The Committee also place on record their appreciation of the assistance rendered to them in connection with the examination of audit paras pertaining to the Indian Oil Corporation by the Comptroller and Auditor General of India.

NEW DELHI;
March 3, 1967.
Phalguna 12, 1888 (S).

D. N. TIWARY,
Chairman,
Committee on Public Undertakings.

I

INTRODUCTORY

The oil refining industry in India has progressed a long way since independence. In 1947, only a single 0.45 million tonne unit functioned in Assam, processing crude oil received from the Digboi oilfields in that State into petroleum products. The rest of the requirements of finished oil products were imported and paid for in foreign exchange.

2. In the beginning of the early fifties, the three major international oil companies, long established in Bombay as importers of refined products, agreed under special covenants with the Government of India, to set up their own oil refineries. Two of these were built at Trombay, near Bombay and the third at Vishakhapatnam. By the late fifties, they were on full stream and processed imported crude to yield a total annual production of 4 million tonnes of finished products.

3. Meanwhile the Government's enterprise in exploring and prospecting for crude within the country had begun to yield results in Naharkatiya in 1953 and in Moran in 1956, in Assam. The Industrial Policy Resolution of 1956, laid emphasis on developing oil production in the public sector by placing this industry in Schedule 'A' *i.e.* industries whose "future development will be the exclusive responsibility of the State". In August, 1958 a company, the Indian Refineries Ltd., was formed to construct, operate and manage two Refineries at Gauhati in Assam and at Barauni in Bihar. The commissioning of the Gauhati Refinery of 0.75 million tonne capacity with Rumanian assistance in January, 1962 marks the beginning of the public sector Refineries. This was followed in July, 1964 by a new and larger Refinery with a capacity of 3 million tonnes (after expansion) at Barauni in Bihar. Both of these were based on crude supplies from the oil-fields of Assam.

4. The discovery of crude deposits at Ankleshwar and Kalol in Gujarat encouraged plans for the setting up by the Oil and Natural Gas Commission of the Gujarat Refinery—the third oil refinery in the public sector.

Imalgamation.

5. The Indian Refineries Ltd. was merged on the 1st September, 1964 with the Indian Oil Company Ltd. to form the Indian Oil Corporation Ltd. in terms of an order called the Petroleum Companies Amalgamation Order, 1964, dated 31-8-1964. The Corporation had two independent Divisions called the Refineries Division and the Marketing Division each under a Managing Director.

6. By a subsequent order, another Division called the Pipelines Division under a Director-in-charge was created on the 11th March, 1965. Prior to this, the work relating to the pipelines was under the Refineries Division.

7. The Gujarat Refinery was transferred from the Oil & Natural Gas Commission to the Refineries Division of the Indian Oil Corporation Ltd. on the 1st April, 1965.

Examination by Estimates Committee.

8. The working of the Gauhati and Barauni Refineries (then under the Indian Refineries Ltd.) was examined by the Estimates Committee in 1962-63 and their recommendations|observations are contained in their Thirty-fourth Report (Third Lok Sabha). The replies furnished by the Government indicating the action taken by them on the Report were considered by the Committee on Public Undertakings in 1965-66 and a further Report (Fourteenth Report of C.P.U., Third Lok Sabha) was submitted to the House.

9. The Gujarat Refinery was examined by this Committee as part of their examination of the O.N.G.C. in the year 1964-65 (Fifth Report). Replies to recommendations contained in that Report received from Government have not so far been considered by the Committee.

Gauhati Refinery.

10. The Gauhati Refinery has been set up with the assistance of the Rumanian Government. An agreement was concluded on the 20th October, 1958 between the Government of India and the Government of the Rumanian People's Republic providing for technical and financial assistance for setting up this Refinery. Following this agreement, a commercial contract was executed on the 17th August, 1959 between Messrs Industrial export of Bucharest—a State-owned Company nominated by the Rumanian Government, and the erstwhile Indian Refineries Ltd. The object of the contract was to spell out the responsibilities of both the parties with regard to the designing of

the Refinery, the supply of equipment and materials, technical assistance to be given by the Rumanians in the construction, erection and operation of the Refinery, the guarantees of performance of the plant, etc.

11. The value of technical assistance from Rumania has been as follows:—

	Rs. in crores
(ii) Designing work	0·39
(ii) Designing work	·39
(iii) Technical ..	0·28

The total cost of the Refinery has been Rs. 17·70 crores.

12. The construction of the Refinery was taken up in October, 1959. Whereas it was to be commissioned in the third quarter of 1961, it went into full operation only in the second quarter of 1962 after having started production on the 1st January, 1962.

Barauni Refinery.

13. The Barauni Refinery has been set up with the Soviet assistance. An agreement in this regard was concluded between the Government of India and the Government of U.S.S.R. on 28th September, 1959. Under this agreement the Soviet Government agreed to give credit upto 100 million (old) roubles at a rate of interest of 2·5 per cent. per annum repayable in 12 years with the provision that any further amounts in excess of this amount and not exceeding 50 million roubles will also be met by the Soviet Government.

14. In pursuance of this agreement, a contract was signed between the M/s. Tiajpromexport, Moscow and the Indian Refineries Ltd. on 3rd December, 1959 for carrying out the detailed analysis of the Naharkatiya crude oil samples at a cost of Rs. 11·86 lakhs, for preparation of the Detailed Project Report at a cost of Rs. 30·85 lakhs and the supply of working Drawings of the Refinery at cost of Rs. 75·92 lakhs.

15. The Detailed Project Report was received in December, 1960 and accepted in April 1961. A contract was signed with M/s. Tiajpromexport for the supply of equipment and materials from the Soviet Union, deputation of Soviet specialists and interpreters and industrial/technical

training of Indian technicians in the U.S.S.R. The total cost of the contract was 25,515,000 roubles, c.i.f. Calcutta port.

16. The construction of the Refinery began in the winter of 1961. The first stage consisting of one million tonne refining capacity went on stream in July, 1964, and the Refinery is now running at full designed capacity without any trouble so far as the first stage is concerned. The second stage had been completed, tested and commissioned in February 1966, but could not thereafter be operated as the Coking Unit required some modifications to improve its capacity. These modifications were completed by the end of December, 1966.

17. The third stage comprising of the Lube Oil Units was also expected to be commissioned by the beginning of 1967.

18. The total project cost now estimated is Rs. 44·41 crores as against the original estimate of Rs. 38·21 crores.

Gujarat Refinery.

19. The Gujarat Refinery has been set up with the financial and technical assistance from the Soviet Union. The initial capacity of the Refinery is two million tonnes of crude oil per year. The Refinery was under the Oil and Natural Gas Commission till 1st April, 1965, on which date it was transferred to the Refineries Division of the I.O.C.

20. In pursuance of the Indo-Soviet Agreement of February 21, 1961 a contract was signed in October, 1961 between the Oil, and Natural Gas Commission and M/s. Tiajpromexport, Moscow for the preparation of the Detailed Project Report. The Detailed Project Report was received in January 1963 and three months later it was accepted. A further agreement with the same Soviet party for the supply of equipment and materials for the construction of the Refinery was concluded on the 29th June, 1963.

21. The construction of the Refinery started on the 5th October, 1963. The first phase, comprising the first million tonne per annum capacity of the Refinery, was commissioned on the 11th October, 1965. It was, however, possible to operate on full throughout for the one million tonne stage only in December, 1965. The second phase *i.e.* the two million tonne was completed in June, 1966.

22. The feed stock of crude oil is piped to the Refinery from Ankleshwar oil fields through a pipeline over a distance of 98 kms.

23. The civil engineering works for the expansion of the Refinery to three million tonnes were started on the 19th March, 1966 and the expansion scheme is likely to materials during mid 1967.

24. An Udex Plant is also being set up at the Gujarat Refinery for the extraction of Benzene and Toulene from the reformed Naphtha. The process for this plant has been taken from U.O.P. of U.S.A. and the design and engineering is being carried by M/s. Nuovo Pignone (a subsidiary of E.N.I. of Italy). The plant will be completed during 1968.

II

COORDINATION

The orders of the Ministry of Petroleum and Chemicals dated the 31st August, 1964, amalgamating the Indian Refineries Ltd. and the Indian Oil Company Ltd. stated as follows:—

> "With a view to enable each Division to discharge its function efficiently, economically and speedily, the Managing Directors shall be entitled to enter into correspondence direct with Government and other agencies. Each Division of the Company will prepare its own budget and accounts and operational programme and after approval by the Board of Directors, it shall be submitted to the Government of India. Each Division will have its own Financial Controller. The accounts of each Division will be kept separately though for purposes of the Companies Act consolidated accounts will have to be presented. The Board of Directors shall discuss the performance of each Division and later consider the consolidated Annual Report and consolidated annual accounts. Each Division will evolve its own personnel, training and recruitment policy, keeping in view the plan targets and its peculiar requirements. Each Division shall keep the Government of India informed of quarterly and annual targets, the targets achieved and shall submit such returns/statements as may be prescribed by Government".

26. After the amalgamation of the two companies, the Chairman of the Indian Oil Corporation continued to be the Managing Director of the Marketing Division. The Refineries Division had a separate Managing Director and the Pipelines Division, a Director-in-charge. Coordination between the three Divisions took place only at the level of the Board of Directors and by its very nature, was rather superficial. As a matter of fact, the intention behind amalgamating the two comapnies was to achieve "economy,

efficiency and coordination as also to eliminate duplication of effort and wasteful expenditure" as enunciated in the recommendation of the Estimates Committee contained in para 8 of their Thirty-Fourth Report (Third Lok Sabha). *It appears that the actual working of the Corporation after amalgamation has not achieved any of these objectives.*

Coordination meetings.

27. In August, 1966, when the Chairman of the I.O.C. changed, a new Managing Director was appointed for the Marketing Division and the Chairman became a full-time Chairman without direct executive responsibility over any of the Divisions. Instead of the Board, the coordination between the three Divisions came to be effected through the Chairman. Every month a coordination meeting is held in which the representatives of the three Divisions are present. A representative of the Cochin Refinery is also present at these coordination meetings as the Marketing Division is responsible for selling the products of the Cochin Refinery. The month-to-month problems of production, marketing and movement are discussed at these meetings and decisions taken. *This is a step in the right direction. Such coordination meetings should have been held before.* In fact, the Committee came across several instances where lack of coordination had resulted in creation of unnecessary difficulties. The most glaring of these is the case of the pipelines from Barauni to Kanpur and Barauni to Haldia, where the Pipelines Division finished their work and the Marketing Division, which was responsible for constructing the storage tanks and railway sidings, remained far behind schedule with the result that the pipelines could not be operated. This resulted in considerable difficulties in the movement of products from Barauni. Another example of lack of coordination relates to excess production at Barauni at times which could not be lifted.

Need for close coordination.

28. During the course of oral evidence, the Committee asked the Chairman of the Corporation whether he considered the present arrangements for coordination as satisfactory and he replied that a change had been made from the past practice which had resulted in the toning up of efficiency to a considerable degree. The results of this experiment would be watched and if found necessary, he would have no hesitation in effecting changes that were considered desirable to improve coordination between the various wings of the Corporation. *While the Committee*

appreciate the changes made, they emphasise that close co-ordination should exist between the Divisions. The three Divisions of the Corporation should not work like water-tight compartments, looking only to the Chairman or the Board of Directors as the connecting link. The Senior Officers should enter into communication at their own levels to solve mutual problems and carry out policies to the maximum advantage of the Corporation.

Location of Divisions.

29. In regard to other matters, the Committee regret that the Government of India's order of 31st August 1964 referred to above, really intended to keep the identity of the Divisions separate from each other. In fact, very little economy has been effected by this amalgamation. One of the main drawbacks has been that the Refineries and the Pipelines Divisions were located at Delhi, while the Marketing Division functioned from Bombay. This was due to historical reasons. The Committee enquired whether there were any special advantages in locating the Refineries Division at Delhi and were informed that apart from the fact that it had several advantages during the construction of the Refineries, there were no special reasons why Delhi need be the location of the Division. *The Committee agree that till the construction phase of the Refineries is over it might be advantageous for the Refineries Division to be in Delhi for the purpose of contacting the various foreign parties, D.G.S & D., etc. After this is over it might be examined whether it would not be advantageous for all the Divisions of the I.O.C. to be under one roof, preferably in its own building. If this takes place, it would be possible for the various Divisions of the Corporation to have common service departments to cater to the needs of all the Divisions. For example, there could be common departments for personnel, accounts, legal affairs, labour, civil engineering, stores and purchase, public relations, etc. The Committee feel that considerable duplication in these matters exist at present and should be done away with.*

Conditions of Service of Staff.

30. The Committee also found that the conditions of service of staff were different in the Divisions. They were informed during oral evidence that the Refinery staff had peculiar functions, responsibilities and working conditions, which were not the same as of the staff of the Marketing Division. As such, the pay scales were different and the conditions of service differed greatly in several matters. In fact, the

Committee found that some changes in the emoluments of the junior staff of the Marketing Division, which were made as a result of an agreement with the Union, were not applicable to the staff of the other Divisions.

31. *The Committee feel that this is a matter which requires looking into carefully. While the pay scales could be different depending upon the peculiar nature of duties in each Division, it might be desirable that the terms and conditions of service of the staff working in the same public undertaking should be common with peculiarities relating to certain categories of posts being taken care of by separate provision, which should be in the form of exceptions to the general rule. The Committee are not happy over ad hoc concessions made to one group of employees, while ignoring others of the same status in another group. This is bound to have an undesirable effect on the staff.*

32. *The Committee suggest that the Chief Personnel Officers of the three Divisions should be constituted into a Committee which should go into the entire matter of service conditions, pay scales, etc. of the various Divisions and suggest how uniformity can be achieved.*

Pipeline Division

33. Under the Government order dated 11th March 1965, the Pipelines Project was separated from the Refineries Division to be constituted into a separate Pipelines Division under a Director-in-charge. This Division is responsible for the construction and maintenance of the Products Pipelines. separation.

34. The Government order referred to above had stated as follows:—

> "The separation of the Pipelines Division from the Refineries Division should be effected in the most economical manner and as far as possible without significant additions to staff. Government believe that the Indian Oil Corporation (Refineries Division) should be able to provide to the Director-in-charge, Pipelines Division, some financial, personnel and secretariat staff from its present strength."

35. The Committee, however, found that the Pipelines Division had its full-fledged office with its own Financial Controller, Administration Department, Accounts Department, etc. apart from the Technical Departments and Officers. *The Committee wonder whether there has been any definite advantage in effecting the separation of the Division. It has certainly added to the overhead expenditure. That there has been lack of coordination between this Division and the Marketing Division is only too obvious. It is only now that the coordination meetings have been taking place at which the Pipelines Division is represented. The product pipelines are managed by the Pipelines Division and monetary transactions between the Pipelines Division and the Marketing Division entail several accounting procedures and accounts staff. The Committee do not consider that this has led to efficiency and economy. It should be examined whether the Division could be amalgamated with either the Refineries Division or the Marketing Division.*

III

GAUHATI REFINERY

The Refinery is designed to process 0.75 million tonnes of crude oil. The crude is obtained by the Refinery from Naharkatiya and Moran regions of upper Assam and this is supplied by Oil India Ltd. Since April, 1966, 500 tonnes of crude have been obtained every week from the Rudrasagar oil fields, which are under O.N.G.C. It was stated that the Rudrasagar crude had to be blended before use in the Refinery and that the blending was the responsibility of the Refinery. Crude from Naharkatiya and Moran oil fields is obtained through pipelines, while the crude from Rudrasagar is obtained in railway tank wagons.

37. The Refinery has three main processing units *viz.* the Crude Distillation Unit, the Kerosene Treating Unit and the Coking Unit. The Refinery produces motor spirit, superior and inferior kerosene, H.S.D., L.D.O., furnace oil, iomex and petroleum coke. Supplies within Assam are despatched by lorries and railway tank wagons. For distribution outside Assam, white oil products and L.D.O. are despatched to Siliguri by a products-pipeline while furnace oil is despatched by tank wagons.

A. Production

38. The crude oil throughput and the quantum of production during the past 3 years were as follows:—

	Crude throughput (tonnes)	% of rated capacity	Products (tonnes)	% of throughput
1963-64 . .	543,524	72·3	492868	83·32
1964-65	749,164	99·8	685300	91·48
1965-66 .	799,434	106·6	720743	90·16

39. The Committee were informed that the Refinery could function at its full designed capacity only in Janu-

ary, 1964 although according to Consultant's programme, it was due to go on rated capacity after a few months of its commissioning, i.e. by the 1st June, 1962.

Inbuilt capacity.

40. The Committee were, however, glad to know that crude throughput of the Refinery had exceeded the designed capacity during 1965-66. It appears that during the months April to June, 1964, the Refinery processed 2,84,789 tonnes of crude oil which gives a capacity of 0.85 million per annum. This shows that the Refinery has an inbuilt capacity. which can result in a higher production than the actual designed capacity.

41. The Committee learnt that most refineries have an inbuilt capacity and that with certain marginal changes it would be possible to increase the capacity to a considerable extent. The Burmah-Shell Refinery at Trombay was able to expand from the original design of two million tonnes to almost four million tonnes, by a judicious utilisation of inherent built-in capacity. It was stated that this increase had been achieved with very little capital investment and slight additional facilities and modifications. The Gujarat Refinery also hopes to expand from three million tonnes to four million tonnes with very little additional capital investment, by taking advantage of the inherent built-in capacity.

42. *The Committee feel that it should be possible for both the Gauhati and Barauni Refineries to increase their rated capacities to a considerable extent by utilising the in-built capacity of the plant and equipment. Like the Gauhati Refinery, the Atmospheric Vacuum Unit I of Barauni is stated to have achieved a throughput rate of* 1.15 *million tonnes in June* 1966 *against the rated capacity of one million tonnes. This indicates the extent of extra capacity. The Committee hope that this matter will be actively pursued and suitable modifications for increasing the throughput of the Refineries thought of. It might be desirable for the Head Office of the Refineries Division to specifically entrust this task to certain experts in the Refineries and call for regular reports in regard to plans and progress in this direction.*

43. *The Committee understand that it is proposed to increase the throughput capacity of the Gauhati Refinery*

to 1 or 1.1 million tonnes but that no final decision has been taken on this matter yet. Part of this proposed increase in throughput should be achieved in the manner suggested above. The Committee hope that Indian know-how and equipment will be utilised, instead of depending on foreign help.

B. Crude Distillation Unit

44. The Committee found that the operation of the Crude Distillation Unit has not been uniform. From the financial reviews for the year 1965, the following information emerge in respect of the working of this unit:— Operation not uniform.

Period	*Working*
1-1-65 to 31-3-65	The Unit was run for 86 days and processed 202,558 M.T. of crude oil, it was shut down for four days on account of high stock of reduced crude.
1-4-65 to 30-6-65	It processed 225,8[illegible]o M. T. of crude oil and was run on a reduced throughput for 25 days on account of accumulation of reduced crude.
1-7-65 to 30-9-65	It worked for 89 days to process 200,438 M. T. of crude oil and was run on a reduced throughput for 18 days on account of accumulation of reduced curde.
1-10-65 to 31-12-65	It worked for 81½ days to process 185, 102 M.T. of crude oil and was run on a reduced throughput for 15 days on account of accumulation of reduced crude. In December, 1965, it had its annual shut down lasting 10½ days.

45. It will be seen that the Crude Distillation Unit had to be shut down for 4 days during the year 1965 on account of high stock of reduced crude and thereafter for another 58 days, it had to run on a reduced throughput on account of accumulation of reduced crude. Accumulation of reduced crude.

46. The Committee examined the actual throughput month by month from April, 1965 to May, 1966. The figures are as follows:—

Year	Month	Through-put Actual (MT)
1965	April	70,290
	May	79,470
	June	71,273
	July.	63,756
	August	7
	September	60,777
	October	54,734
	November	74,949
	December	48,070
1966	January	70,345
	February	60,751
	March	73,654
	April	35,779
	May.	68,827

(Rated average monthly throughput-62,500 tonnes.)

47. The Committee enquired why the accumulation of reduced crude had been allowed to affect the operation of the Refinery and were informed that in January, 1962 the Crude Distillation Unit of the Refinery went on stream when the Coking Unit was still not ready. As a result, reduced crude accumulated to the extent of 25,724 tonnes. According to the design, the Coking Unit can run for 312 days, which accounts for a throughput of 300,000 tonnes of reduced crude. This much quantity of reduced crude is produced when the Crude Distillation Unit processes 0.75 million tonnes of crude oil. However, by a little additional increase in the throughput of the Coking Unit, the Refinery was able to clear the accumulation of reduced crude to some extent.

Storage capacity.

48. It was stated that the original design provided for two storage tanks for reduced crude of a capacity of 2,600 tonnes each or 5,200 tonnes in all. The extra reduced crude

was stored in two 5000 tonnes capacity storage tanks meant for crude oil. It appears that past operations have shown that a minimum of 12,000 tonnes of reduced crude exist at any one time at the Refinery. As such two additional storage tanks of 5.000 tonnes capacity each have been recently installed for storage of reduced crude.

49. *Judging from the facts available, the Committee are not convinced that the accumulation of reduced crude was an inevitable result of the Crude Distillation Unit starting before the Coking Unit. That this should have happened is unfortunate.* Since then, it is only in 1964-65 that the Crude Distillation Unit has reached the rated capacity. The percentages of production in 1962-63, 1963-64 and 1964-65 have been only 38 per cent, 72.3 per cent and 99.8 per cent respectively of the designed capacity. If the Coking Unit had worked satisfactorily during this period the accumulation of stock of reduced crude should have been exhausted. In fact, the Committee understood that right from 1962-63, the Coking Unit has had to work on reduced throughput at times for want of sufficient feed stock.

50. *It has been stated that it has been possible to have a continuous run of the Coking Unit upto 70 days as against the earlier period of 45 to 60 days. If this is so, it should be able to cater to the increased throughput of the Crude Distillation Unit which has already been achieved. As has already been stated above, the Coking Unit as designed, balances the capacity of the production of reduced crude by the Crude Distillation Unit. In view of this the Committee feel that accumulation of reduced crude will arise only if the operations of the Coking Unit are unsatisfactory. As such, to have built two extra storage tanks for keeping reduced crude, appears to lay a premium on inefficient operations of the Coking Unit. It will be seen that the extra capacity of the storage tanks is about 200 per cent of the tankage envisaged in the original design of the Refinery. The Committee recommend, therefore, that this matter be reviewed by the top management of the Refineries Division during the expansion phase. There is no justification to add to the capital cost of the Refinery unless the reasons are extremely compelling.* **Extra tanks.**

C. Kerosene Refining Unit

51. The decision to start the Crude Distillation Unit in December, 1961 was taken in the expectation that the Coking Unit would be commissioned by the 10th February and the Kerosene Refining Unit by the 15th February, 1962. But the Crude Distillation Unit had to be shut down from the 1st March, 1962 as the crude stock was low. On account of this, the Kerosene Refining Unit was ready to go into operation only in early April 1962. It was, on the 30th June, 1962, that the Unit was commissioned, as in between there was trouble with the sulphur-dioxide compressor.

Mechnical troubles.

52. The mechanical troubles in the plant and equipment continued in the year 1962-63. The Unit operated for only 88 days. For 39 days the Unit was deliberately shut down owing to accumulation of products during December, 1962 and January, 1963.

53. The troubles in the Unit and the limited off-take of products continued even during 1963-64. On the I.O.C.'s request, a delegation of Rumanian experts took various steps to carry out modifications in the Unit and re-started it on the 25th August, 1963.

54. However, from the four quarterly financial reviews for the year 1965, the working of the Kerosene Refining Unit does not appear to be very encouraging as indicated in the table given below:—

Period	No. of days operated.	Quantity processed.
1st January to 31st March, 1965	8 days.	4258 MT
1st April to 30th June, 1965 .	9 1/2 days	6366 MT
1st July to 30th September, 1965 . .	9 1/2 days	5004 MT
1st October to 31st December, 1965 .	13 days	6270 MT
TOTAL	40 days	21,898MT

55. The designed throughput of the Kerosene Refining Unit is 2,30,000 tonnes per annum. It was stated that the Kerosene Refining Unit could not be run to rated capacity because of the difficulty in marketing iomex. For every 100 tonnes of raw kerosene 56 tonnes of superior kerosene and 44 tonnes of iomex are obtained. The only consumer of iomex is M|s Phillips Carbon Black Ltd., Durgapur, who use it as a feed stock for the manufacture of carbon black. The present demand of the Company is about 2,200 tonnes per month. This quantity can be obtained by running the Kerosene Refining Unit for the maximum period of 10 days in a month. The Committee were informed that there is no technical difficulty in operating the Unit but that operations had to be restricted merely because of the lack of off-take of income. In the meanwhile, the raw kerosene is sold as inferior kerosene. Iomex.

56. It was stated that as there was very little demand of L.D.O. in the Eastern Region, iomex was not being blended to produce L.D.O. as was being done at Barauni. Iomex can be used for the manufacture of petro-chemicals but there are no schemes in regard to this matter. Iomex can also be a substitute for the Refinery's fuels, but as the Refinery gases which cannot be use as fuel, are now flared, there is no economic benefit from this. In short, there does not appear to be any escape from the present impasse.

57. *The Committee understand that the Indian Institute of Petroleum, Dehra Dun is studying the question of alternative uses of iomex, but that the results were not known to the I.O.C. yet. It should be possible to find out how other countries are utilising this product and whether it would be economical to utilise it in the same way in India also. The Committee hope that the Indian Institute of Petroleum will be able to offer a solution to this problem.*

58. *Since in the Western India there is a great dearth of L.D.O., the Committee suggest that it may be examined whether iomex could be sent to the Gujarat Refinery for being blended with other products to produce L.D.O. If this is possible it will take care of the iomex production*

Superior Kerosene

at Gauhati and the deficit of L.D.O. in the Kandla-Okha area.

59. *As far as the economics of the production of superior kerosene is concerned, the I.O.C. would perhaps prefer things to stand as they are because more production of superior kerosene would mean firstly marketing it in the economic zone of the Barauni Refinery and secondly, incurring an under recovery of freight on such sales. This arises out of the present pricing policy of petroleum products which takes only ports as the pricing points and not the Refineries. While the I.O.C. would be justified in taking a purely commercial view of the situation, it has to be remembered that superior kerosene is imported into the country and paid for in foreign exchange while there is idle capacity in the country for production of kerosene. This anomalous situation arises as a result of Government's policy on pricing about which the Committee have dealt with in their Report on the Marketing Division. The Committee have also recommended there that Government should device a method of compensating the I.O.C. for the heavy losses it incurs as a result of under-recoveries of freight. Once this is done, the I.O.C. should be able to revise its policy in the matter of production of superior kerosene at Gauhati and elsewhere so as to produce the maximum quantity possible.*

D. Petroleum Coke

60. The Refinery produces about 40,000 tonnes of petroleum coke per annum. Most of this is sold to Messrs India Carbon Ltd., Gauhati. The Company had some difficulties during 1964-65 and 1965-66 when their sales were low with the result that they purchased less petroleum coke from the Refinery than agreed upon. The Committee enquired into this matter and found that the reduced sale of calcined coke by the Company was due to the fact that import licenses had been granted to several users of calcined coke in the country during 1963-64 with the result that these users, who had accumulated huge stocks, did not make their purchases in India. *It is a matter of regret that import licences are granted and foreign exchange wasted*

on import of material which is available in India and the factory producing it has to close down for a part of the year for want of market for it.

61. Due to lack of off-take of petroleum coke by Messrs India Carbon Ltd. the Refinery faced a very difficult problem in storing the accumulated stock. In November, 1964, the Refinery was obliged to write to the Company threatening to store the coke elsewhere and recover the cost of such loading and storage from them. This had some effect on the Company. In fact in November, 1964 and April, 1965 about Rs. 10,000 were incurred by the Refinery in shifting large quantities of coke manually from their yard and re-stacking it in an open place.

62. *The Committee find that there is no clause in the contract whereby it is obligatory for Messrs India Carbon Ltd., to lift the coke at specified periods. The Committee suggest that such a clause should be introduced in the agreement at the time of renewing to prevent repetition of the incident which occured in* 1964-65.

E. Staff

63. The Committee were informed that a work study had been conducted in the Gauhati Refinery in regard to the requirement of staff by IBCON Private Ltd. The studies were made during 1963 to 1965 and covered ten departments. Some of the technical sections not covered by this study were later on studied by the Industrial & Engineering Department. Some of the non-technical departments, like Accounts, Personnel, Administration, Security, etc. were under study at present. Work study.

'Surplus staff.

64. The present position is that after standardising the staff strength nearly 200 employees will be rendered surplus out of the existing strength. The Committee were informed that there was some difficulty in retrenching these men, because of opposition from the Union. *The Committee recommend that constant efforts should be made to find alternate employment for the surplus staff either at Gauhati or in nearby towns. The help of the Government of Assam may also be taken in regard to this matter.*

65. The Committee also found that the sanctioned strength of the Refinery is 994 while the actual strength on 30-6-1966 was 1143. This was besides the muster-roll staff of 267 for whom no separate sanction existed. The surplus staff were mostly in the grade of Rs. 75—145, Rs. 120—210 and Rs. 165—275.

66. *The Committee recommend that the Refineries Division should examine the staff position in detail in each Refinery and determine norms for each department and category of operations. These norms should be applied while fixing the permanent staff strength of each Refinery. The Refineries Division should also evaluate the productivity of the staff in the various departments of each Refinery and make a comparative study* inter-se. *The Committee also suggest that the Research Department of the Division should try to obtain information on staff productivity techniques employed in other countries and suggest their application in the Refineries.*

IV

BARAUNI REFINERY

A. Location

Expert Committee.

The location of a Refinery at Barauni was first suggested by an Expert Committee in 1956. It was felt that the refined products would be mainly intended for consumption in the Bihar area and the areas slightly to the north and west of it. These areas were being fed through imports from Calcutta and from products produced by the Bombay Refineries. Barauni was specially selected because it was a focal point of the metre gauge and broad gauge lines. Additionally, it was felt that as north Bihar did not have any major industry, the location of an oil refinery would provide scope for industrialisation of a backward area, thus contributing to the economic advancement in that region. Government's decision on the choice of Barauni for the location of the Refinery was taken in June, 1957.

Site Selection Committee.

68. Having determined the location, it was left to the Indian Refineries Ltd., to choose the actual site. A Site Selection Committee was constituted in which the Russian experts were included. Three sites were considered and all of them had unfavourable soil conditions and were located in the seismic belt. Further investigations also proved that there was no better site on the north bank of the river Ganges, near Barauni. A suggestion was also made that the location should be shifted away from the seismic belt, preferably to the south bank of the river Ganges. Government examined this suggestion with reference to the commitments already made in the Oil India Agreement wherein it was stipulated that the terminus of the crude oil pipeline would be Barauni. While there would be a saving of Rs. 2 crores in the cost of construction of the Refinery if it was erected at a site on the south bank of the river Ganges, there would be an increase of Rs. 2 crores to the Oil India Ltd. on the re-alignment of the pipeline, including a major river crossing. In view of this, it was decided that the Refinery location, already tentatively decided at Barauni, should remain unchanged.

Objections by experts.

69. The Russian experts raised several objections to the site and ultimately the matter was referred to certain Indian experts in the Central Water & Power Commission, Bhakra Designs Directorate, the Central Road Research Institute, etc. for opinion. These experts also thought that the site selected was not suitable from the engineering point of view on account of the seismic factor, the level of sub-soil water involving drainage difficulties and the low level of the terrain itself.

70. The Chief Minister of Bihar promised to strengthen the Gupta Bund to the extent considered desirable as a safeguard against floods. He further urged that the Refinery site should not be changed. It was also confirmed that seismic effects were common in the entire area around Barauni including south of the Ganges. The Oil India Ltd. refused to consider a change of location to a site south of the Ganges. Apart from the increase in the cost, they felt that it would involve heavy delay in bringing the pipeline into use. These three factors ultimately led to the final decision of locating the Refinery at the present site.

71. The level of the site though 0·06 metres above the heavy flood level, was 1.6 metres below the maximum flood level. It was, therefore, decided to raise the level of the area by 1.8 metres. It was also necessary to raise the level of the site to ensure the gravitational flow of water and to avoid flooding during heavy rains. The earth work involved was 1.80 million cubic metres. Unfortunately, when, the work of earth-filling was under way on a round the clock basis, the area had very heavy rainfall—18" in 14 hours in 1961 and 24" in 36 hours in 1962—which caused severe flooding. Precious time was lost in de-watering the area each time, before the work could begin.

Sub-soil investigations.

72. The sub-soil investigations of the area were first conducted by the Bihar Institute of Hydraulic and Allied Research. Later a team of Soviet experts conducted soil investigations at the site in 1959. These investigations revealed that the site area was made up entirely of alluvial soil under laid by several fault zones.

73. After actual excavation for some of the foundations in December, 1961, it was observed that the soil strata was extremely erratic—differing widely even between the nearest two foundations due to the presence of dust-like sand as against clay-with-admixture mentioned in the

Working Drawings. The laying of the foundations, therefore, could not be carried out as envisaged in the Working Drawings. Evidently, the earlier investigations proved wrong. Detailed study of the problem was made in January, 1962 and in April, 1962 and the Soviet experts prescribed special foundation treatment involving displacement of the dust layer by sand and stone. Huge quantities of sand and stone had to be procured for this and ultimately a delay of four to six months took place in solving the foundation problem.

Precautions against floods.

74. The Committee were informed that the precautions taken against the floods by filling up the Refinery area to ensure gravitational flow of water were considered adequate against floods and rain water. As regards the possibility of floods from the river Ganges, the bund put up by the State Government had already been strengthened and this was considered sufficient.

Precautions against seismic factors.

75. As regards earthquakes, it was stated that the steps taken to strengthen the foundations were considered adequate to withstand an earthquake of normal intensity but it could not be said with any degree of certainty that the foundations would be able to face a big earthquake. All that the designers had done was to take reasonable precautions according to normal engineering standards.

76. The Committee were informed that the earth-filling operations had cost Rs. 150 lakhs*, while the cost of strengthening the foundations due to weak soil conditions and against the seismic factor was Rs. 29·19 lakhs.

Wrong decision.

77. *The Committee feel that in retrospect it was an entirely wrong decision to have located the Refinery at its present site—a decision taken in spite of strong objections on technical grounds both from the Indian and Russian experts. That facts proved the experts to be right and the decision-makers wrong is all too obvious. It is doubtful even today whether satisfactory safe-guards have been taken against severe flood and earthquakes in spite of the colossal extra expenditure incurred in providing safeguards. As the Rfinery is already* fait accompli, *the Committee sug-*

*At the time of factual verification it was stated that 40% of Rs. 150 lakhs i.e., Rs. 60 lakhs would have been in any case necessary for site preparation works regardless where the Refinery was situated. As such the extra cost apportionable to the work of raising the level of the site was Rs. 90 lakhs only.

gest that a study at regular intervals should be undertaken by the Refinery authorities to ensure that the foundations of the various Units of the Refinery are intact and do not show any sign of damage or subsidence. If contra indications exist, immediate steps should be taken to safe-guard against any catastrophe.

Development of area round Barauni.

78. *As regards the development of the area round Barauni as a sequel to the location of the Refinery, progress has been rather slow. One would have expected that the area would be developed with petroleum based industries including a petro-chemical complex and a fertilizer plant based on naphtha. This has unfortunately not come about, the main reason being the fact that Barauni not being a pricing point for petroleum products has great disadvantages in so far as the prices of its products are concerned. The Committee in their Report on the Marketing Division have dealt with this matter in detail. Suffice it to say here that when Barauni goes into full production, the I.O.C. will lose Rs. 3 crores per annum on under-recoveries if the present pricing policy of Government is not changed.*

79. *Private entrepreneurs should be attracted to Barauni to establish industries there. This can be done only by making the raw material cheaper at Barauni than say at Calcutta. The Committee also feel that vigorous efforts are required both by the Central Government and the Government of Bihar to carry out the policy of economic development of the north Bihar as a direct consequence of locating the Refinery there. The locational disadvantages of the Barauni Refinery can only be compensated if development of the area results from such a location.*

B. Delays in construction.

80. The following table shows the delays that took place in the completion of the various units of the Barauni Refinery:—

Units	COMPLETION SCHEDULE				
	Target		Achieved		Delay
	As contemplated (before construction)	As revised in July 1963	Completion of construction	Commissioning	Year Month
First Phase					
(A) AVU-I	Feb., 1963	March, 1964	May, 1964	July, 1964	1—3
(B) T. P. S.	Feb., 1963	Feb. 1964	May, 1964	June, 1964	1—3
(C) Coking Unit	Feb. 1963	May, 1964	Aug., 1964	October, 1964	1—6
(D) K.T.U. (Phase-I)	March, 1964	March, 1964	Dec., 1964	January, 1965	0—9
(E) Connected General Facilities	Feb., 1963	March, 1964	May, 1964	July, 1964	1—3
Second Phase					
(A) AVU-II	July, 1963	July, 1964	Sept., 1965	Feb., 1966	2—2
(B) T. P. S.	July, 1963	June, 1964	Oct., 1964	Nov., 1964	1—3
(C) K. T. U. (Phase II)	March, 1964	June, 1964	Dec., 1965.	—	1—9
Third Phase					
(I) Phenol Extraction Unit	April, 1964	Aug., 1964	June, 1966	Aug., 1966	2—4
(II) Bitumen Unit	July, 1963	Aug., 1964	April, 1966	Nov.. 1966	2—9
(III) Dewaxing Unit	April, 1964	Aug., 1964	Dec., 1966	Feb., 1966	2—9
(IV) Filtration Unit	April, 1966	Aug., 1964	Dec., 1966	Feb., 1966	2—9
(V) Other Associated General facilities	April, 1964	Aug., 1964	Dec., 1966	Feb., 1966	2—9

Reasons.

81. The delays that occurred were on account of several reasons. As stated earlier, the foundation problems led to a delay of six months. The unprecedented rains which resulted in floods retarded the progress by another four months. Late receipt of equipment from the U.S.S.R. was another contributory cause. According to the agreement, all the equipment for the first phase were to have been received by December, 1961, but the actual supply was completed only by August, 1963, except for a few items which were air-lifted in 1964. Delays ranging from one to four months were also stated to have occurred due to some confusion about foundation bolts. Besides these, there was labour trouble involving the labour of both the civil and mechanical contractors. Finally, the performance of the contractors themselves was far below expectation. It was stated that the performance of the mechanical contractor sometimes was as low as 30 per cent of the quota fixed for a month, even after taking into account the actual availability of equipment and material, which were below those originally envisaged. Matters came to such a pass that in October, 1963 a part of the work was taken away from the contractor to be done departmentally. This decision was challenged by the contractor in a court of law. The Refinery then felt that a Court decision might adversely affect the construction schedule and as such, they dropped the decision to withdraw a part of the work from the contractor. In the meanwhile, the contractor has made a claim on the Refinery for alleged losses suffered by him on account of delays and other factors for which the I.O.C. was responsible. This is under arbitration. The Refinery has made a counter claim of Rs. 8.15 crores on account of losses caused to it by delays in construction. The Refinery has also withheld a sum of Rs. 1 lakh from the civil contractor for delay in certain works.

82. *The Committee are not happy over the delays that have taken place in the construction of the Barauni Refinery. To begin with, the Refinery was dogged by ill-luck in having floods and rains. A proper soil investigation would have saved six months delay. In spite of the knowledge that the soil was extremely unfavourable, it is surprising that detailed investigations were not carried out in the initial stages. As regards delays in receipt of equipment, Government might consider whether agreements*

with suppliers could stipulate some compensation for losses due to delays in receipt of equipment. There appears to have been no such clause in the present agreement.

83. As regards the contractors, the Committee found that both the firms entrusted with the mechanical and civil works were given contracts worth more than Rs. 5 crores each. According to the I.O.C. "their performance has not been generally satisfactory," and "they had generally exhibited lack of deligence in organising men and materials for execution of works." *It is doubtful whether a careful study was made initially of the capacity of these two firms to handle such a large volume of work themselves. That they were unable to fulfil their monthly quotas, itself indicates their incapacity. The Committee regret to point out that necessary care was not exercised in this matter by the management of the Refinery. The proper thing would have been to split up the total volume of work into small contracts and to engage several contractors as was done at Koyali. According to the I.O.C., about 60 per cent of the overall delay could be attributed to the poor performance of the contractors. The Committee hope that Government will benefit by this unfortunate experience and lay down proper guide-lines for the future.* Contractors.

84. *As has been pointed out earlier, the Refinery withdrew a part of the work of the mechanical contractor with the intention of undertaking it departmentally. This would also indicate that in the initial stages no proper assessment was made as to what work could be undertaken departmentally and what work could be given out on contract. If this had been done, considerable amount of money and time could have been saved.*

85. *In spite of specific clauses in the contracts for compensation in case of avoidable delays on their part, the Committee observe that the contractors have been leniently treated. The Chief Engineer and the General Manager of the Refinery have been for too indulgent in so far as the contractors were concerned. There are no indications that they exercised proper control and if they had, things might not have come to such a pass.*

86. *The lack of supervision on the part of the supervisory staff of the Refinery over the work of the contractors has also contributed to the delay. The staff lived in* Lack of Supervision.

Hathidah Colony—five miles away from the site, on the south bank of the river Ganges. Adequate facilities did not exist for transport, because apart from Refinery's own transport, there was hardly any public transport available. The roads were also poor and weather conditions often unfavourable. The site itself was often slushy and muddy. The Committee do not wish to under-rate the heavy odds against which the staff had to work to fulfil their tasks. The Committee's only contention is that by locating the township so far away, supervision became lax.

Hathidah Colony.

87. It was learnt that the Hathidah Colony was taken over from the Railways and that most of the buildings were of a temporary nature. *The Committee hope that this Colony will not be made into a permanent township in view of its distance from the Refinery and other practical disadvantages like lack/cost of transport, etc.*

C. Coking Unit

Difficulties

88. Most of the present difficulties, of which the Refinery has many, can be attributed directly to the Coking Unit. This Unit was commissioned on the 5th October, 1964. Within a short time, it was apparent that it would not be possible to produce furnace oil in accordance with specifications laid down in the Detailed Project Report. The result was that the off-specification furnace oil component produced at the Unit accumulated to the maximum of storage capacity available and brought the Refinery operations to a stand still in December, 1964. It was found that both the quality and quantity of the furnace oil component (coker fuel oil cut) obtained from the Coking Unit differed considerably from that given in the Detailed Project Report, thus aggravating the situation and making it impossible to dispose all the Coking Unit products as to produce on specification finished products. The furnace oil component obtained was 40 per cent of the feed with a pourpoint of 42 to 45° C as against 21 per cent in the design with pourpoint of 30 to 35° C. Further, an attempt was made to establish the design through put of the Coking Unit, irrespective of the quality and quantity of the coker fuel oil cut obtained, under design operating conditions, but it was found that the throughput could not be raised beyond 1,600 tonnes per day as against the

design throughput of 2,000 tonnes per day. This was found to be due to limitations of equipment on the Unit.

89. The Indian specification requirement of furnace oil was supplied to the U.S.S.R. at the Project design stage. However, the Detailed Project Report clearly stated that the furnace oil produced in the Refinery would not meet Indian specifications. Furnace oil.

90. Discussions took place with the Russians, who finally wrote as follows:—

> "We have considered this question thoroughly and do not find suitable process which could give a fuel oil of low pour point and high viscosity. In order to make fuel oil more suitable for the requirements of consumers, we are decreasing the pour point to the extent of 14°C by diluting it with kerosene extract. In our opinion this is the best solution and IRL should approach the Government for getting exemption from levying diesel oil duty on this furnace oil. This product will not meet the specifications of diesel oil because of carbon content and its pour point. Besides as a fuel oil, this product is of much higher grade than what is available at present in the market. We, therefore, see no difficulty in marketing this product."

The Detailed Project Report was, however, accepted.

91. The furnace oil question was also raised with the Russian specialists a number of times during the progress of construction of the Barauni Refinery. This issue was later discussed with Mr. Blagavidov, Director of the Institute of Research of Petroleum, Moscow, in May, 1964 and he informed that several blends for producing on specification furnace oil were carried out in Moscow, but none of the blends met the viscosity and pour point specifications of furnace oil. He, however, recommended a new specification for furnace oil to meet the product produced at the Refinery, rather than to change the design of the Refinery to produce furnace oil of the existing Indian specifications. This new specification was put up to the Central Board of Revenue, who objected to the specification on grounds that it would result in a considerable loss

in revenue to the Government as this product could not be distinguished from and may be abused as L.D.O.

Modifications.

92. With the help of the Russian specialists, several experiments were conducted on the Coking Unit and on 31st March 1965, the Unit was completely shut down for major modifications. The modified Unit was re-started on 10th May, 1965 for trials and was stabilised from June, 1965. It also transpired that due to the modified scheme of operation, it was not possible to operate the Unit beyond 1,300 to 1,400 tonnes per day as against the design throughput of 2,000 tonnes per day, mainly on account of the limitations of the heaters. Under these conditions it was not possible to operate the Refinery at 2 million tonnes. The problem arose also of disposing of 15,000 tonnes of reduced crude per month for which there was no market.

93. The Russians were then requested to undertake major modifications with a view to operate the Unit to the designed throughput of 2,000 tonnes per day and to obtain on-specification marketable products. The Russians submitted their recommendations in 1965 and these were accepted with minor modifications. The modifications were expected to be completed by December, 1966. The total expenditure on these modifications was expected to be of the order of Rs. 45 lakhs.

94. *The Committee are distressed to note the failure of the Indian authorities in having accepted the Detailed Project Report which very clearly indicated that furnace oil of Indian specification could not be produced in the Coking Unit. The problems of disposal of the product, the specification of which was indicated in the Detailed Project Report, or the difficulties in regard to the levy of excise duty on new types of blended products which were neither furnace oil nor L.D.O. according to Indian specification, do not seem to have been considered properly. If only the problems, which were very clearly evident at the time of the Detailed Project Report, had been tackled and a revision of the design sought, as was done much later, the working of the Refinery would have been happier. The Committee hope such mistakes would not be committed in future.*

Loss.

95. The Committee enquired what was the total loss to the Refinery as a result of its working at a reduced

throughput because of the defects in the Coking Unit and it was stated that no calculations had been made. Between April, 1965 and June, 1966 the Refinery has been able to operate only to the extent of 75 per cent of its installed capacity of the 1st million tonne stage. The 2nd Atmospheric Vacuum Unit was ready for commissioning in February, 1966, but could not be commissioned because of the Coking Unit. *The loss incurred by the Refinery on account of the reduced throughput of the 1st million tonne stage and the non-commissioning of the 2nd tonne stage for over a year is great. This is besides the spending of valuable foreign exchange on importing products which could have been produced there. This unfortunate and enormous loss is most regrettable.*

D. **Kerosene Treating Unit**

96. There are two identical Kerosene Treating Units at the Barauni Refinery each with a capacity of 300,000 tonnes per year. The Units were designed with a view to upgrade the kerosene produced from the two Atmospheric Distillation Units and the Coking Unit. The products proposed to be obtained from the two Kerosene Treating Units were superior kerosene, inferior kerosene and aviation turbine fuel along with the resulting aromatic extracts. According to the Detailed Project Report 270,000 tonnes per year of kerosene feed stock obtained from the Atmospheric Distillation Unit No. I was envisaged to be treated in the Kerosene Treating Unit No. I to produce superior kerosene, whereas 288,000 tonnes per year of kerosene feed stock consisting of 210,000 tonnes per year from the Atmospheric Vacuum Unit No. II and 78,000 tonnes per year from the Coking Unit was envisaged to be treated in the Kerosene Treating Unit No. II in a block-wise operation to produce aviation turbine fuel and inferior kerosene respectively. In actual practice, only about 170,000 tonnes per year of kerosene feed stock is produced from the Atmospheric Distillation Unit No. I as against 270,000 tonnes per year according to the design. This was with a view to maximise production of H.S.D. The economics of the Refinery operations were worked out for an average yield of kerosene feed stock of 170,000 tonnes per year as against 270,000 tonnes per year envisaged in the Detailed Project Report and it was found that the existing pattern of operations was more profitable by

Rs. 3,343,669:00 per year. Further, the kerosene from the Coking Unit is not treated in the Kerosene Treating Unit as this product is more economically utilised for blending with high speed diesel, light diesel oil and furnace oil without any treatment. Besides this, the Refinery has been licensed by the Government to make 36,000 tonnes per year of mineral turpentine oil. The production of 36,000 tonnes of M.T.O. will utilise about 57,000 tonnes/year capacity of the K.T.U. which was not envisaged in the Detailed Project Report.

Excess capacity.

97. The total production of kerosene feed stock for the Kerosene Treating Units at 2 million tonne crude oil throughput, at the present operating conditions will amount to about 350,000 tonnes per year as against 558,000 tonnes per year indicated in the Detailed Project Report. It will, therefore, not be necessary to run both the Kerosene Treating Units at the 2 million tonne crude oil throughput.

98. The yield pattern of kerosene and diesel was stated to be kept under active consideration. It was expected that when the country attains self-sufficiency in H.S.D., the situation would be reviewed again and indications are that it would be possible to increase the kerosene yield, thereby utilising the available capacity in the K.T.U.

99. The question of extra capacity of the Kerosene Treating Units was also discussed with the Russian specialists shortly after commissioning the first phase units and it was proposed to utilise the extra capacity to treat the kerosene production from the 3rd million tonne unit after expansion, without adding to the capacity of the Kerosene Treating Units. The total kerosene production from 3 million tonne Naharkatiya crude oil will be about 530,000 tonnes.

Lack of planning.

100. *The Committee feel that there has been a lack of proper planning in regard to the Kerosene Treating Units. At the moment, the capacity of the Units is almost double of what is required at the 2nd million stage. Unnecessary capital has been blocked up and the high capital cost adds unnecessarily to the expenses of operations. These could have been avoided if all the factors had been taken into consideration at the planning stage and the exact requirements communicated clearly to the Russian experts.*

101. The Committee found that the Kerosene Treating Unit I was closed down in 1965 for 208 days and for 59 days in 1966 (upto 30th June, 1966).

102. The Committee were informed that during shut-downs, the expenditure incurred on the personnel for the Kerosene Treating Unit is charged to the Unit even if these personnel are utilised elsewhere in the Refinery during the idle period of the Unit. During the shut-down period of the Kerosene Treating Unit the personnel of the Unit were utilised on training or in the other Units of the Refinery. It was stated that personnel for the Kerosene Treating Unit No. II have not been recruited and will not be recruited until this Unit is to be commissioned. Personnel.

103. *The Committee hope that there will not be waste of manpower in these Units. The personnel attached to the Kerosene Treating Units should be given training in the work of two or three other units so that they could be of use there when the Kerosene Treating Unit is shut-down. It should also be examined how far the personnel of Kerosene Treating Unit No. I can manage the Kerosene Treating Unit No. II. Only the minimum stuff should be recruited for Kerosene Treating Unit No. II, so that overheads are kept to the minimum. The Committee, however, cannot but express regret at this state of affairs.*

E. Atmospheric Vacuum Unit

104. The A.V.U. No. II constitutes the second phase of the Refinery. This Unit was completed in the beginning of 1966 and was commissioned on 4-2-1966. However, the Refinery could not be worked on throughput of 2 million tonnes because it was not possible to operate the Coking Unit beyond 1,400 tonnes per day. The entire feed stock of the Coking Unit was obtained from the A.V.N. No. I. The difficulties relating to the Coking Unit have been dealt with elsewhere in this Report. The Committee were informed that another factor which would have restricted the throughput of the Refinery to one million tonne beyond February, 1966 even if the difficulties of the Coking Unit did not exist, was the critical storage position of motor spirit in the Refinery. On 1-6-1966 the stock of motor spirit stood at 21,000 tonnes as against a maximum storage capacity of 22,000 tonnes. As such, even though the A.V.U. II had been commissioned in February, 1966

it was necessary to shut-down the Unit subsequently *inter alia* due to lack of off-take of motor spirit.

Loss.

105. The Committee enquired what would have been the loss in not operating the second million tonne stage from 4-2-1966 to 1-7-1966. The answer received was as follows:—

> "It will be seen that it may not at all have been possible to commission the Atmospheric Vaccum Unit No. II. However, if we completely overlook the above mentioned limitations, (off-take of motor spirit) which are contrary to the facts, it would have been possible to commission the Atmospheric Vacuum Unit No. II. As this Unit was not commissioned due to the limitations indicated above, the cost of keeping the Unit idle from 4th February to 1st July 1966 is only of academic interest. The details of the economics in not operating the second million tonne unit are presented below:
>
> The Coking Unit was operated for 113 days from 4th February to 1st July, 1966 and processed a total quantity of 146,000 tonnes of reduced crude. If full design capacity of the Coking Unit of 2000 tonnes per day was available it would have been possible to process an additional 80,000 tonnes of reduced crude in the Coking Unit. In order to obtain this additional quantity of reduced crude it would have been necessary to process 190,000 tonnes of crude oil in the Atmospheric Vacuum Unit No. II. Hence the financial benefit in operating the Coking Unit at full throughput during the period from 4th February to 1st July, 1966, would have amounted to about '17 lakhs of rupees."

Lack of Coordination.

106. *The facts stated above reveal lack of coordination in that arrangements for sales should have been made simultaneously with production. If this is not remedied the situation will be further aggravated when the second and third million stages go into stream. There is need for very urgent action in this matter by the Marketing Division. Unless the motor spirit is sold as soon as it is pro-*

duced, the Refinery will come to a halt. Apart from the loss to the Refinery, such shut-downs will also involve unnecessary waste of foreign exchange required in importing deficit products which could otherwise have been produced locally. The Government should also keep a watch over this aspect and ensure that such shut-downs do not take place.

F. Cost of Plant and Equipment

107. The Committee asked for details of the estimated and the actual cost of the plant and machinery of the Refinery and were informed that the total cost of the Project was estimated on functional basis and not on the basis of individual plant units. The estimated cost under the various heads is given below:—

(Rupees in lakhs)

Particulars	Total estimated cost	Actual upto 31-3-66	Reasons for variation
Cost of the Plant and Equipment:			
(*a*) Soviet supplies .	1,698·99	1,805·17	
(*b*) Indian supplies .	87·26	66·31	
Construction equipment Transport vehicles, Tools, etc.	94·08	80·35	
Mechanical erection and Electrical Works	584·09	570·62	
Civil Engineering works within Refinery	529·58	545·82	The estimates were prepared before the receipt of Actual Working Drawings. But later on it was found that more works are required to be executed.
Construction site requirement and Misc. construction	29·74	39·10	
Railway sidings . .	111·88	70·10	
Water supply, sewage and Effluent discharge	131·40	108·86	

Indigenous supplies

These items exclude general expenses, salaries and allowances and other works not conforming to Plant and Machinery.

108. The Committee were informed that the increase in cost of the Soviet equipment was due to the increase in the customs duty, cost of the equipment itself and freight. It will be seen from the figures that the Indian supplies accounted for only a negligible proportion of the total

cost of the plant and equipment. This is in contrast to the position at Koyali, where 60 per cent of the equipment of the first and second million stage was indigenous and for the third million satge, this figure was expected to increase to 75 per cent. The motto of self-reliance does not seem to have been adopted by the management of the Barauni Refinery. In fact even the modest estimates framed for purchase of Indian equipment were achieved only to the extent of 75 per cent. The Committee came across several cases of imports of Soviet equipment which could have been procured within India if efforts had been made in this direction. One extreme example is the import of scroll steel sheets for the manufacture of storage tanks. The Gujarat Refinery fabricated the tanks with indigenous material and also saved rupees one crore in expenditure. The Committee also found that several construction equipment including cranes, pipe layers, dozers, etc. were imported at Barauni. The indigenous component of all the electrical equipment constituted one per cent.

109. *The Committee cannot escape the conclusion that the management of the Refinery made no efforts to find out indigenous sources of materials or to reduce expenditure. Comparisons with other public sector refineries are inevitable and the failure at Barauni is all the more glaring when a comparison is made with the Gujarat Refinery. The Committee hope that for the third million stage, imports will be made only when inevitable. The Government of India should also make a comparative and detailed study of the Barauni and Koyali construction with a view to provide guidance for the other public sector refineries envisaged in the Fourth Plan.*

G. Movement of products

110. A long term plan is drawn up by the Marketing Division in consultation with the Refineries Division for the upliftment of various products from the Refineries. Every month a coordination meeting is held with the representatives of the Marketing Division in which planned offers based on the operation of the various units are given for the next month by the Refinery. The Marketing Division then plans upliftment of these products based on the offers. The following statement gives an idea of the planned offers given to the Marketing Division of various pro-

ducts and the total quantities of each product that they were able to lift from January to June, 1966:—

(Figures in KLs)

	JANUARY		FEBRUARY		MARCH	
	Offer	Despatched	Offer	Despatched	Offer	Despatched
M.S.	20,000	14,973	28,000	15,297	30,000	16.901
SK/ATF	5,000	5,203	6,000	5,163	8,000	5,720
M.T.O.	..	..	..	..	3,000	276
I.K.	1,000	528	1,000	800	..	..
HSD	17,000	16,037	15,000	12,343	20,000	21,936
LDO	15,000	11,452	17,000	13,081	19,200	14,118
F.O.	6,000	7,749	8,000	6,904	4,000	3,292
LSHS	5,000	4,328	6,000	4,720	8,000	5,483
COKE	34,000	1,119	37,000	951	40,000	5,002
LPG	50	34	50	58	50	52

	APRIL		MAY		JUNE	
	Offer	Despatched	Offer	Despatched	Offer	Despatched
M.S.	30,000	17,640	30,000	17,833	30,000	24,385
SK/ATF	8,000	4,935	8,000	5,269	10,000	6,884
M.T.O.	3,000	1,074	4,000	1,294	3,000	2,503
H.S.D.	25,000	24,265	20,000	22,188	21,000	21,152
L.D.O.	20,000	14,142	20,000	13,157	20,000	14,077
F.O.	5,000	2,828	6,000	3,694	8,000	4,014
LSHS	10,000	6,574	30,000	7,196	2,5000	7,676
COKE	30,000	703	40,000	633	40,000	568
L.P.G.	100	62	100	111	100	84

111. It would be seen from the above table that the off-take has been considerably less in many cases than the planned offers. While this would be understandable in the case of a surplus product like motor-spirit, it is surprising that the off-take of superior kerosene, which is a deficit product, and which is also imported, has in almost all months been about 30 per cent to 40 per cent less than the quantities offered. The main difficulties with regard to the off-take of products was stated to have been shortage and irregular supply of railway tank wagons on account of various reasons and due to mechanical failure of the Refinery Units. When products do not move, stocks get accumulated and cause extreme difficulties in Refinery operation. In fact there had been occasions when the Refinery had come to a complete stop. This happened from September 28th to October 8th, 1965 on account of high

stock of finished products. Also the Kerosene Treating Unit was shut down from June 17th to 25th, 1966 due to high stock of superior kerosene.

112. *The Committee are not happy over this matter. There has been an apparent lack of coordination between the Refineries Division and the Marketing Division or an inability on the part of the Marketing Division to sell products in time. As only the first million stage of the Refinery had gone into stream, there was no reason to believe that it was difficult to sell the products as and when they were produced. The area served by this Refinery is highly industrialised one, with a proportionately larger consumption of petroleum products than in the other parts of the country. In view of this, marketing difficulties cannot be a valid excuse for the accumulation of products in the Refinery. The Committee would urge a close scrutiny of this matter by the top management of the I.O.C. and the Government with a view to devising adequate safeguards to prevent the Refinery's operation from coming to a standstill or its working at reduced throughputs.*

Tank wagons

113. The Committee called for figures of actual indents for tank wagons and the actual number made available from January to June, 1966. The following are the figures:—

Broad Gauge	*Indents*	*Placed*	*Loaded*	*Rejected*
January, 1966	1720	2267	2027	240
February, 1966	2550	2274	2147	127
March, 1966	2600	2060	2046	14
April, 1966	3240	2191	2094	97
May, 1966	3720	2313	2163	150
June, 1966	3600	2944	2777	167

(Loading of Tata special are excluded from above as LSHS move by a special close circuit rake.)

Metre Gauge	*Indents*	*Placed*	*Loaded*	*Rejected*
January, 1966	560	473	456	17
February, 1966	530	370	332	38
March, 1966	630	577	537	40
April, 1966	820	750	676	74
May, 1966	725	584	528	56
June, 1966	720	568	486	82

114. It will be seen from the above figures that in most months, placements have been much below than the actual indents and also that the rejection of the wagons actually placed has been rather heavy. During oral evidence, the Committee were informed that rejections took place mostly of wagons which were leaking or otherwise not worthy of use. Sometimes, the type of wagons indented were not the same as were actually supplied, *e.g.* white-oil tank wagons for black-oil tank wagons and *vice-versa. The above facts reveal a none too satisfactory state of affairs in regard to the supply of tank wagons for distribution of products. This difficulty would not arise when the pipelines to Kanpur and Maurigram are commissioned. Till this is achieved, it has to be ensured that movement of products is not hampered because of wagon shortage. The Railway Board and the Marketing Division of the I.O.C. should give adequate attention to this matter.*

H. **Petroleum coke**

115. As on 1-7-1966 the Refinery had a stock of petroleum coke of 42,959 tonnes as against the total production of 55,128 tonnes since the commissioning of the Coking Unit. here is an Agreement with M/s. India Carbon Ltd., whereby the supply of petroleum coke to the company will be made at 36,000 tonnes in 1967 to be gradually reduced to 10,000 tonnes in 1970. This reduced sale agreement has been made because there is a scheme for putting up a Coke Calcination Plant at Barauni. This Calcination Plant will have a capacity of about 50,000 tonnes per annum. It was stated that a study was in progress with a view to ascertain the total investment involved in such a plant. It was expected that the project could be completed within two years after the Government sanctioned the project.

Agreement with M/S India Carbon Ltd.

116. *The Committee understand that calcination of coke is an extremely profitable industry. In view of this and need for calcined coke in considerable quantities in the country, Government should have set up this plant for calcination of coke along with the Refinery itself. The Committee understand that this coke has many industrial uses especially in the making of carbon black electrodes used in the manufacture of aluminium, manufacture of abrasives, artificial graphite, calcium carbide and electric*

furnace resistors and linings, etc. The Committee recommend that early steps should be taken by Government to set up a calcination plant at Barauni.

117. *During their visit to Barauni, the Committee saw the huge stocks of coke spread out in the open area around the Refinery. It was stated that such exposure for long period was likely to deteriorate the quality of the material. Vigorous efforts must, therefore be made to find out a market for the coke. Because of the reduced sale each year to M/s. India Carbon Ltd., stock accumulation each year will be heavier in future, and as such, it is necessary to find out a proper market for the coke. The Committee understand that efforts are being made through the S.T.C. for its export to certain Middle East countries. This should be actively pursued. The I.O.C. may perhaps investigate whether it would be possible also to interest private parties in effecting exports. Even if the Refinery does not make much profit on this deal, it will at least save it from the problem of storing these vast stocks with the attendant possibility of loss by deterioration.*

I. Wrong payment of Bill

118. The Committee came across a case of wrong payment of a bill for Rs. 1.15 lakhs at the Barauni Refinery. The case had many peculiarities as the following facts will reveal:—

(i) *Tenders*:—Barauni Refinery Project required seamless carbon steel pipes. A public tender was issued in August, 1964 and 27 tenders were received in response. The tender dated 12-9-1964 of Messrs Rekam Industries, Bombay was considered the lowest tender for sizes:—(a) 89 mm x 4 mm and (b) 57 mm x 3.5 mm as per specification.

A limited enquiry was also issued on 11th November, 1964 for the supply of seamless carbon steel pipes of 32 mm x 3.5 mm size. The enquiry was issued to all the firms who had quoted against the press tender for carbon steel pipe referred to above. Against this enquiry also, the quotation of Messrs Rekam Industries was considered the lowest as per specification.

(ii) *Samples*:—By way of expediting purchase of carbon steel pipes which were then most urgently required, the Assistant Purchase Officer and an Executive Engineer (Mech.) were sent to Bombay to inspect the pipes offered by Messrs Rekam Industries against their quotation submitted in response to the public tender notice. On reaching Bombay on 24th November, 1964 the firm informed those officers that there was a labour strike in their godown and it was not possible for them to show the godown. They went to the firm's office located at Lucky Mansion, Mohammad Ali Road, Bombay-3 on three consecutive days *i.e.* on 24th, 25th and 26th November, 1964, but the firm could not show them the godown as there was alleged to have been no improvement in the strike situation. The firm, however, handed over to them samples of cut pieces of the following sizes of allegedly seamless carbon steel pipes:—

(a) 89 mm—2 pcs.

(b) 57 mm—2 pcs.

(c) 32 mm—2 pcs.

(iii) *Order*:—The sample of 89 mm x 4 mm was considered by the Officers to be as per requirement and a letter supply order was placed by the Assistant Purchase Officer for this item with suitable terms and conditions subject to confirmatory order to be placed from Barauni. The order for 57 mm x 3·5 mm was not placed ostensibly as it was considered desirable to get this pipe sample further inspected and tested at the Refinery. The order for 7000 M of carbon steel pipes of 89 mm x 4 mm size was placed at Bombay subject to the following conditions:—

"(i) The order was subject to samples being found suitable after metallurgical and other tests by the Refinery and by Government Test House, Calcutta.

(ii) The firm would provide test certificate alongwith the supply of the materials.

(iii) Random samples from bulk supply would be taken for conducting metallurgical and other tests for accepting the materials. If after necessary test the materials failed to conform to the standard laid down in the tender notice, the materials were liable to be rejected.

(iv) Payment would be made within 30 days of receipt and acceptance of the materials as per company's standard terms."

(iv) *Testing*:—The samples brought by the officers from Bombay were tested by Assistant Engineer (Inspection) and a test report was submitted on 8th December, 1964. The test report indicated that the samples supplied were carbon steel pipes (seamless). It was certified by the Chief Maintenance Engineer on the basis of test results that the pipes were of acceptable quality and recommended placement of orders subject to the conditions that random samples of materials received be further tested and the supply was liable to be rejected if there was any material deviation.

(v) *Purchase*:—Regular purchase order was thereupon issued by the Controller of Stores & Purchases on 9th January, 1965 for supply of the following sizes:—

(a) 89 mm x 4 mm—7000 M.

(b) 57 mm x 3·5 mm—3000 M.

(c) 32 mm x 3·5 mm—3000 M.

The purchase order was duly concurred by the Accounts Department and the General Manager. The formal purchase order was sent by way of confirming the earlier order placed at Bombay. In the regular purchase order it was specified that the supply should conform to the samples supplied by the firm. The clause in the letter order placed from Bombay that "random samples would be drawn from the bulk supply and if after necessary test the materials failed to conform to the standard laid down in the tender notice materials were liable to be rejected" was not repeated in the regular purchase order.

(vi) *Acceptance of samples*:—The Purchase Department of the Refinery had also communicated the acceptance of samples collected from the suppliers in their telegram dated 24th December, 1964. But it transpired that in the meantime the firm despatched 5000 M of pipes of 89 mm x 4 mm size on 14th December, 1964 and 17th December, 1964 even before the receipt of the communication of test results of the samples. Although the supply order was placed with Messrs Rekam Industries, Bombay, these supplies were made by Messrs AAI AAR Industries,

Bombay *vide* their letter dated 19th January, 1965. They had also sent a bill for Rs. 1,14,750 alongwith the R.Rs.

(vii) *Inspection*:—The samples in question were tested and certified as suitable after metallurgical and other tests by the Refinery Engineers and they were *not* sent to Government Test House as envisaged in the order placed at Bombay. The firm also did not send the test certificate alongwith the bulk supply which they had agreed to do as had been indicated in the order placed at Bombay.

5000 M of pipes (89 mm X 4 mm) were received at Barauni on 27th January, 1965. The Inspection Officer, after inspection of the pipes on 30th January, 1965 certified in the following words "Inspected visually and accepted".

After arrival of the pipes in the Stores, the Purchase Department also appears to have advised the Maintenance Engineer *vide* their letter dated 6th February, 1965 to arrange necessary metallurgical test in the workshop to ensure that the quality of the pipes supplied conformed the specifications laid down. This letter appears to have been received by the Maintenance Engineer on 11th February, 1965. He marked the letter to the Inspection Engineer on the same day. The Inspection Engineer received it on 12th February, 1965 and sent a copy of the letter to the Deputy Maintenance Engineer (Shops) for information and necessary action. The letter was despatched from the office of the Inspection Engineer on 15th February, 1965.

(viii) *Change of Supplier*:—Messrs Rekam Industries sent a letter to the Controller of Stores and Purchases with a request for transfer of purchase order from Messrs Rekam Industries to Messrs AAI AAR Industries. Their letter of 18th December, 1964 was received in the Purchase Department on 2nd February, 1965. The Purchase Department issued the order of transfer signed by the Assistant Purchase Officer on 11th February, 1965.

(ix) *Duplicate Bill*:—Messrs AAI AAR Industries handed over the duplicate copy of their bill No. 101 dated 19th January, 1965 for Rs. 1,14,750 under the signature of Shri S. J. Boondiwala *vide* their letter dated 11th February, 1965 to the Accounts Department, probably because, the original bill was not traceable in the Accounts Department

at that time. In the covering letter itself Messrs AAI AAR Industries certified that no payment had been earlier received by them against the above bill; and they also undertook to indemnify the Indian Oil Corporation Ltd. (Refineries Division), Barauni and make good the loss to the Corporation in case any payment had been made against the above bill.

(x) *Payment*:—The duplicate bill was checked in the Accounts Department and passed for payment and the cheque for Rs. 1,14,750 was handed over to the firms's representative on 12th February, 1965, after he was identified by the Assistant Purchase Officer. Later on, the original bill which appears to have been received on 21st January, 1965 in the Accounts Department was traced and kept in the file.

The duplicate bill was checked on 12th February, 1965, and voucher prepared and signed on 12th February, 1965. The cheque was also prepared without obtaining signature of General Manager on the voucher. The cheque was signed and handed over to the representative on the same day *i.e.* 12th February, 1965.

(xi) *Rejection*:—Out of the bulk supply to be made as per tender notice, a part supply of the carbon steel seamless pipes were meant for use by the Gujarat Refinery Project. There was a telegram by the Director-in-Charge of the Gujarat Refinery Project dated 11th March, 1965 to the General Manager, Barauni Refinery intimating that the pipes were got tested and were found not seamless. A telegram was immediately sent to Messrs AAI AAR Industries reporting rejection of the pipes offered to the Gujarat Refinery Project. There was also a test report on the bulk supply of the pipes made under the two consignments despatched on 14th December, 1964, 17th December, 1964 and another on 10th March, 1965. These were found to be not seamless.

(xii) *Civil suit*:—A civil suit against Messrs AAI AAR Industries and Messrs Rekam Industries was filed on the 23rd July, 1965 praying for the following reliefs:—

1. That decree for a sum of Rs. 1.27.987.60 P paid by the Refinery to Messrs AAI AAR Industries as also on account of railway freight, demur-

rage charges, and other charges be passed in favour of the IOC Ltd.

2. Decree for courts interest pendentilite as also future interest be passed in the I.O.C's favour.

3. Decree for any other relief or reliefs against all or any of the defendants as the court thinks proper be passed in the I.O.C's favour.

The statement of account of the claim is as under:—

Account of claim

1. Price paid on account of consignments dated 14-12-1964 and 17-12-1964.	Rs. 1,14,709.00
2. Railway freight, demurrage charges, undercharges, siding charges, handling charges and incidental charges.	Rs. 13,257.00
	1,27,967.00

119. Several points arise in this case:—

(i) The Committee cannot understand how the Barauni Refinery accepted the non-seamless pipes as of seamless quality. In fact if the Gujarat Refinery, (for whom a part of the consignment was meant as replacement of pipes taken on loan earlier) had not reported the cheating, Barauni Refinery would have been in oblivion of the fraud. During oral evidence the Committee desired to know if it was that difficult to differentiate between seamless and non seamless pipes and were informed that no one could normally be deceived easily. In spite of this, the Inspecting Officer at Barauni accepted the pipes and the Maintenance Engineer who used the pipes did not protest. *This is indeed strange.*

(ii) The order was placed on Messrs Rekam Industries, Bombay but the supplies were made by Messrs AAI AAR Industries, Bombay. A request was made by Messrs Rekam Industries for the transfer of the purchase order *vide* their letter dated 18th December, 1964. This was received at Barauni on 2nd February, 1965. This was a long time for a letter to travel from Bombay to Barauni. Obviously the supplying firm did not wait for a formal reply to this letter of 18th December, 1964. They despatched the goods on 19th

January, 1965. The question *arises as to how this came to be done.*

(iii) The purchase order specified that metallurgical tests were to be carried out (i) by the Refinery and (ii) by the Government Test House, Calcutta. The firm was also to provide a test certificate. The inspection at the Refinery was "visual". It is true that the Purchase Department requested the Maintenance Engineer to conduct the necessary metallurgical tests but there is no record to prove that this was done. At any rate no certificate was obtained before payment was made. No test was carried out at the Government Test House, Calcutta. The firm also did not provide any test certificate along with the supply made. *The question arises why these tests and test certificates were dispensed with and under whose orders.*

(iv) The bill for Rs. 1,14,750 was dated 19th Jan., 1963 and was received at Barauni with the RR for the supplies. The goods were received on 27th January, 1965. The bill seems to have reached the Accounts Department on 21st January, 1965, but was misplaced. On 12th February, 1965, payment was made on a duplicate bill. The duplicate bill was received, checked and paid in one day *i.e.* on 12th February, 1965. It will be seen from the facts given above that the letter conveying transfer of the purchase order to Messrs AAI AAR Industries was issued only on 11th February, 1965 and that the letter from the Inspection Engineer to the Deputy Maintenance Engineer (Shops) requesting for metallurgical inspection was issued only on 15th February, 1965, three days after the payment of the bill.

The haste with which the bill was paid is most surprising. Further more the bill was paid even before the certificates of approval of quality as specified in the purchase order were obtained by the Accounts Department. The question arises as to who was responsible for this payment and what was the motivation.

(v) The bill dated 19th January, 1965 was stated to have been received by the Accounts Department on 21st January, 1965 but had been earlier reported missing. It *is strange that bills are missed in this manner. It might be worth investigating how many such cases of untraced*

bills were there and how many payments of duplicate bills were made by the Accounts Department. If the findings are not satisfactory, an overhaul of the Accounts Department would be called for.

120. *The Committee understand that as a result of a suggestion made during the oral evidence of officials of the Refineries Division, the case has been handed over to the Special Police Establishment for investigation. The points raised above by the Committee should be gone into and the results reported.*

V

GUJARAT REFINERY

A. Construction

The Gujarat Refinery is the third public sector Refinery and has been constructed with Soviet assistance. Compared to Gauhati and Barauni it has had a lesser share of difficulties during the construction phase. In fact, there were several commendable features, which enabled the construction phase to be completed smoothly. One of the first works to be undertaken was the construction of a repair workshop. This was stated to have been a great asset and about Rs. 47 lakhs worth of work was done at the workshop during the construction period. Apart from the fact that the work was done quicker and cheaper it gave a good training to the staff. Another feature of the construction phase was that all electrical and instrumentation work was done departmentally. It was also stated that there were no major contractors for the civil and mechanical works as at Barauni. There were 88 contractors in all for various works. This resulted in a healthy competitive spirit which enabled the various works to be done quicker and cheaper.

122. The Committee understand that the original date of completion of the first phase was December, 1964, but it was actually completed in September, 1965. The delay was stated to have occurred because of the late arrival of detailed drawings for certain units, and equipment from the U.S.S.R. and the delay in the construction of the railway siding on account of writ petition put in the High Court by the nearby villagers. But once these difficulties were overcome, the construction work proceeded at a rapid pace and the first million unit was completed in 25 months.

Delays.

123. *While considering the delays that take place in the construction of refineries one basic fact which has to be remembered is that imports have to be made to meet the demands of refined petroleum products in the country. The Committee understand that according to pre-devaluation prices Rs.* 113 *worth of products could be manufactured*

from one tonne of crude oil costing Rs. 72. In short, a delay of one month in a one million tonne plant using indigenous crude would amount to a waste of foreign exchange to the extent of Rs. 94 lakhs. This is a considerably large sum of money and if the delays at Gauhati, Barauni and Koyali are to be taken into consideration for the calculation of this avoidable expenditure of foreign exchange it will amount to Rs. 48 crores. The Committee, therefore, urge that in planning and executing future refineries and in expanding the present refineries this aspect of the matter should be borne in mind by Government.

B. Costs

124. The estimate for the two million tonne stage was Rs. 30.21 crores. The actual expenditure amounted only to Rs. 27.50 crores. The third million tonne stage was expected to cost only Rs. 2.91 crores. As such, this expenditure would be met from the savings of the second million tonne stage. It was stated that with some minor modifications it would be possible to raise the throughput to four million tonnes by utilising the in-built capacity of the plant and equipment. In short, the refinery was expected to achieve a throughput of four million tonne at the estimated cost of a two million tonne refinery.

125. *The Committee are happy that the management of the Refinery have been able to achieve this success which is in heartening contrast to the state of affairs at Barauni.*

Assessment of construction costs

126. *The Committee suggest that after the construction phase is over the Head Office of the Refineries Division should make a complete and detailed assessment of the entire cost structure of the three refineries to determine the factors that have contributed to the success at Koyali as compared to the Gauhati and Barauni Refineries. This analysis should stand in good stead for the construction of the future refineries intended to be put up during the Fourth Plan period.*

C. Designs

Central Designs Organisations.

127. In contrast to the Gauhati and Barauni Refineries where almost 100 per cent of the working drawings were prepared in Rumania and Russia respectively over 40 per cent of the designing work for the two million tonne stage at the Gujarat Refinery was done by the Indian engineers.

Furthermore 100 per cent designing work of the third million tonne expansion will be undertaken in India.

128. This design work was achieved by the Central Designs Organisation. This Organisation was initially set up at Baroda and manned by Indian technicians assisted by 7 Russian specialists. The Central Designs Organisation is headed by an Engineer-in-charge and comprises of various engineering sections like Process, Civil, Mechanical, Public Health, Electrical and Instrumentation. The achievements of the C.D.O. were as follows—

(i) Completed the working drawings for the general facilities of the second million tonne unit.

(ii) Prepared all the working drawings for the third million tonne expansion of the Koyali and the Barauni Refineries, thus saving the expenditure in obtaining them from the U.S.S.R.

(iii) Designed the general facilities of Udex Plant.

129. It was stated that the C.D.O. had not attempted any design work for the Unit operations, but this could be developed with the help of qualified design engineers in the respective fields. The C.D.O. intended to take up small design work, such as the designing of the Hexane Unit which was expected to come up within two years.

130. *The Committee are glad to learn about the good work of the Central Designs Organisation. They suggest that this organisation should make continuous studies of improvements in refining technology taking place elsewhere and make efforts to introduce these new techniques in the public sector Refineries in India. A close liaison should also be maintained with the Indian Institute of Petroleum, Dehra Dun in this regard.*

Improvements in technology.

131. The Committee asked whether it would be possible to introduce improvements over the technology employed in the existing Refineries in the expansion stages and

were informed that it would not be possible to do so as the product pattern and design of equipment had already been determined. Any addition or modification could only be taken up after the completion of the expansion scheme and the performance guarantees by the Soviet collaborators. *The Committee feel that the expansion schemes of the Refineries should also be subjected to a scrutiny by the Central Designs Organisation, with a view to locate possible performance difficulties. The Committee have in mind instances like the Coking Unit at the Barauni Refinery whose difficulties could perhaps have been avoided if the design had been subjected to a close scrutiny at the preparation stage. If improvements in technology are capable of being made at this stage, the Committee see no reason why this should not be done, instead of waiting for the construction to be over before making modifications.*

Drawings

132. One of the important works being undertaken by the Central Designs Organisation was stated to be in respect of preparation of drawings of various spare parts of the plant and equipment of all the three Refineries. *The Committee were glad to hear about this attempt at self-reliance. They hope that it would be possible for the C.D.O. to prepare drawings for all the important spare parts of the three Refineries. Side by side with the preparation of drawings, continuous efforts should also be made to locate sources in the country for obtaining the spare parts. Such spares will fall into two broad categories:— (i) for process equipment for expansion, capital project work and plant modification and (ii) for operational maintenance. Attempts should also be made to rationalise the various component parts and produce suitable Indian standards. The Committee understand that if earnest efforts are made, it will be possible to obtain several refinery equipment like heat-exchange equipment, pressure vessels, pumps, compressors, steam turbines, pipes and fittings and process control and measuring instruments in India. The basic necessities in regard to the indigenous manufacture are stated to be the lack of specifications, composition of construction material, drawings and technical know-how. This is the field in which the Central Designs Organisation can play a vital role.*

D. Production

133. The Committee enquired about the month-wise throughput from January to June 1966 and were informed that the figures were as follows:—

January	87,008	tonnes.
February	78,503	„
March	1,01,704	„
April	97,004	„
May	92,042	„
June	1,13,937	„

134. It will be seen that the variations in the throughput were considerable from month to month. It was stated that the throughput of the Refinery was being limited due to the marketing problems of naphtha and reduced crude. It was stated that the despatches of residual fuel (LSHS) to Dhwuvaran thermal power station were lower than anticipated. The power station was consuming 575 tonnes per day while the production was 675 tonnes—thereby leaving a surplus stock of 100 tonnes per day. In November, 1966 the Refinery had a surplus stock of 24,000 tonnes of LSHS. The I.O.C. had entered into a contract with Tata Power Plant at Bombay and it was expected that as soon as despatches commenced, the difficulties relating to LSHS would considerably ease. During the third million stage, LSHS would also be supplied to Ahmedabad Electricity Board and Gujarat State Fertilisers.

135. As regards naphtha, the Committee found that the position was less happy than LSHS. It was stated that the production of the Refinery was likely to be hampered for sometime because of low off-take of naphtha. The construction of the Gujarat Fertilizers, which was to have utilised the naphtha had been considerably delayed. A partial solution to the problem of excess naphtha had been found at the Fertilizer Factory at Trombay, which had undertaken to purchase naphtha with effect from January, 1967.

136. *The Committee feel that it would be an unhappy situation if the Refinery has to work at a reduced throughput, because of lack of off-take of products. The Committee are not aware if serious efforts had been made to blend LSHS with other products to produce something which is*

easily marketable. If such a solution is possible, it would help the Refinery to tide over its difficulties. Even if all of its prospective consumers fulfil their commitments fully, it is very likely that the Refinery will have surplus LSHS on its hands when the proposed increase in its throughput from three million tonnes to four million tonnes takes place. Unless a solution for the problem of disposal of LSHS is found, either by formulating it into another product or sale to other customers, the de facto expansion is not likely to take place.

137. In this connection the Committee came across the case of a petroleum refining company in the U.K. which was discussed in a book* on Management and which is relevant in this particular case. The following is an extract therefrom:—

> "The technological flexibility is the mechanical ability to change one's equipment to produce those products desired by consumers at the time and place at which they desire them. Two examples of this concept will clarify its meaning. In refining, it is possible to maintain specialised equipment so that the product mix from a barrel of crude oil can be varied. In 1949, at a time in which many refining companies were experiencing unusual pressure from the sudden drop in the price of residual fuel oil, this company was able to reduce its production of residual to almost zero and to increase the production of other products, prices of which had not declined. A second example of technological flexibility was in the transportation phase of the industry. While major oil companies depend, to a large extent, upon pipe lines for the economical land transportation of crude oil and refined products, this management built the company in its early years around the utilization of barge transportation on the inland waterways. This type of transportation enabled the company to purchase crude oil in fields that were not served

*"Management—analysis concepts and cases" by W. Werren Haynes and Joseph L. Massie, pp. 170-71.

by pipe lines, and to extend its marketing of finished products to areas in which the price was favourable even for only short periods of time. The emphasis on barges not only enabled the company to transport crude oil and oil products at a cost comparable with the efficient pipe lines, but also to maintain this economy on smaller shipments to and from temporary points which could not support the large fixed cost of a pipe line. By means of this type of flexibility the company was able to adapt its refining and transportation operations to demand and supply conditions."

The I.O.C. might benefit by such examples.

138. *The problem of disposal of naphtha exists in all the Refineries and it is vital that the Marketing Division finds out a satisfactory solution to it, as otherwise, the alternative is for the Refinery to close down for short periods or work to reduced throughputs. It would be a pity if this were to happen. When even at the one million tonne stage, the Gujarat Refinery has had to face this difficulty, the problem is likely to be more acute when the throughput reaches the figure of four million tonnes, unless very special efforts are made. The Committee suggest that the Government should appoint a special study team for the purpose of finding out an immediate solution for the disposal of naphtha. In the meanwhile, intensive efforts should be made for the export of motor spirit and naphtha.*

E. Storage

139. The Committee were informed that the Refinery had sufficient storage capacity for three million tonnes throughput provided the off-take of products by the Marketing Division matched the rate of production. It was stated that it was quite possible that the Refinery might have to produce a greater number of products than stipulated in the Detailed Project Report, in which case, the Refinery would be running short of storage capacity.

Movement of products.

140. From the information placed before the Committee, it appears that the position of movement of products is also not too happy. It was stated that firstly there was a shortage of tank wagons. Secondly, there is a shortage of demand sometimes due to fluctuating market

conditions. Thirdly, special circumstances like heavy movement of foodgrains hampered movement of petroleum products by rail. The Committee were informed that within this short period since starting, the Refinery has had several anxious moments when lack of off-take filled available storage space and nearly led to a stoppage of the Refinery operations.

141. *The Committee are not happy over this matter and feel that unless great care is taken to ensure that off-take of products is regular and unhampered, the Refinery would have to work to reduced throughputs specially after the expansion takes place. It is suggested that the matter should be discussed with the Marketing Division and a decision taken as to the minimum requirements of storage capacity that would be required for the various products. The efficiency of the Marketing Division should be ensured at an optimum level and shortcomings in this regard should not be made responsible for increasing the capital outlay at the Refinery by building extra storage tanks.*

142. *The Committee were informed that in regard to movement of products, from the operational angle, the loading facilities at the Refinery have the drawback of having no facility of loading any product at any loading point and this usually resulted in lot of shunting operations. The Committee recommend that efforts should be made to streamline the design and layout of the loading facilities so that optimum efficiency is obtained and operations are carried out smoothly.*

F. Water Supply

143. The Refinery requires about eleven million gallons of water per day. It was stated that for this purpose, a novel French method had been introduced for the first time in India. Briefly stated, the method involved tapping the sub-surface water-bearing strata of a river by means of radials driven horizontally into the appropriate strata. Two wells had been sunk to calculated depth and water was collected through the radial tubes as stated above. Each well had a designed output of ten million gallons per day. The water was to be shared by the Gujarat Fertilizers, who will take at the rate of nine million gallons per day.

144. *The Committee understand that the French method had been a great success especially as the water was obtained from below the surface of the river bed. This eliminated the possibility of shortage of water when the flow of the river decreased or when the river turned course as happened at Gauhati. In view of the success of this method, which incidentally was stated to be also cheaper, the Committee would suggest that Government should bring this matter to the notice of all State Governments and major municipalities. In all major Government projects which require considerable quantities of water, it might be advisable to adopt the system introduced at Koyali.*

145. *The Committee were informed that the original design of the Refinery had not provided for any water treatment. It was stated this was perhaps a slip on the part of the designers. It was noticed that salts were deposited in the coolers. If allowed to continue, this might have affected production. Action had been taken to correct this by treating the water with chemicals. It was hoped that the problem would be solved satisfactorily. The result would be known only after six months. The Committee wonder why such slips should occur if the designs are carefully scrutinised. It is, however, fortunate that the defect was noticed in time. The Committee hope that the action taken will prove satisfactory.*

VI

HEAD OFFICE

A. Decentralisation of Powers

The Refineries Division has three tier system of administration *viz.*, a Board with a full time Chairman, a Head Office of the Division at New Delhi with a Managing Director and the three Refineries with General Managers. The Head Office of the Refineries Division deals with all policy matters, rules and regulations and all staff matters which are beyond the delegated powers of the Genral Managers of the Refineries. In addition, the Head Office is responsible for negotiations with foreign consultants and with the various Ministries and Offices of the Government of India, leading up to the conclusion of agreements/contracts: processing of all sanctions from the Government, all foreign exchange matters including import licenses and indigenous clearances from D.G.T.D. for the import of equipment and machinery; all arrangements for the deputation to India and return of foreign specialists required for the projects, similar arrangements for the training abroad of Indian engineers required for the projects, recruitment of all the senior categories of posts, compilation of annual accounts of the Refineries Division, Profit & Loss Accounts, Annual Reports, providing assistance to Refineries in the matter of arrangements for tank wagons, Government clearances of controlled or restricted items, relaxations in excise specifications, allocation of funds to the Refineries after obtaining the same from the Government and approval of Refineries' budgets, production programmes, changes in production patterns of the Refineries etc. Previously, there was no headquarter of the I.O.C. Limited as such, but only the Registered Office of the Corporation. All matters connected with the sale and disposal of products from the Refineries, and financial adjustments arising therefrom, etc., were being dealt with by the Head Office of the Refineries Division with the Head office of the Marketing Division. With effect from the 1st August, 1966 the whole-time Chairman of the Corporation is responsible for co-ordination between all the Divisions of the Corporation, preparing overall deve-

lopmental, operational and economic plans for the Corporation, resolving differences or difficulties amongst the three Divisions, allocation of funds to the three Divisions, etc., besides the functions to be discharged by him in terms of the Articles of Association of the Corporation. Some of the matters on which the Head Office of the Refineries Division deals with the Head Office of the Marketing Division are also referred to the Chairman for expediting decisions.

147. The Head Office obtains several periodical reports from the Refineries which include daily reports on production, despatch and stock position and finances and weekly and monthly operating results.

148. The Managing Director has been delegated considerable powers by the Board of Directors. The Managing Director, in turn has delegated powers to the General Managers which are on a reduced scale than his own powers. The Refineries have to refer all cases which are beyond the powers of the General Managers to the Head Office, such as, capital works proposals, creation of posts and appointments thereto, changing the production pattern of the Refineries, approval of contracts, import licences, foreign exchange allocations, all new schemes not provided for in the budget, requests for assistance on various issues such as relaxation of product specifications, railway wagons, priorities for allotment of controlled items, allocations of funds, etc.

149. Reviews of the delegation of powers are stated to have been made from time to time with a view to vest General Managers with more powers for expeditious disposal of work. For example, the original powers of the General Managers have been enhanced in the case of sanctioning capital works from Rs. 1 lakh to Rs. 3 lakhs, powers for appointment have been increased from the scale upto Rs. 525 to Rs. 850, and powers have been given to the General Managers to re-appropriate funds from one head to another within the sanctioned budget. The powers with regard to the acceptance of tenders other than the lowest have also been enhanced.

150. *The Committee feel that the subject of decentralisation of powers with a view to achieve maximum flexi-*

bility of operations needs urgent attention. All the three Refineries have gone into production and it should be possible now to take stock of the position and arrive at certain conclusions in regard to the directions in which changes would be desirable. The Committee are not in favour of a system whereby the General Managers have to make constant references to the Head Office on varied matters and obtain concurrence on problems which they, as men-on-the-spot, are better qualified to judge. The Head Office should at best be responsible for policy and coordination while the actual day to day working should be left entirely in the hands of the General Managers.

Decentralization.

151. We have in the recent past seen the example of the Hindustan Steel Limited which completely decentralised powers to the three steel plants. This had a great effect on the working efficiency of the steel plants. The scheme has been working for some years now and the HSL has been able to make a proper assessment of the comparative advantages and disadvantages of the decentralisation scheme. *The Committee would suggest that the Refineries Division of the I.O.C. should consult the Chairman of the Hindustan Steel Ltd. on this matter, ascertain the practical virtues and drawbacks of the scheme and draw up concrete proposals as to what further power should be delegated to the Refineries. A larger measure of operating authority should be given at the plant level while minimising the need for close scrutiny at the Head Offie in the day to day operations of the plants.*

B. Budgetary Control

152. The Division prepares a capital and revenue budget. The capital budget is prepared on a cash basis to fit in with the Government system of budgetting, where only the cash expenditure is required to be included in the capital budget. It was stated that since the liabilities in respect of uncompleted jobs are carried forward, the budget reflects the full performance and liabilities in respect of capital works. The revenue budget takes into account the operations at the Refineries and also includes liabilities on the accrual basis so that the total income is estimated as also the expenditure against it.

153. The capital budget is prepared on an annual basis, but the revenue budget is broken into quarters.

154. The Committee wonder how far the budget is used as a tool by the management for the purposes of guidance and control of the business operations of the Division. In such a case the estimates will not merely be on a cash basis but would also include a plan whereby the operations of all the Departments are logically related to each other and are coordinated to make possible a formulated programme which acts as the basis for control of the entire business operations during the budgetary period. It would envisage a sub-division of the budget to several function-wise areas *e.g.* production, materials, purchase, manufacturing expense, plant and equipment, repairs and maintenance, sales, transportation and delivery expense, labour, administration, etc. the estimates would be drawn up on the basis of actual past experience combined with pre-determined standards and policy. The progress made month to month within these various areas would be watched with a view to (i) ensuring utmost efficiency, control and reducation of expenses and therefore costs (ii) forestall rather than to correct losses by means of a dynamic, rather than a post mortem, control (iii) control production, sales, and transport and compare actual results with the budgetted tasks (iv) ensure continuous flow of goods in the most economical manner yet with mixiumum efficiency, so as to allow the sales plan to be carried out and yet keep stocks at the minimum level and (v) estimate and control the amount of working capital required to finance usual business operations and to make special arrangements in time to accommodate any special features in the production policy.

155. *The budget at present is used mainly for defining of physical targets against which actual results are compared at the end of the year. If budgetary control is to have any meaning, the relationship between the values which are produced by physical results and the expenses involved in achieving them should be clearly understood, measured and gauged. It is only then that the control can be effective.*

156. *The Committee feel that it would be very desirable for the Division to re-orient its budgetting in order to make it an effective tool for managerial control. Performance budgetting, which is the objective that the Committee*

has in view, has come to be realised as useful in modern management practice and the Committee recommend that it should be introduced by the I.O.C. in all their Divisions.

C. References on technical matters to Head Office

157. The Committee found that the Refineries usually made references of a technical nature to the Head Office of the Division for a decision. The Managing Director is not a technical person and the question arises as to how he gives a decision on this reference of a technical nature. He does not have the assistance of a Technical Advisor to advise him on such matters. There are, however, three chemical engineers to clarify technical points for him. If, however, any technical issue of a complicated nature arises, the Managing Director consults other technical bodies, such as the Indian Institute of Petroleum, etc.

158. *It is inevitable that technical problems will often arise in the plants for which the plant requires an expert opinion or advice. The Head Office should be in a position to offer such advice. One solution is for the Head Office to have a well qualified senior technical expert with considerable experience in refining technology who can give opinions on technical problems. With the country's limited experience in this field, however, such a person might be difficult to obtain. However, it would be desirable to appoint the best man available and groom him for this task. During tnis period of grooming, the Committee suggest the formation of a committee consisting of one technical expert each from the Head Office, the three Refineries, and the Indian Institute of Petroleum. This Committee may be the technical advisor to the Managing Director, who should refer to it all the technical matters on which he requires advice. Besides the problems referred to him by the Plants, the Managing Director should utilise this Committee to find solutions to some fundamental problems like new product manufacture, maximum utilisation of surplus products by blending or conversion to more saleable products, maximising production, etc. This committee should also have the advantage of a first class technical library, contributing to good technical journals brought out in various countries and a team of researchers to find out the progress being made in refinery technology elsewhere.*

D. Research

159. *The petroleum industry is a highly specialised industry and techniques of refining are constantly advancing through research. As the industry in the public sector is fast developing, it is essential for it to keep abreast of the developments in the technical and economic fields in foreign countries. The industry has an international character which affects the Indian industry also. It would, therefore, be desirable to build up a well equipped research and development section for the public sector. It might be considered how far it would be desirable to attach this to the Indian Institute of Petroleum at Dehra Dun.*

160. *Incidentally, a suggestion was received by the Committee that it would be better if the Indian Institute of Petroleum was located near a Refinery instead of at Dehra Dun, so that actual trial or pilot plant studies may be facilitated. The Committee feel that there is some force in this suggestion and recommend that this should be considered by Government. The Committee would recommend Baroda, since it is both near a Refinery as well as the oil wells.*

E. Ecnomics of Refining

161. The Committee enquired whether a study of the economics of the petroleum industry with special reference to refining was being made in the Head Office of the Division and the reply received was as follows:—

> "Managing Director at the Head Office is advised by the Financial Controller, the Chief Administrative Officer and three Chemical Engineers in the study of economics of petroleum industry with reference to refining. There is however, no economic expert as such, attached to the Division but the present staff at the Head Office, as mentioned above is quite adequate. At the Refineries, the General Managers are assisted by the Chief Accounts Officer, the Deputy General Managers (Technical) with necessary statistical and technical data with regard to the economics of refining."

162. The Committee understand that the big Refineries in other countries attach very great importance to the study of the economics of the industry, which is something

quite different from research on technology. In fact, not being content with mere hand methods of calculation, these Refineries have started to use computers to do the calculations. Problems of optimising the use of crude in terms of preferred products and for setting the refinery programme, operational planning of a changing situation, control of fixed and variable costs in refinery operations, maximum utilisation of products for blending or sale of surplus products, etc. are all important from the point of view of efficient management. *From the answer given by the Refineries Division, reproduced above, it is obvious that no importance has been attached by the Division to this vital aspect of management. This is unfortunate. The Committee suggest that a well organised research cell should be organised at the Head Office to make continuous studies of the economics of operations of the three Refineries with a view to cost control, maximising of utilisation of production, etc. Cost and operational data of refineries in other countries and the private refineries in India should be analysed where the figures are available and comparisons made. Efforts should also be made to obtain cost and operational data from friendly foreign refineries and if possible, some of these Refineries should be persuaded to train some of our officers on the techniques employed by them for economic operations.*

VII

MISCELLANEOUS MATTERS

A. Refining Cost

The cost of production per tonne in the three public sector refineries and the three private sector refineries during 1965 were understood to be as follows:—

Gauhati	Rs. 21.60
Barauni	Rs. 37.93
Gujarat	Rs. 37.46
Burmah-Shell	Rs. 18.02
Esso	Rs. 12.19
Caltex	Rs. 19.98

(the figures in respect of I.O.C. refineries are exclusive of interest charges on loans).

164. It was stated that the figures are not exactly comparable with the figures of the private sector refineries on account of the fact that the processes involved are different for each refinery depending upon the products being produced. Besides, facilities like water, power, etc. in respect of the public sector refineries, ar etheir own as against the private sector refineries who draw these facilities from the common grid.

165. The Committee were informed that the Refinery cost now was proportionately high at Barauni and Gujarat as the Refineries were working at reduced throughputs. When the Gujarat Refinery reached optimum production, it was expected that the refining cost would be about the same as that of the Burmah-Shell Refinery. Similarly, when the Barauni Refinery reached full throughput, the refining cost was expected to come down to Rs. 23.00 per tonne.

166. While the Committee realise that the processes involved and the product pattern will to a great extent effect the cost of refining, they cannot help feeling that

the costs in all the three public sector refineries are on the high side and can be reduced if proper measures are taken. To take one example, the Committee found that the percentage of out turn of products to the crude input at the three Refineries was much less than in the private sector refineries. For example while the Burmah Shell Refinery and ESSO Refinery had an outturn of 95 per cent of the crude throughput, the Gauhati Refinery had only 90 per cent at optimum production and Barauni had only 80 per cent in 1965, which figure will go upto 88.5 per cent at the two million tonnes stage. *In fact, the Committee were surprised to learn that the flare loss and handling and storage losses were as high as 2.5 per cent on an average. For a three million tonne plant, 1 per cent amounts to 30,000 tonnes of products. If the difference in a public sector refinery is high as even 5 per cent it amounts to a figure of 1,50,000 tonnes per annum. The question arises as to whether the public sector refineries can increase their production to match the figures of the private sector refineries, and if so, how best this can be done. Serious thought should be bestowed to this matter by the technical experts.*

Formulations.

167. Another aspect of production was mentioned by the Secretary of the Ministry of Petroleum and Chemicals during his oral evidence before the Committee. This related to formulations which he said was intended to be done after the Refineries had gone into full production. The number of products would be increased and attempts would be made to manufacture products which were now imported. To some extent, more profitable products would be manufactured, thereby adding to the profitability of the Refineries. *Instead of waiting till the Refineries have gone into full production, the Committee suggest that this matter should engage the attention of the Head Office of Refineries Division now. The cost aspects of various schemes should be worked out and a programme drawn up keeping in view the product requirements of the country.*

168. *The Committee would also suggest that an O & M team under a well qualified and experienced officer should be set up in all the Refineries to make continuous studies in all the Units with a view to increase efficiency, point*

out wasteful methods and practices and reduce costs. Adequate incentives might also be given by way of monetary awards for suggestions by staff on cost control measures.

Cost control.

169. The subject of cost control also leads to the question of cost accounting. The Committee found that there was no standard costing system in vogue. In fact, the Company Auditors had been pressing for the introduction of such a system since long but the Refineries Division do not appear to agree. In spite of the I.O.C's views on the matter the Company Auditors had the following to say:—

> "We would suggest that a standard costing system may be introduced so that for each product and/or process a certain standard may be laid down on the basis of technical opinion against which the actual performance can be compared so as to determine whether the operations are being efficiently carried out or otherwise."

Asked about this matter, the I.O.C. had the following to say:—

> "The Company is controlling the costs through the revenue budgets which act as the standard of operational efficiency for the year. The actuals are compared with the budgetted figures and variances, if any, are reported at monthly intervals. It is not, therefore considered necessary to have an elaborate system of standard costing to work out the cost of production of each product every month though the cost of processing at each plant and the expenditure at all cost centres are controlled through budgets and are checked from the financial books by the integerated system of costing and financial accounts which is being followed by the company and which is considered far superior to the separate systems of financial and costing systems as it eliminates the necessity of an involved reconciliation of the two systems. However, cost of production of each product is worked out for closing stock valuation."

170. *The Committee have not gone into the details of the system followed and are, therefore, not able to express any opinion on its merits. However, it is very essential*

that each Refinery should know the individual costs of its various operations and make comparisons of "performance" and "promise" with a view to enable the management to take timely action to control adverse trends. How satisfactorily this is achieved at present is for the management to judge, but the Committee hope that efforts will made to improve upon and perfect the system so that it becomes an excellent tool in the hands of the management for cost control. The Committee would also suggest that advice of an outside expert may also be taken in making improvements.

B. Staff

171. It was stated that the organisational pattern of all the three Refineries was the same. The Committee analysed the staff position of the three Refineries and found that though the general pattern was more or less the same, considerable differences existed from Refinery to Refinery.

172. The staff strength of the Refineries are as follows:—

	Officers	Staff	Total
Head Office . . .	16	84	100
Gauhati	94	1095	1189
Barauni	201	2050	2251
Gujarat	172	1524	1696

173. Compared to these figures, Burmah-Shell Refinery with a throughput of 3·75 million tonnes has a strength of 70 senior supervisory staff, 87 junior supervisory staff, 130 clerks and 1171 labour employees, totalling 1458 personnel. The ESSO Refinery on the other hand with a throughput of 2·5 million tonnes has only a total staff strength of about 500 men.

174. The Committee were informed that it would not be possible to generalise on the number of persons required for a particular capacity of the unit. There are various other factors which have to be taken into consideration, like the design of the unit, extent of automation,

number of plants, housing, power-house, water supply and welfare facilities. *While the Committee agree with this, they hope that one important factor will be kept in view while reviewing staff requirements. The refining industry is quite new to the country and not many experienced hands both among officers and labour would be available to a new refinery. As such, staff strength will probably have to be fixed at a higher level in the initial years than what is actually required. As the staff learn and become experts, their individual efficiency will rise. It would then be possible to gradually reduce the staff strength. Incentives may be provided to staff to increase their* per capita *output so that reduction in strength may not create other problems usual in industry.*

175. *The Head Office should constantly review the position and devise suitable formula whereby the expenditure on staff in each unit is expressed as a ratio of the output. Constant endeavour should be made to make inter-refinery comparisons, to publicise successful efforts in increase of staff efficiency and to foster a healthy sense of competition.*

176. *The Committee also found that there were considerable variations in the strength fixed for the various units as between the three refineries. While this could be easily explained in the case of the technical departments* e.g. *process, electrical, maintenance, etc. as they would depend upon the peculiarities of the refineries, the figures should be comparable in so far as the service departments are concerned.* After giving due allowance for the size of the Refineries, the Committee found that the sanctioned strength of the following service departments in the three Refineries did not follow this principle.

Department	Gauhati Refinery	Barauni Refinery	Gujarat Refinery
Accounts	55	117	93
Stores & Purchase . .	47	151	65
Personnel	46	88	72
General Administration & Public Relations. . .	48	61	27
Security	73	133	120

177. *Judged by these figures, the Committee are inclined to feel that the strength of the technical departments have also been fixed without consideration of any norm. The Committee desire that this matter should be gone into by a committee of experts chosen from the three Refineries and the Head Office, who should determine what should be the strength of each department in each Refinery.*

178. The Committee found that several posts having the same designation had different scales of pay. Some of these are as follows:— Different scales of pay.

Sl. No.	Designation	Scales of pay		
		Gauhati	Barauni	Gujarat
		Rs.	Rs.	Rs.
1	Dy. General Manager .	1800—2250	2250—2500	2250—2500
2	Chief Maintenance Engr.	1600—2000	2000—2250	1600—2000
3	Chief Production Engr.	1600—2000	2000—2250	1800—2250
4	Chief Accounts Officer	1300—1600	1600—2000	1600—2000
5	Dy. Chief Accounts Officer	1100—1400	1300—1600	1300—1600
6	Controller of Stores & Purchases	1100—1400	1300—1600	1100—1400
7	Welfare Officer . .	350—850	600—1000	350—850
8	Public Relations Officer	350—850	600—1000	350—850
9	Cashier . . .	300—525	225—360	165—275
10	Assistant Cashier .	165—275	120—210	120—210

179. *The Committee feel that there should be uniformity in the pay scales of posts carrying the same designations in the Division. If a lower or higher scale is intended to be given in a particular Refinery on account of any special responsibility attached, then it would be better to call the posts senior and junior or grade I and grade II so that the distinction is clear.*

C. Safety Measures

180. The Committee were informed that each Refinery had a separate Safety Division under the charge of a Safety Engineer and that adequate safety equipment had been provided in all the Refineries. The statistics relating to

the accidents that occurred in the Refineries during the last two years are as follows:—

	No lost time accidents	Lost time accidents.	Man days lost.
Gauhati . .	42	30	305
Barauni	42	50	312
Gujarat (since Oct. 1965)	173	21	291

181. At Barauni there were two major fires, one in the Wagon Loading Rack in September, 1965 and the other in the Cocking Unit in February, 1966. There was no loss of life in both though the demage to property amounted to Rs. 50,000 in the case of former and Rs. 69,000 in the case of the latter. In the first case, the investigation revealed the cause as negligence on the part of a Railway employee, while in the second case the fire was attributed to a mechanical failure of an equipment.

182. *The Committee were informed that the staff were being trained in the observance of safety measures and that all precautions were being taken in this regard. The figures of the accidents during the past two years given above, do not present a happy picture. This is a matter in which constant vigilance has to be exercised by the management. It is a fact that experienced staff sometimes tend to take safety regulations for granted. The regulations should be enforced rigidly and individual staff violating them should be warned or punished for endangering security.*

D. Security Measures

183. *While adequate safety measures are necessary to prevent accidents from happening and controlling losses arising from accidents, adequate security measures in the Refinery are vital to prevent mishaps arising from the action of unsocial elements, miscreants and enemies. This is a matter which should engage the considered attention of the top management in the organisation. Unlike most other industries refining of petroleum products is of vital importance in the country's economy, more so, in times of emergency, and the I.O.C. cannot afford to take any risks in this regard.*

E. Audit Paras.

I. *Lack of coordination of complementary works in the Water-Supply Scheme at Barauni (Section XXII of Audit Report Commercial,* 1965).

184. A scheme was drawn up on the 8th February, 1961 by the Project Authorities of the Barauni Refinery for the supply of water to the entire township at an estimated cost of Rs. 5.04 lakhs—two large tube-wells and two R.C.C. water towers each of one lakh gallon capacity were to be constructed. The work of sinking the tube-wells at a cost of Rs. 1,05,900 was completed on the 15th February, 1962, but the construction of water towers, which was taken up on the 20th May, 1963, was completed only on the 9th May, 1964. As without the water-towers, water could not be supplied to all the quarters, the Project Authorities had to sink five temporary tube-wells at different locations at a cost of Rs. 1,52,380 during the period from 8th March, 1962 to 31st May, 1963 to meet urgent requirements.

185. The delay in construction of water towers and the failure to coordinate the two jobs of the same scheme resulted in an extra expenditure of Rs. 1,52,380 on the sinking of temporary tube-wells.

186. The Chief Engineer of the Project held on the 22nd October, 1962 that the Engineering Department was responsible for the delay and consequential additional expenditure.

187. The I.O.C. has stated that the limiting factor in the programme was the procurement of vertical turbine pumping sets. There was only one indigenous manufacturer of these pumps and the I.O.C. had to accept their delivery period *i.e.*, 29th May, 1963. The pumps were actually received on 6th September, 1963. Some of the parts which were damaged during transit were replaced by the firm in December, 1963.

188. It was further stated during evidence that the I.O.C. knew that the pumps would take about two years to arrive and that there was no possibility of expediting deliveries. As such the I.O.C. did not want to incur any expenditure on the water supply project before the pumps were received. Unless the pumps were received and installed, the wells could not be considered complete. As water was

urgently required, the tube-wells were sunk. The Managing Director stated that the money spent on the tube-wells had not been wasted as the tube-wells had come in handy to augment the water supply in times of shortage.

189. *The Committee have examined this matter and find that the circumstances which led to the sinking of the tube-wells were not wholly unjustified. It is true that there was an apparent delay in initiating the project and in coordinating it with other aspects of the construction of the Refinery. This has, however, to be seen in conjunction with the difficulty of obtaining the pumps, a matter which was not in the hands of the Refinery. While the extra expenditure was unfortunate, the Committee did not find a case for blaming the management of the Refinery.*

II. *Irregular payment of construction allowance*: [*Section V Para 2 of Audit Report (Commercial)*, 1966].

190. On the 30th May, 1959 the I.O.C. sanctioned the payment of construction allowance to the staff at the Gauhati and Barauni Refineries subject to the condition that the allowance would be admissible only during construction stage and would be withdrawn at a date which would be notified later but in no case later than the date when the Refineries went on stream.

191. The Refineries at Gauhati and Barauni went on stream in December, 1961 and July, 1964, respectively. The payment of the construction allowance was, however, continued up to the 31st August, 1962 and the 31st May, 1964, respectively, and thereafter it was merged partly in basic pay and partly treated as personal pay of the employees who were absorbed in the permanent set-up at each of these Refineries. The continuance of the payment of construction allowance after they went on stream and the treatment of a part of the construction allowance as personal pay at Gauhati and Barauni Refineries involved a non-recurring expenditure of Rs. 45,588 (Rs. 37,968 at Gauhati and Rs. 7,620 at Barauni). Besides, the merging of the remaining part of the construction allowance in basic pay resulted in a recurring expenditure of Rs. 51,680 (Rs. 38,000 at Gauhati and Rs. 13,680 at Barauni) per annum.

192. The undertaking of the liability for the expenditure mentioned above, besides being against the company's decision of the 30th May, 1959, was also not in conformity with the instructions issued in March, 1960, by the Ministry of Finance according to which "the construction allowance was intended primarily to compensate the staff for lack of amenities such as housing, schools, markets, dispensaries, etc." and "the allowance sanctioned originally for the regular staff was to be reduced in stages as the necessary amenities were provided, until it was withdrawn finally."

193. The Ministry stated in November, 1965, that "in the interest of the economic working of the projects of the company, it was considered beneficial to have given a small rise by merging a part of the construction allowance into the basic pay than to lose most of the personnel who had gained considerable experience during construction."

194. It has been stated that the I.O.C. feared that but for the grant of the concession of payment of construction allowance at the Gauhati Refinery after it went on stream and the treatment of a part of the construction allowance as personal pay at Gauhati and Barauni Refineries, most of the staff concerned would have left the Undertaking. In case the allowance was not continued to be paid, most of the staff would have opted for service with other better paying organisations. This *enmasse* dissatisfaction would have been to the detriment of the Refineries.

195. It was stated during evidence that the decision of the Board on the merger of this allowance was taken as a considered policy decision, first in Gauhati, then in Barauni and then in Gujarat Refinery. The conditions in which the construction allowance was initially sanctioned not only continued after the Refineries had been completed but were in fact even more severe. Both in Gauhati and Barauni and to a certain extent in Koyali, the cost of living in the area in which the Refineries were situated had increased beyond all proportion to the general increase in the cost of living in the surrounding areas, because of concentration of the population in the Refineries which included besides the Refinery staff and their families, the people required for ancillary needs of the townships. Ordinarily, to keep the staff contended and to prevent a drain on the trained staff to

other industries, the I.O.C. would have sanctioned higher scales of pay. This could not be done, as it would have upset the structure in other public sector undertakings. This was the least that could have been done to keep the staff contented.

196. *Audit have taken the view that the decision to continue payment of construction allowance beyond the construction phase was irregular and involved a recurring expenditure of Rs. 51,680 per annum in both the Refineries. Though wrong in principle, in view of the subsequent decision of the Board the Committee do not wish to comment upon the matter.*

VII

CONCLUSION

The public sector Refineries have been set up with the objective of developing our own resources and being self reliant especially in regard to strategically important petroleum products. To-day the country has four public sector Refineries and these play an important role in the country's economy. Foreign exchange is saved when we are able to refine our own crude and meet our requirements of petroleum products.

198. *The Gauhati Refinery is working to full capacity and has earned a handsome profit during the last financial year. The Gujarat and Barauni Refineries have completed their second phase of construction though their production difficulties have not enabled them to attain the rated capacities as yet. The delays in construction and some of the difficulties like that of the Cocking Unit at Barauni have been most unfortunate and the Committee have commented upon these in the Report. The Committee noticed several other shortcomings in the working of the Refineries and have made several recommendations, chief of them being as follows:—*

(i) *There should be close coordination between the three Divisions of the I.O.C. After the construction phase of the Refineries is over all the Divisions of the I.O.C. should be brought under one roof.*

(ii) *It should be examined whether the Pipelines Division could be amalgamated with the Refineries Division or the Marketing Division.*

(iii) *The staff position in each Refinery should be examined and norms determined for each department and category of operation. The productivity of staff should also be evaluated.*

(iv) *Private entrepreneurs should be attracted to Barauni to establish industries there.*

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(v) *The construction delays and the difficulties with the Coking Unit at Barauni have been most unfortunate.*

(vi) *During the expansion stage at Barauni and Koyali imports of plant and equipment should be made only when inevitable.*

(vii) *A special study team should be appointed for finding out an immediate solution for disposal of naphtha. In the meanwhile intense efforts should be made for the export of motor spirit and naphtha.*

(viii) *A time has now come for a rethinking on the subject of decentralisation of powers with a view to achieve maximum flexibility of operations.*

(ix) *Budgeting procedure should be re-oriented in order to make budgetary control by the top management effective. Performance budgeting should be introduced in all the Divisions of the I.O.C.*

(x) *A well equipped research and development section should be developed. Continuous studies sould also be made of the economics of refining with a view to cost control, etc.*

199. *The Committee hope that in view of the technical competence and skill acquired in the refining industry attempts will be made during the expansion of the existing refineries and the construction of new ones to manage without the aid of foreign help. It is only when this is done can one say that the industry has come of age.*

D. N. TIWARY,
Chairman,
Committee on Public Undertakings.

NEW DELHI;
March 3, 1967.
Phalguna 12, 1888 (S).

APPENDIX

SUMMARY OF CONCLUSIONS/RECOMMENDATIONS

S. No.	Reference to para No. in the Report	Summary of Conclusions/ Recommendations
1	2	3
1	26	The intention behind amalgamating the Indian Refineries Ltd. and the Indian Oil Company Ltd. was to achieve "economy, efficiency and coordination as also to eliminate duplication of effort and wasteful expenditure" as enunciated in the recommendation of the Estimates Committee contained in para 8 of their Thirty-Fourth Report (Third Lok Sabha). It appears that the actual working of the Corporation after amalgamation has not achieved any of these objectives.
2	27—28	Every month a coordination meeting is held in which the representatives of all the three Divisions are present. The month-to-month problems of production, marketing and movement are discussed at these meetings and decisions taken. This is a step in the right direction. Such co-ordination meetings should have been held before. While the Committee appreciate the changes made to effect co-ordination, they emphasise that close co-ordination should exist between the Divisions. The three Divisions of the Corporation should not work like water-tight compartments, looking only to the Chairman or the Board of Directors as the connecting link. The Senior Officers should enter into communication at their own levels to solve mutual problems and carry out policies to the maximum advantage of the Corporation.
3	29	The Committee agree that till the construction phase of the Refineries is over, it might be advantageous for the Refineries Division to be in Delhi for the purpose of contacting the various

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		foreign parties, D.G.S. & D., etc. After this is over, it might be examined whether it would not be advantageous for all the Divisions of the I.O.C. to be under one roof, preferably in its own building. If this takes place, it would be possible for the various Divisions of the Corporation to have common service departments to cater to the needs of all the Divisions. For example, there could be common departments for personnel, accounts, legal affairs, labour, civil engineering, stores and purchase, public relations, etc. The Committee feel that considerable duplication in these matters exist at present and should be done away with.
4	31—32	The Committee feel that conditions of service of the staff is a matter which requires looking into carefully while the pay scales could be different depending upon the peculiar nature of duties in each Division, it might be desirable that the terms and conditions of service of the staff working in the same public undertaking should be common with peculiarities relating to certain categories of posts being taken care of by separate provision, which should be in the form of exceptions to the general rule. The Committee are not happy over *ad hoc* concessions made to one group of employees, while ignoring others of the same status in another group. This is bound to have an undesirable effect on the staff. The Committee suggest that the Chief Personnel Officers of the three Divisions should be constituted into a Committee which should go into the entire matter of service conditions, pay scales, etc. of the various Divisions and suggest how uniformity can be achieved.
5	35	The Committee wonder whether there has been any definite advantage in effecting the separation of the Pipelines Division from the Refineries Division. It has certainly added to the overhead expenditure. That there has been lack of co-ordination between this Division and the Marketing Division is only too obvious. It is only now that the co-ordination meetings have been taking place at which the Pipelines Division is represented. The product pipelines are managed by the Pipelines Division and monetary transactions

1	2	3
		between the Pipelines Division and the Marketing Division entail several accounting procedures and accounts staff. The Committee do not consider that this had led to efficiency and economy. It should be examined whether the Division could be amalgamated with either the Refineries Division or the Marketing Division.
6	42	The Committee feel that it should be possible for both the Gauhati and Barauni Refineries to increase their rated capacities to a considerable extent by utilising the in-built capacity of the plant and equipment. Like the Gauhati Refinery, the Atmospheric Vacuum Unit-I of Barauni is stated to have achieved a throughput rate of 1·15 million tonnes in June 1966 against the rated capacity of one million tonnes. This indicates the extent of extra capacity. The Committee hope that this matter will be actively pursued and suitable modifications for increasing the throughput of the Refineries thought of. It might be desirable for the Head Office of the Refineries Division to specifically entrust this task to certain experts in the Refineries and call for regular reports in regard to plans and progress in this direction.
7	43	The Committee understand that it is proposed to increase the throughput capacity of the Gauhati Refinery to 1 or 1·1 million tonnes but that no final decision has been taken on this matter yet. Part of this proposed increase in throughput should be achieved by utilising the in-built capacity of the existing plant. The Committee hope that Indian know-how and equipment will be utilised, instead of depending on foreign help.
8	49	Judging from the facts available, the Committee are not convinced that the accumulation of reduced crude at Gauhati was an inevitable result of the Crude Distillation Unit starting before the Coking Unit. That this should have happened is unfortunate.
9	50	The Committee recommend that the building of extra storage tanks for keeping reduced crude should be reviewed by the top management of the Refineries Division during the expansion

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		phase. There is no justification to add to the capital cost of the Refinery unless the reasons are extremely compelling.
10	57	The Committee understand that the Indian Institute of Petroleum, Dehra Dun is studying the question of alternative uses of iomex, but that the results were not known to the I.O.C. yet. It should be possible to find out how other countries are utilising this product and whether it would be economical to utilise it in the same way in India also. The Committee hope that the Indian Institute of Petroleum will be able to offer a solution to this problem.
11	58	Since in the Western India there is a great dearth of L.D.O., the Committee suggest that it may be examined whether iomex could be sent to the Gujarat Refinery for being blended with other products to produce L.D.O. If this is possible it will take care of the iomex production at Gauhati and the deficit of L.D.O. in the Kandla-Okha area.
12	59	As far as economics of the production of superior kerosene is concerned, the I.O.C. would perhaps prefer things to stand as they are because more production of superior kerosene at Gauhati would mean firstly marketing it in the economic zone of the Barauni Refinery and secondly, incurring an under recovery of freight on such sales. This arises out of the present pricing policy of petroleum products which takes only ports as the pricing points and not the Refineries. While the I.O.C. would be justified in taking a purely commercial view of the situation, it has to be remembered that superior kerosene is imported into the country and paid for in foreign exchange while there is idle capacity in the country for production of kerosene. This anomalous situation arises as a result of Government's policy on pricing about which the Committee have dealt with in their Report on the Marketing Division. The Committee have also recommended there that Government should device a method of compensating the I.O.C. for the heavy losses it incurs as a result of under recoveries of freight. Once this is done, the I.O.C. should be able to revise its

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		policy in the matter of production of superior kerosene at Gauhati and elsewhere so as to produce the maximum quantity possible.
13	60	The Committee found that the reduced sale of calcined coke by Messrs India Carbon Ltd. was due to the fact that import licenses had been granted to several users of calcined coke in the country during 1963-64 with the result that these users, who had accumulated huge stocks, did not make their purchases in India. It is a matter of regret that import licences are granted and foreign exchange wasted on import of material which is available in India and the factory producing it has to close down for a part of the year for want of market for it.
14	62	The Committee find that there is no clause in the contract whereby it is obligatory for Messrs India Carbon Ltd., to lift the coke at specified periods. The Committee suggest that such a clause should be introduced in the agreement at the time of renewing to prevent repetition of the incident which occurred in 1964-65.
15	64	The present staff position at Gauhati is that after standardising the staff strength, nearly 200 employees will be rendered surplus out of the existing strength. The Committee were informed that there was some difficulty in retrenching these men, because of opposition from the Union. The Committee recommend that constant efforts should be made to find alternate employment for the surplus staff either at Gauhati or in nearby towns. The help of the Government of Assam may also be taken in regard to this matter.
16	66	The Committee recommend that the Refineries Division should examine the staff position in detail in each Refinery and determine norms for each department and category of operations. These norms should be applied while fixing the permanent staff strength of each Refinery. The Refineries Division should also evaluate the productivity of the staff in the various departments of each Refinery and make a comparative

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		study inter se. The Committee also suggest that the Research Department of the Refineries Division should try to obtain information on staff productivity techniques employed in other countries and suggest their application in the Refineries.
17	77	The Committee feel that in retrospect it was an entirely wrong decision to have located the Barauni Refinery at its present site—a decision taken in spite of strong objections on technical grounds both from the Indian and Russian experts. That facts proved the experts to be right and the decision makers wrong is all too obvious. It is doubtful even today whether satisfactory safe-guards have been taken against severe flood and earthquakes in spite of the colossal extra expenditure incurred in providing safeguards. As the Refinery is already *fait accompli,* the Committee suggest that a study at regular intervals should be undertaken by the Refinery authorities to ensure that the foundations of the various Units of the Refinery are intact and do not show any sign of damage or subsidence. If contra indications exist, immediate steps should be taken to safe-guard against any catastrophe.
18	78—79	As regards the development of the area round Barauni as a sequel to the location of the Refinery, progress has been rather slow. One would have expected that the area would be developed with petroleum based industries including a petro-chemical complex and a fertilizer plant based on naphtha. This has unfortunately not come about, the main reasons being the fact that Barauni not being a pricing point for petroleum products has great disadvantages in so far as the prices of its products are concerned. The Committee in their Report on the Marketing Division have dealt with this matter in detail. Suffice it to say here that when Barauni goes into full production, the I.O.C. will lose Rs. 3 crores per annum on under-recoveries if the present pricing policy of Government is not changed. Private enterprenuers should be attracted to Barauni to establish industries there. This can

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		be done only by making the raw material cheaper at Barauni than say at Calcutta. The Committee also feel that vigorous efforts are required both by the Central Government and the Government of Bihar to carry out the policy of economic development of the north Bihar as a direct consequence of locating the Refinery there. The locational disadvantages of the Barauni Refinery can only be compensated if development of the area results from such a location.
19	82	The Committee are not happy over the delays that have taken place in the construction of the Barauni Refinery. To begin with, the Refinery was dogged by ill-luck in having floods and rains. A proper soil investigation would have saved six months delay. In spite of the knowledge that the soil was extremely unfavourable, it is surprising that detailed investigations were not carried out in the initial stages. As regards delays in receipt of equipment, Government might consider whether agreements with suppliers could stipulate some compensation for losses due to delays in receipt of equipment. There appears to have been no such clause in the present agreement.
20	83	As regards the contractors, the Committee found that both the firms entrusted with the mechanical and civil works were given contracts worth more than Rs. 5 crores each. According to the I.O.C. "their performance has not been generally satisfactory," and "they had generally exhibited lack of deligence in organising men and materials for execution of works." It is doubtful whether a careful study was made initially of the capacity of these two firms to handle such a large volume of work themselves. That they were unable to fulfil their monthly quotas itself indicates their incapacity. The Committee regret to point out that necessary care was not exercised in this matter by the Management of the Refinery. The proper thing would have been to split up the total volume of work into small contracts and to engage several contractors as was done at Koyali. According to the I.O.C., about 60 per

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		cent of the overall delay could be attributed to the poor performance of the contractors. The Committee hope that Government will benefit by this unfortunate experience and lay down proper guide-lines for the future.
21	84	The Refinery withdrew a part of the work of the mechanical contractor with the intention of undertaking it departmentally. This would indicate that in the initial stages no proper assessment was made as to what work could be undertaken departmentally and what work could be given out on contract. If this had been done, considerable amount of money and time could have been saved.
22	85	In spite of specific clauses in the contracts for compensation in case of avoidable delays on their part, the Committee observe that the contractors have been leniently treated. The Chief Engineer and the General Manager of the Refinery have been far too indulgent in so far as the contractors were concerned. There are no indications that they exercised proper control and if they had things might not have come to such a pass.
23	86	The lack of supervision on the part of the supervisory staff of the Refinery over the work of the contractors has also contributed to the delay. The staff lived in Hathidah Colony—five miles away from the site on the south bank of the river Ganges. Adequate facilities did not exist for transport, because apart from Refinery's own transport, there was hardly any public transport available. The roads were also poor and weather conditions often unfavourable. The site itself was often slushy and muddy. The Committee do not wish to under-rate the heavy odds against which the staff had to work to fulfil their tasks. The Committee's only contention is that by locating the township so far away, supervision became lax.

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24	87	It was learnt that the Hathidah Colony was taken over from the Railways and that most of the buildings were of a temporary nature. The Committee hope that this Colony will not be made into a permanent township in view of its distance from the Refinery and other practical disadvantages like lack/cost of transport, etc.
25	94	The Committee are distressed to note the failure of the Indian authorities in having accepted the detailed Project Report of the Coking Unit of the Barauni Refinery which very clearly indicated that furnace oil of Indian specification could not be produced in that Unit. The problems of disposal of the product, the specification of which was indicated in the Detailed Project Report, or the difficulties in regard to the levy of excise duty on new types of blended products which were neither furnace oil nor L.D.O. according to Indian specification, do not seem to have been considered properly. If only the problems, which were very clearly evident at the time of the Detailed Project Report, had been tackled and a revision of the design sought, as was done much later, the working of the Refinery would have been happier. The Committee hope such mistakes would not be committed in future.
26	95	Between April, 1965 and June, 1966 the Barauni Refinery has been able to operate only to the extent of 75 per cent of its installed capacity of the 1st million tonne stage. The 2nd Atmospheric Vacuum Unit was ready for commissioning in February, 1966, but could not be commissioned because of the Coking Unit. The loss incurred by the Refinery on account of the reduced throughput of the 1st million tonne stage and the non-commissioning of the 2nd tonne stage for over a year is great. This is besides the spending of valuable foreign exchange on importing products which could have produced there. This unfortunate and enormous loss is most regrettable.
27	100	The Committee feel that there has been a lack of proper planning in regard to the Kerosene Treating Units at the Barauni Refinery. At the moment, the capacity of the Units is almost

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		double of what is required at the 2nd million stage. Unnecessary capital has been blocked up and the high capital cost adds unnecessarily to the expenses of operations. These could have been avoided if all the factors had been taken into consideration at the planning stage and the exact requirements communicated clearly to the Russian experts.
28	103	The Committee hope that there will not be waste of manpower in the Kerosene Treating Units. The personnel attached to these Units should be given training in the work of two or three other units so that they could be of use there when the Kerosene Treating Unit is shut-down. It should also be examined how far the personnel of Kerosene Treating Unit No. I can manage the Kerosene Treating Unit No. II Only the minimum staff should be recruited for Kerosene Treating Unit No. II, so that overheads are kept to the minimum. The Committee, however, cannot but express regret at this state of affairs.
29	106	The facts regarding the Atmospheric Vacuum Units at Barauni which were brought to the notice of the Committee reveal lack of coordination in that arrangements for sales should have been made simultaneously with production. If this is not remedied the situation will be further aggravated when the second and third million stages go into stream. There is need for very urgent action in this matter by the Marketing Division. Unless the motor spirit is sold as soon as it is produced, the Refinery will come to a halt. Apart from the loss to the Refinery, such shut downs will also involve unnecessary waste of foreign exchange required in importing deficit products which could otherwise have been produced locally. The Government should also keep a watch over this aspect and ensure that such shut-downs do not take place.
30	109	The Committee cannot escape the conclusion that the management of the Barauni Refinery made no efforts to find out indigenous sources of materials or to reduce expenditure. Comparisons with other public sector refineries are inevitable and the failure at Barauni is all the more

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		glaring when a comparison is made with the Gujarat Refinery. The Committee hope that for the third million stage, imports will be made only when inevitable. The Government of India should also make a comparative and detailed study of the Barauni and Koyali construction with a view to provide guidance for the other public sector refineries envisaged in the Fourth Plan.
31	112	The Committee are not happy over the movement of products from Barauni. There has been an apparent lack of coordination between the Refineries Division and the Marketing Division or an inability on the part of the Marketing Division to sell products in time. As only the first million stage of the Refinery had gone into stream, there is no reason to believe that it was difficult to sell the products as and when they were produced. The area served by this Refinery is highly industrialised one, with a proportionately larger consumption of petroleum products than in the other parts of the country. In view of this, marketing difficulties cannot be a valid excuse for the accumulation of products in the Refinery. The Committee would urge a close scrutiny of this matter by the top management of the I.O.C. and the Government with a view to devising adequate safeguards to prevent the Refinery's operation from coming to a stand-still or its working at reduced throughputs.
32	114	It was seen from the figures furnished that in most months, placements of the wagons have been much below than the actual indents and also that the rejection of the wagons actually placed has been rather heavy. During oral evidence, the Committee were informed that rejections took place mostly of wagons which were leaking or otherwise not worthy of use. Sometimes, the type of wagons indented were not the same as were actually supplied, e.g. white-oil tank wagons for black-oil tank wagons and *vice versa*. The facts reveal a none too satisfactory state of affairs. This difficulty would not arise when the pipelines to Kanpur and Maurigram are commissioned. Till this is achieved it has to be ensured that movement of products is not

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		hampered because of wagon shortage. The Railway Board and the Marketing Division of the I.O.C. should give adequate attention to this matter.
33	116	The Committee understand that calcination of coke is an extremely profitable industry. In view of this and need for calcined coke in considerable quantities in the country, Government should have set up this plant for calcination of coke along with the Refinery itself at Barauni. The Committee understand that this coke has many industrial uses especially in the making of carbon black electrodes used in the manufacture of aluminium, manufacture of abrasives, artificial graphite, calcium carbide and electric furnace resistors and linings, etc. The Committee recommend that early steps should be taken by Government to set up a calcination plant at Barauni.
34	117	During their visit to Barauni, the Committee saw the huge stocks of coke spread out in the open area around the Refinery. It was stated that such exposure for long period was likely to deteriorate the quality of the material. Vigorous efforts must, therefore be made to find out a market for the coke. Because of the reduced sale each year to M/s. India Carbon Ltd., stock accumulation each year will be heavier in future, and as such, it is necessary to find out a proper market for the coke. The Committee understand that efforts are being made through the S.T.C. for its export to certain Middle East countries. This should be actively pursued. The I.O.C. may perhaps investigate whether it would be possible also to interest private parties in effecting exports. Even if the Refinery does not make much profit on this deal, it will at least save it from the problem of storing these vast stocks with the attendant possibility of loss by deterioration.
35	119—120	In regard to the case of a wrong payment of a bill at the Barauni Refinery the following points arise:—
		(1) how it could not be detected that the pipes were not seamless;

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		(2) how the firm despatched the goods before receiving a reply to the request for amendment of the purchase order;
		(3) why the tests and test certificates were dispensed with and under whose orders; and
		(4) who was responsible for the payment of the bill and what was the motivation.
		It is strange that bills are missed in the Accounts Department as happened in this case. It might be worth investigating how many such cases of untraced bills were there and how many payments of duplicate bills were made by the Accounts Department. If the findings are not satisfactory, an overhaul of the Accounts Department would be called for.
		The Committee understand that as a result of a suggestion made during the oral evidence of officials of the Refineries Division, the case has been handed over to the Special Police Establishment for investigation. The points raised above by the Committee should be gone into and the results reported.
36	123	While considering the delays that take place in the construction of refineries one basic fact which has to be remembered is that imports have to be made to meet the demand of refined petroleum products in the country. The Committee understand that according to pre-devaluation prices, Rs. 113 worth of products could be manufactured from one tonne of crude oil costing Rs. 72. In short, a delay of one month in a one million tonne plant using indigenous crude would amount to a waste of foreign exchange to the extent of Rs. 94 lakhs. This is a considerably large sum of money and if the delays at Gauhati, Barauni and Koyali are taken into consideration

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		for the calculation of this avoidable expenditure of foreign exchange it will amount to Rs. 48 crores. The Committee, therefore, urge that in planning and executing future refineries and in expanding the present refineries this aspect of the matter sould be borne in mind by Government.
37	124—125	The estimates for the two million tonne stage of the Gujarat Refinery was Rs. 30.21 crores. The actual expenditure amounted only to Rs. 27.50 crores. The third million stage was expected to cost only Rs. 2.91 crores. As such, this expenditure would be met from the savings of the second million stage. It was stated that with some minor modifications it would be possible to raise the throughput to four million tonnes by utilising the in-built capacity of the plant and equipment. In short, the refinery was expected to achieve a throughput of four million tonnes at the estimated cost of a two million tonne refinery. The Committee are happy that the Management of the Gujarat Refinery have been able to achieve this success which is in heartening contrast to the state of affairs at Barauni.
38	126	The Committee suggest that after the construction phase is over, the Head Office of the Refineries Division should make a complete and detailed assessment of the entire cost structure of the three Refineries to determine factors that have contributed to the success at Koyali as compared to the Gauhati and Barauni Refineries. This analysis should stand in good stead for construction of the future refineries intended to be put up during the Fourth Plan period.
39	130	The Committee are glad to learn about the good work of the Central Designs Organisation. They suggest that this organisation should make continuous studies of improvements in refining

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		technology taking place elsewhere and make efforts to introduce these new techniques in the public sector refineries in India. A close liaison should also be maintained with the Indian Institute of Petroleum, Dehra Dun in this regard.
40	131	The Committee feel that the pattern and design of equipment for the proposed expansion schemes of the Refineries should also be subjected to a scrutiny by the Central Designs Organisation, with a view to locate possible performance difficulties. The Committee have in mind instances like the Coking Unit at the Barauni Refinery whose difficulties could perhaps have been avoided if the design had been subjected to a close scrutiny at the preparation stage. If improvements in technology are capable of being made at this stage, the Committee see no reason why this should not be done, instead of waiting for the construction to be over before making modifications.
41	132	One of the important works being undertaken by the Central Designs Organisation was stated to be in respect of preparation of drawings of various spare parts of the plant and equipment of all the three Refineries. The Committee were glad to hear about this attempt at self-reliance. They hope that it would be possible for the C.D.O. to prepare drawings for all the important spare parts of the three Refineries. Side by side with the preparation of drawings, continuous efforts should also be made to locate sources in the country for obtaining the spare parts. Such spares will fall into two broad categories:—(i) for process equipment for expansion, capital project work and plant modification and (ii) for operational maintenance. Attempts should also be made to rationalise the various component parts and produce suitable Indian standards. The Committee understand that if earnest efforts are made, it will be possible to obtain several refinery equipment like heat-exchange equipment, pressure vessels, pumps, compressors, steam turbines, pipes and fittings and process control and measuring instruments in India. The basic necessities in regard to the indigenous manufacture are stated to be the lack of specifications,

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		composition of construction material, drawings and technical know-how. This is the field in which the Central Designs Organisation can play a vital role.
42	136	The Committee feel that it would be an unhappy situation if the Gujarat Refinery has to work at a reduced throughput, because of lack of off-take of products. The Committee are not aware if serious efforts had been made to blend LSHS with other products to produce something which is easily marketable. If such a solution is possible, it would help the Refinery to tide over its difficulties. Even if all of its prospective consumers fulfil their commitments fully, it is very likely that the Refinery will have surplus LSHS on its hands when the proposed increase in its throughput from three million tonnes to four million tonnes takes place. Unless a solution for the problem of disposal of LSHS is found, either by formulating it into another product or sale to other customers, the *de facto* expansion is not likely to take place.
43	137	The I.O.C. might benefit by examples of the working of other Refineries in foreign countries like the example quoted by the Committee.
44	138	The problem of disposal of naphtha exists in all the Refineries and it is vital that the Marketing Division finds out a satisfactory solution to it, as otherwise, the alternative is for the Refinery to close down for short periods or work to reduced throughputs. It would be a pity if this were to happen. When even at the one million tonne stage, the Gujarat Refinery has had to face this difficulty, the problem is likely to be more acute when the throughout reaches the figure of four million tonnes, unless very special efforts are made. The Committee suggest that the Government should appoint a special study team for the purpose of finding out an immediate solution for the disposal of naphtha. In the meanwhile, intensive efforts should be made for the export of motor spirit and naphtha.
45	141	The Committee are not happy over the movement of products and feel that unless great care is taken to ensure that off-take of products is

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		regular and unhampered, the Gujarat Refinery would have to work to reduced throughputs specially after the expansion takes place. It is suggested that the matter should be discussed with the Marketing Division and a decision taken as to the minimum requirements of storage capacity that would be required for the various products. The efficiency of the Marketing Division should be ensured at an optimum level and shortcomings in this regard should not be made responsible for increasing the capital outlay at the Refinery by building extra storage tanks.
46	142	The Committee were informed that in regard to movement of products, from the operational angle, the loading facilities at the Refinery have the drawback of having no facility of loading any product at any loading point and this usually resulted in lot of shunting operations. The Committee recommend that efforts should be made to streamline the design and layout of the loading facilities so that optimum efficiency is obtained and operations are carried out smoothly.
47	144	The Committee understand that the French method used for the water supply scheme at Koyali had been a great success especially as the water was obtained from below the surface of the river bed. This eliminated the possibility of shortage of water when the flow of the river decreased or when the river turned course as happened at Gauhati. In view of the success of this method, which incidentally was stated to be also cheaper, the Committee would suggest that Government should bring this matter to the notice of all State Governments and major municipalities. In all major Government projects which require considerable quantities of water, it might be advisable to adopt the system introduced at Koyali.
48	145	The Committee were informed that the original design of the Refinery had not provided for any water treatment. It was stated this was perhaps a slip on the part of the designers. It was noticed that salts were deposited in the coolers. If allowed to continue, this might have affected production. Action had been taken to correct this by treating the water with chemicals. It

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		was hoped that the problem would be solved satisfactorily. The result would be known only after six months. The Committee wonder why such slips should occur if the designs are carefully scrutinised. It is however, fortunate that the defect was noticed in time. The Committee hope that the action taken will prove satisfactory.
49	150—151	The Committee feel the subject of decentralisation of powers with a view to achieve maximum flexibility of operations needs urgent attention. All the three Refineries have gone into production and it should be possible now to take stock of the position and arrive at certain conclusions in regard to the directions in which changes would be desirable. The Committee are not in favour of a system whereby the General Managers have to make constant references to the Head Office on varied matters and obtain concurrence on problems which they, as men-on-the-spot, are better qualified to judge. The Head Office should at best be responsible for policy and co-ordination while the actual day to day working should be left entirely in the hands of the General Managers. The Committee would suggest that the Refineries Division of the I.O.C. should consult the Chairman of the Hindustan Steel Ltd. on this matter, ascertain the practical virtues and drawbacks of the scheme and draw up concrete proposals as to what further power should be delegated to the Refineries. A larger measure of operating authority should be given at the plant level while minimising the need for close scrutiny at the Head Office in the day to day operations of the plants.
50	155—156	The budget at present is used mainly for defining of physical targets against which actual results are compared at the end of the year. If budgetary control is to have any meaning, the relationship between the values which are produced by physical results and the expenses involved in achieving them should be clearly understood, measured and gauged. It is only then that the control can be effective.

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		The Committee feel that it would be very desirable for the Division to re-orient its budgetting in order to make it an effective tool for managerial control. Performance budgetting, which is the objective that the Committee has in view, has come to be realised as useful in modern management practice and the Committee recommend that it should be introduced by the I.O.C. in all their Divisions.
51	158	It is inevitable that technical problems will often arise in the plants for which the plant requires an expert opinion or advice. The Head Office should be in a position to offer such advice. One solution is for the Head Office to have a well qualified senior technical expert with considerable experience in refining technology who can give opinions on technical problems. With the country's limited experience in this field, however, such a person might be difficult to obtain. However, it would be desirable to appoint the best man available and groom him for this task. During this period of grooming, the Committee suggest the formation of a Committee consisting of one technical expert each from the Head Office, the three Refineries, and the Indian Institute of Petroleum. This Committee may be the technical advisor to the Managing Director, who should refer to it all the technical matters on which he requires advice. Besides the problems referred to him by the Plants, the Managing Director should utilise this Committee to find solutions to some fundamental problems like new product manufacture, maximum utilisation of surplus products by blending or conversion to more saleable products, maximising production, etc. This Committee should also have the advantage of a first class technical library, contributing to good technical journals brought out in various countries and a team of researchers to find out the progress being made in refinery technology elsewhere.
52	159	The petroleum industry is a highly specialised industry and techniques of refining are constantly advancing through research. As the industry in the public sector is fast developing, it is essential for it to keep abreast of the developments in the technical and economic fields in foreign

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		countries. The industry has an international character which affects the Indian industry also. It would, therefore, be desirable to build up a well equipped research and development section for the public sector. It might be considered how far it would be desirable to attach this to the Indian Institute of Petroleum at Dehra Dun.
53	160	A suggestion was received by the Committee that it would be better if the Indian Institute of Petroleum was located near a Refinery instead of at Dehra Dun, so that actual trial or pilot plant studies may be facilitated. The Committee feel that there is some force in this suggestion and recommend that this should be considered by Government. The Committee would recommend Baroda, since it is both near a Refinery as well as the oil wells.
54	162	It is obvious that no importance has been attached by the Division to a study of the economics of refining which is a vital aspect of Management. This is unfortunate. The Committee suggest that a well organised research cell should be organised at the Head Office to make continuous studies of the economics of operations of the three Refineries with a view to cost control, maximising of utilisation of production, etc. Cost and operational data of refineries in other countries and the private refineries in India should be analysed where the figures are available and comparisons made. Efforts should also be made to obtain cost and operational data from friendly foreign refineries and if possible, some of these Refineries should be persuaded to train some of our officers on the techniques employed by them for economic operations.
55	166	The Committee were surprised to learn that the flare loss and handling and storage losses were as high as 2·5 per cent on an average. For a three million tonne plant, 1 per cent amounts to 30,000 tonnes of products. If the difference in a public sector refinery is high as even 5 per cent, it amounts to a figure of 1,50,000 tonnes per annum. The question arises as to whether the public sector refineries can increase their production to match the figures of the private

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		sector refineries, and if so, how best this can be done. Serious thought should be bestowed to this matter by the technical experts.
56	167	Instead of waiting till the Refineries have gone into full production, the Committee suggest that the matter relating to formulations should engage the attention of the Head Office of the Refineries Division now. The cost aspects of various schemes should be worked out and a programme drawn up keeping in view the product requirements of the country.
57	168	The Committee suggest that an O. & M. team under a well qualified and experienced officer should be set up in all the Refineries to make continuous studies in all the units with a view to increase efficiency, point out wasteful methods and practices and reduce costs. Adequate incentives might also be given by way of monetary awards for suggestions by staff on cost control measures.
58	170	The Committee have not gone into the details of the cost control system followed and are, therefore, not able to express any opinion on its merits. However, it is very essential that each Refinery should know the individual costs of its various operations and make comparisons of "performance" and "promise" with a view to enable the management to take timely action to control adverse trends. How satisfactorily this is achieved at present is for the management to judge, but the Committee hope that efforts will be made to improve upon and perfect the system so that it becomes an excellent tool in the hands of the management for cost control. The Committee would also suggest that advice of an outside expert may also be taken in making improvements.
59	174	The Committee hope that one important factor will be kept in view while reviewing staff requirements. The refining industry is quite new to this country and not many experienced hands both among officers and labour would be available to a new refinery. As such, staff strength will probably have to be fixed at a higher level in the initial years than what is actually required. As the staff learn and become experts, their

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		individual efficiency will rise. It would then be possible to gradually reduce the staff strength. Incentives may be provided to staff to increase their *per capita output* so that reduction in strength may not create other problems usual in industry.
60	175	The Head Office should constantly review the staff position and devise suitable formula whereby the expenditure on staff in each unit is expressed as a ratio of the output. Constant endeavour should be made to make inter-refinery comparisons, to publicise successful efforts in increase of staff efficiency and to foster a healthy sense of competition.
61	176	The Committee found that there were considerable variations in the strength fixed for the various units as between the three refineries. While this could be easily explained in the case of the technical departments e.g. process, electrical, maintenance, etc., as they would depend upon the pecularities of the refineries, the figures should be comparable in so far as the service departments are concerned.
62	177	The Committee are inclined to feel that the strength of the technical departments have also been fixed without consideration of any norm. The Committee desire that this matter should be gone into by a committee of experts chosen from the three Refineries and the Head Office, who should determine what should be the strength of each department in each Refinery.
63	179	The Committee feel that there should be uniformity in the pay-scales of posts carrying the same designations in the Division. If a lower or higher scale is intended to be given in a particular Refinery on account of any special responsibility attached, then it would be better to call the posts senior and junior or grade I and grade II so that the distinction is clear.
64	182	The Committee were informed that the staff were being trained in the observance of safety measures and that all precautions were being taken in this regard. The figures of the accidents

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		during the past two years given above, do not present a happy picture. This is a matter in which constant vigilance has to be exercised by the management. It is a fact that experienced staff sometimes tend to take safety regulations for granted. The safety regulations should be enforced rigidly and individual staff violating them should be warned or punished for endangering security.
65	183	While adequate safety measures are necessary to prevent accidents from happening and controlling losses arising from accidents, adequate security measures in the Refinery are vital to prevent mishaps arising from the action of unsocial elements, miscreants and enemies. This is a matter which should engage the considered attention of the top management in the organisation. Unlike most other industries refining of petroleum products is of vital importance in the country's economy, more so, in times of emergency, and the I.O.C. cannot afford to take any risks in this regard.
66	189	The Committee find that the circumstances which led to the sinking of the tube-wells in connection with the water supply scheme at Barauni were not wholly unjustified. It is true that there was an apparent delay in initiating the project and in co-ordinating it with other aspects of the construction of the Refinery. This has, however, to be seen in conjunction with the difficulty of obtaining the pumps, a matter which was not in the hands of the Refinery. While the extra expenditure was unfortunate, the Committee did not find a case for blaming the management of the Refinery.
67	196	Audit have taken the view that the decision to continue payment of construction allowance beyond the construction phase was irregular and involved a recurring expenditure of Rs. 51,680 per annum in both the Refineries. Though wrong in principle in view of the subsequent decision of the Board, the Committee do not wish to comment upon this matter.

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68	199	The Committee hope that in view the technical competence and skill acquired in the refining industry attempts will be made during the expansion of the existing refineries and the construction of new ones to manage without the aid of foreign help. It is only when this is done can one say that the industry has come of age.

GMGIPND—RS—2528(aii)LS—11-3-67—1270.