C.P.U. No. 277

COMMITTEE ON PUBLIC UNDERTAKINGS

(1974-75)

(FIFTH LOK SABHA)

SIXTY-FOURTH REPORT

INDIAN PETROCHEMICALS CORPORATION LIMITED

(MINISTRY OF PETROLEUM & CHEMICALS)

LOK SABHA SECRETARIAT
NEW DELHI

April, 1975/Chaitra, 1897(S)

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(1974-75)

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INTRODUCTION

I, the Chairman, Committee on Public Undertakings having been authorised by the Committee to present the Report on their behalf, present this Report on the Indian Petrochemicals Corporation Ltd.

2. This Report is based on the examination of the working of the Indian Petrochemicals Corporation Ltd., upto the year ending 31st March, 1974.

3. The Committee took evidence of the representatives of the Indian Petrochemicals Corporation Ltd. on the 18th and 19th December, 1974 and on 3rd January, 1975 and those of the Ministry of Petroleum and Chemicals on the 17th and 18th January, 1975.

4. The Committee on Public Undertakings considered and adopted the Report at their sitting held on the 18th April, 1975.

5. The Committee wish to express their thanks to the Ministry of Petroleum and Chemicals and the Indian Petrochemicals Corporation for placing before them the material and information they wanted in connection with the examination of the working of the Indian Petrochemicals Corporation Limited. The Committee wish to thank in particular the representatives of the Ministry and the undertaking who gave evidence and placed their considered views before the Committee.

NAWAL KISHORE SHARMA,
Chairman,
Committee on Public Undertakings.

April 22, 1975.
Vaisakha 2, 1897 (*S*).

CHAPTER I

A. Historical Background

1.1. Petrochemical industry has great significance for the economic development of a country. The cost of chemicals derived from petroleum is cheaper. The very large number of synthetic chemicals, delivered on a commercial scale from petroleum, help to overcome the shortages of natural raw materials like cotton, wool, rubber, steel, non-ferrous metals and oils and fats. The growing variety of synthetic fibres, fabrics and plastic materials, which petrochemicals are producing as end-products, are meeting the growing sophistication in demand. [Petroleum products also include construction and engineering materials.] The variety of products made from petroleum include not only necessities of life like fabrics but also those which are essential for increasing productivity of land like fertilizers and those such as proteins which are vital for human existence.

1.2. Petrochemicals also make significant contribution to food industry. The current developments in the production of protein feed-supplements from petroleum feedstocks have significance towards a probable solution of present and future food shortage in the world. Many of the insecticides developed in recent years are also used to protect the health of the World's population. Petrochemical industry is important not only for import substitution but also for spurring new lines of industrial activity. Petrochemicals not only contribute to the present day industrial growth, economic development and better life but are also playing an active role in shaping the World of tomorrow.

1.3. The important role of petrochemical industry in our national economy can easily be judged from the wide range of chemicals that can be produced as petrochemicals and the vast field of their application. For instance, thermoplastics like polyvinyl chloride, polyethylene, polypropylene, polystyrene can partly replace the conventional materials for building like steel and scarce metals. The manufacture of pipes, cables and refrigerators etc., is becoming progressively dependent on plastics. Synthetic fibres which are also derived from petrochemicals have a special significance to our country mainly because we are short of natural fibres. Synthetic

detergents mark yet another field of petrochemicals, the development of which will be in the country's interest mainly because we are short of edible oils and fats required for the production of conventional soap.

1.4. The Petrochemical industry is comparatively of recent origin. Petroleum raw materials began to be used for the manufacture of chemicals about 40 years ago in the U.S.A. where gases were available from the refineries at a very low price. During the last four decades the World production of petrochemicals has risen from 30,000 tonnes in 1930 to 50,000 tonnes in 1940 and to 13 million tonnes in 1960. The National Committee on Science and Technology (NCST) panel V on Chemical Industry in its "General Overview" report published in 1973 states that World petrochemicals production which was 50 million tonnes in 1970 is expected to go up to 150 million tonnes by 1980, to 250 million tonnes by 1985 and to a record figure of 600 million tonnes by 2000 A.D.

1.5. On the rate of growth of the World petrochemicals industry the NCST report comments:

> "The growth of the Petroleum based organic chemicals was of the order of 25 per cent a year during 1960's and is predicted to continue rising at a rate of about 14 per cent annually over the next 5 years. This compares to a growth in the 1960's of 12 per cent for all organics and 10 per cent for all chemicals. The tremendous expansion in petrochemical production, particularly the heavy organic sector, in the industrialised countries in the last two decades has been made possible not only by technological advances, but also by dramatic increase in the scale of plant and operations."

1.6. The development of Petrochemical Industry in India was reviewed for the first time by a special committee appointed by the Government under the Chairmanship of Dr. G. P. Kane. This Committee had for its objective the preparation of a plan for the development of petrochemical industries during the Third and Fourth Five Year Plans.

1.7. The Kane Committee restricted itself to identifying various products to be manufactured out of petroleum sources and indicated targets of production by 1965-66 and 1970-71. The Kane Committee did not, however, carry out any detailed technical or financial assessment of the petrochemical production in India. Because of

the capital intensive nature of the petrochemical industry and the large amount of foreign exchange component involved, the Oil and Natural Gas Commission requested Institute Francais Du Petrols (IFP) to prepare a detailed report indicating time phasings, the locations and order of investments for the development of the petrochemicals industry in India. IFP Committee was headed by Dr. V. E. Henny. Subsequently two other groups studied the subject of development of petrochemical industry. These were the planning Sub-Group for petrochemicals appointed by the Ministry of Industries & Supply in October, 1963 and the working group appointed by the Ministry of Petroleum & Chemicals in November, 1964. The report submitted by the latter group in January, 1965 formed the basis of the Fourth Plan programme for petrochemicals.

1.8. The planning group for petrochemical industries, in consultation with the various Ministries of Government of India and Oil & Natural Gas Commission examined the targets of production consistent with the projections of market demand, availability of naphtha and other raw materials, etc. A petrochemicals Division was also created as a part of the Oil & Natural Gas Commission to take follow-up action.

1.9. Based on the recommendations of the planning group the Petrochemicals Division of Oil & Natural Gas Commission examined in detail the techno-economic feasibility of setting up certain petrochemical projects around the Gujarat Refinery and drew up detailed project reports for two projects—Gujarat Aromatics Project and Gujarat Olefins Project. The intention of the Government at that time was that the public sector would manufacture the basic petrochemical intermediates to be further processed in the private sector into end projects. Consistent with the intention, the Petrochemicals Division of the Oil & Natural Gas Commission concentrated its attention on developing the two mother units—the Aromatics and the Olefins. Projects for the utilisation of the products from these two mother units were to be licensed in the private sector.

1.10. Recently the trends in consumption of various Petrochemicals in India during the past few years has been examined by a special Task Force appointed by the Planning Commission. This Task Force had for its objectives the detailed examination of the various aspects of the Indian Petrochemical Development programme, such as growth of demand, the likely production by the end of the Fifth Plan, requirements of additional production and capacity during the Fifth Plan period and compilation of data re-

garding investment, employment potentiality, infra-structure facilities, etc.

1.11. As per the analysis of the Task Force the consumption of total petrochemicals has grown rapidly during the last five years. The growth rate of plastics has been 21.5 per cent, Synthetic Rubber 14.35 per cent, Organic Chemicals 12.3 per cent and Synthetic Detergents 35.5 per cent.

1.12. Discussing the likely impact of indigenous production/availability on the future demand potential, the Task force report states "in a developing country, the potential demand for petrochemicals—plastics, synthetic detergents, synthetic rubber and fibres, etc. can normally go to very high levels because of the possibilities of substitution and supplementing supplies of traditional materials like paper, metals, glass, leather cotton, vegetable oil. etc. by these new petrochemical products. The production of these petrochemicals is, however, highly capital intensive and requires large foreign exchange inputs. The availability of these products is, therefore, largely dependent on the allocation of resources for setting up these plants and the production that can flow in the internal markets from the facilities that could be set up. Due to the restricted availability of foreign exchange for imports of the petrochemical products, the demand at any point of time is conditioned very largely by the indigenous availability".

1.13. The Indian Petrochemicals Corporation, Ltd. (IPCL) was formed on March 22, 1969 as a separate registered Company with its Registered office at Jawaharnagar (near Baroda) in Gujarat to implement the public sector petrochemical projects formulated earlier by the Petrochemicals Divsion of O.N.G.C. Subsequently, however, Indian Petrochemicals Corporation Limited was entrusted with the implementation of the projects for utilisation of the products from the Gujarat Olefins Project (These projects are collectively called the Downstream Units).

B. Objects and Present Function

1.14. The main objects of IPCL are contained in its Memorandum of Association. Almost all activities relating to manufacture and sale of petrochemical products have been covered under the head 'Main Objects'.

Briefly stated, the main objects are to carry on the business of processing, manufacturing and distribution of organic and inorganic chemicals derived from petroleum hydrocarbons and to carry on its

business in the field of petrochemicals, polymers and industries based on petrochemicals in all their varied aspects, including the outlining of technology and fabrication of equipment.

1.15. IPCL is at present engaged in implementing the first petrochemicals Complex in the Public Sector, near Baroda.

The Complex consists of the following projects:

(a) Aromatics Project

(b) *Olefins Project*

(1) Naphtha Cracker Unit

(2) Pyrolysis Gasoline Hydrogenation Unit

(3) Bengene Extraction Unit

(4) Butadiene Extraction Unit

(c) *Downstream Units of the Olefins Project*

(1) Low Density Polythylene

(2) Polypropylene

(3) Ethylene Gycol

(4) Polybutadiene Rubber

(5) Acrylonitrile

(6) Acrylic Fibre

(d) Detergent Alkylate

Research and Development is also being undertaken.

1.16. About the extent to which the aims and objectives have been achieved by IPCL the difficulties faced in achieving the objects and the steps taken by IPCL to resolve these difficulties, the Management stated in a note that the main objective in the setting up of Indian Petrochemicals Corporation Ltd. was to set up and operate petrochemicals plants in the public sector. One project, *viz.* the Gujarat Aromatics Project, had been set up and had been in operation from 1973-74. The Company was currently engaged in implementing the Gujarat Olefins Project and the connected downstream units. It was also engaged in the formulation of some more projects for implementation in the near future.

1.17. The Management added that the constraints and difficulties faced in achieving the objectives were not peculiar to the Indian Petrochemicals Corporation. They were common to most industries in the country—be they in the public or in the private sector. Some

of the important constraints were (i) limited fabricating capacity in the country, (ii) shortage of experienced contractors with qualified personel, (iii) over-run of capital costs consequent upon escalation in prices and; (iv) shortage of power, etc.

In this connection the representative of the Ministry of Petroleum and Chemicals informed the Committee during evidence that the aims and objectives apart from production of several petro-chemicals, intermediates and raw materials would be achieved when the project goes into production on a regular commercial basis. The obligations of the Corporation would not be confined merely to production of the petro-chemicals but would comprise of the various objectives with regard to profitability, resource generation, development of marketing facilities, technical services, introduction of new conversion products, research and development to the extent practicable, reaching a position of near independence of know-how, in technology.

At this stage, it could be said that the Corporation was fairly well on its way to achieving the primary objective of implementing its various projects. "The representative added I do not think that I can say that it has already achieved the aims and objects for which it has been set up. In the process of implementation there are obviously many constraints and difficulties that arise from time to time and the Corporation by itself tries to resolve them. The Chairman and the Managing Director of the Corporation approaches various agencies of the Government of India himself and where necessary he seeks the assistance of the Ministry. Wherever this assistance is sought, the Ministry tries to resolve the difficulties as quickly as possible. It needs assistance from the State Governments' agencies, it might need it from agencies such as Railways, the Directorate General of Technical Development, the Chief Controllor of Imports and Exports, the Department of Economics Affairs of the Government of India and occasionally through our Ambassadors in countries from where the process know how, such equipment are to be purchased."

1.18. The Committee note that IPCL was formed in March, 1969 as a separate Company to implement the public sector Petrochemical Projects formulated earlier by the Petrochemicals Division of the ONGC, with the main objects of carrying on the business in the field of Petrochemicals polymers and industries based on Petrochemical including outlining of technology and fabrication of equipment.

The Committee are informed that the aims and objectives of the Corporation apart from production of several petrochemicals intermediates and raw materials would be achieved when the project

goes into production on a regular commercial basis. The obligations of the Corporation will not be confined merely to production of the petrochemicals but will comprise the various objectives with regard to profitability, resource generation, development of marketing facilities, technical services, introduction of new conversion products, research and development to the extent practicable, reaching a position of near independence in know-how in technology. From the subsequent chapters, it will be seen that, from the date of inception of the Corporation till now, only the Aromatics Project has been completed and is in operation at present and the other projects are at different stages of their completion. In view of the need for the petrochemicals and its end-products in the country and the importance of Petrochemical Industry for the development of the country, the Committee stress that every effort should be made both by the corporation and the Government to complete and commission all the projects under Indian Petrochemicals Corporation Ltd. in accordance with their scheduled dates of completion so as to achieve the aims and objectives of the Corporation at the earliest.

1.19. The Committee find that while the World had made tremendous progress in Sixties in the field of Petrochemical industry, our country lagged way behind. It is only during the last Five Year Plan that some effort has been made to set up a Petro-Chemical industry at Baroda. But this effort suffered initially, for the plan covered only the installation of two mother plants without the down-stream units. The Committee note that in the beginning the idea was that the projects for the utilisation of the products from the two mother units of IPCL were to be licensed in the private sector. it took Govt. almost three years to take a decision to place the responsibility for the down-stream units also on the Public Sector. The net result of all this was heavy delay in the setting up of the down-stream units and in the achievement of objective of integrated development of Petro-Chemical industry.

The Committee stress that Government should learn a lesson from this experience and see that in future Petro-Chemical industry plants are planned in an integrated manner.

Having regard to the tremendous potentialities of the Petro-Chemical industry in the matter of accelerating the pace of development and creating employment opportunities, the Committee feel that like the Electronic industry this is another field which should receive prior and intensive attention of the Government.

1.20. The Committee stress that having regard to the experience already gained in setting up the Petro-Chemical Unit in Baroda,

Govt. should prepare in depth a shelf of schemes so that these could be taken up for implementation on a priority basis having regard to the availability of resources, raw-materials, demand pattern etc.

The Committee need hardly stress that in deciding the product mix, Govt. should keep in view the primary need for utilising petro-chemical industry for manufacture of products which would best serve the interest of the common man and development, rather than cater to the fanciful requirements of more affluent section of society.

1.21. The Committee stress that there should be coordination at the highest level in research and technological fields to see that know-how in the crucial areas of petro-chemical industry is developed in the country in the shortest time and where it is not available, latest know-how best suited for our requirements is obtained without delay so as not to hold up development.

1.22. Another aspect to which the Committee would like to draw attention is the need for ensuring that petrochemical industrial units do not pollute the environment, thus alienating the sympathies and jeopardising the health of the people in the vicinity of the plants.

Statement of objectives and obligation.

1.23. As far back as 1963, the Estimates Committee had in their 32nd Report on National Coal Development Corporation recommended that broad principle regarding financial and economic obligations of public sector enterprises should be laid down by Government. The recommendation was reiterated by the Committee on Public Undertakings in their 7th Report (3rd Lok Sabha) in 1965.

1.24. The Administrative Reforms Commission suggested in its report (October, 1967) that Government should make a comprehensive and clear statement on the objectives and obligations of Public Undertakings. This recommendation was accepted by Government, and the Bureau of Public Enterprises, Government of India *vide* their letter No. 9(156/70-BP (9GMI) dated the 3rd November, 1970, asked all Government Companies to formulate a statement of their objectives and obligations clearly, if not already done, and communicate the same to Government.

1.25. In paragraph 1.44 of their 40th Report (5th Lok Sabha) on Role and Achievements of Public Undertakings (1973-74) the Committee on Public Undertakings had regretted that "even though a period of 10 years has elapsed since the Estimates Committee made their recommendation Government have not laid the financial, economic and social objectives of public sector enterprises so far". The

Committee had recommended that Government should present to Parliament a White Paper setting out *inter-alia* (i) a frame work of principles of Government's general economic, financial and social strategy for public sector undertakings; (ii) micro objectives, both financial and economic, of each public undertakings and providing for review from time to time, and (iii) quantification of social objectives and obligations.

1.26. In a written note, the Committee were informed that the Indian Petrochemicals Corporation Ltd. had not as yet formulated any such statement of objectives and obligations in the light of the recommendations of the Administrative Reforms Commission which was accepted by Government as far back as November, 1970. Explaining the reasons, the Management of IPCL stated as follows:—

> "Originally the Aromatics Projects and Olefins Project were thought of for implementation by Government and the Corporation to be formed for the purpose but subsequently during the period 1970—72, other projects were added. It therefore seems appropriate to take steps to formulate objectives and obligations once a reasonable picture of a substantial portion of the activities and responsibilities of the Corporation emerges." ....

1.27. The Management added that there were no particular reasons for the delay in the formulation of such a statement of objectives and obligations. Information had however been collected from other public sector undertakings and it was expected that the said statement would be finalised in consultation with the Government soon.

1.28. During evidence, the Secretary, Department of Petroleum apprised the Committee as follows:—

> "The statement of objectives and obligations as recommended by Administrative Reforms Commission has not yet been formulated for the IPCL. This is an important aspect of public sector enterprises. Although its importance at the construction stage may be some what less, it is important when a project goes into commercial production. There is tendency to preface such a statement with a number of platetudinous observations but I do not think that is really intended or was intended by the Administrative Reforms Commission when they made their recommendation..... It has to assume the role of a pace-setter for the petrochemical sector and work for price stability which is so important in a sector which has a very wide clientele for its

intermediates and conversion products. It should aim at economy of operation to ensure price stability and also generate resources for further growth. It should optimise its production within the present scope of the organisation and try and de-bottleneck the project because such projects usually have a certain amount of inbuilt capacity which could be utilised when diversification is taken up. Then as more and more production is achieved or it can into diversification.

1.29. Another responsibility is a well-planned research and development programme coordinated with national laboratories, other laboratories and university departments and private sector organisations.

1.30. The collaboration agreements with process licencors generally provide for transfer for know-how and new developments over a period of time. That becomes an added responsibility, to profit by these provisions in the collaboration agreements so that new technology is transferred by the process licencers well in time and the period allowed for such time does not run out and technical snags develop. It should work for new product ranges within its own organisation and downstream and also pay very careful attention to pollution which is a special feature of industries in the petrochemical field. In its research and development, it ought to aim at reaching a stage where the need for foreign know-how is progressively eliminated.

1.31. Another obligation would be to provide technical and marketing services to its clients and suggestions to the clients for the introduction of new products for the user industry.

It should take up its own training programmes and attend to employees' welfare, and improving productivity. It should fit into the socio-economic environment in which it has to work. These are the broad objectives for which the undertaking should work.

1.32. As regards the reasons for delay in formulating the statement of objectives and obligations I would say the objectives and obligations have to be developed gradually especially in a project which is under implementation. It is unfortunate, so much time has been taken in working out these objectives and obligations and we would like to see that IPCL does work them out and make them known as quickly as possible."

1.33. On being asked as to why this has not been done so far the Committee were informed that in the pressure of implementing a project and putting right the Aromatics Project and with some what limited staffing which still continued this important aspect seemed to have been ignored and they (Government) would like to see that this was rectified as quickly as possible.

1.34. The representative of the Ministry of Petroleum and Chemicals admitted that "in the ultimate analysis, it is the fault of the Ministry." They should have pursued it more vigorously and insisted that they did come down to defining their objectives. The IPCL was asked in 1971 to look into this matter; but the Ministry did not pursue it with vigour. It was due to the neglect of a particular file. The Ministry would like IPCL to get down to business purposefully.

1.35. The Committee regret to note that even though the Bureau of Public Enterprises had asked all the Public Undertakings as far back as November, 1970 to formulate a statement of their objectives/ obligations clearly and communicate the same to the Government and even though the need for formulating such a statement was reiterated in the 40th Report (5th Lok Sabha) of the Committee on Public Undertakings on Role and Achievements of Public Undertakings, the Indian Petrochemicals Corporation Ltd. has not so far formulated its statement of objectives/obligations in spite of the fact that IPCL was asked by the Ministry in 1971 to look into the matter .The Ministry admitted during evidence that in the ultimate analysis it is the fault of the Ministry and they should have pursued it more vigorously. The Committee are unhappy at this long delay and recommend that the Corporation/Ministry should finalise the statement of objectives/obligations of IPCL without any further delay and place it before Parliament.

CHAPTER II

CONSULTANCY AND COLLABORATION

2.1. The Indian Petrochemicals Corporation Ltd. has entered into 23 collaboration agreements for provision of technical know-how, preparation of process, engineering design and supply of equipment with foreign parties. In one case the Company is a joint signatory to an agreement between the Government of India and Kreditanstalt fur Wiederaufbau for foreign exchange credit for the Gujarat Aromatics Project. The Company has also entered into certain agreements/arrangements with M/s Engineers India Limited, a Public Sector Company, for the provision of detailed engineering and procurement services for indigenous equipment. In addition, in the case of two units, IPCL has entered into agreements with Indian organisations jointly with foreign parties.

2.2. A List of foreign collaborators for projects under implementation by IPCL is given below.

Name of Project	Foreign Collaborators
Gujarat Aromatics	M/s Fried Krupp GmbH-Chemicanlagenbau, West Germany.
	M/s Engelhard Minerals and Chemicals Corporation, Newark, New Jersey.
	M/s Kalichemie Engelhard, West Germany.
	@M/s Kreditanstalt fur Wiederaufbau
Gujarat Olefins	
(a) Naphtha Chracker Plant . .	M/s Lummus Company Limited, U. K.
(b) Benzene Extraction Plant . .	M/s Universal Oil Products Company. U.S.A.
(c) Butadiene Extraction Plant . .	M/s Universal Oil Products Company, U.S.A. M/s Proofrance, S.A. France.

Name of Project	Foreign Collaborators
(d) Pyrolysis Gasoline Hydrogenation Plant	M/s Institute Francais Du Petrol Des Carburants et Lubrifiants, France. (M/s Council of Scientific and Industrial Research, New Delhi.)
Downstream Units	
(a) Low Density Polyethylene . .	M/s Aquitanie Total Organico, S.A., France. M/s Compagnie Francaise'd Etudes et de Construction Technip, France.
(b) Ethylene Glycol . . .	M/s Halcon International Inc., USA
(c) Polypropylene	M/s Tecnimont, S.P.A., Italy
(d) Acrylonitrile	M/s Prospect International C.A. (Venezuela), Cleve and, Ohio, USA M/s Badger BV , Netharlands.
(e) Acrylic Fibre	M/s Asahi Chemical Industry Co. Ltd., Japan. M/s Kobe Steel Ltd. Japan. M/s C. Itoh & Co., Japan.
(f) Synthetic Rubber . . .	M/s Polysar International, S.A. Switzerland
(g) Detergent Alkylate . . .	M/s Universal Oil Products Company,USA.
(h) Polyester Filament Yarn . .	M/s Karl Fischer, W. Germany. (M/s J. K. Synthetics, India M/s Industries Petroquimicas Maxicans (MSA), Maxico.
(i) Project Management Assistance .	M/s Lummus company Ltd. U. K. (M/s Lummus Company, India)

@IPCL is a joint signatory along with the Government of India to an agreement with this organization for the provision of a loan of DM 43 million for the project.

2.3. It was added that the Foreign collaboration agreements in respect of the Gujarat Aromatics Project had been entered into by the Government of India itself and later assigned to IPCL. In the case of the Naphtha Cracker, the negotiations with the foreign parties had been held under the aegis of the Government of India. The draft contract was also finalised by the Government with the assistance of the representatives of IPCL. The contract was, however, executed by IPCL.

2.4. In the case of the downstream units of the Gujarat Olefins Project, however, the contracts were negotiated by IPCL and later approved by the Government. The following steps were taken in this connection.

(1) Offers were invited from various process licensors and engineering contractors. A special task force undertook an extensive tour to discuss the techno-economic and commercial aspects with the overseas process licensors and engineering firms in great detail.

(2) In order to obtain data on a comparable basis and to get a full appreciation of the cost and nature of technologies offered necessary for a proper selection of the process and the engineering services for each project, the task force drafted and issued the following documents:

(a) A note defining basic engineering.

(b) List of equipment available in India.

(c) Draft Licence Agreement.

(d) Draft Engineering Agreement.

The last two documents set out the commercial framework within which IPCL desired to function, both from the point of view of Government of India's regulations, instructions and guidelines and IPCL's own past experience with collaboration agreements. Some of the essential point covered to arrive at a comparable and standard basis on the commercial aspects were the following: (i) Complete indemnity to IPCL in case of patent infringement suits, (ii) Guarantees of Engineering quality, plant capacity, yield, consumption of raw materials, chemicals, utilities, etc. backed up by suitable liquidated damages for non-fulfilment of the guarantees, (iii) Suitable schedule of payment for licence and engineering services, (iv) Programme for development of the Indian market in the concerned products through preproduction imports from the licensor on a product loan basis, and (v) three way exchange of technical information on improvements in process and technology.

(3) Proposals received from the foreign parties were evaluated with a view to narrow down the number of parties from among whom final selection of technology for the down-stream units could be made.

(4) The final phase of the selection of technologies for the downstream units was taken up during September 1971. This consisted essentially of inviting selected parties for final discussions.

(5) The selected parties were requested to bring with them draft agreements and their best offers. Discussions were held with these parties in October and November 1971. In these discussions Engineers India Limited, Ministry of

Petroleum and Chemicals, DGTD and the Ministry of Law were associated.

(6) Separate legal advice was also taken from IPCL's Legal Adviser on the individual draft licence, engineering and equipment delivery agreements submitted by the overseas companies.

(7) After the final techno-commercial evaluation of the offers, IPCLAs recommendations were submitted to the Government. On the approval of the recommendations by Government the agreements were finalised and submitted to Government. Individual agreements had received the scrutiny of the concerned Ministries/Departments before approval was accorded and the agreements were taken on record.

From the foregoing it would appear that all possible efforts were made to ensure that Government guidelines on foreign collaboration agreements were kept in mind throughout the evaluations and negotiations. Variations, if any, were dictated by the circumstances peculiar to each agreement and were within the knowledge of the Government."

2.5. In this connection the Secretary, Ministry of Petroleum and Chemicals stated as follows during evidence,—

"The guidelines, as the name itself shows, are indicative and Ministries or public undertakings negotiating projects are expected to observe the guidelines to the extent feasible, and IPCL has made efforts to adhere to the guidelines as far as it was possible to do so. However, the process licensors who come up with these rather scarce processes—there are not too many licensors for each project—do stipulate certain conditions which cross the guidelines, and it was not always possible for the IPCL to adhere strictly to the guidelines. When such a thing happens, Government comes into it. The Foreign Investment Board which clears every foreign collaboration project does go into this and then allows relaxation of the guidelines. This procedure was fully followed in the case of IPCL's contracts ."

2.6. The following cases in which there were deviations from the guidelines in respect of foreign collaboration agreements entered into by IPCL, were brought to the notice of the Committee:—

(1) *Guidelines*	The payment will be subject to applicable Indian Taxes :
Deviations	Collaboration Agreements in respect of the following projects contain provisions for payments net of taxes Olefins project (Agreement with Lummus and Agreement with U.O.P. for Sulfolane process only), Polypropylene Projects, Acrylic Fibre Proje ct.
(2) *Guidelines*	The Indian Party should be free to sub-licence the technical know-how/product design/engineering design to another Indian party :
Deviations	Collaboration Agreements in respect of the following units specifically prohibit sub-licensing. DMT, Octafining Process (Licence transferable only to licensees affiliates), Sulfolane Process and Acetonitrile process for the Olefine Project, Low Density Polyethylene Project, Ethylene Glycol Project. Collaboration agreement in respect of Acrylic Fibre Project grants right to Participate in licensing to other parties.
(3) *Guideline*	To the fullest extent possible, there should be no restrictions on free export to all countries ;
Deviations	Collaboration Agreements in respect of the following units contain export restriction provisions of varying nature :— DMT, Polybutadine Rubber Project, Lo[w] Density Polyethyene Project, Polprcpylene Project, Acrylic Fibre Project.
(4) *Guideline*	Collaboration Agreements will be subject to Indian Laws :
Deviations	In the case of Gujarat Aromatics Project General Contract, Paraxylene Licence, Agreement and DMT Licence Agreement Indian Laws are applicable if licensee is claimant. In the case of Agreement for octafining process and Catalytic Reforming Plant, Indian Laws are applicable if licensor is claimant and laws of the State of New Jersey, U.S.A. applicalbe if li censee is the claimant. The agreements for Sulfane Process and Acitonitrile process for the Olefins Project as also the Agreement in respect of Detergent Alkylate Project are subject to laws of State of Illinois, U.S.A.

The agreement is respect of Polybutadine Rubber Project is subject to laws of Switzerland.

The agreement in respect of Lwo Density Polyethylene Project, is subject to laws of U.K.

In the case of Ethylene Glycol Project Agreement, the provisions regading secrecy and arbitration alone are not subject to Indian laws.

2.7. In the agreement between the Indian Petrochemicals Corporation Ltd. and the Lummus Company Limited for the Project Management Assistance, it has been provided that,—

"In the event of (a) an item of Foreign Equipment having been approved by the CLIENT for the purchase from a source outside India, (b) LCL (Lummus Company Ltd.) having carried out work in terms of such approval and (c) it being decided subsequently that this item should be purchased by the CLIENT direct from a source inside India, the CLIENT shall pay to LCL a Fee of ½ per cent of the lowest quotation received from an intended Supplier outside India or of the price of the item purchased from a source inside India" (Clause 3.3).

2.8. When asked about this extraordinary condition the Management stated, in a written note, as under,—

"Under the project management assistance contract with M/s Lummus, payment of a fee of half a percent of the lowest quotation received from an intended supplier outside India or of the price of the item purchased from a source inside India would arise only in the event of—

(a) an item of foreign equipment having been approved by IPCL for purchase from a source outside India;

(b) Lummus Company Ltd., London having carried out work in terms of such approval; and

(c) it being decided subsequently that this item should be purchased by IPCL direct from a source inside India.

It would, therefore, be clear that the payment of a fee of half a percent to Lummus is intended to cover the cost of procurement work undertaken by them at the instance of IPCL which has subsequently to be discontinued and

would be payable only after all the three conditions are fulfilled. Payment of half a percent of procurement fee is not automatically made for all purchases made either outside or within India. It arises only in cases where procurement action has been initiated by Lummus Company Ltd., London and it is subsequently decided to purchase the item in India.

If the order is placed on a foreign vendor on the recommendations of Lummus Company Ltd., the fee payable to Lummus would be as follows:

4 per cent of the FOB port of shipment value upto £10 MM of foreign equipment purchased.

3 per cent of the FOB port of shipment value from £10 MM to £15 MM of foreign equipment purchased.

2 per cent of the FOB port of shipment value above £15 MM of foreign equipment purchased.

This fee covers procurement action (preparation of tenders, calling of bids, evaluation, recommendation), placement of purchase order, expediting and inspection. Therefore, if in a particular case, action is discontinued before the order is placed, it does not seem unreasonable that a fee should be paid to cover the costs incurred.

In the case of our agreement the Lummus Company Ltd. for the Naphtha Cracker (executed in 1970) and with Badger B.V., Netherlands for the Acrylonitrile Project, payment towards infructuous work undertaken at the instance of IPCL at 1 per cent of the lowest of the lowest quotation (in the case of Lummus) and on the basis of a formula for working out costs incurred (in the case of Badger B.V.) have been agreed to.

We have not been able to verify if such a condition exists in contracts executed by other public undertakings. Moreover, this provision cannot be considered in isolation without reference to other contract terms. If the basic procurement fee itself is high, there may be no provision for a fee for infructuous work.

All the contracts executed by IPCL with foreign licensors and engineering firms have been carefully scrutinised in the various Ministries of Government and by the Foreign Investment Board and it appears, therefore, that in the tota-

lity of circumstances, the provision for payment for infructuous work was not considered extraordinary or unreasonable."

2.9. In a written note, the IPCL further informed the Committee that:—

"(a) The provisions in the agreement with Lummus Co. Ltd., London, for procurement services for Project Management Assistance are of an enabling nature. Lummus' service have not been utilised for any procurement so far and no procurement fee has, therefore, become payable.

(b) Under our agreement with Lummus Co. Ltd., for the Naphtha Cracker, out of a total claim of about £4190 for infructuous work, that for £527 has been settled and the balance of £3663 is under examination.

(c) No payment towards infructuous procurement work has so far accrued to Badger in respect of the contract for the Acrylonitrile Project."

Asked whether this sort of condition is also to be found in other Collaboration agreements, the representative of the Ministry stated during evidence,

"that if it is not mentioend separately in an agreement, it does not mean that it is not included—because they will charge for all the services they render. It may be 4 per cent or 5 per cent for engineering services, with procurement and everything included, or it may be separately mentioned. In this particular case it is separately mentioned."

2.10. On pages 18-19 of their report the Task Force of the Planning Commission, for Petrochemicals observed that,

"The recent developments in the international market had shown that there are possibilities that with the recurrent shortages of petrochemicals, there will be search for sources of supplies of these petrochemical products from conutries which have not till now been in the export market. It would, therefore, appear that there will be considerable possibilities of exports of petrochemicals provided it is possible to consistently produce products of acceptable quality and market them at internationally competitive prices. It would also appear that the construction of fresh

capacities in the developed countries has been slowed down due to environmental problems, high cost of construction, rising labour costs and other factors and a number of design engineering firms are in a position to offer their services for constructing petrochemical production facilities in developing countries on attractive terms. It is possible that many of such firms would be able to arrange for the payments to be made in exported end-products so that the manufacturing facilities become self paying in terms of foreign exchange total cost involved. The possibilities of setting up of a petrochemical complex mainly to take advantage of the international market position and based on payment of the facility cost in terms of export of the finished products could, therefore, be attractive. Such a complex after initial export pay-out could make sizeable quantities of these raw-materials available for the internal market. This Task Force recommends that the possibility should be explored as one of the methods of financing the development programme for the 5th and 6th Plans."

2.11. When asked whether the recommendation of the Task Force to the effect, that the possibility of making payment in exported end-product to foreign collaborations as one of the methods of financing the development programmes, was kept in mind while finalising the aforesaid agreements, the IPCL stated in a written note that the report of the Task Force became available in early 1973 sometime after all the IPCL foreign collaboration agreements had been finalised. Foreign exchange payments to foreign engineering firms had been provided in most cases out of Government to Government long term loans or credits.

2.12. The Committee note that IPCL has entered into 23 foreign collaboration agreements in connection with the implementation of its schemes of Aromatics project and Olefins project and Down Stream units. The Committee were informed that every effort was made to secure as much conformity as possible of the foreign collaboration agreements with the guidelines issued from time to time by the Government in this regard but in certain cases there have been deviations from such guidelines. For example, in certain cases, provisions in the agreements relating to payments, sub-licensing of technical know-how, exports, operation of Indian laws vis-a-vis the agreements have not been on the lines prescribed in the Guidelines. These deviations are stated to have been dictated by the circumstances peculiar to each agreement and made with the knowledge of the Govern-

ment and after each case of diviation was examined and approved by the Foreign Investment Board.

The Committee would like Government to undertake a critical rivew of the working of callaboration agreements with a view to finding out that these agreements are in the best interests of the country and also to what extent the deviations approved in the agreements of IPCL could have been avoided, so that lessons may be drown for the future.

2.13. The Committee note that the project management assistance contract with M/s. Lummus & Co. for the Olefins project include a condition for payment to M/s. Lummus & Co. of a fee of ½ per cent of the lowest quotation received from an intended supplier abroad or of the price of the item purchased from a source inside India when they have been authorised to proceed with procurement action for plant and machinery and it is subsequently decided by IPCL to purchase them in India or outside India without the assistance of M/s. Lummus so as to cover the cost of infructuous work undertaken by them in connection with the procurement. The Committee also note that in the case of the agreement for Naphtha Cracker a fee of 1 per cent is similarly payable to M/s. Lummus & Co. and in the case of the Acrylonitrile project a certain amount on the basis of a different formula is payable to Badger B.V., Netherlands in similar circumstances. The Committe feel that these are unusual provisions even though IPCL does not consider them extraordinary or unreasonable. The Committe would like Government to examine the foreign collaboration agreements entered by other public undertakings to ensure how far the inclusion of such terms of payments either directly or indirectly are justified and in the financial interests of the undertakings and lay down suitable guidelines in this regard for the benefit of all concerned.

2.14. The Committee further note that under the terms of agreement for the Naphtha Cracker, M/s. Lummus have preferred a claim of £4190 for work done and considered by them as infructuous in connection with the procurement of hydronyl distillation trays out of which a sum of £527 has been accepted by IPCL and the balance is stated to be under examination. While noting that what was originally intended to be imported through M/s. Lummus was ultimately manufactured indigenously through the efforts of Engineers India Ltd., the Committee feel that he IPCL could have saved the infructuous expenditure on fees payable to M/s. Lummus if indigenous sources of supply had been identified and action had been taken to

consult such indigenous suppliers in advance before asking M/s. Lummus to initiate procurement action.

The Committee recommend that Ministry/Corporation should draw a lesson from this experience and issue suitable guidelines to all Undertakings in this regard.

2.15. The Committee note that according to the findings of the Task Force of Planning Commission, a number of design engineering firms in developed countries are in a position to offer their services for constructing petro-chemical production facilities in developing countries on attractive terms and it is possible that many of such firms would be able to arrange for the payments to be made in exported end-products so that the manufacturing facilities become self paying in terms of foreign exchange cost involved. The Task Force has recommended that this possibility should be explored as one of the methods of financing the development programmes for the Fifth and Sixth Five Year Plans.

2.16. The Committee are informed that all the foreign collaboration agreements signed by IPCL had been finalised well before the report of the Task Force was available. The Committee are of the view that the recommendation made by the Task Force in regard to the method of financing of development programmes should be borne in mind while negotiating all such foreign collaboration agreements in future not only by IPCL but also by other Government and public sector agencies with a view to eliminating or at least reducing foreign exchange remittances abroad. The Committee would like Government to consider issue of suitable instructions in this matter to all Public Sector Undertakings for compliance.

CHAPTER III

AROMATICS PROJECT

A. Project Estimates and Actual Expenditure

3.1. The original estimates of capital expenditure were contained in the Detailed Project Report of the Aromatics Project. They were submitted to the Government of India in 1968. Based on these estimates, Government of India approved on September 5, 1970, an investment of Rs. 22.4 crores, "as modified by the Rupee equivalent of the foreign exchange component set at DM 40.0 million between the period March 29, 1968 and the date of utilisation of this quantum of foreign exchange". The modification indicated above worked out to Rs. 60.21 lakhs on the basis of revaluation of DM in September 1969 which enhanced the rate of exchange by 18 paise per DM. Thus the investment as approved by the Government stood at Rs. 23.0 crores.

3.2. The original estimates of Rs. 23 crores were revised to Rs. 25 crores in September, 1970. The revised estimates were approved by the Board of Directors in exercise of their power under Article 82(2) of the Articles of Association of the Company. A copy of the Revised Cost Estimates was submitted to Government in September, 1970. The estimates of Rs. 25 crores had to be revised further upwards to a total of Rs. 28 crores. The final revised estimates were submitted to the Government on January 3, 1973 and formal approval to these Revised Estimates of Rs. 28 crores was received from Government in September, 1974.

Comparison among the three estimates and reasons for variations

3.3. The following statement shows the comparison among the originally approved estimates as in DPR, the first revision of the estimates and the second revision, and the cumulative actual expenditure.

COMPARISON OF ORIGINAL ESTIMATES, REVISED ESTIMATES AND ACTUALS

Sl. No.	Particulars	DPR(1967) Rs/million	First revision (1970) Rs/million	Second revision (1972-73) Rs/million	Cumulative actual Expdn. Rs/million
I.	*FOREIGN EXCHANGE COMPONENTS*	DM/Million	DM/Million	DM/Million	
1.	Plant & Equipment & Catalyst (C&F), overseas engineering, procurement and inspection	37.00	30·65	33·90	68·63
2.	Supervision & Pre-production expenses (overseas personnel in supervision of Indian Engineering, Erection, startup and training of Indian personnel in West Germany)	2·84	4·14	5·60	12·73
3.	Process Licence Fees	1·82	5·21	5·21	10·90
4.	Contingencies	3·07		0·09	
5.	Pre-production interest	2·89	..	..	..
		47·62*	40·00**	44·80***	
		Rs. 90·00	Mill.81·686	99·009	92·26†
II.	*Rupee cost*—	Rs/Million	Rs/Million	Rs/Million	
1.	Plant & equipment including erection	110·02	127·291	137·468	137·63
2.	Land, Township and other buildings	7·00	11·876	11·876	11·49
3.	Pre-production training, management expenses & contingencies.	13·13	16·177	19·177	20·90
4.	IPCL Share of Infrastructure facilities to be provided by GIDC		4·500	5·00	0·73††
		130·15	159·844	173·521	170·75

* @Rs. 1·89 per DM—This will be Rs. 900·00 lakhs.

** @Rs. 1·89 per DM on DM 6·552 million & Rs. 2·07 per DM on balance—this will be Rs. 816·86 lakhs.

*** @Rs. 1·89 per DM on DM 6·552 million.
@Rs. 2·07 per DM on DM 21·07 million.
@Rs. 2·50 per DM on balance—this will be Rs. 990·09 lakhs.

† Expenditure on standby equipment and spares estimated at Rs. 6·75 mill. Still to be incurred.

†† Expenditure still to be incurred and allocations made estimated at Rs. 45 lakhs.

Sl. No.	Particulars	DRP(1967) Rs/million	First revision (1970) Rs/million	Second revision (1972) Rs/million	Camulative actual Expenditure Rs/million
III					
1	Pre-production interest	3·85	8·470	8·470	8·28
	Grand Total (I+II+ III)	224·00	250·000	281·000	271·29

3.4. The main reasons for the variations between the original estimates, the first revision and the second revision have been stated to be briefly as under:—

1. *Foreign Exchange Component*

(i) *Plant and Equipment*:—Reduction (DM 3.10 million) in foreign exchange due to transfer of substantial quantity of equipment from foreign to indigenous sources offset by additional charge of catalyst and additional quantity of imported equipment and spares (DM 3.25 million).

(ii) *Supervision and pre-production expenses*:—Increase due to delay in the completion of te project and consequent extensions of the stay of expatriate personnel.

(iii) *Process licence fee*:—Increase due to availability of West German credit facilities for completion of the project and decision to make full payment of the licence fee.

(iv) *Contingencies*:—Final Arrival of the total foreign exchange component on the basis of actual contracts entered into.

(v) *Pre production interest*:—Reduction (2.89 DM/Million) due to the decision to utilise suppliers credit for this project.

II. *Rupee Component:*

(i) *Plant and equipment including erection:*—Increase due to transfer of substantial quantity of equipment from foreign to indigenous (DM 6 Million); increase in cost and quantity of equipment (Rs. 19.08 lakhs); additional items of work not originally contemplated (Rs. 73.83 lakhs); and additional customs duty due to increase in the rate (Rs. 6.86 lakhs) from May, 1971.

(ii) *Land township and other Buildings:*—Due to going in for additional units in the permanent township as the expectation of finding suitable accommodation in nearby areas for the essential staff did not materialise.

(iii) *Pre-production training, management expenses and contigencies:*—Due to the expenditure incurred by the ONGC, Petrochemicals Division on Petrochemical Project investigation prior to the formation of IPCL (Rs. 25 lakhs) and due to slippage in the target of completion of the project (Rs. 30 lakhs).

(iv) *IPCL's spare of infra-structure facilities to be provided by G.I.D.C.:*—Due to an agreement with GIDC to share the capital cost of the intfra-structure facilities which include roads, power, water and effluent disposal.

3.5. About the increase of Rs. 75.83 lakhs due to "additional items of work not originally contemplated", it was stated that these works were not foreseen at the time of preparation of the cost estimates but were later on found to be absolutely necessary from the operational point of view. Certain works were common to the Olefins Project also and accordingly 50 per cent of the total cost thereof had been debited to the Aromaties Project.

It would be seen from the above that as against the original estimate of Rs. 23 crores approved by Government, the revised cost estimate was Rs. 28 crores. Nearly Rs. 130 lakhs out of this amount was on account of the revaluation of the Deutsche Mark and increase in the customs duty in May, 1971 and the decision to make full payment of licence fees.

If this amount is taken out, the net increase in the total cost of the Project would be Rs. 3.7 crores or 16 per cent of the original cost approved by Government *viz* Rs. 23 crores.

3.6. The Management stated in a written note that the estimates have not yet been finally closed mainly because some items of insurance spares have yet to be received and some adjustments on stores transfers have still to be carried out in the accounts.

3.7. The accounts relating to the project are likely to be closed during the current financial year. The final capital cost of the project is, however, not likely to exceed Rs. 28 crores.

3.8. As regards excess under various heads the Chairman and Managing Director, IPCL informed the Committee, during evidence, that "the excesses have resulted from a number of causes. Firstly, the amount of detailed engineering originally proposed to be carried in this country was very little. But we decided that we should carry out the detailed engineering in our own country and that cost higher amount. By this, we have saved a considerable amount of foreign exchange. Secondly, the original project reports are based on not very good data. They are based on rough data. In this case, the original proposals were put up in 1968; the final costs were evaluated in 1973. So, there were many changes. We have now done detailed analysis and we revised the original estimate of Rs. 23 crores to 25 crores. We have further revised it by Rs. 3 crores more. This is largely due to change in exchange rates and changes in detailed engineering. It was actually implemented two years later and all the expenses were included. To avoid this, we could have done a turnkey job. So, I think, the mistake is not in execution but the mistakes are in the assumptions on which the original estimates were made."

3.9. In this connection the Ministry stated in a note as follows;

"Although the proposal regarding revision in the project cost was received in January, 1973, certain additional information/clarifications had to be obtained from IPCL and this necessitated making back reference to the Corporation twice. Thereafter the case was processed in consultation with the Ministry of Finance and the approvals of PIB and the Cabinet to the proposal were obtained. All this took considerable time.

(b) The Government have gone into the reasons for the excesses and are satisfied that in the circumstances these were unavoidable.

(c) The increase in the final estimate over the original estimate amount to Rs. 5 crores. On this Rs. 2.26 crores are accounted for by the following:—

	Rs./lakhs
(i) Increase due to variation in rate of exchange from Rs. 2·07 to Rs. 2·50—IDM	53·23
(ii) Increase due to change in rate of customs duty	6·86
(iii) Decision to make full payment of licence fees instead of 1/3rd the balance to be paid after the plant went into operation.	70·17
(iv) Additional charge of Catalyst	47·50
(v) Additional cost of land and housing	48·76
TOTAL	226·52

The balance of Rs. 274 lakhs forms a little over 10 per cent of the original estimate. Considering that the original estimates were based on inadequate data and that a period of five years had elapsed between the framing of the original estimates and the completion of the work, it is felt that the excess is not unreasonable.

3.10. The Committee regret to note that the original estimates of Rs. 23 crores in respect of the Gujarat Aromatics Project of IPCL in 1968 which were approved by Government of India in 1970 had to be revised immediately thereafter to Rs. 25 crores and approved by Government in 1970. These revised estimates were further revised to Rs. 28 crores in January, 1973 and approved by Government in 1974. The Committee also note that the basic reasons for the revision of the project estimates were besides revaluation of D.M. and increase in the customs duty additional items of work not originally contemplated in the estimates additional charge of catalyst and additional items of plant and equipment, buildings etc. and consequential increase in IPCL's share of infra-structure facilities and management expenses etc. The Committee are informed that another basic reason for the revision of estimate was that the original estimate was not based on a very good data. It has been admitted during evidence that "the mistake is not in execution but the mistakes are in assumptions on which the original estimates were made." The Committee are informed that the actual expenditure on the project upto August, 1974 is Rs. 27.1 crores and that the accounts relating to the project are likely to be closed during the year 1974-75. The final capital cost of the project is, however, not likely to exceed Rs. 28 crores. The Commit-

tee are informed that the Government have gone into the reasons for excesses and are satisfied that these were unavoidable. The Committee desire that the Ministry should critically examine the revised estimates with a view to ensuring that economic viability of the project is not adversely affected. The Committee would like to be informed of the results.

3.11. The Committee would like to draw attention of Government to their recommendation in para 118 of their Fifteenth Report (4th Lok Sabha) on Financial Management in Public Undertakings and reiterate that the importance of estimates in the detailed project report being as realistic as possible needs hardly any emphasis as the project report forms the very basis on which Government approved the project and the capital outlay. It is therefore essential that the estimates take into account all foreseeable items of expenditure and are based on correct data so as to obviate the necessity of revision of estimates frequently.

3.12. The Committee regret to note the long period of more than one and half year taken by the Government in giving formal approval to the revised estimates of Rs. 28 crores submitted to them on 3rd January, 1973 and the formal approval of which was received by IPCL in September, 1974. In the opinion of the Committee, it is irregular to delay sanction of revised estimates and allow the Corporation to continue to incur expenditure in excess of sanctioned estimates. The Committee recommend that if estimates should really serve the purpose of controlling costs, there should not be any avoidable delay in sanctioning the estimates.

B. Delay in completion and commissioning of Aromatic Project

3.13. According to the critical path schedule in the detailed project report for the Gujarat Aromatics Project, the median critical time for the completion of the Project was 38 months from February, 1967.

The activity relating to securing final approval to award foreign engineering contracts was envisaged to start in August, 1967 and end by September, 1967. Start-up and testing was to commence in March, 1970 and regular production to commence from April, 1970. As against this the actual date of conclusion of the engineering contract with Krupp was May, 1968. Again, it was only in July, 1968 that a supplementary contract setting out payment terms based on West German capital aid was concluded. For all purposes of comparison of the scheduled and actual dates of completion, the IPCL

therefore, took July, 1968 as the starting point. Engineers India Ltd. started their work as consultants for the Project in August, 1968. Based on the critical path schedule drawn up in the DPR for the project, the initial scheduled date of completion of the Project was April, 1971. Compared to this date of completion the actual dates of completion/trial runs of the various plants are as follows:—

Plant	Actual date of mechanical completion	Actual date of commissioning	Actual date of start-up of trial runs	Actual date of completion of trial runs
1	2	3	4	5
Reformer .		21-6-73	20-11-73	24-11-73
Insomerisation		25-9-73	20-11-73	24-11-73
Orthoxylene	20-6-73	21-6-73	20-11-73	24-11-73
Paraxylene*		12-11-73	18-6-74	22-6-74
DMT	20-3-73	20-3-73	7-6-73	10-6-73

Explanation

Col. 3 The actual dates of commissioning mentioned in this column are those at which the input of feed was introduced in the Plant.

Col. 4 & 5 These dates relate to the start-up of guarantee demonstration tiral runs under the various collaboration agreements under the supervision of representatives of foreign collaborators on the completion of which protocols were signed.

*Excepting cold insulations.

REASONS FOR THE LATE COMMISSIONING OF DIFFERENT PLANTS IN THE GUJARAT AROMATICS PROJECT AND REMEDIAL MEASURES TAKEN

According to Management, the following factors contributed to the delay in commissioning the plant:

(1) In the year 1969-70, there was worldwide shortage of nickle leading to many of the stainless steel manufacturers not giving quotations for the tube sheets, plates, etc. This in turn was reflected by the hesitation by the indigenous fabricators in giving the quotation and indication of a longer delivery period.

(2) There were delays in the supply of indigenous equipment from the different vendors partly due to reasons stated in (1) above and also due to labour unrest in some of the vendors' shops namely BHPV, UTKAL, Anup Engineering, etc., during the period of supply. The following remedial

measures were taken to expedite deliveries of equipment:—

(a) Orders placed on UTKAL were taken out of them and placed on other fabricating firms *i.e.*, L&T, Anup Engineering, etc.

(b) In case of non-critical items, material of construction was changed from the imported SS 316 Ti to indigenously available SS 316. This was done since some of the vendors could not get SS 316 Ti in time for the fabrication.

(c) Forged flanges for some of the equipment were air-freighted by BHPV.

(d) Expeditors were stationed at the different shops to avoid further delay in the fabrication.

(e) Help from Ministry of Steel and Heavy Industries was also sought for improving delivery schedule of equipment ordered on BHPV.

(3) There was strike by the labour of the erection contractors M|s. Simon Carves at site during the month of May and June, 1972. Following remedial measures were taken:—

(a) Government of Gujarat was approached and requested to use their good offices to settle the strike.

(b) Part of the erection job was taken out of this contractor and handed over to another contractor—M|s Alkan Engineering.

(4) Due to Indo-Pak War in December, 1971 tere was slowdown of construction activities at site as well as at various fabricators' shops leading to delay in delivery of equipment.

(5) The last indigenous equipment for DMT Plant was received at site in the month of December, 1972 whereas the last equipment for the Xylenes Plant was received only in the month of February, 1973.

(6) It normally takes about 3-4 months from the date of receipt of last equipment to the start-up of production. Thus DMT Plant started producing from the month of April, 1973 and Xylenes Plant from August, 1973.

(7) Paraxylene Plant, however, could not be started earlier due to the following reasons:—

Part of the cold insulation with indigenously available polyurethane foam had to be done after the completion of piping connected to the last equipment received and the plant was ready for start-up in the month of August, 1973. However, due to repeated failures of imported propane compressor, regular production could not be achieved till the month of March, 1974.

3.14. The Management further stated in a written note that the following general factors have also been relevant in assessing the contributing causes for the delay in the completion of the project:—

(i) *Engineering*:—

The entire detailed engineering for the project has been completed by M|s Engineers India Limited. Work of this complexity and magnitude was being carried out perhaps for the first time in this country by an Indian Engineering organisation. It is possible that the actual time taken for detailed engineering is necessarily longer than would have been required had the work been entrusted to a foreign firm who have already carried out such work for similar projects. The employment of an Indian organisation had firstly resulted in considerable saving in foreign exchange and secondly, has provided a unique opportunity to build up indigenous skills of unusual complexity. The experience and skills have been of great value in subsequent projects.

(ii) *Fabrication of equipments*—

Likewise, many items of equipment which have normally being imported and would have, in the usual course, been imported were procured indigenously for this project. These were being manufactured for the first time in the country and the fabrication time taken by the vendor proved to be longer than was anticipated originally. Here again, special skills in procurement, planning and building of special machinery were all required to execute fabrication of high quality. These skills and managerial expertise in Indian companies have proved to be a great asset in implementation of further projects and in producing a higher order of self-reliance.

(iii) *Import of Raw Material for Equipment—*

The indigenously fabricated equipment required import of raw materials such as stainless steel nozzle pipes and other components of stringent specifications. These were within the scope of supply of the fabricators who had to tie up the imports on the basis of credits made available on their individual applications.

The individual requirements of the vendors were so small that there was inadequate and poor response from foreign vendors for these requisitions.

(iv) *Delay in issue of Import Licence—*

In a number of cases, it was observed that the time taken by some of mapor suppliers for getting an import licence in respect of the various requirements of imported steel varied between 6 and 12 months. This time-lag itself put off the delivery schedule by well over six months in most of the cases.

(v) Even in cases where import licences were available with the vendors, the supply of steel plates had become so difficult in the international market during the last quarter of 1969 that most of the foreign suppliers regretted their inability to book further orders.

3.15 To sum up the following could be considered as the main causes contributing to the delay in the completion of the project:

(1) The longer time required for engineering and placement of orders than originally estimated, which is a consequence of the decision to carry out all detailed engineering in India other than abroad.

(2) Delay in the delivery of equipment by indigenous fabricators consequent to the decision to obtain significantly higher proportion of plant and equipment indigenously than originally contemplated.

Even in respect of the above, only the delay in delivery of equipment by well over a period of 12 to 18 months in most of the cases was the main contributory cause for the delay in the mechanical completion of the project.

3.16. It was also stated that all suppliers who had delayed the delivery of the equipment much beyond even the extended delivery schedules were levied appropriate penalties as per terms of the purchase contracts. The basis of penalty has been stated to be 1|2 per

cent of the value of order for each week of delay subject to a maximum 5 per cent of order value.

3.17. The Committee regret to note that though according to the DPR the time for completion of the project was 38 months from February 67 and that production was to commence from April, 70, the Corporation has taken 57 months for completion of the project with the result that the Corporation suffered a loss in production of about Rupees Nine crores due to the delay in the commissioning of the plant and the consequent loss in production. The Committee note that even initially there had been a delay of 9 months for the conclusion of the engineering contract & the supplementary contract took another two months to be concluded. The Engineers India Ltd. started their work as consultants of their project in Aug. 68. Even according to these revised dates, the scheduled date of completion of the project was April, 71. The Committee however note that as against this revised schedule the actual dates of mechanical completion of the DMT was 20th March, 73 and Xylenes plant was June, 73 and these plants were commissioned between 20th March 73 and 12th November, 73 respectively. The result was that there had been a loss of production to the extent of 37,600 MT of DMT and 29,400 MT of Orthoxylenes.

3.18. The Committee are informed that the main causes which contributed to the delay in the completion of the project were the longer time required for detailed engineering and the consequent placement of orders in India rather than abroad, delay in delivery of equipment by indigenous fabricators consequent to the decision to obtain significantly higher proportion of plant & equipment indigenously and the delay in the delivery of equipment by over a period of 12—18 months by the indigenous suppliers due to shortage of nickel, steel plates, labour unrest power cuts etc. The Committee regret to observe that no effective action was taken except recovery of penalty from the suppliers of indigenous machinery. In the opinion of the Committee it should not have been difficult for the Corporation to have avoided these delays, had the Corporation planned its requirements in advance and taken coordinated and concerted measures for the placement of orders and procurement of machinery. The Committee feel that the Corporation should have also monitored the programme of suppliers and kept a watch on the progress so that timely assistance could have been rendered to remove the constraints and minimise the delays in supplies in the interest of adherence to time schedule.

C. DMT and Xylenes Plant

3.19. The Aromatics Projects comprises of two distinct units—DMT and Xylenes.

The DMT plant was completed according to expectations in March, 1973 and commercial production commenced in April, 1973 with the imported para-xylene. The paraxylene unit was expected to be ready for trial runs in August, 1973. Though the paraxylene plant was mechanically completed in June, 1973 the smooth operation of the plant could not, however, be achieved till practically the end of 1973 owing to the repeated failure of an imported compressor in the propane refrigeration system. The rotor of the compressor had to be airfreighted to the manufacturers in West Germany on three occasions for repair and modification. The bearings of the compressor also had to be changed a number of times. The compressor has been working satisfactorily and continuously since the beginning of March, 1974.

3.20. Repeated breakdown of the paraxylene plant resulted in stoppage of the DMT plant which depended on the former for its feed-stock. The stock of imported paraxylene was exhausted by August, 1973 and due to acute shortage of petrochemical raw materials in the world markets no further import could be effected.

3.21. On being asked as to why the construction and commissioning of these two inter-dependent plants could not be sychronised and whether the construction and commissioning of the paraxylene plant should not have been taken up earlier than DMT so as to provide requisite feed stock *via,* Paraxylene to DMT Plant, the management of ICPL stated in a written note that the xylene plant was originally scheduled to be commissioned earlier than the DMT Plan to provide the requsite feed stock *viz,* paraxylene. However, delay in the receipt of components for fabrication of heat-exchangers, vessels, etc. for the xylenes plant resulted in delay in fabrication and delivery of the equipment. Equipment for DMT Plant were, however, received from the fabricators before December, 1972.

When it was known that in spite of best efforts the schedule of delivery of equipment for xylenes plant could not be improved upon, it was decided to complete the DMT Plant first and operate it with imported paraxylene. It will be appreciated that, on the other hand, earlier completion of the paraxylene plant would not have been of any advantage.

3.22. On being asked about the loss in production, product-wise due to delay in completion and commissioning of different units/ plants, the Management stated as under:—

"Based on the assumptions made in DPR, the various plants in the Aromatics Project should have been commissioned in April, 1971. For reasons already explained the actual commissioning of the DMT Plant took place in April, 1973. Based on the assumed production at 60 per cent capacity for the first year and 80 per cent capacity for the second year as envisaged in the DPR, the production that could have taken place between April 1971 and April 1973 works out to.

Product	*Metric tonnes*
DMT	37,600
Orthoxylene	29,400
Mixed xylenes	3,500

It would perhaps be more correct to say that there was a delay in production of this quantity rather than to consider it as a loss of production."

3.23. In regard to the Foreign Exchange spent on the Import of paraxylene due to delay in commissioning of xylene Plant and the total loss suffered by IPCL due to shut-down of DMT Plant and late commissioning of Xylenes Plant the Committee were informed that an amount of $ 5,63,992.10 (equivalent to Rs. 44,80,797.91) was spent in foreign exchange on the import of paraxylene due to delay in the commissioning of the xylenes plant.

3.24. After commissioning, the DMT Plant remained closed from September to December 1973 for want of paraxylene. The loss suffered during the year 1973-74 due to low production consequent on closure of DMT Plant and late commissioning of the xylenes plant was Rs. 2.62 crores (including depreciation of Rs. 2.5 crores) and after paying interest of Rs. 1.06 crores.

.. **3.25. The Committee note that there are two units in the aromatics Project—one Xylenes Plant using naphtha from Gujarat Refinery and the second DMT plant using paraxylene from the Xylenes Plant. Though the DMT plant was completed in March, 1973, the actual production could be started in April, 1973, only with imported para-xylene as the para-xylene plant which was to provide the feed stock for DMT plant was not ready at that time. The Committee also note that though the para-xylene plant was mechanically completed in June 1973 the smooth operation of the Plant could**

not be achieved till the end of 1973 owing to repeated failure of an imported compressor which had to be repaired and modified ultimately. The compressor is reported to be working satisfactorily and continuously since March, 1974. The Committee have dealt with this aspect in a subsequent Chapter in the Report.

3.26. The Committee regret to note that lack of planning and synchronisation in having the para-xylene plant commissioned later than the DMT plant when the DMT plant was based on para-xylene as its feed stock. The result of this was that the DMT plant had to be run with imported para-xylene and foreign exchange to the extent of Rs. 44 80 lakhs had to be spent. The Committee are also informed that the plant had to be shut down and remain closed from September to December, 1973 for want of para-xylene. The loss during 1973-74 due to low production consequent on the closure of the DMT Plant and the late commissioning of Xylenes Plant was reported to be of the order of Rs. 2.62 crores. The Committee feel that with better planning and monitoring of the programmes at several stages including effective steps for production of indigenous machinery, it should not have been difficult for the Undertaking to have ensured synchronisation between the two plants and effected considerable saving in foreign exchange. The Committee would like the Government to analyse the reasons for this lack of synchronisation between the two plants and draw lessons for the future. The Committee would like to be informed of the result. The Committee recommend that the Management of I.P.C.L. shrould take advantage of modern management techniques like PERT etc. to guard against the usual inadequacies and pitfalls in the matter of ensuring sequence and adherance to delivery schedules. The Committee hope that at least in the future plants of the Corporation, namely Olefins project and the down stream units etc. such a situation will not arise.

D. Failure of the Propane Compressor

3.27. As stated earlier the Paraxylene unit of the Xylenes Plant in the Aromatics Project of IPCL was mechanically completed in August, 1973. The smooth operation of the plant could not, however, be achieved till practically the end of 1973 owing to the repeated failure of our imported compressor in the propane refrigeration system. The rotor of the compressor had to be air freighted to the manufacturers in West Germany on three occasions for repair and modifications. The bearings of the compressor also had to be changed a number of times. The compressor has been reported to be working satisfactorily and continuously since the beginning of March, 1974.

3.28. In this connection the Ministry of Petroleum and Chemicals stated in Lok Sabha on the 23rd July, 1974 it was stated that the Paraxylene unit was commissioned in the first week of September, 1973. However, one of the main compressors in the refrigeration plant of this unit failed immediately after commissioning and the rotor assembly had to be airlifted to West Germany around the middle of September 1973. The unit was re-commissioned during the first week of November, 1973 and after 130 hours of operation, the compressor failed again resulting in the shut down of the paraxylene plant. The unit was re-started after repairs to the compressor, but within a few minutes the compressor failed for the third time towards the end of November, 1973. The rotor and the bearings were airlifted once again to West Germany for repairs. A thorough study of the reasons for the repeated failures had been made by the Corporation's foreign consultants, the compressor manufacturers and a Professor of University of Aachen. The Indian Petrochemicals Corporation Limited|Engineers India Limited engineers were also closely associated. After making certain modifications to the rotor and the bearings, the compressor was re-commissioned in March 1974 and the paraxylene unit has been running satisfactorily since then except for minor shut downs due to power failures etc.

3.29. In reply to a similar question in the Rajya Sabha on the 12th August, 1974 in regard to the failure of the propane compressor, it was stated as follows:—that

> "the Government of India entered into a contract with M|s. Krupps Ltd. of West Germany, and they provided all the basic engineering equipment, and this particular equipment was made by a firm called Linde on their recommendation, M|s. Linde are the fabricators. They gave a guarantee also for 24 months that if it does not work for 24 months then they will rectify if there is any fault or change it altogether, if need be. That was the guarantee. Now, this compressor was first installed in July, 1973, and in September, 1973 it was started, but within minutes of its start, it went off, and then immediately it was sent back to Germany, and it was repaired there and brought back. It was re-started on 9-3-74 and since then it has been working satisfactorily.
>
> The entire expenses on taking the machine from here to West Germany and bringing it back and on maitenance and replacements were borne by Messrs. Krupps and Company, that is, the suppliers of this equipment.

There was the period of guarantee for 24 months after the supply of machinery. The machinery was supplied but in the meanwhile our IPCL Paraxylene and DMT plants could not go into operation because of delays which had nothing to do with supply of equipment but supply of indigenous equipment. Therefore, the 24 months period expired when we started this. We did it after 24 months of guarantee period. Therefore, there was a misapprehension and that the suppliers, M|s. Krupps would not be legally bound to pay this. We sorted out with the company; the German Ambassador was also involved in it and M|s. Krupps have agreed to pay all expenses for the repairs and also for maintenance and replacement.

They had to provide this machinery in a working order. It did not work. Therefore, they took it back, rectified the mistakes, replaced whatever replacement was necessary and brought it back and gave it in a working order. The total price of this equipment, of this particular compressor is 30 lakhs. All the expenses were met by them and they fulfilled their part of the contract. They gave it to us in a working order. And, if there was any delay, that delay was already there. But, they had done the job.

I would like to give an answer to the question as to whose fault was it. We placed the order with one of the best Companies in the world and they selected one of the best fabricators of paraxylene equipment. So, it is not so much anybody's fault; there may be some other factors. All these will be looked into. I do not find that anybody can be held responsible for it. But I would like to give one figure. The loss due to the non-starting of this from that period till now it started would be of the order of Rs. 6 crores in terms of price of DMT.

I have always thought that this is a very serious matter and, therefore, we took steps to change the management of the IPCL. We have appointed a new managing Director and Chairman of the Company on the recommendations, of a Committee headed by Mr. P. Shastri of the Royal Society and a well known eminent scientist. We are trying to tie-up all the loose knots that may have been there. Certainly, we are trying to improve things and we hope that as the things are moving now, it will be pos-

sible for us to produce the targeted quantum of DMT in this country, which is around 24 thousand tonnes a year."

3.30. About the failure of the Propane Compressor the Management stated as under in written note:—

"The exact reasons for the failure of propane compressor in the paraxylene plant have not been identified either by the manufacturer of the compressor (Linde) or by the collaborators (Krupp Chemieanlagenbau). However, the following probable causes for the failure have been indicated in the report on Propane Compressor in Krupp with the assistance of Linde on the propane compressor referred to above:—

1. Dirt and dust in the gas system and lube oil system.
2. Inadequate flow of lube oil to the bearings.
3. Looseness of polygon bush on the shaft.
4. Effect of vibration due to the lifting of pressure relief valve on the lube oil system.

3.31. In regard to the selection of propane compressor of 24000 RPM and the basis for selection of Linde as the supplier of the compressor, the Management in a written note stated, that contractually, M/s. Krupp Chemieanlangenbau were responsible for the selection and procurement of all imported equipment for the project including the propane compressor which forms a part of the refrigeration system in the paraxylene plant.

M|s. Krupp chemieanlagenbau had invited offers for the refregeration system as a whole, of which the propane compressor formed a part. They had offers from two West German firms, namely M|s. Linde and M|s. Borsig. They had selected the Linde turbo compressor for the present application because Linde was a widely known manufacturer of refrigeration plants, high speed turbines and turbo compressors and had sufficient expertise in this field. Linde's reference list showed that their machines had been running successfully in the Krupp-built paraxylene plants in Bulgaria for the same refrigeration duty but using freon as refrigerant.

3.32. Asked about the adequacy of the test run of the compressor before delivery of the equipment by the vendor|collaborator the Management stated that under Article 7 of Contract No. 5 (Delivery Contract) between Krupp Chemieanlagenbau and IPCL, Krupp Chemieanlagenbau were responsible for carrying out inspecttion and testing of the equipment before despatch to the extent considered necessary by Krupp Chemieanlagenbau. Krupp pro-

vided certificates to prove that tests had been successfully carried out on the machine.

3.33. The Committee pointed out that the test run was conducted only for 5 hours and asked if this short run was considered enough for test purposes and whether the testing was done with the requisite load to make sure of its capability. The Management in a written reply stated that the normal practice of test run of compressor is on API standard which provided for test-run for four hours. It was not possible to test-run the compressor on load since the simulation of operating conditions could not normally be created by the manufacturers in their shops.

3.34. In regard to the reasons for testing compressor with a different type of lubricating oil than what was to be used in India the Management added:—

> "Testing of such compressors is usually done with air as a medium being empressed. In actual operation, however, the compressor will be performing duty of compressing propane gas which is a solvent. The normal lubricating oil which is used while taking the trial on air cannot be used while compressing the propane. Hence a different type of lubricating oil was used while testing the compressor."

3.35. Asked as to why IPCL did not exercise the option to visit Lined's works and to inspect the compressor, the Committee were informed that under the contract with Krupp, primary responsibility for inspection, testing, etc, of inmported equipment rested with Krupp. Article 7.3 of the Delivery Contract (Contract No. 5) gives right to IPCL's representative to be present during the testing. Article 7.4 of the same Contract, however, reads as follows:

> "The attendance of the AGENT during inspection or tecting will not relieve KRUPP of its responsibility regarding the quality, workmanship and mechanical guarantee of EQUIPMENT as provided for in this CONTRACT. Should any disagreement arises between Krupp and the Agent in respect of any item of Equipment, Krupp shall take into due consideration the objections of the AGENT. However, Krupp shall be entitled to despatch such items of equipment on its own responsibility."

In this connection, the representative of the Ministry stated during evidence "I do not really excuse this aspect of it that inspection should have been done .....The testing was on the workshop bench and not part of the whole system." IPCL did not elect to participate in the inspection as it was probably felt that it would not serve any special purpose.

3.36. The Committee pointed out that it was known in June, 1971 that Krupps equipments guarantees would expire before start up in July, 1972. and enquired whether action was taken to extend the guarantee period suitably the Management informed the Committee in a written note that the contract with Krupp provided that all the equipments shall be guaranteed for first class quality and workmanship and that if the guarantees could not be proved due to defective design, material of construction or defective workmanship, Krupp shall carry out the repairs or replacements of the defective items as Krupp deemed fit within a resonable time at its own cost—(Article 9 of Delivery Contract No. 5). The guarantees were to expire 24 months after expiry of the delivery period, originally stipulated as between 18 and 23 months from the date of effect of the contract (defined as 26th July 1968 in Supplementary Contract I.) In short, the mechanical guarantees would have exired in May 1970.

In Supplementary Contract III, the delivery period for equipment was defined as between May, 1, 1970 and October, 1970. This automatically extended the guarantee period to September, 1972. During a visit by the then Finance Director to West Germany, extension of mechanical guarantees was sought from Krupp. According to a note recorded by the then Finance Director "Krupp stated that they would certainly extend the period of mechanical guarantee within reasonable limits, say by three months after start up of plants if the reasons of delay for commissioning is due to fault of Krupp".

3.37. In response to IPCL efforts to reduce the understanding to writing Krupp, in their letter dated December 14, 1972 *inter alia* stated as follows:—

> "In order to come to meet you we are, however, prepared to concede that the mechanical guarantee period for the items of EQUIPMENT which have been supplied beyond October, 31, 1970, is to be recknoned from the date of actual shipment of the respective EQUIPMENT.
>
> Furthermore you may rest assured that in case any item is found defective and if such defect is due to defective design, material of construction or defective workmanship we are quite prepared to enter into a discussion with you

about the actual event and to try to come to a satisfactory settlement with the manufacturer of the part concerned, It is, however, to be understood that a general extension of the mechanical guarantees cannot be taken into consideration."

3.38. The Committee pointed out that although equipment guarantee had expired, Krupps had still to fulfil total systems performance guarantee. In this regard the Management stated that the compressor was repaired and has been working satisfactorily since March, 1974. Subsequently, Krupp had fulfilled the total systems performance guarantee for the paraxylene plant in terms of quality/quantity of output, consumption of raw materials, utilities, etc.

All costs on the repairs of the Comprossor had been borne by Krupp.

3.39. Asked to comment on the view that the propane compressor of 24,000 RPM chosen for IPCL was not of proven design the representatives of the undertaking, stated during evidence as follows:—

".....It is correct to say that there was no comprossor which was exactly identical to this compressor in all respects and was being used for the same purpose. It is now clear that they did not have an identical compressor for an identical purpose."

3.40. On being asked if there was not a basic difference between a prototype and an equipment that had gone down the production and that had been tested for a pretty long time, the representative of the undertaking stated:—

"Each compressor is of such a large size that it is unique or it is specifically made for that purpose. There will always be variations in design. And now, we have found that Linde has supplied 25 compressors before it but they are not comparably equivalent. Previously they were supplying 12000 RPM and 18000 RPM but ours was 24000 RPM.

3.41. The Committee pointed out that they (suppliers) were supplying 12,000 RPM and 18000 RPM compressor but the one supplied to IPCL was 24,000 RPM. The Chairman and Managing Director, IPCL informed the Committee as follows in this regard:—

'They had not supplied it to anybody before. I agree that there was not a single identical compressor. There was a compressor which was made of this speed, as you mentioned, for this purpose and what they did in this case was that they aimed apparently to reduce the size. It is compact compressor. Generally, the compressors are of five stages but this compressor was of three stages."

3.42 On being asked as to how much the IPCL has lost because of the failure of the compressor, the Committee were informed during evidence that the loss was Rs. six crores of production.

3.43. Asked as to whether the government have investigated the causes for the repeated failure of propane compressors, the representative of the Ministry stated during evidence that no investigation was made by the government as such into the causes for the repeated failure of the propane compressors. The IPCL had obtained a report from Krupps and they were going into this in detail. The representative of the Ministry have added "this is considered a preliminary finding and I do not know if we will ever get to the bottom of the whole thing in a very high frequency process like this. Its experience alone will show that we have got to the right cause."

3.44. The Committee regret to note that though paraxylene unit of Aromatics Project was mechanically completed in August 1973, the smooth operation of the plant could not be achieved till the end of 73 owing to the repeated failure of the imported compressor in the propane refirigeration system. The Committee were informed that this equipment was supplied by M/s. Linde fabricators who were selected by M/s Krupps accordng to the terms of the collaboration agreement. The Committee however find that the propane compressor was not of proven design and as admitted by the management "there was no compressor which was exactly identical to this compressor in all respects and was being used for the same purpose." While the compressors supplied by M/s Linde earlier were of 12000 RPM and 18000 RPM, the one supplied to IPCL was of 24000 RPM. The Committee were also informed that Linde was selected by the collaborators on the basis that its machines had been running successfully in the Krupps built-paraxylene plants in Bulgaria for the same refrigeration but using Freon as refrigerant. The Committee are surprised that such a compressor had been accepted for conditions which are entirely different from those countries.

The Committee also note that though Krupps were responsible for carrying out inspection and testing of the equipment before despatch and they provided certficates that test had been successfully carried out on the machines, the IPCL did not exercise the option of deputing a representative to Linde's works and to inspect the compressor inspite of the fact that the contract No. 5 gave the right to IPCL representative to be present during the testing. It has been admitted by the Secretary of the Ministry during evidence that "I do not really excuse this aspect of it. Inspection should have been done ..the testing was in the workshop at the shop bench and not

as part of the whole system." The Committee are convinced that if IPCL had exercised its right of inspection at Linde's works, the adequacy of test of the compressor could have been proved and scope for the failure which was attributed to the system could have been avoided. The Committee regret to observe that in spite of the repeated failure of the compressor, no investigation was made either by Undertaking or by the Government to identify the exact causes of the repeated failure except getting a report from the collaborators. According to the Management, the exact reasons for the failure have not been identified by the manufacturers of the compressor or by the collaborators although the probable causes have been indicated in the collaborators report as (a) dirt and dust in the gas system and lube oil system, (b) inadequate flow of lube oil to the bearings, (c) looseness of the polygon bush on the shaft and (d) effect of vibration due to the lifting of pressure relief valve on the lube oil system.

3.45. According to the Ministry, "This is considered a preliminary finding. I do not know if we will ever get to the bottom of whole this in a very high frequency compressor like this." The Committee also find that when this question was raised in the Parliament on 12th August, 1974, it was stated by the Minister of Petroleum and Chemicals "I have always thought this is a very serious matter".

The Committee are informed that because of the repeated failure of the compressor and delay in the commissioning of the plant, the Corporation suffered a loss of production of Rs. 6 crores The Committee are also informed that the compressor was recommissioned in March 1974 and the unit has been running satisfactorily since then. The Committee are not happy at the huge loss suffered by the IPCL on account of the delay in commissioning due to the repeated failure of the compressor. The Committee desire that the entire matter should be thoroughly investigated by an independent Committee of experts to be appointed immediately in order to identify the shortcomings at several stages including the points raised in Parliament on this issue from time to time and fix responsibility for the lapses. The Committee would like to be informed of the action taken within six months of this Report. The Committee also recommend that the Corporation should derive lessons from the experience of the working of this contract for future.

E. Stand by Compressor

3.46. Although the Propane compressor in the Paraxylene Plant has been working without mishap since the beginning of March, 1974, the Management decided to instal a standby compressor as an addi-

tional measure of insurance for sustained production. Since the delivery and installation of the standby compressor would take over a year (From June, 1974), arrangements have been made with the manufacturers of the existing compressor to provide all necessary spares so that repairs can be carried out speedily in the event of any further failure. In order that the DMT plant is kept running in spite of any possible future failure of the paraxylene plant, an order for 2000 tonnes of paraxylene has been placed and the consignment is likely to arrive in August, 1974.

3.47. In a written note the Management informed the Committee that

> "The new compressor is ordered with M/s. Mid Continent Supply Co., Forthwith, USA and is manufactured by York P.a. and is expected to be delivered by 3rd quarter of 1975. Since this compressor is to be hooked into the existing system, the parameters for inlet, side streams and outlet for gas are similar to the existing compressor. But the spare compressor is a 5-stage slower speed machine of 13420 r.p.m. compared to the existing high-speed 3-stage compressor of 23300 r.p.m.

3.48. In regard to the basis of Selection the Corporation stated that it had invited quotations from 23 firms in U.S.A., France, West Germany, U.K., Switzerland, Japan, and Italy. Simultaneously, M/s. Krupp, the foreign collaborators for Aromatics Project, had also issued enquiries to nine firms in West Germany, Italy, France, U.K. Japan and U.S.A. As against these enquiries IPCL had received offers from 7 firms and Krupp from 3 firms. These offers were discussed in great detail by IPCL/EIL team with Krupp at their office in West Germany. The offer of M/s. Mid Continents for York Compressor was found to be the lowest with the shortest delivery period. From the list of references given by the firm, it was noted that this make (York) machines were working for similar duties in large petrochemical plants in U.S.A. Krupp also mentioned that they had used two York compressors for their paraxylene plant in Poland and were satisfied with their performance.

3.49. IPCL had also asked for a confidential report on the performance of similar model compressors from 7 other U.S. firms where similar model compressors were installed. Replies have been received from six firms.

A total of 17 compressors similar to the one in view by IPCL were in operation with these six firms for the last few years and indicated satisfactory performance.

Considering the above mentioned factors—lowest capital investment, shortest delivery, proven performance, etc.—it was decided to go in for York Compressor Model 526 AB with gear and motor from M/s. Mid Continent Supply Company, U.S.A. It was stated that the cost of procurement and installation of the standby compressor for the Paraxylene plant: was estimated to be Rs. 56.17 lakhs.

3.50. The Management also stated that though it was not normal to have standbys for such equipment, in this instance, because of difficulties encountered during the commissioning of the compressor it had been considered prudent to instal a standby compressor of a different design.

3.51. In this connection, the Secretary of the Ministry stated during evidence—

> "the mal-functioning of the first compressor was noticed in September, 1973. In October, 1973 the Board of Directors decided to investigate the possibility of procuring a spare compressor. Action was initiated and queries floated with a number of firms in Europe, USA and France. Some offers were sought and simultaneously IPCL took up the matter with DGTD for getting clearance. BHEL were contacted but they said they could not do a thing of this kind. Procurement action was initiated and very soon it was introduced.
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> * * *
>
> It is not usual to have spare compressors for such plants elsewhere but when we have in this country only one unit manufacturing DMT with a large number of industries depending on it. I think, it was a wise decision on the part of the Board to go in for a spare compressor."

3.52. The Committee are informed that though it is not normal to have standby compressors for Paraxylene plants because of the difficulties encountered during the commissioning of the original compressor, in this instance, it has been considered prudent to instal a standby compressor of a different design. The Committee note that the Corporation had decided to purchase a standby compressor of a five-stage slower speed machine of 13420 RPM compared to the existing high speed three stage compressor of 23300 RPM from M/s. Mid Continent of USA and its installation would involve an expenditure of Rs. 56.17 lakhs. The new compressor is expected to be delivered by 3rd quarter of 1975.

The Committee are also informed that the selection of the vendor was made on the basis of the lowest capital investment, shortest delivery, proven performance etc. The Committee would only caution that IPCL should on the basis of the past experience with the present compressor take all precautionary measures to ensure that the shortcomings in the existing compressor are not repeated in the new compressor. The Committee would also like that IPCL should in particular ensure about the performance of the stand-by compressor in the whole system as the specific action of the proposed stand-by compressor is different from the existing 24,000 RPM one. The Committee would also like to be assured that the stand-by compressor would suit the Indian conditions and adequately serve the purpose and that no further expenditure would be incurred on such costly stand-bys.

F. Performance Appraisal

Licensed Capacity

3.53. The DMT, Orthoxylene and Mixed Xylenes Plants of the Aromatics Project are at present in operation and their licensed capacities are as follows:—

D.M.T. Plant		
DMT (Dimethyl Terephythtsae)	24,000	MTA
Xyenes Plant		
Para xylene (for captive c convertion into DMT)	17,000	MTA
Orthoxylene	21,000	MTA
Mixed xylenes .	2,500	MTA
Dimethyl Isohthalate	80-160	MTA
Methyl Benzoate	200-240	MTA

3.54. According to the DPR the rated capacity is to be reached in the 3rd year of operation of the project.

3.55. In accordance with the mid-term appraisal of the Fourth Five Year Plan, the targetted production in 1973-74 was 18,000 MTA of DMT.

It was expected that the plants in the Aromatics project would achieve 100 per cent capacity utilisation during the Fifth Five Year Plan period.

The Management in a written note stated that during test runs of the DMT and Xylenes plants, it had been demonstrated section-wise

that the rated capacity could be achieved under normal operational conditions. A systematic study was being conducted to determine the reliability and capacity of individual items of equipment to sustain continuous operation at full through put throughout the year and to identify and clear bottlenecks. During April/ may, 1974 the average monthly production as a percentage of rated capacity was approximately 56 per cent orthoxylene, 48 per cent paraxylene 42 per cent DMT. Production during the period was interrupted by power shortages. There was also a break down of a compressor due to an accident. During June, 1974 the Xylene Plant was worked at 60 per cent of capacity and the DMT Plant at 95 per cent of capacity. Nevertheless, as several operational problems remained to be resolved, it was considered prudent to set a production target of 50 per cent of installed capacity for the year 1974-75.

3.56. On being asked about the problems faced by IPCL in achieving their rated capacities and the remedial measures taken to resolve them the Management stated in a written note that

"(i) Quality of naphtha being fed to the xylenes plant needs improvement for achieving rated production.

ACTION TAKEN: Efforts are being made to improve the quality of naphtha available from the Gujarat Refinery. Discussions have been held with the representatives of the Gujarat Refinery who propose to carry out modifications of their system. A short term improvement can be expected in the next two months while a long term solution is possible only after about a year.

(ii) Inadequate quantity of process air to achieve rated capacity in Oxidation section of DMT Plant:

ACTION TAKEN: The pressure drop across the system has been reduced by removing the oil filters. On a long term basis, an additional air compressor has been ordered with the indigenous supplier and this is expected to be installed by June, 1975.

(iii) Frequent power dips and occcasional failure of power supply leading to shut down of the plant.

ACTION TAKEN: The stoppage of plant due to power dips will be reduced with the installation of an inventor and a DC battery. These have already been ordered and are expected to be delivered in about six months period.

(iv) Frequent failures of boilers.

ACTION TAKEN: The suppliers of the boilers (BHEL) are identifying the problems one by one and are taking remedial measures by way of new economiser tubes, changing the design of the super-heaters, etc. The job is already on hand and is likely to be completed in another 2/3 months.

(v) Failure of the critical re-circulating gas compressor and the refrigerating propane compressor in the past.

ACTION TAKEN: Purchase orders have already been placed for the procurement of standby compressors for both the recirculating gas compressor and the refrigerator propane compressor. If all the other current problems—naphtha quality, steam generation and power shortages—are resolved it should be possible to attain near full production in third year of operation of the plants."

3.57. The utilisation of capacity of different units/plants in the Aromatics Project during 1973-74 and 1974-75 (April—August 1974) is as follows:—

	Installed capacity	April 1973	March 1974	April August 1974 1974-1075	
	MTA	Production MTA	% of capacity	Production MTA	% of capacity
Orthoxylene	21,000	7927	65 (1)	5061	58 (2)
Mixed xylenes .	2,500	1929	116	548	52·6
DMT	24,000	5169	21·5 (3)	5851	58·5(4)

(%Utilisation has been taken on a pro-rata basis)

Reasons for under-utilisation:

(1) *Orthoxylene in* 1973-74

(a) Production started only in September, 1973.

(b) Initial teething problems in naphtha drying system, recirculating compressor, etc.

(2) *Orthoxylene in* 1974-75

(a) Failure of Isomerisation compressor due to an accident in April, 1974 for about a month.

(b) Gradual deactivation of the catalyst.

(c) Interruptions in the availability of utilities such as electricity and steam.

(3) *DMT in* 1973-74

Production started in April 1973 with imported paraxylene. The limited import lasted only till the beginning of August, 1973. The plant was restarted in January 1974 when IPCL paraxylene became available. One of the compressors in the paraxylene unit of the Aromatics Plant was not satisfactorily performing and adequate quantities of paraxylene for running the DMNT unit at a higher level of production were not available.

(4) *DMT in* 1974-75

DMT production was conditioned by the availability of paraxylene. There were interruptions in the availability of utilities such as steam and electricity. The paraxylene plant had also to be stopped periodically for (a) routine inspection of the propane compressor which had been failing repeatedly and (b) replacement of the bearings of the motor of the compressor in April/May 1974.

3.58. During evidence the Chairman and Managing Director, IPCL informed the Committee that the plant is expected to reach 75 per cent capacity next year (1975) and 90 per cent capacity in the year after i.e. 1976.

PRODUCTION PERFORMANCE

3.59. Repeated breakdown of the paraxylene plant resulted in stoppage of the DMT plant which depended on the former for its feedstock. The stock of imported paraxylene was exhausted by August, 1973 and due to acute shortage of petrochemical raw material in the world markets no further import could be effected. Consequently during the year 1973-74, only 5169 tonnes of DMT could be produced (of which 3863 tonnes were produced out of imported feedstock) as against installed capacity of 24,000 tonnes per annum, the target envisaged in the Detailed Project Report during the first year of operation of 14,400 tonnes and that fixed in the mid-term appraisal of 18,000 tonnes.

3.60. The sustained production of paraxylene became possible from March 1974. The production targets for the main products of the Aromatics Projects for the financial year 1974-75, the pro rata tar-

gets for the first six months (April-September, 1974) and the actual production during this period are as under:—

Product	Target for 1974-75	Pro rata target for six months	All figures in metric Tonnes: Actual production during April-Septemer, 1974	
DMT . .	15,000	7,500	7,726	51 5%
Orthoxylene . .	10,500	5,250	5,416	51%
Mixed xylenes	1,250	625	654	52%

Monthly targets began to be set for internal purposes from June, 1974.

3.61. Asked about the difference between the monthly targets fixed for internal purposes and the pro-rata targets, the Management in a written reply stated:

> "The annual target takes into consideration the expected constraints, normal shut-down, possible breakdowns, etc. The monthly target is set at the maximum possible production during the month taking into consideration known constraints. The monthly target is, therefore, often necessarily higher than the pro-rata target.
>
> Failure in achieving monthly internal target has been due to various reasons like power cuts, dips, failure of steam failure of machines in single stream, etc."

3.62. The Committee note that as against the installed capacity of 24,000 and 21,000 MT of DMT and Oxylene, actual production of DMT and Oxylene was 5169 MT and 7927 MT in 1973-74 and 5851 MT and 5061 MT in April—August 1974, thus indicating that the capacity utilisation has been only of the order of 21.5 per cent. and 65 per cent in 1973-74 and 58.5 per cent and 58 per cent in April—August, 1974, respectively. Though according to DPR, the Project is expected to reach the full rated capacity in 3rd year of operation, the Committee are informed that the Project is expected to reach 75 per cent capacity in 1975 and 90 per cent in the year 1976 which is the 3rd year of operation. The factors responsible for low capacity utilisation were stated to be, supply of inferior quality of naphtha, inadequate quantity of process air,

frequent power dips and failure of power supply, frequent failure of boilers, and failure of critical recirculating gas compressor and refrigeration propane compressor in the past. It has been stated that necessary steps to overcome these problems had been initiated and these are expected to bear fruit by the middle of 1975.

3.63. The Committee however, fail to understand as to why the correct specification about the quality of Naphtha could not have been given to the Gujarat Refinery even at the initial stages and firm commitment therefor entered into with the Refinery and avoid the complaint of inferior quality of Naphtha at this stage. The Committee are informed that the Gujarat Refinery have agreed to certain modifications but a long term solution is possible only after a year, though some improvement can be expected in next two months. The Committee would like to be informed of the development in this regard.

3.64. The Committee also find that amongst the reasons for low utilisation of capacity, were the frequent failures of boilers and recirculating gas compressor. The Committee are informed that the suppliers of the boilers are identifying the problems and taking remedial measures and the job is expected to be completed shortly and action has been also taken for procurement of a stand-by compressor. The Committee are not sure whether these boilers and compressors were pre-tested before taking delivery and whether any action has been taken to allocate the responsibility of the suppliers in the matter for such defective supplies. The Committee recommend that these matters should be investigated in detail so as to demarcate the responsibility of the Management and the suppliers in regard to each one of the reasons so that suitable remedial action may be taken.

3.65. The Committee note that as against the production targets of 15,000 MT of DMT and 10500 MT of Orthoxylene for 1974-75 the actual production during the first months (April to September) of 1974-75 was 7,726 MT of DMT and 5,416 MT of Orthoxylene. The Committee are informed that 'if all the other current problems—Naphtha quality, steam generators and power shortages are resolved it should be possible to attain near full production in the 3rd year of operation of the plants'. The Committee would therefore, like that the Management should take effective steps and Government should render necessary timely assistance so that the problems can be resolved and constraints removed without any delay to enable achievement of the full rated capacity according to schedule fixed in the DPR.

IV

PROJECTS UNDER IMPLEMENTATION

4.1. Besides the Aromtics Project which is in operation, ICPL is at present engaged in implementing the following projects;

I. *Olefins Project*

(i) Naphtha Cracker Unit
(ii) Pyrolysis Gasoline Nydrogenation unit.
(iii) Benzene Extraction Unit.
(iv) Butadiene Extraction Unit.

II. *Down-stream Units of the Olefins Project*

(i) Low Density Polyethylene
(ii) Polypropyelene
(iii) Ethylene Glycol
(iv) Polybutradiene Rubber
(v) Acrylonitrine
(vi) Acrylie Fibre

III. *Detergent Alkylate*

IV. **Polyester Filament Yarn Project*

The utilities and offsite facilities for the downstream units have been integrated and are being set up as a project.

A. Olefins Project and its Downstream Units

4.2. The Olefins Project consists of a naphtha cracker (with an estimated annual throughput of 450,000 tonnes of nephtha) and associated units for the extraction of benzene and butadine and

*Govt. have set up a separate Cooperative Society for the purpose of running the Polyster Filament Yarn Project. The Cooperative Society was registered under the name of "Petrofils Cooperative Limited" on the 10th September, 1974.

hydrogenation of pyrolysis gasoline. All these units will result in the ultimate annual production capacity of

	tonnes
Ethylene	130,000
Propylene (Polymer grade)	38,000
Propylene (Chemical grade)	33,240
Butadiene	18,100
Benzene	24,000
Light pyrolysis gasoline	29,300
Heavy pyrolysis gasoline	34,600
Reffinate	8,200
Carbon Black Feed-stock	17,900

The Foreign collaborators for these units are

Naphtha Cracker	M/s. Lummus Co. Ltd. (UK)
Benzene and Butadiene Extraction Units	M/s. Universal Oil Products (USA) and M/s. Procofrance (France)
Pyrolysis Gasoline Hydrogenation Unit	Institute Francais du Petrol (France) in association with the Indian Institute of Petroleum (Dehra Dun).

4.3. Detailed engineering for the Project by Engineers India Limited is almost complete and about 75 per cent of the equipment for all the units of the project has been ordered. Civil and structural works have also been completed to the extent of about 75 per cent Equipment has begun to arrive at site and erection will commence shortly.

Downstream Units

4.4. The gaseous streams available from the naphtha cracker will be further processed in the following units which are collectively called down-stream units of the Olefins Project:

1. *Low Density Polyethylene*

This Project envisages the establishment of a plant for the manufacture of 80,000 tonnes per annum of Low Density Polyethylene. The foreign collaborators for this Project are: M|s. Acquitaine Total Organico (ATO) and M|s. Compagnic Francaise d' Etudes et de Construction Technip (TECHNIP) (France). ATO have supplied the Process Book. TECHNIP, the foreign engineering contractors for the Project, have completed the basic engineering as well as that part of the detailed engineering which covers the high pressure

portion of the plant. Detailed engineering of the remaining portion is proceeding in Engineers India Limited.

2. *Polypropylene*:

This Project envisages the establishment of a plant for the manufacture of 30,000 tonnes per annum of Polypropylene resins. The foreign collaborators for this Project are: M|s. Montedison (Tecnimont), Italy. The process design and basic engineering for the Project have been completed and the process and engineering documents have been received. Detailed engineering is proceeding in Engineers India Limited.

3. *Ethylene Glycol|Ethylene Oxide*:

This Project envisages the establishment of a plant for the manufacture of 20,000 tonnes per annum of Ethylene Glycol, 2,400 tonnes per annum of Polyethylene Glycol and 5,000 tonnes per annum of purified ethylene oxide. The foreign collaborators for this Project are: M|s. Halcon International Inc. USA. The process design and basic engineering for the Project have been completed and detailed engineering is in progress in Engineers India Limited.

4. *Polybutadiene Rubber*:

This Project envisages the establishment of a plant for the manufacture of 20,000 tonnes per annum of high-cis polybutadiene rubber. The foreign collaborators for this Project are: M|s. Polysar International, Switzerland and M|s. Polymer Corporation, Canada. The process package for the Project was received from the foreign collaborators in October, 1973. Detailed engineering commenced in Engineers India Limited in November, 1973.

5. *Acrylonitrile*:

This Project envisages the establishment of a plant for the manufacture of 24,000 tonnes per annum of acrylonitrile. The foreign collaborators for this Project are: M|s. Prospect International CA, Venzuela and M|s Badger BV, Netherlands. The process design package was received in September, 1973 from the foreign engineering contractors—M|s. Badger BV. Detailed Engineering and procurement action are progressing in Engineers India Limited.

6. *Acrylic Fibre*:

This Project envisages the establishment of a plant for the manufacture of 12,000 tonnes per annum of acrylic fibre. The foreign collaborators for this Project are: M|s. Asahi Chemical Industry Co. Limited., M|s. Kobe Steel Ltd., and M|s. C. Itoh (all of Japan).

Basic process data and basic design package were received according to schedule in March, 1974. Detailed Engineering will be done by Engineers India Limited.

Detergent Alkylate:

4.5. This Project envisages the establishment of a plant for the manufacture of 30,000 tonnes per annum of Detergent Alkylate. The foreign collaborators for this Project are: M|s. Universal Oil Products Company, USA. The process design documents for the project have been received from the collaborators. Detailed engineering and procurement action for both indigenous and imported equipment are progressing in Engineers India Limited.

Project istimates:

4.6. A statement showing Project cost estimates original and revised and the actuals, in respect of the Olefins Project and its Downstream Units in terms of foreign exchange and rupee cost thereof, is given below:—

INDIAN PETROCHEMICALS CORPORATION LIMITED

(A Government of India Undertaking)

(All figures in Rs. Lakhs)

Project	Original Cost			Revised Cost			Budgeted	Actuals upto 73-74			Budgeted (Revised)		
	Rupee cost	Foreign exchange	Total	Rupee	Foreign exchange	Total	Revised estimates up to 73-74	Rupee cost	Foreign exchange	Total	Rupee	Foreign exchange	(1974-75)
Gujarat Olefings	2216	764	2980	4402	1404	5806	1614	1011	255	1266	838	403	1241
Acrylonitrile	752	570	1322	1531	655	2186	297	43	76	119	167	4	171
Polybutadine Rubber	760	392	1152	1611	629	2240	150	30	67	97	176	57	233
Law Density Polyethylene	1645	1363	3008	2564	1608	4172	572	58	429	487	432	251	683
Polypropylene	1162	552	1714	1715	1097	2812	85	41	21	62	339	35	374
Detergent Alkylate	892	303	1195	2150	541	2691	123	68	27	95	347	26	373
Ethylene Glycol	576	236	812	1074	426	1500	89	30	27	57	152	51	203
Acrylic Fibre	1211	933	2144	2104	1489	3593	313	39	139	169	102	80	182
Integrated Utilities & Off-set Facilities	1358	66	1423	7611	582	8193	303	504	24	528	1120	143	1263
TOTAL	10572	5178	15750	24762	8431	33193	3546	1815	1065	2880	3673	1050	4723

4.7. The Management stated in a written note that the detailed Project Reports in respect of Gujarat Olefins Project, Acrylonitrile Project and Synthetic Rubber Project had been prepared initially and investment approval/expenditure sanction obtained. In the case of other projects, Feasibility Reports had been prepared. Detailed Project Reports are under preparation. Revised cost estimates in respect of all projects have been prepared and submitted to the Government.

4.8. On the Committee's pointing out that the revised project cost of Olefins Project and its Downstream Units is Rs. 33193 lakhs as against the original cost of Rs. 15750 lakhs i.e. the revised cost is more than the double of the original cost, the Management stated in a written note that "the variations between the estimates contained in the Detailed Project Reports|Feasibility Reports and the revised costs estimates are attributable to the following:—

Variations in exchange rate
Increases in customs duty
Price escalations
Increases in pre-production interest
Increases in management expenses
Additional items of equipment
Additional provision for contingencies
Quantitative changes.

4.9. A detailed analysis of the total difference of Rs. 17443 lakhs between the original and the revised estimates is presented in the following statement:—

Sr. No.	Name of Project	Variation in Exchange rate	Variation due to Customs duty	Price escalation	Addl. pre-production int.	Addl. Management Exp.	Addl. items	Addl. contingencies	Balance (under estimations quantitative changes)	
							(Rs. in lakhs)			TOTAL.
1.	Naphtha Cracker	211·0	396·0	582·0	90·00	225·0		326·0	996·0	2826·4
2.	Acrylonitrile	163·9	41·3	341·5	48·00	55·0	..	57·0	212·7	919·4
3.	Polybutadiene Rubber	50·0	116·1	307·0	115·8	33·0		63·9	543·1	1228·9
4.	Low Density Polyethylene	224·0	237·0	688·0	123·5	34·0		80·4	56·0	1442·9
5.	Polypropylene	27·0	119·3	241·1	289·0	33·0	..	136·2	284·4	1130·0
6.	Detergent Alkylate	2·4	164·8	729·4	..	17·9	..	142·7	457·3	1514·85
7.	Ethylene Glycol	8·7	108·9	284·0	47·0	27·0		66·8	125·6	668·0
8.	Acrylic Fibre	140·9	288·9	210·0	150·0	63·3	..	500·6	158·3	1512·0
9.	Integrated Offsites	144·0	160·0	726·0	.	..	4290·0	..	882·0	6202·0
	TOTAL	971·9	1632·3	4109·0	863·3	488·2	4290·0	1373·6	3715·6	17443·7

4.10. About the reasons for the delay in the approval of the revised cost estimates the representative of the Ministry informed the Committee during evidence that the revised estimates in respect of the Olefins Project were originally received in December, 1973 and certain additional information and clarifications have since been obtained. The revised estimates in respect of the down-stream units were received in October, 1974 and these are under consideration. Government will be examining them and will have to put them up before the Investment Board and, thereafter, before the Cabinet.

4.11. In regard to the effect on overall profitability of these projects on account of the revision, the Management apprised the Committee in a written note that the overall profitability of the entire Complex had been reworked together with the revised cost estimates as under:—

Assumption	
1. *Raw Material (Rs./MT)*	
Ethylene	3640
Propylene (Polymer Grade)	3640
Propylene (Chemical Grade)	3270
Benzene	2500
Butadiene	2500
2. % *Capacity built-up*	
first year of start up	50
2nd year of start-up	80
3rd year onwards	100
3. Capital Cost (Rs./crores)	332
4. Turnove at full capacity (Rs./crores)	319
5. *Profitabilty Summary*	
(a) Pay back period (years)	4·75
(b) Internal rate of return (?	11·5
(c) Profit after tax before interest to capital employed (%)	15·5
(d) Benefit : Cost ratio (at 10 %)	1·08 1

4.12. During evidence, the Secretary, Ministry of Petroleum and Chemicals stated:—

> "the average profitability of the Olefins complex has been recalculated together with the cost estimates and it now

comes to a return of 15.5 per cent after tax but before interest. This, I must submit, is still a very flexible figure because it will depend very much on what naphtha is going to cost and what kind of difficulties they may have to face—whether the world supply situation will alter so dramatically as to alter even that."

4.13. On being asked if the Corporation expeited to complete the works within the sanctioned estimates the Committee were informed in a written note as follows:—

"As has been mentioned earlier the present estimates of capital expenditure on each of the projects under implementation are in excess of the original sanctioned estimates. These revised cost estimates have been drawn-up only in September, 1974. However, due to abnormal inflationary conditions prevailing in India and in many countries abroad such as Western Europe, North America and Japan from where foreign equipment is being obtained, some escalation cannot be ruled out altogether, even when the project implementation and completion schedules are maintained according to expectations. If project schedules are not maintained due to unforeseen delays in delivery of indigenous or imported equipment or difficulties in supplies of construction materials such as cement, steel, argon gas, etc. or in provision of utilities such as power and water, some increase in costs will take place."

4.14. On being asked during the evidence whether the Government have ensured that there will not be any further revision of estimates of these projects the representative of the Ministry stated that if the inflationary situation in India and the world over continued, they could not say the price would not escalate but what the IPCL had indicated around Rs. 300 crores—was at present a realistic estimate.

Scheduled Dates of Completion of Projects

4.15 The detailed Project Report|Feasibility Report for each project envisaged a certain number of months from the date of

effect of the foreign engineering contract for the completion of the project. These are as follows:—

Project	No. of months envisaged in the DPR/FR for project completion from the date of effect of the foreign engineering contract	Date of effect of the engineering contract	Expected month and year of completion in accordance with columns (2) (3) and, (4)	Revised schedule of mechanical completion
Gujarat Olefins Project	33*			
Naptha Cracker		31-7-70	April, 73	May, 76
Benzene Extraction Unit		8-5-72	Feb, 75	Aug., 76
Butadiene Extraction Unit		20-12-72	Sept. 75	Aug., 76
Pyrolysis Gasoline Hydrogenation Unit		..		Aug., 76
Low Density Polythylene	30—33	1-5-73	Nov. 75/ Feb. 76	May, 76
Ethylene Glycol	26	8-12-72	Feb. 75	Aug., 76
Polypropylene	30—33	5-4-73	Oct. 75/ Jan. 76	June, 76
Acrylonitrile	32	19-3-74	Dec. 75	July, 77
Acrylic Fibre	30—33	31-10-73	April/ July, 76	Feb., 77
Polybutadiene Rubber	30	16-3-73	Sept. 75	Sept., 76
Detergent Alkylate	30—33	23-9-72	March/ June, 75	Sept., 76
Integrated Utilities and Offsite facilities.		The utilities and other offsite facilities such as workshop, warehouse storage facilities etc. for the Olefins Project Downstream projects are being integrated to effect economies in scale and completion will be sychconised with the completion of the projects.		

*From the date of establishing basis of design.

4.16. The original schedule was based on certain assessment of availability of foreign exchange for the effectuation of prime engineering contracts. The tying up of foreign exchange for these projects within the projected time scheduled has not been possible. The completion schedule of these units has had to be correspondingly

shifted back. Further, the world-wide economic disturbance occasioned by the oil crisis and the power and other shortages within the country have resulted in extended delivery schedule for equipment ordered for various projects. A detailed review of the schedules of completion of the projects was, therefore, undertaken and target dates for mechanical completion had been revised as shown in Column 5 of statement above.

4.17. These revised schedules are subject to several constraints in particular; availability of steel and cement and the ability of indigenous fabricators to meet their delivery commitments.

4.18. The work on all these projects has been stated to be preceding according to the revised schedule.

4.19. On being asked if the equipment, material and technical know-how is being supplied by the Collaborators, as per the terms of the agreements the Management stated in a written note that the Technical know-how had been supplied by the foreign collaborators in respect of various projects largely in line with the terms of the contract.

4.20. It was expected that material and equipment to be supplied by the foreign collaborators would also be available according to the terms of the agreements.

4.21. About the constraints/difficulties coming in the way of adhering to scheduled dates and the effect of delays in execution of projects on the costs and economics of the plants and on the overall profitability of the Corporation the Management stated in a written note as follows:—

> "The main difficulty in adhering to scheduled dates encountered so far is the time required for the supply of indigenous equipment—particularly equipment which has to be fabricated. This is mainly due to inadequate previous experience of vendors together with the impact of various other difficulties such as power cuts, shortages of trained personnel, difficulties in obtaining timely delivery of sub-contracted components such as forgings etc.
>
> Delay in completion of projects adds to capital costs because of (a) additional pre-production interest and expenses and (b) escalation of prices because of the inflationary situation. The latter may to a great extent be neutralised by the higher prices which the products will command but the former will add to costs.

It is difficult at this stage to work out the precise effect on profitability of the delays which have occurred. However, while preparing the revised project cost estimates in September, 1974, profitability calculations were also attempted and it was estimated that at the present level of prices of raw materials and products, an average profit after tax of over 15 per cent could be expected."

4.22. The following steps were stated to have been taken by IPCL to avoid delay from the indigenous supplies/fabricators:

"(i) Unlike the practice followed in the case of the Aromatics Projects, supply of materials like steel plates, pipes for nozzels has in most cases been undertaken by IPCL.

(ii) In all our agreements with the Process Licensors/Foreign Engineering Companies for the Downstream Units, first material take-off is given with 15 to 20 per cent variations in quantity of raw materials like steel and pipes within 4 to 6 weeks from the effective date of the contracts. Based on this information importation formalities are carried out and imports arranged so that this material could be available around the time the orders for fabricated equipments are placed.

(iii) Inspectors from Engineers India Limited are posted in most of the fabricators' shops for the purpose of reviewing and expediting progress.

(iv) Periodical review meetings are being held with the major fabricators to assess the progress and remove bottlenecks.

(v) Chasers are being provided with wagons carrying such materials to cut down transit time."

4.23. The Management stated that as on 30th November, 1974 45 per cent of the indigenous equipment and 65 per cent of the imported equipment had been ordered.

The foreign exchange for all these projects (Olefins Project and Downstream units) had been tied up. The revised schedules of completion of the various projects which were worked out in May, 1974 are being further reviewed in the light of the latest information on deliveries of equipment and progress of other work.

4.24. The Committee note that the original cost estimates of Rs. 157.50 crores in respect of the Olefins Projects and the downstream units were revised, upwards to Rs. 331.93 crores in Septem-

ber, 1974. The variations between the original estimates and the revised estimates have been attributed to variations in exchange rates (9.71 crores) increases in customs duty (16.32 crores), price escalation (41.09 crores), increase in pre-production interest (8.63 crores), increase in management expenses (4.88 crores), additional items of equipment (42.90 crores), additional provision for contingencies (37.13 crores) and quantitative changes. It has been stated that the Revised estimates of the Olefins Project were received by Government in December, 1973 and in respect of other down stream units in October, 1974. These estimates are still under consideration. The Committee are not happy over the delay of 1 year in the sanction of the revised estimates by Government. According to the management of IPCL, due to abnormal inflationary conditions prevailing in India and in many countries abroad from where foreign equipment is being obtained, some further escalation cannot be ruled out altogether if the schedules are not maintained due to delays in delivery of indigenous or imported equipment or difficulties in supply of construction material such as cement, steel, argon gas etc. or in provision of utilities such as power and water. The Committee feel that while some of these factors necessitating escalation in cost estimates may not be entirely under the control of IPCL or Government, factors like timely supplies of materials, supply of power, water etc. are not entirely outside the control of the undertaking or the Government. They would, therefore, like the IPCL and the Government to go into the factors which have resulted or are likely to result in further revision of cost estimates and take effective measures to control at least those factors which can be controlled by the undertaking itself or through the intervention of the Government of India. The Committee also recommend that Government should critically examine each one of the reasons for the revision of the estimates of the Olefins Project and the down stream units to see how far such excesses which are over 100 per cent are jutified. The Committee are informed that while according to the revised estimates the profit before tax was of the order of 15.5 per cent, in the Revised Estimates, it is stated to be 15 per cent. The Committee need hardly stress that revision of cost estimates effects the profitability of the project ultimately and the cost of production. The Committee, therefore, recommend that Corporation/Government should take timely concerted measures to keep the costs well within the estimates sanctioned by the Government.

4.25. The Committee further note that there has already been slippage in the schedule of mechanical completion of the projects

under Gujarat Olefins Project and its down-stream units the delays ranging from 12 to 36 months. In the case of Naptha Cracker Project the delay in execution is expected to be of more than 3 years. The Committee are informed that the original schedule was based on certain assessment of availability of foreign exchange and the tying up of foreign exchange for the projects within the time schedules has not been possible. There were also various other difficulties such as delay in the supply of indigenous equipment because of inadequate previous experience of vendors and various other difficulties such as power cuts, shortages of trained personnel, difficulties in obtaining timely delivery of sub-contracted components such as forgings etc. The Committee are also informed that certain steps have been taken by IPCL like assured supply of steel plates, pipes and other raw materials to fabricators, posting of inspectors from Engineers India Limited in the fabricated shops to expedite progress, periodical review of progress at meetings with the major fabricators etc. etc. The Committee feel that in this case also some of the difficulties which have contributed to delays could have been solved by an imaginative approach by IPCL itself if necessary with the assistance of Government by taking advance action to tie up with foreign exchange, placement of orders in time for indigenous equipment, procurement of scarce raw materials etc. The Committee are informed that as on 30th November, 1974, 45 per cent of indigenous equipment and 65 per cent of imported equipment had been ordered and foreign exchange for the project had been tied up and the revised estimates are being worked out. The Committee need hardly stress that such delays not only put up the cost and affect the profitability of the project but also contribute to delays in other developmental activities. The Committee recommend that Corporation should work out a realistic cost estimate and revised profitability of the Project and other down stream units after taking into account all the factors and bring it to the notice of Parliament without any delay.

4.26. The Committee also recommend that IPCL/Government should take up concerted and concrete measures, in the light of experience gained by them in setting up of the Gujarat Aromatics Project, to see that there is no slippage in the programme of execution of the project and to ensure that sufficient safeguards exist for inspection and testing of equipments and for guaranteed performance.

B. Polyester Filament Yarn Project

4.27. The Project envisages the setting up of a Polyester Filament Yarn Plant with an initial capacity of 3,500 tonnes/annum expendable to 7,000 tonnes|annum. The technology for the Project has been selected and approval of Government reieived for the teihnical iollaboration agreements.

4.28. On the basis of capital cost estimates forwarded to Government in September, 1971 and investment approval to the project was given by Government in March, 1972 for the setting up of the plant for the manufacture of 10 tonnes per day of yarn (with an in-built provision for expansion to double the capacity) at an estimated cost of Rs. 15.39 crores including foreign exchange out go of Rs. 7.88 crores. In August, 1973 the estimates of capital cost were reviewed and revised to Rs 24.76 crores including a foreign exchange component of Rs. 6.44 crores. Approval of the Government of India for the revised cost estimates is awaited.

4.29. Soon after the receipt of Government sanction to the project estimates, detailed technical and commercial proposals were invited from various companies and after a critical evaluation both from technical and commercial points of view supplemented by detailed discussions with prospective collaborators as well as visits to the plants abroad and after testing and critical analysis of the yarn of the collaborators etc. the final selection of technical collaporation was made.

4.30. Based on the final selection of technology, the estimates were revised to Rs. 24.76 crores including a foreign exchange component of Rs. 6.44 crores. In view of the revision in the capital cost, profitability exercises have also been redone. The gross return to average capital employed is stated to be 31 per cent and profit before tax to average capital employed is 21.5 per cent based on a selling price of Rs. 15 per kilogram for polyester chips and Rs. 39 per kg. for yarn. The actual selling price in the country for polyester yarn is stated to be Rs. 58 per kg. The collaborators for this Project are Karl Fis-cher (West Germany), J.K. Synthetics (India) and Industrias Petroquimicas Mexicanas (IMSA). These organisations will jointly provide basic engineering, supply of equipment, training facilities and other services for the project. Government clearance for imported equipment for the Project has been obtained. Procurement of indigenous equipment for off site facilities is in progress.

4.31. The responsibilities of collaborators namely Karl Fischer, JK and IMSA are stated to be briefly as follows:—

Licence and Technical assistance agreement IPCL|JK|KF:

Karl Fischer shall provide the necessary technical know-how, basic engineering and technical services for the manufacture of Polyester chips from DMT.

Karl Fischer jointly with J.K. Synthetics shall provide technical know-how and basic engineering for the manufactrue of polyester filament yarn from Polyester chips. Karl Fischer and JK shall provide procurement services for all imported equipment.

Supply of Indian Equipment Agreement IPCL—JK

JK Synthetics shall supply all onsite (battery limit) plant and equipment (excluding those for the yarn unit).

Back up Assistance Agreement—IPCL|IMSA:

IMSA shall give necessary practical training to IPCL (or Petrofils) personnel at its plant in Mexico and also technical services, such as exchang of information on technical improvements in the plant and start up assistance.

4.32. The Committee asked if any detailed study had been made in regard to the foreign exchange elements in the collaboration agreement and how the foreign exchange components in this agreement compared with the foreign exchange component in respect of similar polyester fibre projects in private sector. The Management stated in a written note as follows:——

"The feasibility report which envisaged a total capital investment of Rs. 15.4 crores provided for a foreign exchange component of Rs. 7.38 crores. While the total capital cost of the project has undergone an upward revision to Rs. 24.76 crores, the foreign exchange component has undergone a downward revision to Rs. 6.44 crores, in spit of pronounced increase in the costs of equipment and materials, throughouht the world lately. This has been possible after an evaluation of firm offers from overseas process licensors and engineering companies.

The breakup of the foreign exchange component of the capital cost estimates for the project is as follows:—

	Rs. lacs
1. Know-how fee	22·23
2. Basic Engineering fee	26·73
3. Expatriate Assistance (Estimated)	27·30
4. Pre start-up expenses (Estimated)	3·00
5. Equipment cost (CIF)	564.85
TOTAL	644·16

It is not possible to compare this foreign exchange requirement with other polyester fibre projects in the country. The reason for this is that all the other plants in India are for manufacturing *polyester staple fibre* and not *Polyester filament yarn.* The capital costs and foreign exchange requirements of the two types of plants are not comparable because the types of spinning and drawing machinery that is used for making staple fibre and filament yarn are quite different. The machinery for filament yarn is much more expensive than that for staple fibre"

4.33. On being asked if there was any delay in the delivery of imported|indigenous equipment|components the Management stated that none of the equipment ordered so far had become due for delivery yet. At this stage, no delay was anticipate. It was, however, ensure that equipments of proven make were ordered.

4.34. As regards the market survey done in respect of Polyester Filament Yarn Project and the end uses of Polyester Filament, the Management stated that an estimate of demand for Polyester filament yarn was made in the year 1971. The demand potential was then estimated to be about 10,000 tonnes of polyester filament yarn for the year 1973-74.

4.35. The various and uses to which polyester filtment yarn will be put, are stated to be as follows:—

(i) Weaving	Shirting, suiting, dress material, sarees, lungis, home furnishings, apparels, swimsuit, 'T' shirts, blouses, etc.
(ii) Warp kniting	Shirting, sarees, lce, dress, material, Dupattas, Hakoba knitted fabrics, night wears, skirts, beouses, ski-wear, women's and girls' stretch pants, etc.

(iii) Hosiery	Socks, slacks, dress materials, sweaters jerseys, etc.
(iv) Industrial	Cordage, fishing nets, marine [conveyers, laundry bags, industrial-felts, sewing thread, quality sails.
(v) Other	Tufted rugs and carpets.

4.36. In regard to the selection of Karl Fisher foreign collaborator for the Polyester Filament Yarn Project and the participation of JK in the collaboration, the Secretary, Ministry of Petroleum and Chemicals during his evidence informed the Committee as follows:—

"This polyester filament yarn project has two main sections: the first is the poly-condensation section where the DMT and the ethylene glycol are converted into chips and the second is the spinning and draw twisting section where the chips are melted. The IPCL were handling this work till the cooperative was formed, although there was a project manager appointed. The project invited quotations from various parties; and found that there were two competent ones. One was Zimmer; and the other was Karl Fisher, with JKs of India.

The whole thing was analysed. These are the final evaluation figures on a strictly comparable basis. Know-how; Zimmer-Rs. 48.91 lakhs; Karl Fisher—J.K.—Rs. 4173 lakhs; Equipment foreign exchange Zimmer—Rs 532.27 lakhs; Karl Fisher—J.K.—Rs. 392.15 lakhs; Indian part of the equipment; Zimmer—Rs. 604.77 lakhs; Karl Fisher—J.K.—Rs. 675.47 lakhs;. Total equipment Zimmer—Rs. 1137.04 lakhs; Karl Fisher—J.K. Rs. 1067.62 lakhs. The grant total of the costs of the two projects was a Rs. 1,246.84 lakhs for Zimmer and Rs. 1,146.63 lakhs for Karl Fisher—JK which was, therefore, about a crore, slightly over a crore, cheaper. Foreign exchange again in the case of Zimmer was Rs. 642.07 lakhs and in the case of Karl Fisher—J.K. Rs. 528.16 lakhs. Therefore, there was a foreign exchange saving of Rs. 113.91 lakhs.

In this case J.K. will cooperate with Karl Fisher in the supply of know-how and basic engineering for the spinning and draw twisting plant. J.K. has been in this field for almost eleven years for its own manufacture and therefore should be considered to have a fair amount of experience. The plant performance guarantee is given jointly by Karl Fisher and J.K. for the spinning and draw twisting plant.

The advantages of obtaining J.I.'s participation are that a part of the know-how and basic engineering fees for the spinning and draw twisting plant will be paid in rupees and J.K.'s technical experts and facilities for training of personnel can be used. Most of the equipment so far ordered has a guarantee period of twelve months from the date of start up of the plant or eighteen months from the date of delivery, whichever is earlier. The validity of the guarantees themselves extends beyond the scheduled date for the commissioning of the plant, which is November, 1976 as of today.

The projects set up by Calico, Indian Organic Chemicals and Swadeshi are not for the manufacture of polyester filament yarn, but for polyester fibre where the type of plant is quite different from that of polyester filament yarn which is more expensive.

The present texturising capacity is for the order of 6,000 tonnes per annum. It will have to be increased for polyester and nylon filament yarn, which is expected to be produced in the order of Rs. 25 to 30 thousand tonnes. The texturising will be 12 to 15 thousand tonnes. Therefore, it will have to be increased. The Ministry is looking into this matter and appropriate action will be taken to create additional capacity, but I might point out here that this aspect again has to be done by the Commerce Ministry and not by the Ministry of Petroleum."

4.37. The Committee pointed out during the evidence of the representatives of the Ministry that the main reason for going into an agreement or collaboration with JK and its counterpart was the saving of foreign exchange. If that hope was belied then what would happen because if the fabricating unit of JK at Ghaziabad was delayed, then the hope of saving the foreign exchange would not be there and then it would be a proposition which might not be to the advantage of the country. They also asked whether Government had satisfied themselves that JKs had adequate indigenous technology.

4.38. The representative of the Ministry stated as follows:—

"It is true that lower cost, lower foreign exchange, use of indigenous equipment were the main considerations subject to a very clear stipulation that the Board of Directors of the IPCL recommend it. The Board is squarely responsible for making the recommendation. If somebody records a note of dissent, then Government will have to make a special judgment, Then the matter goes to the DGTD who are

the overall technical advisers; from the financial aspect, it goes to the Ministry of Finance. So, within Government, the overall things are considered and in the Board, the details are considered. These are certain things by which we are guided. One of the main things is that the guarantee must not come from JK alone. If the guarantee had been only from JK then the whole thing would have been changed and here the guarantee was jointly by JK and Karl Fisher.

In this particular case of Polyester Filament Yarn Project, the indigenous technology is limited to fabrication of some equipment and doing of certain design work on the basis of basic design provided by Karl Fisher. It is not JK technology that is being used. JK have associated themselves for the manufacture of equipment and for doing some detailed design work, and the guarantees are coming from Karl Fisher & J.K.

* * * * *

That is why I have been trying to emphasise that it is not J.K. technology that has been accepted but it is Karl Fisher technology that has been accepted. What J.K.'s are contributing is rather limited.

* * * * *

I can say that we have not reached the stage where JK can give us indigenous technology for the Polyester Filament plant. May be the stage will be reached after another two years or so."

4.39. Government decided in July, 1974 to set up a separate co-operative society with direct equity participation between the Government of India and the Cooperative sector on a 60:40 basis for the purpose of running the polyester filament yarn project.

4.40. The Management in this regard stated in a written note that the cooperative society was registered under the name of "Petrofils Cooperative Ltd." on 10th September, 1974. Its constituents and functions are detailed in its bye-laws.

4.41. The Management has further stated that no corporate relationship between IPCL and this Cooperative Society is at present contemplated.

4.42. As regards the setting up of a cooperative for purpose of running this project, the representative of the Ministry of Petroleum and Chemicals stated during evidence:—

> "That this was considered as a good cooperative sector venture because of the fairly large number of power looms and handlooms which were using polyester filament yarn, and it was therefore, floated as a cooperative venture. But, again, it is a fairly complex plant and it is expensive—around Rs. 25 crores—and therefore Government agreed that for a considerable period of time it would retain a substantial equity interest. There is a provision for gradual retrenchment of the Government interest by the cooperatives themselves.

4.43. The Committee pointed out that when the finances were coming from the Government and since it is a complicated plant, why was it not taken up as a part of the IPCL itself and desired to know the advantages in having a cooperative and whether there was any special feature which compelled the Government to go in for a cooperative. The representative of the Ministry stated that, in this particular case, Government did not act under a compulsion. But there were cooperative handlooms and power looms which were using this particular end product.

This was a decision which created interest in the cooperative movement—in the cooperatives owning their own raw material plant. That was all; there was nothing special in it.

4.44. The Committee note that Polyester Filament Yarn Project has been finalised at an estimated cost of Rs. 24.67 crores including a foreign exchange component of Rs. 6.44 crores in technical collaboration with Karl Fisher (West Germany), J.K. Synthetics (India) and Industries Petroquimicas Mexicanas (IMSA), Mexico. Karl, Fisher has to provide the necessary technical knowhow, basic engineering and technical services for the manufacture of polyester chips from DMT and Karl Fisher jointly with JK Synthetics shall provide technical know-how and basic engineering for the manufacture of polyester filament yarn from polyester chips. JK synthetics are also to supply all onsite (battery limit) plant equipment. It has been stated that the selection of Karl Fisher with JKs of India was made after inviting quotations from various parties and a critical evaluation of the offers from both technical and commercial points of view, and testing and critical analysis of the yarn of the collaborators.

According to Government, the country had not yet reached the stage where JK alone could give indigenous technology for the polyester filament yarn project. The advantages of obtaining JK's participation in the agreement are that a part of the know-how and the basic engineering fees for the spinning and draw twisting plant will be paid in rupees and JK's technical experts and facilities for training of personnel can be used. The plant performance guarantee is jointly by Karl Fisher and JK for the spinning and draw twisting plant. The Committee find that the selection of Karl Fisher and J.K. technology has been made mainly on account of the advantage in foreign exchange and J.K's. technical experts and facilities for training could be used. The Committee would like Corporation/Government to ensure that the technology selected is proven and upto date, operating costs are economical, and the quality of products is the best.

The Committee recommend that the Corporation should take advantage of the collaboration in developing their own planning and designing with a view to attaining self reliance in this field.

4.45. The Committee are informed that none of the equipments ordered for the project has yet become due for delivery and, therefore, the question of delay cannot be assessed. The Committee would stress that a continuous watch should be kept on the progress being made by the fabricators of equipment so that necessary steps could be taken well in time to obviate any possibility of delays. They would also like that Corporation should draw lessons from their experience with the Gujarat Aromatics Project and ensure timely supply of equipment of good quality and the commissioning of the project on schedule after proper inspection and guaranteed performance.

4.46. The Committee further note that the Government have set up a cooperative society under the name of 'Petrofils Cooperative Limited' in September, 1974 for the running of the Polyester Filament Yarn Project with a direct equity participation between the Government of India and the Cooperative sector on a 60:40 basis. The Committee are informed that this decision to set up a cooperative was taken to create interest in the cooperatives owning their own raw material plant and no corporate relationship between IPCL and this cooperative society is however contemplated at present. It has also been stated that since the plant, is fairly complex and expensive. Government have decided to retain a substantial equity interest for a considerable period of time though there is a provision for gradual retrenchment of the Government interest by the cooperatives themselves. The Committee, however, see no special advantage in not

taking this plant as part of IPCL because of the complexity of the plant and funds for running the cooperative had come from Government. Now that a cooperative has been set up the Committee would like Government to take all possible steps to make the cooperative a success by ensuring that the plant which is both expensive as well as complicated gets the services of competent technical personnel for maintenance and is operated profitably under the supervision of enlightened and efficient management. They feel that it would be advisable to create a corporate relationship between IPCL and the Petrofils Cooperative Limited because of their dependence on each other for the sale and purchase of DMT. Such a relationship will also enable the cooperative to have the benefit of Research and Development wing of the IPCL and make for its more efficient and economical operation.

V

MARKETING

A. Demand and Availability

Demand

5.1. As detailed earlier in this respect, petro-chemicals are of great importance in the economic development of our country.

5.2. The trend in consumption of various Petrochemicals in India during the past few years has been recently examined by a special Task Force appointed by the Planning Commission. As per the analysis of the Task Force the consumption of total petrochemicals has grown rapidly during the last five years. The growth rate of plastics has been 21.5 per cent, synthetic rubber 14.35 per cent, organic Chemicals 12.3 per cent and synthetic detergents 35.5 per cent. The demands for petrochemicals products are expected to grow even more rapidly during the next few years then in the past.

5.3. The demand projection made by the Task Force for the years 1978-79 and 1983-84 is given below:—

	Demand estimates by petrochemical task force ('000 tonns)			
	1978-79		1983-84	
	Level I	Level II	Level I	Level II
1	2	3	4	5
LDRE	110	140	220	320
POLYPROPYLENE	30	28	60	80
PBR	20	20	40	40
DMT	72	72	115/125	115/125
ACRYLONITRILE	24	28	50	50
DETERGENT ALKYLATE	30	83	60	146
POLYOLS (A)	20	20	40	40
Ethylene Glycol	32	45	60	90
ETHYLENE	259	351	535	758
PROPYLENE	142	185	283-293	335

1	2	3	4	5
BUTADIENE	48	72	109	109
BENZENE	199	239	337-376	403-414
ORTHOXYLENE	27	44	66	77
HIPE	30	45	60	100
PVC	90	150	220	290
ACRYLIC FIBRE		15000*		

*Task Force on Synthetic Fibres.

(A) Polyols demand estimate has a direct relation with deman d of Propylene Oxide in the ratio of 0·9 MT of Proylene Oxide to 1·0 MT of Polyols.

Level-I · · · · · Low level demand (Product availability restricted).

Level-II · · High level demand (Product availability unrestricted).

5.4. An independent assessment of the demand for petrochemicals has also been made by the National Committee on Science and Technology in their report on Science and Technology Plan for Chemical Industry—Vol. I, 'A General Overview'. The demand forecast of NCST for various petrochemicals is as under:—

(In '000 Tonnes)

	1973-74	1978-79
LDPE	58	150
POLYPROPLENE	7	15
PBR	10	40
DETERGENT ALKYLATE	12	25
DMT	26	97
ETHYLENE GLYCOL	12	32
ACRYLONITRILE	18	28
HIPE	30	45
PVC	80	175
ACRYLIC FIBRE	10	18
BUTADIENE	40	60

5.5. In respect of the Demand Projections for the Products which are at present being manufactured by the IPCL at the Aromatics Project, the Management stated in a written note as follow:—

	1974-75		1975-76		1976-77		1977-78	
	Demand Project	Avail-ability	Demand	Avail-ability (75% uti-lisation)	Demand	Avail-ability (90% uti-lisation)	Demand	Avail-ability (90% uti-lisation)
1	2	3	4	5	6	7	8	9
Orthoxylene	8,775	10,500	10,800	15,750	16,200	18,900	19,440	18,900
Mixed Xylenes .	2,500	1,250	2,500	1,875	2,500	2,250	2,500	2,250
DMT	18,000	15,000	21,000	18,000	24,000	21,600	24,000	21,600

Orthoxylene:—In the case of Orthoxylene IPCL in currently in a surplus situation. It, therefore, exported one consignment last year. The demand figures refer to use of Orthoxylene as raw materials for manufacture of Chemicals like Pathelic Anhydride. Downstream units which would use Orthoxylene as raw materials have been licenced by the Government. Two units have reached the stage of construction and IPCL experts them to start consuming Orthoxylene from 1976-77. The surplus availability is expected to go down in the next two years and by 1977-78 the Corporation will be in a deficit position.

There are also possibilities of using Orthoxylene in non-Chemical production areas. Management is, therefore, trying to develop these applications so that the current surplus could be utilised in the intervening period. Prior to availability of Orthoxylene from our Aromatics Plant country's entire demand was met out of imports. After IPCL Xylene Unit went on stream imports have been completely stopped.

Mixed Xylenes—These fined use as solvent and carrier medium in paint industry and pesticides formulation.

Prior to IPCL plant going on stream the entire demand of Mixed Xylenes was met out of imports. With the commissioning of its mixed xylenes unit the imports have become negligible and are expected to completely stop.

D.M.T.—Almost entire requirements of DMT are currently being met out of IPCL. Production and imports have more or less stopped. After regeneration of the catalysts in the xylene plant, IPCL hopes to progressively increase production of DMT. It has tlso planned for some imports of para xylene to keep up the production of DMT.

5.6. On being asked the extent to which the demand for Petrochemical products will be met by the IPCL upto the end of the Fifth plan, the Management stated in a written note that on the basis of the estimates of demand made by the Planning Commission, Task Force on Petrochemicals and based on IPCL's own estimates of availability of products from its units, projections of supply|demand balance by 1978-79 are reproduced below. It will be noticed therefrom that even when IPCL Plants operate at near full capacity levels deficits are estimated in all the product lines.

SUPPLY AND DEMAND BALANCE 1978-79

(All figures in tonnes)

Product	Demand (Estimates of the Planning Commission task force for the fifth Plan)	Best Estimates of availability from units other than IPCL	(Deficit)	Estimated availability from IP CL (90% capacity operation	(Deficit)
Orthoxylene .	44,000		(44,000)	18,900	(25,100)
DMT .	72,000	..	(72,000)	21,600	(50,400)
LDPE .	140,000	30,000	(110,000)	72,000	(38,000)
Poly-pro-plene .	36,000	..	(36,000)	27,000	(9,000)
Polybutadiene Rubber	20,000	..	(20,000)	18,000	(2,000)
Acrylonitrile .	28,000	..	(28,000)	21,600	(6,400)
Detergent Alkylate	83,000	..	(83,000)	27,000	(56,000)
Ethylene Gylcol .	45,000	8,750	(36,250)	12,375	(23,875)
Butadiene . .	72,000	29,200	(42,800)	16,290	(26,510)
Benzene . .	239,000	90,000	(149,000)	21,483	(127,517)
Acrylic Fibre . .	15,000	3,600	(11,400)	10,800	600

5.7. The Committee note that the demand projections of the various petro-chemicals made by the task force of the Planning Commission are different from those made by the National Committee on Science and Technology. They further note that the demand projections in respect of Orthoxylene, Mixed Xylenes and DMT—the three products at present being manufactured by the IPCL at its Aromatics Project—indicate that the production of Mixed Xylenes and DMT at the IPCL will always be less than the demand according to the supply and demand balance—1978-79 and as such there will be no difficulty for the IPCL to sell its products. The demand for Orthoxylene, however, has been less than its production at IPCL even in the first year of the operation of the plant and the IPCL is left with unsold orthoxylene even after exporting one consignment last year. The Committee however find that the demand for orthoxylene referred to its use as raw material for manufacture of chemicals. Down stream units which could use orthoxylene as raw material have reached the stage of construction and are expected to consume orthoxylene from 1976-77. The Committee are informed that the surplus availability is ex-

pected to continue in the next two years and by 1977-78 IPCL may be in a position to sell off its entire production of Orthxylene. The Committee would like the IPCL to examine as to why demand for Orthoxylene has not come upto the level of its production and to ensure that the projects which are to use Orthoxylene as raw material do come up and are commissioned in time so that the Orthoxylene Plant is not kept partially idle for want of demand. The Committee also recommend that Government/Corporation should intensify their development efforts in consultation with the Small Scale Industries and Small Industries Institute, so that the surplus Orthoxylene may be advantageously utilised. Government should also consider the possibilities of exporting this product with a view to disposing of the surplus stock.

5.8. The Committee note that the demand projections made by Task Force of the Planning Commission in respect of the products of the Gujarat Olefins Project and its downstream units also indicate that there will be no difficulty for the IPCL to market these products as the demand is likely to be always ahead of availability. They, however, note that there are sharp variations in the demand projections of the Task Force, and the National Committee on Science and Technology in respect of Polypropylene and Detergent Alkylate. According to the Task Force, the demand for Polypropylene in 1978-79 is likely to be of 36000 tonnes whereas the NCST estimates it to be of the order of 15000 tonnes. In the case of Detergent Alkylate also, the Task Force's estimate of demand is 83000 tonnes and the NCST's estimate is 25000 by 1978-79. If the Task Force's estimates are taken into account, the IPCL will have no difficulty in disposing of its entire production of Polypropylene (27000 tonnes) and Detergent Alkylate (27000 tonnes); but if the NCST's estimates are taken into account, IPCL will find itself in difficulty in finding market for its full production and may have to work its plants at low level thus suffering loss in the bargain. The Committee recommend that Government should go into the reasons for the difference between the demands assessed by the Task Force of Planning Commission and by the National Committee on Science and Technology and stress that a realistic demand for the products should be available before setting up the appropriate capacity and planning the production programme.

B. Sales and Marketing

5.9. At present products from the Aromatics plants are sold directly to customers on ex-works basis, against payment by either Demand Draft or letter of credit. In the case of Orthoxylene and Mixed-xylenes these are available either in bulk or packed in two

hundred (200/210) litre drums as required by the customer. DMT is packed either in 25 Kgs. paper bags or woven polyethylene bags.

To take care of the marketing activities of the existing Gujarat Aromatics Project products and the future Gujart Olefins Project Downstream|or products the Corporation proposes to follow the Product Manager's concept within the Marketing Department.

IPCL is planning to have the following major product groups *viz.* Polymers, Fibres and Chemicals.

In addition, it has been also planned for an expert technical group to take care of product and applications development and field technical service. Field sales and the other associated activities would be handled from Regional Sales Offices. Four such regional offices in each of the metropolitan cities were planned. It has also planned to move the solid products by rail from the plant to warehouses in the four cities for distribution amongst the customers.

5.10. About the economics of opening of Regional Offices for Marketing and Distribution, the Management stated that based on an analysis of IPCL's share of market in various regions it had been tentatively decided to have regional marketing offices in the 4 metropolitan cities—Delhi, Bombay, Calcutta and Madras. IPCL already has a liaison office in Delhi and some marketing personnel are expected to start functioning from there by middle of 1975. Similarly it is looking for office space in Bombay and marketing personnel are expected to be in position during 2nd//3rd quarter of 1975.

5.11. IPCL's major product line would be plastics and the consumers of plastic raw-materials are small scale industries spread all over the country. Plastics marketing needs intensive technical support in the field. It is, therefore, of great importance to have technically qualified sales personnel at up country locations so that customer oriented service could be given in the field as and when required.

5.12. It is stated that for Plastic Rubber and fibre products warehouse facilities available with the Central Warehousing Corporation in various cities will be utilised and retail sales would be effected by the Regional Marketing Offices from such warehouses to customers.

Customers for IPCL's liquid products would be very limited. Distribution may, therefore, be handled directly from the plant

site. It is considered that this would be a safe practice to follow since liquid products manufactured by IPCL are generally of a hazardous nature and as far as possible should not be stored outside the plant premises.

5.13. The Management has further stated in a supplementary written note that total quantity of 9 major products manufactured and marketed by IPCL after the commissioning of the Olefins Complex would be about 2,55,000 tonnes based on licenced capacity.

5.14. Approximately 33 per cent of this quantity would be sold in the Bombay region, 15 per cent each in Calcutta and Madras and 17 per cent in the Delhi region. The annual sales volume in each regional office area is likely to be in excess of 35,000 tonnes.

All the products to be marked by IPCL need active technical service support in the field. More particularly, the plastic products, *viz.*, Polypropylene, Low density Polyethylene, Rubber and the Acrylice Fibre need a very high degree of technical skill to provide customer oriented field after-sale service. Based on current selling prices of identical/comparable products the gross sales realisation in respect of the four products in each of the regional office areas would be of the following order:—

(Rupees in lakhs)

	Bombay	Calcutta	Delhi	Madras
Low Density Polythylene .	4200	2400	2400	1800
Polypropylene .	1170	390	390	585
Polybutadiene Rubber	450	600	300	500
Acrylic Fibre .	2610	540	1170	225
TOTAL . . .	8430	3930	4260	3110

5.15. There are about 4,000 plastic processing units situated all over India. Excluding the State of Gujarat, Madhya Pradesh and Rajasthan, the approximate distribution of these units in different regional office areas would be as follows:—

Bombay	1600
Calcutta . . .	1000
Delhi	270
Madras	600

Of these four products detailed earlier, three—Polypropylene (PP), Polybutadiene Rubber (PBR) and Acrylic Fibre (AF—are totally new to the Indian market as these will be produced for the first time in the country by IPCL. Even in the case of Low Density Polyethylene (LDPE) the existing production is restricted to very few grades suited for conventional application.

5.16. While in the case of PP, PBR and AF we have to develop the market from scratch; in the case of LDPE we will be producing quantities in excess of 250 per cent of current availability. Several new grades of LDPE tailored to specific end uses would be made available for the first time. None of the prospective consumers of these products know how to process these into useful articles.

5.17. The magnitude of developing just the Indian Polyolefine market from the current 50,000 tonnes level to over 1,50;000 tonnes in the course of the next 2|3 years will indeed be enormous. IPCL would need to employ all the technical expertise and managerial skill that it can lay hands on. It has planned to develop several important and strategic markets for its new products which will be of immense significance to the country's economy.

5.18. IPCL will have to employ several field sales personnel and technical experts to train the small scale plastic convertors in processing the new grades of resins that it will be producing. It will have to offer a comprehensive techno-economic field service to enble the small plastic convertor earn a satisfactory return on his investment. This service package should include—

—market survey for the ultimate product;

—evaluation of the project profitability;

—selection of equipment and location for the unit;

—arranging financial assistance from appropriate sources;

—employee training;

—marketing, distribution and product advertising;

—selection of right grade of resin and recommendations regarding optimum processing conditions for maximum productivity;

—trouble shooting.

To be able to compete in the international market, it is essential to have an accurate idea of markets, prices, product quality requirements and desired sales appeal. Regional sales offices would make it possible to maintain continuous contact with the processors and for providing them these services.

5.19. Small scale plastic process people need only very small volume of products almost on a daily basis. In order to effectively cater to their needs it is essential to maintain adequate stocks at warehouses located in the 4 cities. Only through movement of large volumes can IPCL minimise on distribution costs. It, therefore, proposes to hold stocks of its products in major cities. To plan and maintain inventory as well as organize sale from warehouses it needs to have personnel in the regional locations.

5.20. It will be clear, therefore, that the opening of regional offices to market products is essential. The staffing of each regional office, the scope of activities, the warehousing facilities required etc. have not yet been worked out in detail and therefore the economics of opening regional offices cannot at this stage be quantified. The intention is to make a modest beginning in the next year in support of the market development programme based on imported material and to work out a fuller programme in the light of the experience gained.

5.21. In a subsequent note submitted to the Committee, the Corporation stated that in designing a marketing organisation, the following points have been kept in view:

(i) IPCL will be the largest petrochemicals manufacturer in the country with special needs for management, planning and coordination.

(ii) The production system will be integrated such that capacity utilisation for the entire system will be determined by the lowest level of capacity utilisation of an individual plant among over dozen plants necessitating a high degree of orientation towards market exploitation for maximising capacity utilisation.

(iii) Capacity utilisation of a plant will depend on a high degree of coordination between marketing and production functionaries at a level where they can mutually solve problems relating to planning, organisation, control and evaluation.

(iv) Because production will be a continuous flow, any form of "bureaucratic" or procedural delays will hurt the entire system.

(v) If planning and operational tasks are not separated to an appropriate degree, confusion between roles and

responsibilities is likely to act as impediments to management effectiveness and efficiency.

(vi) Profit measurement through introduction of the concept of "profit centres" might be difficult unless the organisational design is geared to this purpose.

Marketing Organisation:

Based on the above principles, the marketing organisation has already been established as a specialised division and will eventually consist of four Product Managers, a Sales Manager and a Manager to take care of Applications Development and Field Customer Service. This team in the marketing division will perform the marketing task associated with fulfilment of IPCL objectives.

Organisational Structure for Marketing:

The Marketing Division of IPCL will be headed by the Marketing Manager who will be responsible for the overall marketing task of IPCL. He will develop the marketing plans, organise marketing activities in a systematic manner, build a committed team, motive the marketing personnel, implement the marketing plans with and through them, and control and measure the performance of the overall marketing function.

Three distinct types of functionaries will report to the Marketing Manager. These are—(a) Applications Development and Customer Service Manager, (b) Product Managers, (c) Sales Manager.

5.22. The value and quantity of production and sale of IPCL products year wise since the commencement of production and percentage of sales to production are as under:

Product	Year	Production	Sale (MT)	Percentage of sales to production	Sales realization in Rs.	Remarks
DMT . .	1973-74	5169·175	4827·900	93·4	3,61,39,950	
	1974-75 (April-August)	5852·400	5661·075	96·6	9,26,02,200	
Orthoxylene	1973-74	7927·293	5016·014	63·3	1,16,46,226	Includes 2587·39 tonnes exported in 1973-74.
	1974-75 (April-August)	5061·00	3857·030	76·2	2,31,42,180	
Mixed-xylenes	1973-74	1929·540	1513·343	78·5	34,95,032	
	1974-75 (April-August)	548·00	640·712	117·2	35,23,916	
Methyl-Benzoate . . .	1973-74	23·605	5·025	21·3	12,812	
	1974-75 (April-August)	47·118	5·756	12·21	38,047·16	

Note :—Percentage increase/decrease in production and sale has not been shown as only 5 months have been completed in 1974-75.

5.23. In respect of the percentage of sales value to capital employed it has been stated by the Management in a written note that the percentage of sales value to capital employed in respect of DMT has been 17.33 and that of Orthoxylene and Mixed-xylenes has been 18.13 per cent. The percentage in respect of Orthoxylene and mixed. xylenes has not been given separately for the facilities for production of Orthoxylene and Mixed-xylenes are common and Mixed-xylenes is more or less a by-product of Orthoxylene.

5.24. In regard to the expenses that incurred on sale and distribution the Management stated in written note as follows:--

"Presently we market only DMT and Xylenes. Expenditure on account of the entire marketing department of the Corporation is given below for the year 1972-73 and 1973-74. In addition to responsibility for marketing and sale of the products of the Aromatics Plant, the Marketing Department has been engaged in preparation of Market Survey Reports, Seeding Programmes, Organisation of a Product Applications Laboratory, etc. in connection with the other IPCL projects now under implementation.

Year	Expenditure (Rs. in lak)
1972-73	4·67
1973-74	3·79

5.25. The Consumer composition of IPCL products by sales realisation and sale of different products to them for the year 1973-74 was stated to be as follows:—

	DMT	Orthoxylene	Mixed xylenes
Sales to Private Sector	100%	54%	100%
Sales to Govt. Deptt./Organisation			
Sales to Public Sector Undertaking		..	
Exports		46%	

5.26. In addition to the private sector Companies which use DMT, a new Co-operative Society, with 60 per cent Government of India Shareholding has been formed which will use DMT for production of polyester filament yarn.

It is expected that a proportion of DMT produced by IPCL will be sold to this organisation.

5.27. To a question as to what has been the basis and quantum in each month for distribution/allocation of IPCL products like DMT, Orthoxylene, mixed Xylene and Methyle Benzoate etc. to its dependent units, the Management replied:

> "DMT was distributed between April, 1973 and February, 1974 to any customer who completed all commercial formalities and made firm arrangements for lifting the product on 'first come first served' basis."

5.28. As the demand gradually rose to more than the production of DMT by IPCL, the distribution had to be restricted. Based on the guidelines of the Ministry of Petroleum and Chemicals issued in February, 1974 the available quantity was allocated to the different users in the ratio of their respective requirements (reckoned from their respective licensed capacities) to the total requirements.

5.29. Lately, however, due to financial constraints and consumer resistance many of the customers had not been able to lift the entire quantity allocated.

5.30. In October, 1974, Government were informed that in asurplus situation sale could not be restricted to monthly allocations. Accordingly some parties lifted quantities in excess of their respective monthly allocations.

Ortholxylene:

Since the current production is substantially in excess of demand, IPCL supplied the product to anyone who was interested. Since the major outlet for Ortho-xylene was for the manufacture of Phthalic Anhydride, it met the entire demand for Herdillia Chemicals, Bombay and Srhrid Geigy, Baroda. Some small quantity is also sold for use as solvent and carrier medium in the paint and pesticides industry.

Mixed-Xylene

Mixed-xylene finds use in the paint industry, pesticides manufacture; dye stuff industry and manufacture of wire anamels. For all

the above fields, Mixed-xylene found competition from heavy and light solvent Naphtha, Xyele (all from Hindustan Steel Ltd.) and Toluene. The competition was quite keen and it was a buyers' market. IPCL therefore, did not have any allocation policy for this product. On the other hand, it is making concerted efforts to increase its sales of Mixed-xylene.

Methyl Benzoate

This is a by-product from the DMT plant. The total production between May, 1973 and October, 1974 had been of the order of only 105 tonnes. So far IPCL had been inviting bids from interested parties and disposing of the accumulated stocks to the highest bidder. However, it had recently decided to invite bids for supplies unit 31st March, 1975 and distribution was being planned on the basis of offers received against this. For the period April, 1975 to March 1976, it had planned to distribute on the basis of offers received against an annual tender.

Crude Di-methyl Isoph-thalate:

This is another by-product from IPCL's DMT plant. It had so far accumulated 10 tonnes. There was no ready market for this material for the present, but IPCL was trying to sample and develop use of this product in the paint/resin manufacturing industry.

5.31. About the measures taken or proposed to be taken for the disposal of DMT especially when the production was gradually reaching to the installed capacity of the DMT plant, the Management stated in written note that for several years there was only one plant in the private sector manufacturing polyester fibre out of imported DMT. To promote the use of the polyester fibre and to reduce dependence on cotton imports, Government of India had licensed 4 new polyester staple fibre units in addition to the existing one. Of these, three have already gone on stream in the last 2 years and one more was expected to go on stream in the near future. Almost the entire requirement of DMT was currently being met out of IPCL's production and imports had more or less stopped.

5.32. Firm demand by units which are already in existence amounts to 28,806 tonnes of DMT per annum. In addition, according to the present industrial licensing regulations, liberalisation beyond the licensed capacity is permissible upto 25 per cent. If each of the licensed units operates at 125 per cent the total demand for DMT per

annum would work out to about 35,000 tonnes. Similarly, the units which are under construction or to which letter of intent has been granted would also be entitled to liberalisation to the extent of 25 per cent over licensed capacity. Provision also exists in certain cases for diversification up to an additional 25 per cent of the licensed capacity. At least in one case the plant has operated already at nearly 125 per cent of licensed capacity. In this context, no long term problem in disposing of IPCL's entire production of DMT is envisaged since the present annual installed capacity of the DMT plant is only 24000 metric tonnes. It is seen that IPCL/Government have no allocation policy for mixed xylenes.

5.33. About the prospects for the sale of this product the management has stated in a written note that currently, demand for IPCL's mixed xylenes is resricted due to competition from benzene and toluene on which excise duty is less than that applicable to mixed xylenes. Representations have been made to Government for revising the classification of mixed-xylenes and it is understood that a favourable decision is likely to be taken. After a downward revision of the excise duty rate the demand is expected to pick up.

5.34. Planning of production is done on the basis of estimated market demand on a month-to-month basis.

5.35. The Committee note that to take care of the marketing activities of the existing Gujarat Aromatics Project and the future Gujarat Olefins Project/Downstream Units, IPCL proposes to follow the Product Manager's concept within the Marketing Department and is planning to have the following major product groups, viz., Polymers, Fibres and Chemicals. In addition, it has also planned for an expert technical group to take care of product and applications development and field technical service. Field sales and other associated activities will be handled from Regional Sales Offices which are proposed to be opened in Delhi, Bombay, Calcutta and Madras. In order to see that the products purchased by manufacturing units, a large majority of which will be in small scale sector, are efficiently used, IPCL proposes to have well qualified marketing and engineering personnel in each region to handle all marketing operations and after-sales-service. Three of the four plastics products, viz., Polypropylene (PP), Polybutadiene Rubber (PBR) and Acrylic Fibre (AF) are reported to be totally new to the Indian market as these will be produced for the first time in the country. Even in the case of fourth product viz., Low Density Polyethylene (LDPE), the existing production is restricted to very few grades. While in the case of Polypropylene, Poly-

butadiene rubber and Acrylic Fibre, IPCL has to develop the market from scratch, in the case of LDPE, several new grades tailored to specific end uses would be made available for the first time. None of the prospective customers of these products knowhow to process these into useful articles. IPCL proposes to make a modest beginning this year in support of the market development programme based on imported material.

5.36. The Committee understand that like electronics, plastic industries also do not require large infrastructure facilities. The Committee, therefore, recommend that developmental efforts should be made in consultation with the State Governments and Small Industries Institutes so that the possibilities of setting up units especially in backward areas for the absorption of this orthoxylene may be considered.

5.37. The Committee are informed that as most of the products will be produced for the first-time in the country the IPCL will have to do markets survey for the ultimate projects, stimulate interest in its products through publicity, evaluate project profitability, select equipment and location for the consuming units, arrange financial assistance and employee training, help the units in developing optimum processing conditions for maximum profitability, organising publicity campaigns for new end products and resolving other difficulties which may arise from time to time. In order to find export outlets for plastics and other end products, the company will also have to advise the small scale units about the foreign markets, prices, product quality requirements, desired sales appeal and product pattern suited for export. These are new and challenging tasks. The Committee find that IPCL will have a pioneering role to play in stimulating and creating demand for its solid products through new investments by existing entrepreneurs or through developing a new class of entrepreneurs in this small and medium scale sector.

5.38. In the opinion of the Committee the Corporation should not take upon itself the responsibility of running the individual units nor for their financial results, but merely confine itself to providing the necessary technical knowhow, material assistance and training facilities in close coordination with small scale industries and service institutes.

The Committee, also feel that any organisation of marketing of the products of IPCL should be market oriented rather than customer oriented. The Committee are informed that the Marketing Organisation has been established as a specialised Division headed by a Mar-

keting Manager and it will eventually consist of four Product Managers, a Sales Manager and a Manager to take care of Application Development and Field Customers service.

The Committee would like to watch the performance of this organisation with reference to development, particularly in backward areas.

5.39. The Committee note that the expenditure on sales and distribution has been of the order of Rs. 4.67 lakhs in 1972-73 and Rs. 3.79 lakhs in 1973-74 as against the sales of Rs. 512 lakhs only in 1973-74.

The Committee recommend that Government/Corporation should set suitable norms for such sale and distribution expenses and ensure that such norms are adhered to, so that the overhead expenses of sale and distribution are not excessive.

5.40. The Committee note that the Corporation proposes to handle the field sales and other associated activities through its Regional Offices in the Metropolitan cities. The Committee would like that economics of the opening of such offices should be critically examined with reference to the market for the products in the region before such offices are set up.

5.41. As regards the Regional Offices, the Committee recommend that these offices should be compact so that the small scale sector which are using the products are not unnecessarily loaded with excessive overheads. The Committee recommend that IPCL should finalise the staffing pattern with great care and see that the personnel selected for the regional offices and field services are development minded with technical background capable of handling the jobs efficiently.

5.42. The Committee also note that when the demand for DMT was more than the availability, the available quantity of DMT was allocated to different users in the ratio of their respective requirements on the basis of their licensed capacities. But lately, due to financial constraints and other factors, some of the customers have not been able to lift the entire quantity allocated and consequently some other parties have been allowed to lift quantities in excess of their respective monthly allocations. The Committee recommend that the Corporation, in consultation wih the Government, should critically go into the reasons for the non-lifting of the allocated quantity of DMT by the parties and take suitable remedial measures to avoid recurrence of similar situations in future. They would like the IPCL/Government to keep a constant eye on the market situation and review its allocation policy from time to time to cope with the

situation and to see that the turn-over of the company does not suffer in any way.

5.43. The Committee also note that the current production of Orthoxylene is substantially in excess of the demand. They would like the IPCL to analyse the reasons as to why the units which were expected to consume Orthoxylene products by IPCL have not come up and to see what can be done to help such units be established as early as possible.

5.44. The Committee learn that stocks of the two by-products from DMT plant, namely, Methyl Benzoate and crude Di-Methyl Isophthalate, have accumulated in the plant and IPCL is making efforts to find out outlets for these products.

5.45. The Committee would like to be informed of the specific action taken for the disposal of these products. The Committee stress that there should be greater coordination between the Marketing and Production functionaries in order that the products of the Corporation are not accumulated.

C. Costing

Cost of Production

5.46. In the case of IPCL it had not been possible to arrive at firm cost figures in the initial period of operations of the plant. There had been problems in the functioning of some imported equipment and these were rectified. The world-wide shortage of crude oil and consequent rise in the price of all petroleum products resulted in an unprecedented rise in the price of the principal raw materials-naphtha and methanol. The increase in the prices of naphtha, methanol and fuel oil between the dates 11-1-1974 and 1-4-1974 was stated to be of the following order:—

Naphtha	300%
Methanol	132%
Fuel Oil	128%

These increases in raw material prices had their effect on the prices of finished products and also affected the working capital requirements.

5.47. Consequent on the world-wide inflationary situation, the cost of capital equipment has been rising enormously. This had a

direct bearing on the depreciation, pricing as well as norms for return on capital invested. It had its effect also on cost of repairs and of spare parts even on established plants.

Costing System

5.48. Since the production of DMT and xylenes is a continuous chemical process, a process costing system has been adopted. For accumulating to costs, various cost centres, both for services and production, have been identified. All raw materials and stores, major items of expenses and the various cost centres have been codified. By this method, costs of materials, labour and other expenses in respect of each service and production department are collected and the service costs are allocated to each of the production departments based on the actual utilisation of these services to arrive at the ultimate cost of manufacture of each product.

5.49. It has been stated that for the present, the cost data is used for monitoring performance through comparison of consumption factors with the guaranteed figures given by the process licensors. After the plant working has stabilised, IPCL proposes to work out standard costs and detailed operational budgets with a view to closer control.

5.50. In regard to the standard cost and actual cost of products being manufactured by IPCL at present from the date of their production, the Committee were informed by IPCL in a written note as under:—

> Production in the Aromatics Plant the only plant that has gone into production so far-commenced during the financial year 1973-74. Since the production had not yet stabilised, IPCL has not so far attempted to work out standard costs but the consumption data provided by the foreign licensor are used for assessment of performance. Some important consumption data are set out in the table below:

Input	Consumption as indicated by Process Licensors	Actual 1973-74	Actual 1974-75
1	2	3	4
	M/T	M/T	
*Naphtha M/T per tonne of Xylene . .	1·313	1·847 (42%)	1·616
Methanol per tonne of DMT . . .	0·470	0·508	0·447

*Naphtha consumption per tonne of xylene reduces with higher capacity utilisation as a certain wastage is constant pe unit of time.

1	2	3	4
Power, MWH			
(a) per tonne of xylene	0·119	0·05 (29%)	0·128
(b) per tonne of DMT	0·500	1·107	0·456
(c) per tonne of Paraxylene . .	0·729	2·340 (221%)	0·796
Fuel oil (M/T)			
(a) per tonne of DMT . .	0·160	0·343	0·160

5.51. The statement below indicates production during 1973-74 and in 1974-75 (upto August end) as compared to the installed capacity. It will be seen that as the capacity utilisation increases, there is decrease in the consumption of raw material, etc. per tonne of Product:

Production	Installed capacity as per process Licensors	Actual Production 1973-74		Actual Production 1974-75 (upto August, 1974)	
		M.T.	Capacity utilisation (%)	M.T.	Capacity utilisation (%)
Xylenes . .	23,500	9855	42	5608	57·3
Paraxylene	17,000	1184	7	4065	57·4
DMT . .	24,000	5169	22	5852	58·5

5.52. The average actual cost of production for 1973-74 and the cost envisaged in the DPR in respect of each of the products manufactured are given below:

Product	Cost envisaged in DPR at 100% capacity utilisation	Actual cost for 1973-74	Capacity Utilisation
	Rs./M.T.	Rs./ M.T.	
Dimethyl Terephthalate (DMT)	2,500	12,167	22%
Orthoxylene	575	2,917	42%
Mixed xylenes	465	2,917	

5.53. The management stated that the large difference between the actual cost of production and that envisaged in the DPR was mainly due to (i) lower utilisation of capacity during the year at about 22 and 42 per cent for DMT and Ortho/Mixed xylenes respectively, and (ii) increase in prices particularly of raw materials and fuel oil as detailed below:—

Sr. No.	Materials	Rate adopted in DPR Rs./MT		Actual cost in 1973-74 Rs./MT	
1	Naphtha . .	150	Sept. '73	258	
			Jan. '74	452	
			March '74	2,352	This has, however, been brought down to Rs. 1033/- per MT since 26th March, 1974 and continues to be at that level.
2	Mathanol . .	1300	May, '73	1,600	
			Jan. '74	1,750	
			Feb. '74	2,405	
			March '74	4,017	
3	Fuel Oil . .	225	May '73]	300	
			Jan. '74	578	
			March, '74	685	
4	Power (MWH) .	90	May '73	130	
			March '74	160	

5.54. In addition as the capital cost has increased from Rs. 22.4 crores in the DPR to Rs. 28 crores, the incidence of depreciation and interest on capital in the actual cost is to that extent higher.

5.55. The Committee were informed by the Management in a written note that the average cost of production in 1973-74 for all the products exceeded their respective average selling prices.

5.56. Such excesses of costs over prices are common in the initial stages when capacity utilisation is not high but the incidence of fixed costs (such as depreciation, interest and overheads, including salaries and wages of direct plant staff and supporting service staff) per unit of output is high.

5.57. On being asked as to what action has been taken or is proposed to be taken by Management to effect reduction in cost, the Management stated as under:

"The most important method of reducing costs in our present circumstances would be to maintain a high level of pro-

duction. In order to ensure this a stand-by propane compressor and a stand-by compressor for the reformer and isomerisation systems are being installed.

Steps are being taken to obtain 3 MW of emergency power from the adjacent Refinery to guard against power breakdowns. This will ensure uninterrupted operation of critical equipment in the plant and reduce time lost when a breakdown or dip occurs.

As insufficient process air would reduce the capacity of the DMT plant an additional air compressor is being installed.

Improvements in steam generation are being effected by replacement of parts of the boilers.

A special Committee has been set up to review the availability of spares and stand-by equipment.

An investigation has been undertaken into the composition of naphtha to increase xylene precursers content. This will lead to identifying the precise naphtha cut required for optimum production of aromatics.

Financial cost information is made available to all the officers concerned at the weekly production meetings with a view to increasing cost consciousness.

Stores accounts are being computerised after adopting a seven digit classification system. This will enable rapid analysis leading to maintenance of effective but economical inventories.

Carefully worked out maintenance schedules have been put into operation to ensure good performance of equipment."

5.58. As regards the steps taken to promote cost consciousness at various levels in IPCL the Committee were informed that the Aromatics Project was commissioned in 1973-74; commercial production of DMT started in April 1973 and of Xylenes in August/September 1973. Various operational problems had to be faced during the first year of working. Repeated breakdown of the propane compressor led to low capacity utilisation. It was difficult, therefore, during this period, to obtain a real measure of costs and per-

formance. Nevertheless, all possible efforts are being made to keep the position under continuous and critical review.

Since June 1974, Production Planning and Coordination Meetings are held every week at which the various departments (Production, Maintenance, Marketing, Materials, Technical Services, Utilities and Finance) are represented. The meetings are presided over usually by the Chairman & Managing Director and in his absence by the Finance Director. At these meetings weekly targets of production are fixed and the performance of the previous week is reviewed and reasons sought for any variance from the targets etc. Estimates of costs for targeted production, the actual costs incurred for the week and cumulative upto that week are also prepared and presented. These meetings help in identifying causes of variances from programmed production and cost budgets and formulating remedial measures. They also create an integrated management team for plant operation accountable for attaining the targets set.

5.59. The Committee note that though the Corporation has adopted a costing system, it has not so far worked out standard cost for its products since the production in the Aromatics plant which started in 1973-74 had not stabilised. The actual consumption of inputs is however compared with the consumption data provided by the foreign licensors for purposes of assessment of performance. The Committee note that the consumption of Naphtha, fuel and power during 1973-74 is higher than the fixed by the process licensors though it has decreased during 1974-75. The Committee also note that the average actual cost of production has been much higher than the cost envisaged in DPR.

The Committee were informed that the large variation is stated to be due to low capacity utilisation and increase in prices particularly of raw materials and fuel oil. The Committee recommend that Corporation should take suitable steps to ensure strict adherence to the norms for the consumption of the raw materials as fixed by the Process Licensors, critically analyse any variations between the actual consumptions and the standards so that suitable remedial measures may be taken in time to effect economies in costs.

5.60. The Committee find that the consumption of materials has decreased during 1974-75 with the increase in production. The Committee recommend that the Corporation should take concerted measures to attain full capacity of the plant at the earliest, to obtain economic cost of production.

D. Pricing Policy

5.61. The major products at present produced and sold by IPCL are:

DMT
Orthoxylene and
Mixed Xylenes.

Commercial production of DMT commenced in April, 1973 and xylenes in August/September, 1973. IPCL/Govt. are stated to have been attempting to adopt a pricing policy consistent with the guidelines given by the Bureau of Public Enterprises in their Office Memorandum No. BPE|46|ADV-F|68|25 dated 27th December, 1968, the relevant extracts from which have been reproduced below:

"....It would be useful to have suitable guidelines for these enterprises which operate under monopolistic or semi-monopolistic conditions. In regard to pricing to be adopted by such enterprises the following guidelines will be useful for the consideration of their Board of Directors:

(a) The pricing of their products should be within the basis of the landed cost of comparable imported goods which would be the normal ceiling (and not on the basis of C.I.F. prices). In calculating the landed cost the normal price of such goods in the country of their origin should be taken into account in cases where exports of such goods are subsidised on any appreciable scale either directly or indirectly.[Please see also under (c) below].

(b) Within the ceiling of the landed cost, it would be open to the enterprises to have price for negotiations and fix prices at suitable levels for their products which would give them a reasonable return on the capital invested. It was also desirable that the prices so fixed should be operative for a period of 2-3 years.

(c) Ordinarily, the landed cost should be regarded as the absolute ceiling. If, however, in assessing the landed cost, there are reasons to believe that imported FOB/CIF prices are artificially low, or in other exceptional circumstances, where our own cost of production is very high, it may be necessary to have the prices higher than the landed cost; in such circumstances the matter should be referred to the administrative Ministry concerned for examination in depth in consultation with

the Ministry of Finance, Bureau of Public Enterprises, etc."

5.62. The Management have stated that there have, however, been many difficulties in the determination of prices within these guidelines. These in brief, are indicated below:

Landed Cost

5.63. The landed cost of comparable imported goods has been taken as the normal ceiling. In the case of DMT, the determination of the landed cost itself presented some difficulties in early 1973. Our analysis of landed cost of comparable product in three countries of origin in different regions of the world during the preceding eight years showed considerable fluctuations. After a period of high prices there was a gradual decline since 1969 ending in a very low price in 1972. From the beginning of 1973, however, there has been hardening of international prices culminating in a world-wide shortage of all petrochemical products. Consequently it had become extremely difficult to gauge the prevailing prices. The marginal prices for small quantities were extremely high and unrealistic, and reliable information on regular supplies was difficult to obtain.

Cost of Production

5.64. It had not been possible to arrive at firm cost figures in the initial period of operations of the plant. Even now the plant operation has not stabilised. There have been problems in the functioning of some imported equipment and these are being rectified. It has not been possible either to achieve full capacity or to assess the time by which this could be achieved. The world-wide shortage of crude oil and consequent rise in the price of all petroleum products resulted in an unprecedented rise in the price of our principal raw materials-naphtha and methanol. The increase in the prices of naphtha, methanol and fuel oil between the dates 11-1-1974 and 1-4-1974 was of the following order:

Naphtha	300%
Methanol	132%
Fuel Oil	128%

These increases in raw material prices had their effect on the prices of finished products and also affected the working capital requirements.

5.65. Consequent on the world-wide inflationary situation, the cost of capital equipment has been rising enormously. This had a

direct bearing on the depreciation, pricing as well as norms for return on capital invested. It had its effect also on cost of repairs and of spare parts even on established plants.

5.66. Because of these various complexities, the Board of Directors had to review the pricing policy periodically so as to secure the realisation of a reasonable return on capital invested while keeping the prices within the estimated landed cost of imports.

5.67. The Committee pointed out pricing of IPCL is inflationary in effect and prices have been increased time and again without regard to facts and their adverse effect on downstream units and ultimate consumer. The Management has in a written note stated that the sequence of fixation of prices is as under:

	Product	Price fixed Rs./tonne	Date the Board took the decision
1	DMT	6,000	13th April, 1973
2	DMT	7,000	2nd August, 1973
	Ortho-xylene . . .	2,000	Do.
	Mixed-xylene . . .	2,000	Do.
3	DMT	12,000	11th January, 1974
	Ortho-xylene . . .	3,000	Do.
	Mixed-xylene . . .	2,500	Do.
4	DMT	*18,000 16,000	On 19th March, 1974 the Board fixed the price of DMT at Rs. 18000/-,
	Ortho-xylene . . .	6,000	Ortho-xylene.
	Mixed-xylene . . .	5,500	At Rs. 7,000/- and Mixed-xylene at Rs. 6,500/- based on the then available prices of naphtha and methanol. In doing so, however, the Board had authorised the Management to revise the price appropriately should there be a change in the prices of naphtha and methanol (which changes were anticipated). Accordingly, when the prices of naphtha and methanol were changed the prices were revised appropriately.

*This was only applied to 1,150 tonnes of DMT manufactured out of naphtha purchased at the rate of Rs. 2,352.

1. The initial price of Rs. 6,000/- was based on the estimated landed cost of similar products, since at that time no firm cost data could be worked out as the plant had just been commissioned.

2. The price of Rs. 7,000/- was again based on the estimated landed cost as also to cover a proposed further import of para-xylene for which quotations had been obtained at much higher rates than for the previous consignment. This import did not ultimately materialise and in effect only 555 tonnes of DMT were produced and sold after the coming into effect of this price increase.

3. The revision in January 1974 was proposed on the resumption of production after repair of the propane compressor. The prices fixed on 11th January, 1974 were based on an estimated average production of 60 per cent over a period of 24 months from April, 1973 to March, 1975 (from start-up of the plant to the end of second financial year and a reasonable expected average annual return of 15 per cent on the employed capital. By January, 1974, the costs of some of the major inputs had also gone up so also in the employees costs due to DA revision.

4. The fourth price revision took place in March, 1974, when the costs of inputs shot up as indicated below:

	Delivered price as on 11-1-74 (earlier price fixation) (Rs./MT)	Delivered price as on 1-3-74 (Rs./MT)	Increase in price level (Rs./MT)
Nephtha	258·00	2,352·00*	2,094·00
Fuel Oil	300·00	685·00	385·00
Methanol	1,730·00	3,760·00	2,030·00

*Reduced to Rs. 1,033 on 26-3-1974.

5.68. The prices of DMT and xylenes were again considered by the Board at their meeting held on 6th August, 1974 because of levy of excise duty for the first time on D.M.T. w.e.f. 1-8-74. It was then decided that 25 per cent *ad valorem* duty imposed on D.M.T. w.e.f. 1-8-74 should be passed on to the consumers. It was also de-

cided that the price of mixed xylenes (inclusive of excise duty) be reduced by 10 per cent in response to the suggestion of the S.T.C. to whom R.O. holders had been representing that the indigenous price was much higher than the international prices.

5.69. From the above analysis of the reasons for the revisions in prices of IPCL products, it would be seen that the following principles and factors have governed the pricing policy:—

(i) The cost of inputs, namely, raw materials, power, fuel, etc., *e.g.* the revisions effected in January & March, 1974.

(ii) The level of production achieved or achievable over a period of 18 to 24 months, which was assumed at 60 per cent for the period April, 1973 to March, 1974. It would be relevant to mention that even for subsequent periods it would not be prudent to assume 100 per cent production as in Petrochemical plants it is highly improbable to attain full capacity over extended periods, the maximum attainable capacity during a year being about 90 per cent.

(iii) Realisation of a reasonable return on capital invested. Reasonableness of the return has to be judged in the context of:

(a) high rate of obsolescence of the products, processes and equipment peculiar to the petrochemicals industry;

(b) high replacement costs of existing equipment which cannot be met out of the normal provisions for depreciation, related to original costs;

(c) high costs of stand by equipment and inventories of spares which are necessary to ensure continuous operation of the plant in Indian conditions.

(iv) Keeping prices in line with the landed cost of identical products to the extent possible.

The current prices of IPCL products and the current landed costs based on available information have been stated to be as below:

	Current price (Net of tax)	Current landed cost	Remarks
	Rs.	Rs.	
DMT	16,000/T	16,167/T	STC-Polish supply Rs. 9510/T CIF
Orthoxylene . . .	6,000/T	3,750/T	STC-CIF $300/T
Mixed xylenes . . .	5,500/T	1,787/T	Estimating CIF $ 2?/T

DMT and Xylenes are not produced by any other manufacturer in India.

In regard to the comparative prices of similar products with similar capacities and for corresponding periods abroad, the Management informed the Committee in a written note that IPCL did not have any data. However, it might be mentioned that the capital cost of similar plants in exporting countries are much lower than in India. The prices of the main raw materials also are lower abroad as compared to indigenous prices.

5.70. The Committee desired to know as to why the prices of the products like DMT were fixed provisionally everytime and why IPCL did not follow the standard commercial practices in the matter of pricing. The Management apprised the Committee in a written note that, after the oil-crisis, the international prices of petrochemicals, including DMT, have been fluctuating widely. As already mentioned, IPCL had fixed the price of DMT at Rs. 16,000/- per metric tonne when the international price was much higher. It is true that in recent months, there has been a decline in world prices. It will be necessary to wait until a definite trend is established before we review out prices, taking also into account the cost of our inputs (Particularly naphtha and methanol) and the capacity utilisation.

5.71. The average cost of production in 1973-74 for all the products exceeded their respective average selling prices.

Such excesses of costs over price are common in the initial stages when capacity utilisation is not high but the incidence of fixed costs (such as depreciation, interest and overheads, including salaries and wages of direct plant staff and supporting service staff, per unit of output is high).

5.72. The Committee pointed out during evidence that the prices of the end products polyester fibre cloth like terelene cloth for which the petrochemical products like DMT are the raw material, are very high as compared to the prices of the base products. The representative of IPCL informed the Committee that the costs of production of IPCL products are quite low as compared to the prices of the end products but there are the various taxes levied by Government at different stages which increase the prices of the end products. For example, DMT which is produced by IPCL is converted into polyester fibre for making garments. Excise duty is levied at various stages. The duty on DMT is on an *ad valorem* basis which works out to Rs. 4.4 per kg. of polyester fibre. (Every

Kg. of fibre requires 1.1 Kg. of DMT). The duty on fibre is Rs. 40 per Kg. and that on yard is Rs. 24 Kg. In addition there is an *ad valorem* duty of either 5.5 per cent or 10.5 per cent depending upon the price per sq. meter of cloth. The cumulative effect of the excise at various stages is the increased cost of cloth to the ultimate consumer. If there was no levy of excise duty at any stage it should be possible to produce one Kg. of polyester fibre at around Rs. 30|- as against the present price of over Rs. 75|- per Kg.

The Committee desired to know whether reduction in taxes would keep down the prices of end products and whether even after reduction in taxes the manufacturers would not be increasing the prices. They were informed that besides reduction in taxes, the other method of reducing prices of end products would be to increase the availability of raw material.

5.73. The Committee note that according to the guidelines issued by the Government, the pricing of products of enterprises operating under monopolistic and semi-monopolistic conditions should be within the basis of the landed cost of comparable imported goods which would be the normal ceiling. The enterprises can fix prices within the ceiling of the landed cost and the prices so fixed should be operative for a period of 2-3 years. If it is necessary to fix prices higher than this ceiling, the matter should be referred to the administrative Ministry concerned for examination in depth in consultation with the Ministry of Finance etc. The Committee were informed that the IPCL had not been able to arrive at firm cost figures in the initial period of operations due to a number of problems dealt with elsewhere in this report and the determination of landed costs itself presented some difficulties in early 1973.

5.74. The Committee note that the pricing of the products of IPCL had been undergoing frequent revisions and every time the prices fixed were provisional. While the price of DMT varied from Rs. 6,000 per M.T. in April, 1973 to 7,000 in August, 1973, it was again increased to 12,000 in January, 1974 and 16,000 in March, 1974. In the case of the Oxylene, the price has increased from 2,000 in August 1973 to 3,000 in January, 1974 and further increased to 6,000 in March, 1974. The Committee are informed that the Corporation had been following a pricing policy based on (a) cost of inputs, (b) realisation of reasonable return on capital invested, (c) level of production achieved or achievable over a period of 18 to 24 months and (d) keeping prices in line with landed cost of identical products to the extent possible. The Committee are also informed that while the initial price fixed at first was based on estimated landed cost, since no fixed cost data was available. Subsequently the price

of Rs. 7,000 in August, 1973 was based on estimated landed cost as also the estimated availability of imported paraxylene.

5.75. In January, 1974, the revision proposed was based on the resumption of production after repair of propane compressor and estimated average production of 60 per cent over a period of 18-24 months from April, 1973 and a reasonable return of 15 per cent on capital employed. The further revision in March, 1974 was however stated to be on account of high cost of inputs.

The Committee recommend that the Corporation should take steps to reduce the cost of production by achievement of full rated capacity, establishing production and keeping the overheads to the minimum. The Committee also recommend that Government/Corporation should consider fixing the prices on a fairly long term basis taking into account all the relevant factors and the Board should review the prices periodically to ensure that the prices are competitive and the price increase does not contribute to the iuflationary trend. The Committee need hardly stress that since petro-chemical intermediates are the raw materials for a number of industries, Government should take effective measures to see that the prices of the petro-chemicals which are used as raw materials are reasonable and internationally competitive and the benefit of any reduction in the prices is always available to the common man.

5.76. The Committee find that the price of orthoxylene and mixedxylene are higher than the landed price. The Committee would like that this aspect should be gone into by Government so that the prices of xylene are in accordance with the guidelines issued by Government in this regard. The Committee also expect that the Corporation should fix the price of its products within the framework of the recommendations of BPE and wherever there had been deviations, the Corporation obtain the prior approval of Government.

5.77. The Committee find that while the cost of DMT, the base product for polyster fibre cloth is not high, the cloth produced by using DMT is sold at a price which is higher. The Commiftee feel that with the stabilisation of production of DMT that prices of and other products manufactured with DMT as base should be so fixed that the benefit of reduction in price of DMT could ultimately be passed on to the public.

5.78. The Committee have come across cases where the Private Sector has been making use of the products manufactured by the Public Sector and making huge profits at the expense of the Public

Sector, as in the case of basic drugs of IDPL and steel. The Committee feel that there should be a correlation between the price of the raw material and the cost of the end product. The Committee, therefore, recommend that Government/IPCL should take steps to evolve a procedure by which any reduction in the cost of the raw material ultimately goes to the benefit of the consumer.

E. Freight equalisation

5.79. In connection with the question of pooling of Freight, it was stated by the Corporation that at a meeting held in the Ministry of Petroleum & Chemicals in October, 1972, the Ministry desired that the Corporation should examine the question of fixing a uniform FOR destination price for DMT and Xylenes so that manufacturers situated at a distance from Baroda would not be put to disadvantage price.

This was examined on the basis of estimated production and distribution during the year 1973-74 for DMT and Xylenes separately. It was found that Rs. 110|- per MT in the case of DMT and Rs. 115|- per MT in the case of Orthe-xylene and Mixed-xylenes would have to be added to the ex-works price in order to arrive at a uniform FOR destination.

5.80. However, while offering uniform FOR destination prices, the Corporation did not want to take on the responsibility for booking and despatch of DMT and bulk supplies of Ortho-xylene. Some purchasers might prefer to take their supplies by road and even in the case of those who prefer to use rail transport, there would be an unnecessary assumption of responsibility for contamination, wastage, etc., if IPCL should take on the task of despatch. The intention therefore, was that the bulk purchaser would take delivery ex-works and would be given a rebate on the uniform FOR destination price equal to the railway freight to the particular destination at the rate used in the freight equalisation calculation. The recoveries on account of freight would be reviewed periodically, perhaps six monthly, and adjustments made either by way of refunds to the parties over-charged or short recoveries in the subsequent periods or by invoicing those who have been under-charged. In the case of Mixed-xylenes and orthoxylene sold for solvent, the intention is to make supplies available at Bombay, Calcutta, Madras and Delhi at uniform prices.

5.81. It was also explained that while freight equalisation was possible, it would give rise to marketing and procedural difficulties.

The Board in their meeting held on 26th February, 1973 decided that the matter may be referred to Government for decision. The Corporation were given to understand by the Ministry that the matter would be considered and the views of the Government conveyed to them.

5.82. The Committee pointed out that from the Minutes of the meeting of the Board of Directors held on 26th February, 1973 it was seen that—

> "Regarding the proposal to fix uniform F.O.R. destination prices for DMT and Xylenes, it was decided that the matter be referred to Government for a decision. Shri L. R. Dalal did not agree to freight equalisation as this, according to him would nullify the advantages of location to the units located in nearby areas. As freight equalisation was not resorted to in all industries (especially coal), he was not in favour of its introduction in the petro-chemical industry. Shri R. Narasimhan, on the other hand, felt that unless a uniform F.O.R. price was introduced, the polyester fibre units situated at a distance from Baroda would be put to a disadvantage. This might also set in motion demands for establishing petrochemical projects in other areas; a large petrochemicals complex has been set up at Baroda on techno-economic considerations including the consideration to avail of economies of large scale operation and this benefit should be available to the entire country."

5.83. Asked whether any study was carried out on the incidence of non-equalisation of freight or IPCL user units particularly with reference to those which are affected, the Corporation stated in a written reply that based on the current rates of rail freight and distribution of DMT based on full production capacity and of Orthoxylene according to maximum level of consumption of user units the incidence of non-equalisation of freight has been worked out. It was stated that in the case of DMT among the major consumers Swadeshi Polytex and Indian Organic Chemicals would have to pay Rs. 20 and Rs. 92 less per metric tonne whereas Chemicals and Fibres of India and Calico would have to pay Rs. 58|- and Rs. 135|- more per metric tonne.

5.84. In regard to orthoxylene there were only two customers for the product of which one is close to IPCL. The latter would have to pay about Rs. 73|- more per M.

5.85. In this connection the Secretary of the Ministry stated during evidence that "They put it in the lap of Government and we in turn put it up in the lap of Bureau of Public Enterprises. I got a reply it does not tell us anything. Broadly speaking I would say that freight equalisation is an economic concept that can be operated in the economy as a whole. It should not be attempted for individual product and for such products like D.M.K. where freight may be Rs. 100-200 and price may be Rs. 15,000 to 20,000. It is hardly of any consequence.."

5.86. The Committee note that the question of fixing a uniform FOR destination price for DMT and xylenes was considered by the Corporation on the basis of an estimated production and distribution during 1973-74 and it was found that Rs. 110 per metric tonne in the case of DMT and 115 per metric tonne in the case of ortho-xylene and mixed-xylene would have been added to the ex-works price to arrive at uniform FOR destination price. The Committee were informed that the Corporation would not like to take all the responsibility for booking and despatch of DMT and bulk supplies of Ortho-xylene and it would be convenient for the bulk purchaser to take delivery ex-works. For this purpose, the Corporation would be giving a rebate on the uniform FOR destination price equal to railway freight to the particular destination at the rate used in the freight equalisation calculation. The Committee were also informed that the recoveries on account of freight would be reviewed periodically and adjustments made either by way of refunds to the parties over-charged or by fresh invoicing to the under-charged. In the case of ortho-xylenes and mixed-xylenes, supplies would be available at the regional offices at uniform prices.

5.87. The Committee, however, note from the minutes of the meeting of the board of Directors held on 26th February, 1973 that one of the directors had warned that 'unless a uniform F.O.R. price was introduced, the polyester fibre units situated at a distance from Baroda would be put to a disadvantage. This might also set in motion demands for establishing petrochemical projects in other areas; a large petrochemicals complex has been set up at Baroda on techno-economic considerations including the consideration to avail of economics of large scale operation and this benefit should be available to the entire country, and the Board decided to refer the matter to the Government. The Secretary of the Ministry, however, stated during evidence that "broadly speaking, I would say the freight equalisation is an economic concept that can be operated in the economy as a whole. It should not be attempted for individual

product and for such products like DMT." While the Committee agree with the views of the Secretary that freight equalisation is an economic concept, the Committee need hardly stress that petrochemicals industry being highly employment-oriented, the benefit of the price including freight should be available to the country as a whole irrespective of the distances. The Committee, therefore, recommend that the question should be examined carefully with reference to its effect on the profitability of the project and development of industries particularly in the backward areas. The Committee would like to be informed of the action taken in the matter.

VI

QUALITY CONTROL

6.1. In regard to the Quality Control arrangements the Management of IPCL stated in a written reply that the Units of the Aromatics Project were already functioning and vigorous quality control was exercised over raw materials supply in various stages, intermediates and over final products. A Quality Control Laboratory existed within the Plant and samples were analysed at every stage of production for critical qualities. The Laboratory functioned in all shifts on all days continuously and in each shift there were six persons employed. The Laboratory reported to the Plant Manager.

6.2. In addition to this, a Central Laboratory functioned under the control of a Chief Chemist, who reported to the Head of Technical Services. The Central Laboratory was well equipped with modern analytical instruments and had a staff of eleven persons. Samples from every batch were analysed and approved. The Laboratory also estimated other factors such as feedstock quality, catalyst activity and projection of changes in activity. Studies are also made on the longer term changes in the composition of naphtha feedstock, quality and composition of naphtha feedstock, quality and composition of streams returned to the Refinery, the effect of using imported crudes, quality of effluents.

6.3. The Management added that all IPCL products such as orthoxylene, DMT and paraxylene had, from the beginning, achieved and maintained internationally accepted quality standards.

6.4. IPCL had not received any complaints either from Indian or foreign customers in respect of Orthoxylen or Mixed xylenes.

6.5. In respect of D.M.T., some questions on specifications and some stray complaints of foreign matter had been received from the customers of IPCL. These were of a minor nature and did not affect either the sales or the customers' production. Effective measures have however been taken at the DMT bagging station to avoid such complaints in future. A few complaints had been received on quality of paper bags used for packaging of DMT. This matter was also being attended to by IPCL.

6.6. The Management further stated that there had not been any rejection of any product neither at Plant level on consideration of quality or by the consumers.

6.7. The Committee note that in the various units of the Aromatics Projects, vigorous quality control is exercised over raw materials supply in various stages, intermediates and over final products. In addition to this a Central Laboratory which is well equipped with modern analytical instruments analyses and approves samples from each batch of production. The IPCL products, namely, Orthoxylene, DMT and Paraxylene are stated to have achieved and maintained internationally accepted quality standards. Though there have been no complaints either from Indian or foreign customers in respect of Orthoxylene or mixed xylenes, A few complanits have been received on the quality of paper bags used for packaging of DMT. Even though the complaints are stated to be of minor nature and did not affect either the sales or the customers production, the Committee feel that all possible steps should be taken by IPCL to see that its products which are claimed to be of internationally accepted quality continue to maintain such high standdards and are free from complaints even of a minor nature and are to the satisfaction of the consumers. The Committee recommend that the Corporation should introduce strict standards for quality control and these should be meticulously enforced so that the products of the Public Sector Corporation, establish a name in the world market for their quality.

VII

FINANCIAL MATTERS

7.1. IPCL is a fully owned Central Government Company registered under the Companies Act, 1956. Except for three nominee share-holders, who are officers of the Administrative Ministry —Ministry of Petroleum and Chemicals—each of whom has one share of Rs. 1,000 the entire share capital is held by the President of India. At the time of registration of the Company, its Authorised Capital was Rs. 30 crores. It was subsequently raised to Rs. 60 crores on 13th April, 1973. As on 31st March, 1974, the Paid-up capital of the Company was Rs. 45.15 crores. In addition, a sum of Rs. 16.70 crores has been drawn as loan from the Government of India upto 31st March, 1974.

Capital Structure

7.2. Capital structure of the IPCL for the last four years is as follows:

(Rs. in crores)

	31-3-71	31-3-72	31-3-73	31-3-74
Authorised Capital . . .	30	30	30	*60
Issued Subscribed and paid up capital	11·85	16·42	26·74*	49·00**
Unsecured loan from Govt. of India .		6·69	15·08	16·70
Current liabilities and provisions .	958	0·96	1·53	11·59

*At an Extraordinary General Meeting of the Company held on September 13, 1974 the Authorised Capital since been raised from Rs. 60 crores to Rs. 100 crores with the approval of the Government.

**Includes amount from Government pending allotment Rs. 27 lakhs in 1970-71 Rs. 48 lakhs in 1972-73 and Rs. 385 lakhs in 1973-74.

Financial Results

7.3. The summary of the financial results for the year 1973-74 is given below:—

	(Rs. in crores)
Total sales turn over	5·22
Loss before depreciation and development rebate	0·31
Depreciation	2·50
Provision for development Rebate Reserve	4·96

7.4. On perusal of the published accounts for the year, 1973-74, the Committee came across an entry regarding "material suspense amounting to Rs. 8,05,484 representing the difference between the valuation of the physical inventory of stores and spares transferred from capital stores and that shown in the financial records."

7.5—7. On being asked if the reasons for the material suspense referred to above have been analysed, the Management in a written note stated as follows:—

"During the construction of the Aromatics Project Engineers India Limited were entrusted *inter alia*, with the receipt, storage and issue of equipment, materials and machinery at the Plant Site.

These construction stores were handled by EIL from April 1970 to March 1974, and their value was as under:—

	Value Rs.
1. Imported equipment & Stores	5,18,72,653·15
2. Indigenous equipment & stores	7,41,37,060·08
Total	12,60,09,713·23

After accounting for the materials issued for construction, there remained a balance, the book value of which was Rs. 86,61,298.56. These stores, which were left over after completion of the construction, were handed over by EIL to IPCL between July 1973 and October 1973.

Discrepancy

At the time of handing over the left-over materials the Materials Department of IPCL physically checked the quantity of the stores returned and the condition of the stores

was verified and noted on the materials returned vouchers The returned stores were taken over by IPCL as operational stores. A valuation of the materials returned was carried out with reference to the average rate of the materials, and amounted to Rs. 78,55,814.38, leaving a balance in the account to the extent of Rs. 8,05,484.18. Pending investigation, this amount was kept under suspense in the accounts for the year 1973-74. As the custody of stores during the construction period was with EIL they have been requested to investigate and reconcile this difference and this is at present being done."

7.8. It has been stated subsequently that this discrepancy has been narrowed down to Rs. 42,000. On being asked if a periodical physical verification of such stores is not being done and if this discrepancy could have been noticed earlier the Management stated as under:—

"Physical verification of construction stores in the custody of EIL was being carried out at the close of each financial year. (A perpetual inventory varification system has been introduced for our operational Aromatics stores).

The Stores returned by EIL after completion of the Aromatics Plant were physically verified and then valued to the extent possible. The discrepancy is the difference between the valuation of the physical balance and the figure in the accounts. The discrepancy could be due to a number of reasons such as inability readily to price a number of items, incorrect pricing, failure to record some issues, etc. As a result of work done since the accounts were closed, we have been able to reduce the discrepancy by about Rs. 1,75,000. Thereafter, the matter was referred to EIL who have informed us that reconciliation of a further sum of about Rs. 5 lakhs has been effected and efforts are being made to clear the balance."

7.9. From the Annual Reports of the Corporation it is seen that the expenditure on salaries and wages has been as follows:—

(Rs. in lakhs)

1969-70	1970-71	1971-72	1972-73
5.40	13.27	23.77	58.20

The expenditure was increased from Rs. 5.40 lakhs in 1969-70 to Rs. 58.20 lakhs in 1972-73.

7.10. The Committee find from the schedule F of the Annual Accounts for 1973-74 that a sum of Rs. 8,05,484 representing the difference between the revaluation of physical inventory of stores and spares transferred from the capital stores and that shown in the financial records has been kept under Material Suspense. The Committee are informed that his discrepancy was due to the difference between the book value and the valuation at the time of return of the materials to store. As custody of stores during construction was with E.I.L., they have been requested to investigate and reconcile the difference. It has been stated that the discrepancy has been narrowed down. The Committee were also informed that physical verification of construction stores in the custody of E.I.L. was being carried out regularly at the close of each financial year. The Committee feel that if E.I.L. had been required to render proper accounts for the consumption of material, such a situation at the completion of the work would not have arisen The Committee recommend that steps should be taken to have the discrepancies settled and amount under material suspense cleared at an early date. The Committee would also like that suitable instructions about the maintenance of proper store accounts at construction sites should be issued to avoid similar situation in future. ....

Manuals

7.11. In the Reports of the Company Auditors for the years 1970-71, 1971-72 and 1972-73 submitted to the Comptroller and Auditor General of India, it has been stated that:

> "*System of Accounts and book-keeping.*—There is no manual as such laying down accounting procedure etc. However there are Board resolutions laying down financial powers, duties and responsibilities of different officers of the Corporation.....
>
> *Internal Control.*—No manual outlining the scope and programme of work for Internal Audit is available for the period covered by the report.
>
> ....
>
> *Inventory procedure and control—*
>
> ....
>
> There is no stores manual as such, laying down the scope and procedures of inventory control. This is the Fourth year of the working of the Corporation and the

Corporation is in the stage of introducing effective procedures for the purpose of control."

7.12. The Management stated in a written note as follows:—

"The following Manuals have been prepared:

(i) Inventory Control Manual

(ii) Purchase Manual

(iii) Manual on Codification of Accounts

In addition, detailed instructions on (i) receipt, safe custody, disbursement and handling of cash and maintenance of bank and cash records, etc. (ii) procedure for operation and accountal of imprests, (iii) accounting of purchase transactions, (iv) capital goods and works tender procedures and constitution of purchase and tender committees, (v) delegation of powers, etc. have been issued.

This being the second year of operation, the procedures and systems are being evolved, taking into account the peculiar features pertaining to our Complex. Although some of the accounting procedures have not been formally codified in a manual so far, draft manuals have been prepared. These are being reviewed in the light of working experience and will be issued during the course of the next year."

7.13. The Committee regret to note that though the Company Auditors have been pointing out in their reports about the absence of Manuals for accounts, internal audit, inventory procedure and control right from 1970-71 to 1972-73, it is only now that the Corporation has prepared the inventory control manual, purchase manual and accounts manual. The Committee would like these manuals should be implemented without any delay so that the cash, stores accounts and other accounts records are maintained systematically. The Committee also recommend that a system of Management Accountancy should be developed so that the Management is kept fully informed in time of the different facets of the working of the Corporation, both in financial and physical terms, so that effective measures could be taken to arrest any adverse trends. The Committee also recommend that the procedure for internal audit should also be finalised keeping in view the recommendation of the Committee on Public Undertakings in their 15th Report (IVth Lok Sabha—1967-68) in this regard that the functions of the internal audit should include a critical review of the systems, procedures and the operations of the Undertaking as a whole.

VIII

RESEARCH AND DEVELOPMENT

8.1. Petrochemicals is a technology and engineering intensive industry, in which processing changes take place very rapidly. For instance, most of the processes to be used at IPCL were not even known 15 years ago. An alert and active R&D Department is hence essential not only for the very survival of IPCL and to guard it against technological obsolescence, but also for its future growth and expansion.

8.2. Recognising the need for extensive research and development facilities so that (a) improvements are effected in the technology purchased from overseas, (b) efficient indigenous know-how is developed so that incidence of foreign exchange expenditure is reduced, if not altogether avoided, and (c) by products and co-products available from the plants are rationally and profitably used, a detailed programme for the establishment of a Research and Development Centre was drawn up by I.P.C.L.

8.3. The nature of the R and D Department work will be of three types: supporting industrial research on processes or products of immediate importance to IPCL, innovating or renewing research to pave the way for future expansions and diversifications, and to a limited extent, fundamental or long-term research at the frontiers of knowledge, aiming at basic understandings or entirely new break-through in technologies.

8.4. The Research and Development Centre will engage itself in the following four major areas of research which are of interest to IPCL:

1. Chemical Engineering
2. Polymers
3. Catalysis
4. By-products Utilisation

The *Chemical Engineering* group will deal with process development and assimilation of the purchased technology so that it will be able to build new, similar plants, with improvements, elsewhere in India with little or no foreign technical assistance. Initially, this will be a joint venture with Engineers India Limited.

Polymer Division will mainly concentrate on areas of making co-polymers. It will also assist in the development of better products to suit customers' interests in collaboration with Product Applications Development group. A pilot plant will be set up for making SAN polymers with a view to producing commercial quantities of this polymer.

Catalysis Division.—This Division will not only help in trouble-shooting for the various catalysts in operation, but also try to develop some of the catalysts indigenously so that IPCL may become self-sufficient in the technology for all its catalyst requirements.

By-products Utilisation Division.—This Division will help in the better utilisation of some of the by-product streams in order to obtain maximum profits in the running of the various plants of the Complex.

Important research projects which have to be investigated have been identified and a priority list has been drawn up. The suggestions of NCST have also been taken into consideration.

8.5. Some of the major accomplishments of the R&D Department are detailed below:—

(1) The quality specifications for the naphtha required as raw material in the Aromatics Plant had been drawn up at an earlier date based on the information available at that time (before commissioning of the plant) regarding crude composition and catalyst activity. Based on experience of operation, investigations have been undertaken by the R&D Department jointly with the Process Control Laboratory. It now appears that with a narrower naphtha cut a higher yield can be obtained. Now tentative specifications are being drawn up and are under discussion with the Gujarat Refinery. The possibilities of producing material according to revised specifications of optimum quality naphtha will be studied jointly with the Gujarat Refinery. This may necessitate changes in processing conditions and installation of additional equipment in the Refinery. If this can be done, the advantages will be considerable.

(2) In the future, Koyali Refinery may have to process imported crudes of different compositions, higher sulphur contents, etc. The R&D Department is examining the

consequences of these changes on Aromatics production and on production of Olefins and down stream products.

(3) Supporting investigations have been undertaken to optimise the operational conditions for the expensive platinum catalysts in order to prolong the activity of the catalysts.

(4) The reforming process using platinum catalyst is invariably accompanied by a slow decline of the catalyst activity. Hence the catalyst has to be regenerated (burn off the coke from the catalyst) periodically. The R&D Department is intimately involved in formulating regeneration procedures.

(5) The R&D Department is keeping abreast of new development in the field of catalysts for reforming and is trying to evolve a superior catalyst for IPCL's existing Reformer.

(6) Several by-products will be available in large quantities from IPCL manufacturing processes. Conversion of these by-products into valuable chemicals and intermediates is receiving the attention of the R&D Department.

(7) Certain specific imported raw materials are required for the manufacture of products in IPCL. The R&D Department has undertaken investigations on preparing such materials within the Complex or on ensuring availability from within India.

(8) At present cobalt catalyst is used in the DMT Plant. Some of the DMT Plants abroad are using superior catalysts. Investigations have been undertaken in the R&D Department to prepare an improved cobalt catalyst locally.

(9) The engineering group in IPCL has worked out details of some of the special equipment and spare parts, which were originally imported, and have passed on these to ancillary industries to get these fabricated locally. Such activity ensures a continuous supply of essential spares and parts to IPCL, at the same time contributing to the development of small and medium scale industries in the country.

(10) Where appropriate, the work of R&D Department is supplemented by sponsoring work in National Laboratories and other research institutions. The Company has sponsored supported work in the National Chemical Laboratory for development of process on acrylates and propylene oxide and it is interested to use this information for initial pilot plant and full scale manufacture. Similarly, work has been in progress in the University of Bombay on the development of a process for the production of Isobytylene.

8.6. At present the Research and Development centre is housed in temporary accommodation. Permanent building for the centre are under construction and will be ready for occupation shortly. The R&D Centre is expected to be completely operational when all the plants of IPCL are on stream. A sum of Rs. 80 lakhs was allocated for R&D in IPCL in the Fourth Five Year Plan against which Rs. 61 lakhs were spent.

8.7. The capital expenditure already approved for the period 1974-75 is Rs. 90 lakhs, and the revenue expenditure is estimated at Rs. 9 lakhs.

The cash expenditure incurred on R&D Department from the financial year 1970-71 onwards is furnished below:—

Year	Expenditure on capital (Rs. in lakhs)	Revenue expenditure (Rs. in lakhs)	Total expenditure (Rs. in lakhs)
1970-71	Nil	1·18	1·18
1971-72	1·97	7·24	9·21
1972-73	7·64	6·82	14·46
1973-74	21·24	10·65	31·89

As a percentage of the total cash expenditure of each year, expenditure on R&D works out to:—

1970-71	0·18%
1971-72	0·77%
1972-73	0·98%
1973-74	*1·08%

N.B.—*This percentage is in relation to the total cash outlay on the various projects plus the revenue expenditure excluding depreciation of the Aromatics Plant which was commissioned in 1973-74.

8.8. The Management stated in a written reply that the following schemes have been commissioned in the National Chemical Laboratory at Poona:

Ethylene to Ethylene Oxide,

Propylene to Propylene Oxide

Process for Acrylates.

An expenditure of about Rs. 5-1/2 lakhs has so far been incurred on these schemes.

On two of these schemes, Propylene Oxide and Acrylates—the work had progressed to the stage of pilot plants and it was proposed thereafter to take up the engineering of plants for commercial production. There was close coordination between NCL and IPCL in the field of applied research. IPCL had been sponsoring research schemes in NCL and had also commissioned a study on the assimilation of technology purchased from abroad.

8.9. On being asked whether the Research and Development centre at Koyali near Baroda was set up jointly with Engineers India Limited, the Management stated in a written note that since Engineers India Ltd., were also interested in research of chemical engineering oriented subjects, initially it was thought that the Division on Chemical engineering would be organised and managed jointly by EIL and IPCL. On reconsideration, however, it appeared that the total quantum of research work on chemical engineering that would be required by IPCL alone would be substantial and, therefore, it was proposed to set up this Division under the exclusive management of IPCL. The facilities being created in this Division would, however, be available to others including EIL whenever a specific work could most conveniently be carried out in Baroda.

8.10. The Division in the Research and Development Centre that would deal with 'Research' work on chemical engineering would be a part and parcel of the IPCL and R & D Centre. It would not be a separate organisation.

8.11. On being asked as to what measures have been taken to keep IPCL abreast of the latest developments in technical know-how and expertise in petrochemical industry in other countries the Management informed the Committee as under in a written note:—

"*Measures taken to keep abreast of latest Developments*:

(1) Periodical conferences arranged by process licensors for exchange of information on operating plants in various

countries are attended by concerned project task force personnel as also by scientists in the R & D Department. The scientists of the R & D Department also take an active part in participating or conducting seminars, in discussions of the panels of NCST, expert committees of national laboratories, etc., attend international meetings in their own disciplines, write papers for scientific journals in India and abroad, etc. In this way, they keep close contact with other professionals in the field and keep themselves abreast of the latest developments in science and technology.

(2) IPCL is contributing to a number of technical journals published in different countries of the world on petrochemicals and allied subjects. These journals are reviewed and notes made of any developments in the technologies that are reported.

(3) Letters are written to various internationally renowned firms for the supply of know-how whenever a particular petrochemical product is planned to be manufactured. Process know-how offers received from these firms are evaluated for the claims made by them about the superiority of their process both from technical and economic angle.

(4) After project formulation reports are approved by the Government and before preparing a detailed project report, visits are made to the firms who have responded to our requests for the supply of know-how and clarifications sought from them on various points in detail. Visits are also made to various plants/set up indifferent countries based on technologies offered to find out whether the firms who have set up the plants are experiencing any difficulties and also whether the claims made by the process licensors are correct."

8.12. The Committee note that a full-fledged Research and Development Centre has been set up as part of the IPCL with a view to effecting improvements in the technology purchased for the projects from overseas developing engineering know-how so that expenditure of foreign exchange is reduced if not eliminated and using the by-products and co-products available from the plants rationally and profitably. A sum of Rs. 80 lakhs was allocated for R & D in the 4th Five Year Plan and as against this a sum of Rs. 61 lakhs was spent during the period. The capital expenditure already approved for the period 1974-75 is Rs. 90 lakhs and the revenue expen-

diture for this period is estimated to be Rs. 9 lakhs The centre is stated to have been working since 1970-71 and has done research on raw material specifications effect of different type of crude on the plants, optimisation of operational conditions etc. The Committee hope that the results of research would be advantageously utilised in the operation of plants. The Committee further note that important research projects which have to be investigated by R & D Centre have already been identified and a priority list has already been drawn up. The suggestions of NCST have also been taken into consideration. The work of R & D Centre is stated to be supplemented by sponsoring the work in National Laboratories and other research institutions. The company has in fact sponsored work on certain processes in the National Chemical Laboratory, Poona, and in the University of Bombay. There is stated to be close coordination between the National Chemical Laboratories and IPCL in the field of applied research. The Committee are glad to note that due importance has been given to the research and developmnt work in th IPCL right from the beginning and adequate funds have been placed at its disposal for the purpose. Needless to say, the success of the centre will be indicated not by the amount of money spent by it on capital account or revenue account but by its achievements in the research projects which it has chosen to investigate. The Committee recommend that Government should undertake to an objective appraisal by an Independent Expert Body of the work done by the Research and Development Centre from year to year in order to see how far the centre has succeeded in achieving the objectives for which it has been set up. Among other things, they would like the Centre to pay attention to the problems which arise in the day-to-day working of the various plants of IPCL and not only suggest measures to solve those problems but also to devise techniques to bring about efficiency and economy in the general working of the various plants.

8.13. The Committee understand that Engineers India Ltd. is also interested in research on chemical engineering oriented subjects. Initially it was thought that the Division on Chemical Engineering would be organised and managed jointly by EIL and IPCL. On reconsideration however, the IPCL has decided to do it alone as the total quantum of research work on chemical engineering that would be required by IPCL would be substantial. In view of the fact that both EIL and IPCL are public sector organisations interested in more or less the same field, the Committee recommend that there should be close coordination between the two undertakings to obviate any duplication of activities and efforts should be intensified in more critical areas by pooling the talents and bringing about economies in overheads.

IX

ORGANISATION

A. Organisational Set-up

Board of Directors

9.1. Under the Articles of Association of the Company, the President is empowered to appoint the Chairman, the Managing Director, the Finance Director and other Directors of the Company. The Managing Director and the Finance Director are full time Officers of the Company. The remaining Directors are part-time Directors. The part-time Directors hold office from the date of their appointment until the conclusion of the next Annual General Meeting. The Articles of Association of the Company provide for a maximum of 12 and minimum of two directors. At present there are 10 Directors on the Board including the Chairman & Managing Director and the Finance Director.

9.2. The present composition of the Board of Directors (as on 1st February, 1975) of I.P.C.L. is as follows:—

	Chairman and Managing Director.
Directors	Finance Director.
	Joint Secretary—Ministry of Petroleum and Chemicals.
	Adviser (Petro-Chemicals) Ministry Petroleum and Chemicals.
	Director, Ministry of Finance, (Department of Expenditure).
	Chief Secretary, Govt. of Gujarat.
	Managing Director, Gujarat Industrial Investment Corporation.
	Industrial Adviser, D.G.T.D.
	Managing Director IOC (Refineries Division)
	Managing Director, Industrial Credit and Investment Corporation of India, Bombay.

9.3. Immediately on the formation of the Company, Indian Institute of Management, Ahmedabad, were retained as Consultants for advising the Company on the organisational design. Based on the report submitted by that Institute and the subsequent change in the scope of activities of IPCL, the Organisation Committee of the Board of Directors drew up the Organisation Chart for the Company.

The Organisation has been divided into the following six major divisions:—

(1) Operation Division
(2) Staff Division
(3) Finance Division
(4) Management Services Division
(5) Marketting Division
(6) R&E Division.

9.4. In addition to these six divisions, there would be a temporary construction division, which would be disbanded after the construction work is over.

9.5. It has been stated that this oragnisational set-up (except the construction Division) is envisaged for the permanent set-up after the construction of all the Units is completed.

Present position

9.6. Of the projects assigned to IPCL, only the Aromatics Projects has been completed and is in operation. It has a Production Manager, a Production Superintendent and the necessary supporting engineers and technicians. The rest of the projects are in the project stage. Each of these projects is presently assigned for development to individual project task forces under the responsibility of a Project Coordinator.

9.7. In order to discharge their responsibilities the task forces are assigned engineers from various disciplines—mechanical, electrical, istrumentation and civil. A representative of the Finance and Accounts Department is also attached with each task force.

9.8. For achieving coordinated progress of the individual units, uniformity in design, coordinated procurement and construction efforts, common philosophy on spares, etc. a project Coordination Group has been set up. The Project Coordinators in-charge of the Task forces and the Heads of the Project Coordination Group report to the Managing Director.

In view of the above arrangement during project implementation stage, the positions in the organisation chart are being filled in a phased manner.

9.9. As Petro-chemicals is a sophisticated technology and engineering intensive industry, the Committee stress that there should be an increase in the number of technical hands on the Board of Directors, especially when the Corporation is in the process of setting up down stream units so that they may be in a position to view the problems in their correct perspective and take decisions in the best interests of the Corporation.

B. Manpower Analysis

9.10. A comparative statement of man-power figures as per detailed project report|feasibility report and persons in position as on 31-8-74 is given below:—

Sl. No.	Project	As per DPR/FR			In position as on 31-8-1974			Remarks
		Super-visory	Non-super-visory	Total	Super-visory	Non-Super-visory	Total	
1	2	3	4	5	6	7	8	9
1	Gujarat Aromatics Project	79	141	220	58@	436	494	
2	Gujarat Olefins Project	69	102	171	16	7	23	
3	Polybutadiene Synthetic Rubber	39	82	121*	6	2	8	*Total given in DPR is 122 but it should be 121.
4	Acrylonitrile	13	59	72	7	2	9	
5	Polypropylene			450*	6	2	8	*Break-up of supervisory & Non-supervisory not given.
6	Low density Polyethylene	..	..	500*	4	2	6	* Do.

@Earlier, the figure of supervisory personnel for the Gujarat Aromatics Project included Panel Controllers and Jr. Engineers (Civil)—totalling 20—which was already included under "Non-Supervisory."

*For other projects DPR/FR provides figures on house accommodation while in this project total man-power figures are provided.

1	2	3	4	5	6	7	8	9
7	Detergent Alkylate .			70*	6	3	9 *	Do.
8	Ethylene Glycol. .			100*	6	3	9 *	Do.
9	Acrylic Fibre	65	495	560*	8	2	10	
10	Polyester Filament Yarn**	26	106	132	7	3	10	
11	Project under formulation VC/PVC .		..	..	2	1	3	Under preparation.
12	Common Services .	..	..	..	229	534	763	
	TOTAL .	291	985	2396	355	997	1352	

9.11. The total number as per DPR/FR is 2396. Against this, the personnel now in position directly chargeable to the projects number 579 (excluding for Polyester filament yarn/Project.) In addition, 763 persons are in position in departments such as accounts, personnel, administration, materials, marketing etc. serving the whole complex, including the Aromatics Plant. The total is thus still far short of the number in the DPR/FR's.

9.12. The Management in written note stated that "it was however, felt that the DPR/FR provision for staff had not been realitically worked out and for this reason the Institute of Applied Manpower Research had been commissioned in February, 1973 to undertake a study to assess the staff requirements of each plant when it was operational."

9.13. The Institute submitted a report containing recommendations relating to the staff required excluding supervisory positions, assessed and recommended on the basis of work study reports for each section/department of the Aromatics Plant. (In regard tosupervisory positions the IAMR expressed some ideas in a tentative note but this has to be reviewed further in the context of the overall organisation of the complex). The recommendations of the Institute were discussed in detail with them and with the technical

*For other projects DPR/FR provides figures on house accommodation while in this project total man-power figures are provided.

**A separate organisation has been set up for the project from 10th September, 1974.

officers of the company. As a result of these discussion, the staff strength as finally adopted is as below:—

Sl. No.	Department	Sanctioned by the Management IPCL	Number in position	IAMR Suggestion	Agreed	Diff. No. (3—6)	Percentage difference in department
1	2	3	4	5	6	7	8
1	Production	157	151	119	129	28	17.8
2	Laboratory	28	24	23	24	4	14.1
3	M & E	282	217	225	257	25	8.9
4	Civil	31	28	22	26	5	16.2
	TOTAL	498	420	389	436	62	12.5

9.14. The difference between the number recommended by the IAMR and that finally decided upon is mainly due to the manner of the computation of leave reserve. The Institute had worked on the basis of leave admissible under the Factories Act. Subsequently, however, it was decided to extend to these categories of employees the same leave terms as applicable to the other staff. This had the effect of increasing leave reserve from 25 per cent to about 33 per cent.

9.15. It has further been stated in a written reply by the Management in respect of the staff position in Aromatics and other projects that the total number of employees in the Aromatics Plant is an agreed figure after consideration of the recommendation of the Institute of Applied Man-power Research. There is no surplus at present.

9.16. In the light of experience gained by IPCL the Institute of Applied Manpower Research, has been entrusted with another study on the requirement of staff for the Olefins Project and the Downstream Units so that on the basis of their recommendations a phased progremme of recruitment could be undertaken. The study was entrusted in June, 1974 and it was expected to take about six months to be completed.

It is precisely to avoid any over-staffing in the future that these studies have been undertaken. Right now, eight out of nine of IPCL plants are in the construction stage and the full complement of staff has not been recruited. The position will remain under continuous review.

9.17. There is no over-staffing in other projects since IPCL is far from having in position the ultimate strength required.

9.18. Asked whether there have been details in DPR/FR's of the projects, the Management stated in a written note that the requirement of staff had been very broadly, indicated in DPRs/FRs mainly for the purpose of determining the salary element in the cost of production and for estimating the extent of residential accommodation required. It was difficult to determine the exact requirement of staff unless detailed studies, as the ones at present being undertaken by the Institute of Applied Man-Power Research were made. This could be done with some accuracy only after the process scheme and in the case of maintenance staff where decisions had to be taken about the types of work that would be undertaken departmentally and those that might be contracted out.

9.19. Details relating to supporting non-technical staff would also vary depending upon the extent to which services were centralised or decentralised. In view of these reasons it was not possible at the time of preparing the DPR/FR to work out the staff requirements in detail nor the figures contained therein could be treated as a basis of recruitment.

9.20. The Committee note that as against 79 supervisory and 141 non-spervisory posts indicated in the DPR of Gujarat Aromatics Project, the actual staff in position in the Project is 58 supervisory and 436 non-spervisory. The Committee are informed that because provision for staff in the DPR|Feasibility Report had not been realistically worked out, the Institute of Applied Man-power Research had been commissioned to assess the staff requirements of each plant when it was operational. According to their report the Committee find the Institute had suggested a strength of 389 against the present sanctioned strength of 498 for the project and existing strength of 420. After discussion it was agreed to have a strength of 436 after adjustment of the leave reserve.

9.21. The Committee were also informed that in the light of the experience gained by IPCL, the Institute has been entrusted with another study on the requirements of staff for the Olefins and Downstream Units. Although the Committee has been assured that there is no surplus staff with the Corporation at present, the Committee recommend that the Corporation should keep the position under constant review and in the light of the experience of operations, fix realistic staff standards and ensure that there is no overstaffing at any stage in any of the projects.

9.22. About the recruitment of scientists and engineers from India and abroad, the Management stated in a written note as follows:—

> "It was certainly a challenge to recruit a large number of qualified and experienced scientists and engineers from India and abroad. IPCL had, however, had a fair degree of success in attracting a number of such scientists and engineers to the Corporation. Out of a total of 400 officers in the technical, production, engineering, research, technical services and related categories, a large number held higher degrees and have worked abroad. The following may illustrate this:—

	Nos.
Those trained abroad	78
Those holding Master's degree in Science or Bachelor's degree in engineering or technlology	183
Those holding Doctorate degree	22
Those with more than 10 years of working experience in industry or research	90

9.23. The Management added that IPCL had not yet worked out a detailed career development plan. It was its intention to do so and it had already begun identifying senior positions that would have to be filled during the next five years or so and the persons who could be developed to do so.

9.24. It is no doubt a challenge to recruit a large number of qualified and experienced scientists and engineers from India and abroad and the Committee note that the IPCL is reported to have had a fair degree of success in this field. But in their opinion, there is a bigger challenge ahead in creating a climate in which the highly qualified and experienced scientists and engineers recruited by IPCL can work with creative zeal in an atmosphere of co-operation with one another, have a feeling of job satisfaction and do not feel frustrated for lack of recognition of their talent and achievements. The Committee hope that the IPCL will continue to attract scientific and engineering talent from India and abroad and will soon work out a detailed career development plan which will provide openings for advancement for the competent technical and scientific personnel at all levels.

C. Training

9.25. In its report on Petrochemicals, the Task Force of the Planning Commission made the following observation in regard to the

training facilities for personnel required for the petrochemicals industry:—

"The training of supervisory and non-supervisory staff to enable them to handle the production and maintenance of the petrochemical plants may require 6 months to 18 months depending on the educational levels of the trainees. It will be necessary to give detailed training regarding the petrochemical processes, unit operations, safety requirements in operation and maintenance of these plants since the petrochemical manufacturing processes require handling of highly inflamable explosives and corresive liquids, gases and solids. Detailed information regarding the toxicological and pollution problems involved in the petrochemical plant operation will have to be imported.

The training will have to be closely linked with the experience to be obtained by the trainees in actual operation and maintenance of these production facilities. The training schedule will have, therefore, to be carefully drawn up in consultation with the manufacturing organisations so that the trainees are able to handle and become acquainted with either the plants and machinery which they will have to operate and maintain or are given similar training with the help of process simulators.

Training of quality control staff for looking after the in-plant testing and the raw materials and finished products testing will have also to be organised."

9.26. The Management of IPCL informed the Committee that they were implementing a Training Programme for their employees. The salient features of the various training schemes are given below:—

Operator Technician Training Scheme

Under this scheme fresh Science graduates (with Chemistry, Physics and Mathematics) and Diploma holders in Engineering will be trained as Operators and Technicians respectively for a period of one and a half years.

Act Apprentice Scheme

Under the Apprentices Act, 1961, training facilities are provided to apprentices in different designated trades such as Attendant Operator, Maintenance Mechanic, Instrument Mechanic, Laboratory Assistant, Fitter, Welder, etc.

9.27. The first batch of apprentices under this scheme is undergoing training. Out of the 47 trainees, initially recruited under this training scheme, 43 are currently in training. These apprentices were earlier given six months basic training. They are children of losers of land acquired for establishing IPCL Projects. The scheme for giving them basic training for six months was drawn up specially to fulfil the social obligations of rehabilitating the land-losers. The question of recruiting a fresh batch of such apprentices from out of the dependents of land losers will be considered in due course if felt necessary.

Training programmes for employees:

(i) *Induction Training Programmes:*—This programme is arranged for fresh entrants to enable them to familiarise themselves with the Corporation's rules and regulations, procedures, policies, customs, etc. This is a part-time programme with a duration of 3 to 6 days.

(ii) *Supervisory and Management Development Programme:*—This programme is meant for developing supervisory skill in the executives. This is a full-time programme with a duration of 4 to 6 days. In addition to in-company programmes, officers are sponsored to attend such programmes arranged by institutions devoted to management development.

(iii) *Safety Training Programme:*—This programme is designed towards inculcating safety consciousness among the employees, keeping in view the hazardous nature of operations and maintenance as well as the nature of the products handled in the plants. This is a part-time programme with a duration of 4 to 6 days.

(iv) *Fire Fighting:*—This programme covers the basic elements of fire fighting, fire protection and fire fighting equipment. Demonstrations of fire fighting are also arranged. This is a part-time course for six days.

(v) *First-aid Programme:*—This programme covers theoretical and practical training in First-aid with a part-time duration of 10 days.

(vi) *Refresher Training Programme:*—Such programmes are arranged as and when needed with a view to brusing up the theoretical knowledge of the employees and to acquaint

them with the latest information and techniques related to their professional subjects.

(vii) *Carmody Training Programme*:—This programme uses simulation technique for plant operation. The Carmody process trainer simulates actual operating conditions. The process conditions can be varied and the trainees are afforded an opportunity to test their theoretical knowledge in correcting abnormalities and reacting to emergencies. Abnormal process conditions, which could even blow up the plants, are created in this simulator and the reaction and corrective action taken by the trainee based on his theoretical and in-plant training is assessed. Start up and shut down procedures are also explained with the aid of this simulator. Trainees can operate various control mechanisms in this simulator without fear of complications that would otherwise occur in an operating plant.

(viii) *Vacational Training Programme*:—Training facilities are provided to a number of students from different universities and technical institutes during vacations."

9.28. The number of employees and students trained in various programmes during the years 1971 to 1973 and upto June, 1974 are as follows:—

Sl. No.	Name of Training Programme	No. trained during the year			
		1971	1972	1973	Till June, 1974
1	Induction	33	346	373	110
2	Supervisory/Management Development	..	22	50	29
3	Safety		55	129	..
4	Fire fighting		36	57	..
5	First-aid	..	54	16	
6	Carmody		41	54	..
7	Vacational Trainees		..	28	13

9.29. A permanent training institute building with modern training facilities, laboratories and workshop is nearing completion.

9.30. The total annual expenditure on training from 1971-72 onwards is as follows:—

	Rs.
1971-72 . . .	6,91,473·05
1972-73	1,27,364·26
1973-74	5,61,930·68

9.31. The Committee note that the IPCL has introduced a number of training schemes to prepare the technical and other personnel to handle the maintenance and production of the plants properly and efficiently and to keep them abreast of latest information and techniques related to their professional subjects.

They cannot over-emphasise the importance of training and refresher courses in petrochemicals field in which new and far-reaching technological developments are taking place very fast and IPCL cannot afford to ignore them.

9.32. The Committee note that the Task Force of Planning Commission has emphasised the need for closely linking the training with the experience to be obtained by the trainees in actual operation and maintenance of production facilities. The Committee recommend that these observations would be kept in view in organising the Training Schemes.

9.33. The Committee are glad to note that the IPCL has introduced a training scheme for the children of persons whose land was acquired for establishing petrochemicals projects with a view to fulfil the social obligation of rehabiliting the land losers. Of the 47 trainees initially recruited under this scheme, 43 are currently under training and the question of recruiting a fresh batch of such apprentices is to be considered in due course if considered necessary.

9.34. The Committee also note that the expenditure on training has been of the order of Rs. 6.9 lakhs in 1971-72, Rs. 1.2 lakhs in 1972-73 and Rs. 5.6 lakhs in 1973-74. The Committee would like the Corporation to undertake evaluation of the training programme so as to assess the usefulness of the training in actual operation and maintenance of production facilities. The Committee need hardly stress that the Corporation should ensure that there are no drop-outs in the trainees and there is a systematic follow-up to see that the persons trained are usefully deployed in the appropriate fields.

D. Labour Management Relations

9.35. A Union of employees of the Company in the salary grades upto and including Rs. 270-520 (pre-revised; revised equivalent grade: Rs. 550—800) was registered under the Indian Trade Unions Act in the name of 'IPCL Employees Association' in July, 1973. The Union is affiliated to Bharatiya Mazdoor Sangh. Uptil May, 1974 this Union comprised mainly of employees in the non-technical administrative departments. From May, 1974, however, a substantial number of employees from all departments have been joining the Association. The Association has sought recognition which is under consideration.

9.36. Some time back, a notice pertaining to curtailment of bus facilities was issued on which the Association referred the matter to the Conciliation Officer. Management had, in the meantime, held the curtailment of bus facilities in abeyance till a negotiated settlement was arrived at. This matter is still pending before the Conciliation Officer.

9.37. The officers of the Company formed an Association called the 'IPCL Officers Association' in May, 1974 and registered it under the Indian Trade Union Act. The Association has requested Management to accord recognition and the matter is receiving attention.

9.38. The Management stated in a note that the relations between the Management and the employees have been cordial.

9.39-40. It has been stated that the following welfare amenities have been provided to the employees in IPCL:

(1) Transport facilities
(2) Educational facilities
(3) Housing accommodation
(4) Welfare Organisations for providing recreational, cultural and other facilities to the employees of IPCL and their families, Cooperative Credit Society, Sports Control Board etc.
(5) Medical facilities
(6) Canteen facilities in the shape of a subsidised canteen.

9.41. The Committee are glad to note that the relations between the Management and the employees have been cordial and welfare amenities have been provided to the employees of the Corporation. The Committee recommend that the IPCL should keep in view the recommendation made by the Committee in their 17th Report (5th Lok Sabha) on Personnel Policies and Labour Management Relations in Public Undertakings and shape their Labour Management relations in the light thereof.

X

CONCLUSION

10.1. The Indian Petrochemicals Corporation Ltd. was set up on 22nd March, 1969 implement the public sector Petrochemical Projects—Aromatics Project and Olefins Project with subsequent addition of Downstream Units with the main objects of carrying on the business in the field of Petro-chemical including outlining of technology and fabrication of equipment.

So far only the Aromatics Project comprising DMT and Xylenes Plants has been completed and is in operation at present and the other projects are at different stages of completion.

10.2. During the course of the examination of Indian Petrochemicals Corporation Ltd. the Committee find that:—

(i) Almost entire requirements of DMT are currently being met out of IPCL production.

(ii) The IPCL products, namely, Orthoxylene, DMT and Paraxylene are stated to have achieved and maintained internationally accepted quality standards, and there have been no complaints either from Indian or foreign customers in respect of Orthoxylene or mixedxylenes.

(iii) A full fledged Research and Development Centre has been set up as part of the IPCL with a view to effecting improvements in the technology purchased for the projects from overseas, developing engineering know-how so that expenditure of foreign exchange is reduced if not eliminated and using the by-products and co-products available from the plants rationally and profitably. The Centre has done research on raw material specifications effect of different types of crude on the plants and optimisation of operational conditions.

(iv) IPCL will have a pioneering role to play in stimulating and creating demand for its solid products through new investments by existing entrepreneurs or through deve-

loping a new class of entrepreneurs in this small and medium scale sector.

10.3. The Committee however find that:—

(i) The Indian Petrochemicals Corporation Ltd. has not so far formulated its statement of objectives/obligations in spite of the fact that IPCL was asked by the Ministry in 1971 to look into the matter.

(ii) Though according to the DPR the time for completion of the Aromatics Project was 38 months from February 1967 and production was to commence from April 1970, the Corporation has taken 57 months for completion of the project with the result that the Corporation suffered a loss in production of about Rupees Nine crores due to the delay in the commissioning of the plant.

(iii) There was lack of planning and synchronisation in having the para-xylene plant commissioned later than the DMT plant when the DMT plant was based on para-xylene as its feed stock. The result of this was that the DMT plant had to be run with imported para-xylene and foreign exchange to the extent of Rs. 44.80 lakhs had to be spent. The plant had to be shut down and remain closed from September to December, 1973 for want of para-xylene. With better planning and monitoring of the programmes at several stages including effective steps for production of indigenous machinery it should not have been difficult for the undertaking to have ensured synchronisation between the two plants and effected considerable saving in foreign exchange.

(iv) Though the para-xylene unit of Aromatics Project was mechanically completed in August, 1973, its smooth operation could not be achieved till the end of 1973 owing to the repeated failures of the imported compressor in the propane refrigeration system which was supplied by M/s. Linde who were selected by the foreign collaborators (M/s. Krupps). The compressor was not of proven design. Though Krupps were responsible for carrying out inspection testing of the equipment before despatch the IPCL did not exercise the option of deputing a representative to Linde's works to inspect the compressor in spite of the fact that the contract gave the right to IPCL representative to be present during the testing.

(v) Inspite of the repeated failure of the compressor, no investigation was made either by Undertaking or by the Government to identify the exact causes of the repeated failure except getting a report from the collaborators. Because of the repeated failure of the compressor and delay in the commissioning of the plant, the Corporation suffered a loss in production to the extent of Rs. 6 crores. The Compressor was recommissioned in March, 1974 and the same has been running satisfactorily since then.

(vi) As against the installed capacity of 24,000 MT and 21,000 MT of DMT and Oxylene, the capacity utilisation of Oxylene and DMT has been only of the order of 21.5 per cent and 65 per cent in 1973-74 respectively. As against the production targets of 15,000 MT of DMT and 10500 MT of Orthoxylene for 1974-75 the actual production during the first six months (April to September) of 1974-75 was 7,726 MT of DMT and 5,416 MT of Orthoxylene.

(vii) There has been slippage in the schedule of mechanical completion of the projects under Gujarat Olefins Project and its down-stream units, the delays ranging from 12 to 36 months. In the case of Naptha Cracker Project the delay in execution is expected to be of more than 3 years.

(viii) The pricing of the products of IPCL had been undergoing frequent revisions and every time the prices fixed were provisional.

(ix) While the world had made tremendous progress in sixties in the field of Petrochemical Industry, it is only in the last five year plan that some effort has been made to set up a Petrochemical Industry at Baroda. But this effort suffered initially for the plan covered only the installation of the two mother plants without downstream units. It took Government almost three years to take a decision to place the responsibility for down stream units also on the Public Sector. The result was heavy delay in the setting up of down stream units and in the achievement of objectives of integrated development of Petro-chemical Industry. Government should see that in future Petrochemical Industry Plants are planned in an integrated manner.

(x) While the cost of DMT, the base product for Polyester fibre cloth is not high, the cloth produced by using DMT is sold at a price which is higher. With the stabilisation of production of DMT the prices of Polyster fibre cloth and

other products manufactured with DMT as base should be so fixed that the benefit of reduction in price of DMT could ultimately be passed on to the public.

10.4. Having regard to the tremendous potentialities of the Petrochemical Industry in the matter of accelerating the pace of development and creating employment opportunities, the Committee feel that like the Electronic Industry this is another field which should receive prior and intensive attention of the Government. Government should prepare in depth a shelf of schemes so that these could be taken up for implementation on a priority basis having regard to the availability of resources, raw-materials, demand pattern etc.

In deciding the product-mix, Government should keep in view the primary need for utilising petrochemical industry for manufacture of products which would best serve the interest of the common man and development, rather than cater to the fanciful requirements of more affluent sections of society.

There should be coordination at the highest level in research and technological fields to see that know-how in the crucial areas of petrochemical industry is developed in the country in the shortest time and where it is not available, latest know-how best suited for our requirements is obtained without delay so as not to hold up development.

The Committee would like to draw the attention of Government to the need for ensuring that Petrochemical industrial units do not pollute the environment, thus alienating the sympathies and jeopardising the health of the people in the vicinity of the plants.

Since Petrochemical intermediates are the raw materials for a number of industries, Government should take effective measures to see that the prices of Petrochemicals which are used as raw materials are reasonable and internationally compitetive and the benefit of any reduction in the prices is always available to the common man.

NEW DELHI;
April 22, 1975.
Vaisakha 2, 1897 (*S*)

NAWAL KISHORE SHARMA
Chairman,
Committee on Public Undertakings.

APPENDIX I

Summary of Conclusions/Recommendations in the Report.

Sl. No.	Reference to para No. in the Report	Summary of Conclusions/ Recommendations
1	2	3
1	1.18	The Committee note that IPCL was formed in March, 1969 as a separate Company to implement the public sector Petrochemical Projects formulated earlier by the Petrochemicals Division of the ONGC, with the main objects of carrying on the business in the field of Petrochemicals polymers and industries based on Petrochemical including outlining of technology and fabrication of equipment. The Committee are informed that the aims and objectives of the Corporation apart from production of several petrochemicals intermediates and raw materials would be achieved when the project goes into production on a regular commercial basis. The obligations of the Corporation will not be confined merely to production of the petrochemicals but will comprise the various objectives with regard to profitability, resource generation, development of marketing facilities, technical services, introduction of new conversion products, research and development to the extent practicable, reaching a position of near independence in know-how in technology. From the subsequent chapters, it will be seen that, from the date of inception of the Corporation till now, only the Aromatics Project has been completed and is in operation at present and the other projects are at different stages of their

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		completion. In view of the need for the petrochemicals and its end-products in the country and the importance of Petrochemical Industry for the development of the country, the Committee stress that every effort should be made both by the Corporation and the Government to complete and commission all the projects under Indian Petrochemicals Corporation Ltd. in accordance with their scheduled dates of completion so as to achieve the aims and objectives of the Corporation at the earliest.
2	1.19 to 1.22	The Committee find that while the World had made tremendous progress in Sixties in the field of Petrochemical industry our country lagged way behind. It is only during the last Five Year Plan that some effort has been made to set up a Petrochemical industry at Baroda. But this effort suffered initially, for the plan covered only the installation of two mother plants without the down-stream units. The Committee note that in the beginning the idea was that the projects for the utilisation of the products from the two mother units of IPCL were to be licensed in the private sector. It took Govt. almost three years to take a decision to place the responsibility for the down-stream units also on the Public Sector. The net result of all this was heavy delay in the setting up of the down-stream units and in the achievement of objective of integrated development of Petrochemical Industry. The Committee stress that Government should learn a lesson from this experience and see that in future Petrochemical industry plants are planned in an integrated manner. Having regard to the tremendous potentialities of the Petro-Chemical industry in the matter of accelerating the pace of development and

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		creating employment opportunities, the Committee feel that like the Electronic industry this is another field which shoud receive prior and intensive attention of the Government.
		The Committee stress that having regard to the experience already gained in setting up the Petro-Chemical Unit in Baroda, Govt. should prepare in depth a shelf of schemes so that these could be taken up for implementation on a priority basis having regard to the availability of resources, raw-materials, demand pattern etc.
		The Committee need hardly stress that in deciding the product mix, Govt. should keep in view the primary need for utilising petro-chemical industry for manufacture of products which would best serve the interest of the common man and development, rather than cater to the fanciful requirements of more affluent section of society.
		The Committee stress that there should be coordination at the highest level in research and technological fields to see that know-how in the crucial areas of petro-chemical industry is developed in the country in the shortest time and where it is not available, latest know-how best suited for our requirements is obtained wtihout delay so as not to hold up development.
		Another aspect to which the Committee would like to draw attention is the need for ensuring that petrochemical industrial units do not pollute the environment, thus alienating the sympathies and jeopardising the health of the people in the vicinity of the plants.
3	1.35	The Committee regret to note that even though the Bureau of Public Enterprises had asked all the Public Undertakings as far back as

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		November, 1970 to formulate a statement of their objectives/obligations clearly and communicate the same to the Government and even though the need for formulating such a statement was reiterated in the 40th Report (5th Lok Sabha) of the Committee on Public Undertakings on Role and Achievements of Public Undertakings, the Indian Petrochemicals Corporation Ltd. has not so far formulated its statement of objectives/obligations in spite of the fact that IPCL was asked by the Ministry in 1971 to look into the matter. The Ministry admitted during evidence that in the ultimate analysis it is the fault of the Ministry and they should have pursued it more vigorously. The Committee are unhappy at this long delay and recommend that the Corporation/Ministry should finalise the statement of objectives/obligations of IPCL without any further delay and place it before Parliament.
4	2.12	The Committee note that IPCL has entered into 23 foreign collaboration agreements in connection with the implementation of its schemes of Aromatics project and Olefins project and Down Stream units. The Committee were informed that every effort was made to secure as much conformity as possible of the foreign collaboration agreements with the guidelines issued from time to time by the Government in this regard but in certain cases there have been deviations from such guidelines. For example, in certain cases, provisions in the agreements relating to payments, sub-licensing of technical know-how, exports, operation of Indian laws vis-a-vis the agreements have not been on the lines prescribed in the Guidelines. These deviations are stated to have been dictaeed by the circumstances peculier to each agreement and

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		made with the knowledge of the Government and after each case of deviation was examined and approved by the Foreign Investment Board. The Committee would like Government to undertake a critical review of the working of collaboration agreements with a view to finding out that these agreements are in the best interests of the country and also to what extent the deviations approved in the agreements of IPCL could have been avoided, so that lessons may be drawn for the future.
5	2.13	The Committee note that the project management assistance contract with M/s. Lummus & Co. for the Olefins project include a condition for payment to M/s. Lummus & Co. of a fee of 1/2 per cent of the lowest quotation received from an intended supplier abroad or of the price of the item purchased from a source inside India when they have been authorised to proceed with procurement action for plant and machinery and it is subsequently decided by IPCL to purchase them in India or outside India without the assistance of M/s. Lummus so as to cover the cost of infructuous work undertaken by them in connection with the procurement. The Committee also note that in the case of the agreement for Naphtha Cracker a fee of 1 per cent is similarly payable to M/s. Lummus & Co. and in the case of the Acrylonitrile project a certain amount on the basis of a different formula is payable to Badger B.V., Netherlands in similar circumstances. The Committee feel that these are unusual provisions even though IPCL does not consider them extraordinary or unreasonable. The Committee would like Government to examine the foreign collaboration agreements entered by other public undertakings to ensure how far the inclusion

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		of such terms of payments either directly or indirectly are justified and in the financial interests of the undertakings and lay down suitable guidelines in this regard for the benefit of all concerned. The Committee further note that under the terms of agreement for the Naphtha Cracker, M/s. Lummus have preferred a claim of £4190 for work done and considered by them as infructuous in connection with the procurement of hydronyl distillation trays out of which a sum of £527 has been accepted by IPCL and the balance is stated to be under examination. While noting that what was originally intended to be imported through M/s. Lummus was ultimately manufactured indigenously through the efforts of Engineers India Ltd., the Committee feel that the IPCL could have saved the infructuous expenditure on fees payable to M/s. Lummus if indigenous sources of supply had been identified and action had been taken to consult such indigenous suppliers in advance before asking M/s. Lummus to initiate procurement action. The Committee recommend that Ministry/ Corporation should draw a lesson from this experience and issue suitable guidelines to all Undertakings in this regard.
6.	2.15 & 2.16	The Committee note that according to the findings of the Task Force of Planning Commission, a number of design engineering firms in developed countries are in a position to offer their services for constructing petro-chemical production facilities in developing countries on attractive terms and it is possible that many of such firms would be able to arrange for the payments to be made in exported end-products so that the manufacturing facilities become self paying in terms of foreign exchange cost involved. The Task Force

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		has recommended that this possibility should be explored as one of the methods of financing the development programmes for the Fifth and Sixth Five Year Plans. The Committee are informed that all the foreign collaboration agreements signed by IPCL had been finalised well before the report of the Task Force was available. The Committee are of the view that the recommendation made by the Task Force in regard to the method of financing of development programmes should be borne in mind while negotiating all such foreign collaboratoin agreements in future not only by IPCL but also by other Government and public sector agencies with a view to eliminating or at least reducing foreign exchange remittances abroad. The Committee would like Government to consider issue of suitable instructions in this matter to all Public Sector Undertakings for compliance.
7.	3.10 to 3.12	The Committee regret to note that the original estimates of Rs. 23 crores in respect of the Gujarat Aromatics Project of IPCL in 1968 which were approved by Government of India in 1970 had to be revised immediately thereafter to Rs. 25 crores and approved by Government in 1970. These revised estimates were further revised to Rs. 28 crores in January, 1973 and approved by Government in 1974. The Committee also note that the basic reasons for the revision of the project estimates were besides revaluation of D.M. and increase in the customs duty additional items of work not originally contemplated in the estimates additional charge of catalyst and additional items of plant and equipment, buildings etc. and consequential increase in IPCL's share of infra-structure facilities and management expenses etc. The Committee are informed that another basic reason for the revision of estimate was that the original estimate was not based on a very good data. It has been admitted during

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		evidence that "the mistake is not in execution but the mistakes are in assumptions on which the original estimates were made." The Committee are informed that the actual expenditure on the project upto August 1974 is Rs. 27.1 crores and that the accounts relating to the project are likely to be closed during the year 1974-75. The final capital cost of the project is, however, not likely to exceed Rs. 28 crores. The Committee are informed that the Government have gone into the reasons for excesses and are satisfied that these were unavoidable. The Committee desire that the Ministry should critically examine the revised estimates with a view to ensuring that economic viability of the project is not adversely affected. The Committee would like to be informed of the results.
		The Committee would like to draw attention of Government to their recommendation in para 118 of their Fifteenth Report (4th Lok Sabha) on Financial Management in Public Undertakings and reiterate that the importance of estimates in the detailed project report being as realistic as possible needs hardly any emphasis as the project report forms the very basis on which Government approve the project and the capital outlay. It is therefore essential that the estimates take into account all foreseeable items of expenditure and are based on correct data so as to obviate the necessity of revision of estimates frequently.
		The Committee regret to note the long period of more than one and half year taken by the Government in giving formal approval to the revised estimates of Rs. 28 crores submitted to them on 3rd January, 1973 and the formal approval of which was received by IPCL in September, 1974. In the opinion of the Committee, it is irregular to delay sanction of revised estimates and allow the Corporation to continue to

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		incur expenditure in excess of sanctioned estimates. The Committee recommend that if estimates should really serve the purpose of controlling costs, there should not be any avoidable delay in sanctioning the estimates.
8.	3.17 & 3.18	The Committee regret to note that though according to the DPR the time for completion of the project was 38 months from February 67 and that production was to commence from April, 70, the Corporation has taken 57 months for completion of the project with the result that the Corporation suffered a loss in production of about Rupees Nine crores due to the delay in the commissioning of the plant and the consequent loss in production. The Committee note that even initially there had been a delay of 9 months for the conclusion of the engineering contract and the supplementary contract took another two months to be concluded. The Engineers India Ltd. started their work as consultants of their project in August 1968. Even according to these revised dates, the scheduled date of completion of the project was April, '71. The Committee however note that as against this revised schedule the actual dates of mechanical completion of the DMT was 20th March, 1973 and Xylenes plant was June, 1973 and these plants were commissioned between 20th March 1973 and 12th November 1973 respectively. The result was that there had been a loss of production to the extent of 37,600 MT or DMT and 29,400 MT of Orthoxylenes.
		The Committee are informed that the main causes which contributed to the delay in the completion of the project were the longer time required for detailed engineering and the consequent placement of orders in India rather than abroad, delay in delivery of equipment by indigenous fabricators consequent to the decision to

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		obtain significantly higher proportion of plant and equipment indigenuously and the delay in the delivery of equipment by over a period of 12—18 months by the indigenous suppliers due to shortage of nickel, steel plates, labour unrest power cuts etc. The Committee regret to observe that no effective action was taken except recovery of penalty from the suppliers of indigenous machinery. In the opinion of the Committee it should not have been difficult for the Corporation to have avoided these delays, had the Corporation planned its requirements in advance and taken coordinated and concerted measures for the placement of orders and procurement of machinery. The Committee feel that the Corporation should have also monitored the programme of suppliers and kept a watch on the progress so that timely assistance could have been rendered to remove the constraints and minimise the delays in supplies in the interest of adherence to time schedule.
9.	3.25 & 3.26	The Committee note that there are two units in the aromatics Project—One Xylenes Plant using naphtha from Gujarat Refinery and the second DMT plant using para-xylene from the Xylenes Plant. Though the DMT plant was completed in March, 1973, the actual production could be started in April, 1973, only with imported para-xylene as the para-xylene plant which was to provide the feed stock for DMT plant was not ready at that time. The Committee also note that though the para-xylene plant was mechanically completed in June, 1973 the smooth operation of the plant could not be achieved till the end of 1973 owing to repeated failure of an imported compressor which had to be repaired and modified ultimately. The compressor is reported to be working satisfactorily and continuously since March, 1974. The Committee have dealt

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		with this aspect in a subsequent Chapter in the Report.
		The Committee regret to note the lack of planning and synchronisation in having the para-xylene plant commissioned later than the DMT plant when the DMT plant was based on para-xylene as its feed stock. The result of this was that the DMT plant had to be run with imported para-xylene and foreign exchange to the extent of Rs. 44.80 lakhs had to be spent. The Committee are also informed that the plant had to be shut down and remain closed from September to December, 1973 for want of para-xylene. The loss during 1973-74 due to low production consequent on the closure of the DMT plant and the late commissioning of Xylenes Plant was reported to be of the order of Rs. 2.62 crores. The Committee feel that with better planning and monitoring of the programmes at several stages including effective steps for production of indigenous machinery, it should not have been difficult for the Undertaking to have ensured synchronisation between the two plants and effected considerable saving in foreign exchange. The Committee would like the Government to analyse the reasons for this lack of synchronisation between the two plants and draw lessons for the future. The Committee would like to be informed of the result. The Committee recommend that the Management of I.P.C.L. should take advantage of modern management techniques like PERT etc., to guard against the usual inadequacies and pitfalls in the matter of ensuring sequence and adherence to delivery schedules. The Committee hope that at least in the future plants of the Corporation, namely Olefins project and the down stream units, etc., such a situation will not arise.

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10	3.44 & 3.45	The Committee regret to note that though paraxylene unit of Aromatics Project was mechanically completed in August 1973, the smooth operation of the plant could not be achieved till the end of 73 owing to the repeated failure of the imported compressor in the propane refrigeration system. The Committee were informed that this equipment was supplied by M|s. Linde fabricators who were selected by M|s. Krupps according to the terms of the collaboration agreement. The Committee, however, find that the propane compressor was not of proven design and as admitted by the management "there was no compressor which was exactly identical to this compressor in all respects and was being used for the same purpose." While the compresors supplied by M|s. Linde earlier were of 12,000 RPM and 18,000 RPM, the one supplied to IPCL was of 24,000 RPM. The Committee were also informed that Linde was selected by the collaborators on the basis that its machines had been running successfully in the Krupps built-paraxylene plants in Bulgaria for the same refrigeration but using Freon as refrigerant. The Committee are surprised that such a compressor had been accepted for conditions which are entirely different from those countries. The Committee also note that though Krupps were responsible for carrying out inspection and testing of the equipment before despatch and they provided certificates that test had been successfully carried out on the machines, the IPCL did not exercise the option of deputing a representative to Linde's works and to inspect the compressor inspite of the fact that the contract No. 5 gave the right to IPCL representatives to be present during the testing. It has been admitted by the Secretary of the Ministry during evidence that "I do not really excuse this aspect of it.

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Inspection should have been done. . . . the testing was in the workshop at the shop bench and not as part of the whole system.' The Committee are convinced that if IPCL had exercised its right of inspection at Linde's works, the adequacy of test of the compressor could have been proved and scope for the failure which was attributed to the system could have been avoided. The Committee regret to observe that inspite of the repeated failure of the compressor, no investigation was made either by Undertaking or by the Government to identify the exact causes of the repeated failure except getting a report from the collaborators. According to the Management, the exact reasons for the failure have not been identified by the manufacturers of the compressor or by the collaborators although the probable causes have been indicated in the collaborators report as:

(a) dirt and dust in the gas system and lube oil system,

(b) inadequate flow of lube oil to the bearings,

(c) looseness of the polygon bush on the shaft, and

(d) effect of vibration due to the lifting of pressure relief value on the lube oil system.

According to the Ministry, "This is considered a preliminary finding. I do not know if we will ever get to the bottom of whole thing in a very high frequency compressor like this." The Committee also find that when this question was raised in the Parliament on 12th August, 1974, it was stated by the Minister of Petroleum and Chemicals "I have always thought this is a very serious matter."

The Committee are informed that because of the repeated failure of the compressor and delay

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		in the commissioning of the plant, the Corporation suffered a loss of production of Rs. 6 crores. The Committee are also informed that the compressor was recommisioned in March, 1974 and the unit has been running satisfactorily since then. The Committee are not happy at the huge loss suffered by the IPCL on account of the delay in commissioning due to the repeated failure of the compressor. The Committee desire that the entire matter should be thoroughly investigated by an independent Committee of experts to be appointed immediately in order to identify the shortcomings at several stages including the points raised in Parliament on this issue from time to time and fix responsibility for the lapses. The Committee would like to be informed of the action taken within six months of this Report. The Committee also recommend that the Corporation should derive lessons from the experience of the working of this contract for future.
11	3.52	The Committee are informed that though it is not normal to have standby compressors for Paraxylene plants because of the difficulties encountered during the commissioning of the original compressor, in this instance, it has been considered prudent to instal a stand-by compressor of a different design. The Committee note that the Corporation had decided to purchase a stand-by compressor of a five-stage slower speed machine of 13,420 RPM compared to the existing high speed three stage compressor of 23,300 RPM from M|s. Mid Continent of USA and its installation would involve an expenditure of Rs. 56.17 lakhs. The new compressor is expected to be delivered by 3rd quarter of 1975. The Committee are also informed that the selection of the vendor was made on the basis of the lowest capital investment, shortest delivery,

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		proven performance, etc. The Committee would only caution that IPCL should on the basis of the past experience with the present compressor take all precautionary measures to ensure that the shortcomings in the existing compressor are not repeated in the new compressor. The Committee would also like that IPCL should in particular ensure about the performance of the stand-by compressor in the whole system as the specific action of the proposed stand-by compressor is different from the existing 24,000 RPM one. The Committee would also like to be assured that the stand-by compressor would suit the Indian conditions and adequately serve the purpose and that no further expenditure would be incurred on such costly stand-bys.
12	3.62 to 3.64	The Committee note that as against the installed capacity of 24,000 and 21,000 MT of DMT and Oxylene, actual production of DMT and Oxylene was 5169 MT and 7927 MT in 1973-74 and 5851 MT and 5061 MT in April—August 1974, thus indicating that the capacity utilisation has been only of the order of 21.5 per cent and 65 per cent in 1973-74 and 58.5 per cent and 58 per cent in April—August, 1974, respectively. Though according to DPR, the Project is expected to reach the full rated capacity in 3rd year of operation, the Committee are informed that the Project is expected to reach 75 per cent capacity in 1975 and 90 per cent in the year 1976 which is the 3rd year of operation. The factors responsible for low capacity utilisation were stated to be, supply of inferior quality of naphtha inadequate quantity of process air, frequent power dips and failure of power supply. frequent failure of boilers, and failure of critical recirculating gas compressor and refrigeration propane compressor in the past. It has been stated that

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		necessary steps to overcome these problems had been initiated and these are expected to bear fruit by the middle of 1975. The Committee however, fail to understand as to why the correct specification about the quality of Naphtha could not have been given to the Gujarat Refinery even at the initial stages and firm commitment therefor entered into with the Refinery and avoid the complaint of inferior quality of Naphtha at this stage. The Committee are informed that the Gujarat Refinery have agreed to certain modifications but a long term solution is possible only after a year, though some improvement can be expected in next two months. The Committee would like to be informed of the developments in this regard. The Committee also find that amongst the reasons for low utilisation of capacity, were the frequent failures of boilers and recirculating gas compressor. The Committee are informed that the suppliers of the boilers are identifying the problems and taking remedial measures and the job is expected to be completed shortly and action has been also taken for procurement of a stand-by compressor. The Committee are not sure whether these boilers and compressors were pre-tested before taking delivery and whether any action has been taken to allocate the responsibility of the suppliers in the matter for such defective supplies. The Committee recommend that these matters should be investigated in detail so as to demarcate the responsibility of the Management and the suppliers in regard to each one of the reasons so that suitable remedial action may be taken.
13	3.65	The Committee note that as against the production targets of 15,000 MT of DMT and 10500 MT of Orthoxylene for 1974-75 the actual production during the first six months (April to

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		September) of 1974-75 was 7,726 MT of DMT and 5,416 MT of Orthoxylene. The Committee are informed that 'if all the other current problems—Naphtha quality, steam generators and power shortages are resolved it should be possible to attain near full production in the 3rd year of operation of the plants'. The Committee would therefore, like that the Management should take effective steps and Government should render necessary timely assistance so that the problems can be resolved and constraints removed without any delay to enable achievement of the full rated capacity according to schedule fixed in the DPR.
14	4.24	The Committee note that the original cost estimates of Rs. 157.50 crores in respect of the Olefins Project and the down stream units were revised upwards to Rs. 331.93 crores in September, 1974. The variations between the original estimates and the revised estimates have been attributed to variations in exchange rates (9.71 crores) increases in customs duty (16.32 crores), price escalation (41.09 crores), increase in pre-production interest (8.63 crores), increase in management expenses (4.88 crores), additional items of equipment (42.90 crores), additional provision for contingencies (37.13 crores) and quantitative changes. It has been stated that the Revised estimates of the Olefins Project were received by Government in December, 1973 and in respect of other down stream units in October, 1974. These estimates are still under consideration. The Committee are not happy over the delay of 1 year in the sanction of the revised estimates by Government. According to the management of IPCL, due to abnormal inflationary conditions prevailing in India and in many countries abroad from where foreign equipment is being obtained, some further escalation cannot be ruled out altogether if the

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		schedules are not maintained due to delays in delivery of indigenous or imported equipment or difficulties in supply of construction material such as cement, steel, argon gas etc. or in provision of utilities such as power and water. The Committee feel that while some of these factors necessitating escalation in cost estimates may not be entirely under the control of IPCL or Government, factors like timely supplies of materials, supply of power, water etc. are not entirely outside the control of the undertaking or the Government. They would, therefore, like the IPCL and the Government to go into the factors which have resulted or are likely to result in further revision of cost estimates and take effective measures to control at least those factors which can be controlled by the undertaking itself or through the intervention of the Government of India. The Committee also recommend that Government should critically examine each one of the reasons for the revision of the estimates of the Olefins Project and the down stream units to see how far such excesses which are over 100 per cent are justified. The Committee are informed that while according to the revised estimates the profit before tax was of the order of 15.5 per cent, in the Revised Estimates, it is stated to be 15 per cent. The Committee need hardly stress that revision of cost estimates affects the profitability of the project ultimately and the cost of production. The Committee, therefore, recommend that Corporation/Government should take timely concerted measures to keep the costs well within the estimates sanctioned by the Government.
15	4.25 & 4.26	The Committee further note that there has already been slipage in the schedule of mechanical completion of the projects under Gujarat

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		Olefins Project and its down-stream units the delays ranging from 12 to 36 months. In the case of Naphtha Cracker Project the delay in execution is expected to be of more than 3 years. The Committee are informed that the original schedule was based on certain assessment of availability of foreign exchange and the tying up of foreign exchange for the projects within the time schedules has not been possible. There were also various other difficulties such as delay in the supply of indigenous equipment because of inadequate previous experience of vendors and various other difficulties such as power cuts, shortages of trained personnel, difficulties in obtaining timely delivery of sub-contracted components such as forgings etc. The Committee are also informed that certain steps have been taken by IPCL like assured supply of steel plates, pipes and other raw materials to fabricators, posting of inspectors from Engineers India Limited in the fabricated shops to expedite progress, periodical review of progress at meetings with the major fabricators etc. etc. The Committee feel that in this case also some of the difficulties which have contributed to delays could have been solved by an imaginative approach by IPCL itself if necessary with the assistance of Government by taking advance action to tie up with foreign exchange, placement of orders in time for indigenous equipment, procurement of scarce raw material etc. The Committee are informed that as on 30th November, 1974, 45 per cent of indigenous equipment and 65 per cent of imported equipment had been ordered and foreign exchange for the project had been tied up and the revised estimates are being worked out. The Committee need hardly stress that such delays not only put up the cost and affect the profitability of the project but also contribute to delays in other developmental activities. The Committee recommend

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		that Corporation should work out a realistic cost estimate and revised profitability of the Project and other down stream units after taking into account all the factors and bring it to the notice of Parliament without any delay. The Committee also recommend that IPCL/ Government should take up concerted and concrete measures, in the light of experience gained by them in setting up of the Gujarat Aromatics Project, to see that there is no slippage in the programme of execution of the project and to ensure that sufficient safeguards exist for inspection and testing of equipments and for guaranteed performance.
16	4.44 & 4.45	The Committee note that Polyester Filament Yarn Project has been finalised at an estimated cost of Rs. 24.67 crores including a foreign exchange component of Rs. 6.44 crores in technical collaboration with Karl Fisher (West Germany), J.K. Synthetics (India) and Industrias Petroqimicas Mexicanas (IMSA), Mexico. Karl Fisher has to provide the necessary technical know-how, basic engineering and technical services for the manufacture of polyester chips from DMT and Karl Fisher jointly with JK Synthetics shall provide technical know-how and basic engineering for the manufacture of polyester filament yarn from polyester chips. JK synthetics are also to supply all onsite (battery limit) plant equipment. It has been stated that the selection of Karl Fisher with JKs of India was made after inviting quotations from various parties and a critical evaluation of the offers from both technical and commercial points of view, and testing and critical analysis of the yarn of the collaborators. According to Government, the country had not yet reached the stage where JK alone

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		could give indigenous technology for the polyester filament yarn project. The advantages of obtaining JK's participation in the agreement are that a part of the know-how and the basic engineering fees for the spinning and draw twisting plant will be paid in rupees and JK's technical experts and facilities for training of personnel can be used. The plant performance gurantee is jointly by Karl Fisher and JK for the spinning and draw twisting plant. The Committee find that the selection of Karl Fisher and J.K. Technology has been made mainly on account of the advantage in foreign exchange and J.K.'s technical experts and facilities for training could be used. The Committee would like Corporation|Government to ensure that the technology selected is proven and upto date, operating costs are economical, and the quality of products is the best.
		The Committee recommend that the Corporation should take advantage of the collaboration in developing their own planning and designing with a view to attaining self reliance in this field.
		The Committee are informed that none of the equipments ordered for the project has yet become due for delivery and, therefore, the question of delay cannot be assessed. The Committee would stress that a continuous watch should be kept on the progress being made by the fabricators of equipment so that necessary steps could be taken well in time to obviate any possibility of delays. They would also like that Corporation should draw lessons from their experience with the Gujarat Aromatics Project and ensure timely supply of equipment of good quality and the commissioning of the project on schedule after proper inspection and guaranteed performance.

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17	4.46	The Committee further note that the Government have set up a cooperative society under the name of 'Petrofils Cooperative Limited' in September, 1974 for the running of the Polyester Filament Yarn Project with a direct equity participation between the Government of India and the Cooperative sector on a 60 : 40 basis. The Committee are informed that this decision to set up a cooperative was taken to create interest in the cooperatives owning their own raw material plant and no corporate relationship between IPCL and this cooperative society is however contemplated at present. It has also been stated that since the plant is fairly complex and expensive, Government have decided to retain a substantial equity interest for a considerable period of time though there is a provision for gradual retrenchment of the Government interest by the cooperatives themselves. The Committee, however, see no special advantage in not taking this plant as part of IPCL because of the complexity of the plant and funds for running the cooperative had come from Government. Now that a cooperative has been set up the Committee would like Government to take all possibile steps to make the cooperative a success by ensuring that the plant which is both expensive as well as complicated gets the services of competent technical personnel for maintenance and is operated profitably under the supervision of enlightened and efficient management. They feel that it would be advisable to create a corporate relationship between IPCL and the Petrofils Cooperative Limited because of their dependence on each other for the sale and purchase of DMT. Such a relationship will also enable the cooperative to have the benefit of Research and Development wing of the IPCL and make for its more efficient and economical operation.

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18	5.7 & 5.8	The Committee note that the demand projections of the various petro-chemicals made by the task force of the Planning Commission are different from those made by the National Committee on Science and Technology. They further note that the demand projections in respect of Orthoxylene, Mixed Xylenes and DMT—the three products at present being manufactured by the IPCL at its Aromatics Project—indicate that the production of Mixed Xylenes and DMT at the IPCL will always be less than the demand according to the supply and demand balance—1978-79 and as such there will be no difficulty for the IPCL to sell its products. The demand for Orthoxylene, however, has been less than its production at IPCL even in the first year of the operation of the plant and the IPCL is left with unsold orthoxylene even after exporting one consignment last year. The Committee however find that the demand for orthoxylene referred to its use as raw material for manufacture of chemicals. Down stream units which could use orthoxylene as raw material have reached the stage of construction and are expected to consume orthoxylene from 1976-77. The Committee are informed that the surplus availability is expected to continue in the next two years and by 1977-78 IPCL may be in position to sell off it entire production of Orthoxyelene. The Committee would like the IPCL to examine as to why demand for Orthoxylene has not come up to the level of its production and to ensure that the projects which are to use Orthoxylene as raw material do come up and are commisioned in time so that the Orthoxylene Plant is not kept partially idle for want of demand. The Committee also recommend that Government/Corporation should intensify their development efforts in consultation with the Small

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Scale Industries and Small Industries Institute so that the surplus Orthoxylene may be advantageously utilised. Government should also consider the possibilities of exporting this product with a view to disposing of the surplus stock.

The Committee note that the demand projections made by Task Force of the Plannig Commission in respect of the products of the Gujarat Olefins Project and its downstream units also indicate that there will be no difficulty for the IPCL to market these products as the demand is likely to be always ahead of availability. They, however, note that there are sharp variations in the demand projections of the Task Force and the National Committee on Science and Technology in respect of Polypropylene and Detergent Alkylate. According to the Task Force, the demand for Polypropylene in 1978-79 is likely to be of 36,000 tonnes whereas the NCST estimates it to be of the order of 15,000 tonnes. In the case of Detergent Alkylate also, the Task Force's estimate of demand is 83,000 tonnes and the NCST's estimate is 25,000 by 1978-79. If the Task Force's estimates are taken into account, the IPCL will have no difficulty in disposing of its entire production of Polypropylene (27,000 tonnes) and Detergent Alkylate (27,000 tonnes); but if the NCST's estimates are taken into account, IPCL will find itself in difficulty in finding market for its full production and may have to work its plants at low level thus suffering loss in the bargain. The Committee recommend that Government should go into the reasons for the difference between the demands assessed by the Task Force of Planning Commission and by the National Committee on Science and Technology and stress that a realistic demand for the products should be avail-

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		able before setting up the appropriate capacity and planning the production programme.
19	5.35 to 5.45	The Committee note that to take care of the marketing activities of the existing Gujarat Aromatics Project and the future Gujarat Olefins Project/Downstream Units, IPCL purposes to follow the Product Manager's concept within the Marketing Department and is planning to have the following major product groups, *viz.*, Polymers, Fibres and Chemicals. In addition, it has also planed for an expert technical group to take care of product and applications development and field technical service. Field sales and other associated activities will be handled from Regional Sales Offices which are proposed to be opened in Delhi, Bombay, Calcutta and Madras. In order to see that the products purchased by manufacturing units, a large majority of which will be in small scale sector, are efficiently used, IPCL proposes to have well qualified marketing and engineering personnel in each region to handle all marketing operations and after-sales-service. Three of the four plastics products, *viz.*, Polypropylene (PP), Polybutadiene Rubber (PBR) and Acrylic Fibre (AF) are reported to be totally new to the Indian market as these will be produced for the first time in the country. Even in the case of fourth product *viz.*, Low Density Polyethylene (LDPE). the existing production is restricted to very few grades. While in the case of Polypropylene, Polybutadiene rubber and Acrylic Fibre, IPCL has to develop the market from scratch in the case of LDPE, several new grades tailored to specific end uses would be made available for the first time. None of the prospective customers of these products know how to process these into useful articles. IPCL proposes to make a modest begin-

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ning this year in support of the market development programme based on imported material.

The Committee understand that like electronics, plastic industries also do not require large infrastructure facilities. The Committee, therefore, recommend that developmental efforts should be made in consultation with the State Governments and Small Industries Institutes so that the possibilities of setting up units especially in backward areas for the absorption of this Orthoxylene may be considered.

The Committee are informed that as most of the products will be produced for the first time in the country the IPCL will have to do markets survey for the ultimate projects, stimulate interest in its products through publicity, evaluate project profitability, select equipment and location for the consuming units, arrange financial assistance and employee training, help the units in developing optimum processing conditions for maximum profitability, organising publicity campaigns for new end products and resolving other difficulties which may arise from time to time. In order to find export outlets for plastics and other end products, the company will also have to advise the small scale units about the foreign markets, prices, products quality requirements, desired sales appeal and product pattern suited for export. These are new and challenging tasks. The Committee find that IPCL will have a pioneering role to play in stimulating and creating demand for its solid products through new investments by existing entrepreneurs or through developing a new class of entrepreneurs in this small and medium scale sector.

In the opinion of the Committee the Corporation should not take upon itself the responsi-

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bility of running the individual units nor for their financial results, but merely confine itself to providing the necessary technical knowhow, material assistance and training facilities in close coordination with small scale industries and service institutes.

The Committee, also feel that any organisation of marketing of the products of IPCL should be market-oriented rather than customer-oriented. The Committee are informed that the Marketing Organisation has been established as a specialised Division headed by a Marketing Manager and it will eventually consist of four Product Managers, a Sales Manager and a Manager to take care of Application Development and Field Customers service.

The Committee would like to watch the performance of this organisation with reference to development, particularly in backward areas.

The Committee note that the expenditure on sales and distribution has been of the order of Rs. 4.67 lakhs in 1972-73 and Rs. 3.79 lakhs in 1973-74 as against the sales of Rs. 512 lakhs only in 1973-74.

The Committee recommend that Government/Corporation should set suitable norms for such sale and distribution expenses and ensure that such norms are adhered to, so that the overhead expenses of sale and distribution are not excessive.

The Committee note that the Corporation propose to handle the field sales and other associated activities through its Regional Offices in the Metropolitan cities. The Committee would like that economics of the opening of such offi-es should be critically examined with reference

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to the market for the products in the region before such offices are set up.

As regards the Regional Offices, the Committee recommend that these offices should be compact so that the small scale sector which are using the products are not unnecessarily loaded with excessive overheads. The Committee recommend that IPCL should finalise the staffing pattern with great care and see that the personnel selected for the regional offices and field services are development minded with technical background capable of handling the jobs efficiently.

The Committee also note that when the demand for DMT was more than the availability, the available quantity of DMT was allocated to different users in the ratio of their respective requirements on the basis of their licensed capacities. But lately, due to financial constraints and other factors, some of the customers have not been able to lift the entire quantity allocated and consequently some other parties have been allowed to lift quantities in excess of their respective monthly allocations. The Committee recommend that the Corporation, in consultation with the Government, should critically go into the reasons for the non-lifting of the allocated quantity of DMT by the parties and take suitable remedial measures to avoid recurrence of similar situations in future. They would like the IPCL/Government to keep a constant eye on the market situation and review its allocation policy from time to time to cope with the situation and to see that the turn-over of the company does not suffer in any way.

The Committee also note that the current production of Orthoxylene is substantially in excess of the demand. They would like the IPCL to analyse the reasons as to why the units which were expected to consume Orthoxylene products

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		by IPCL have not come up and to see what can be done to help such units be established as early as possible. The Committee learn that stocks of the two by-products from DMT plant, namely, Methyl Benzoate and crude Di-Methyl Isophthalate, have accumulated in the plant and IPCL is making efforts to find out outlets for these products. The Committee would like to be informed of the specific action taken for the disposal of these products. The Committee stress that there should be greater coordination between the Marketing & Production functionaries in order that the products of the Corporation are not accumulated.
20	5.59 & 5.60	The Committee note that though the Corporation has adopted a costing system, it has not so far worked out standard cost for its products since the production in the Aromatics plant which started in 1973-74 had not stabilised. The actual consumption of inputs is however compared with the consumption data provided by the foreign licensors for purposes of assessment of performance. The Committee note that the consumption of Naphtha, fuel and power during 1973-74 is higher than the fixed by the process licensors though it has decreased during 1974-75. The Committee also note that the average actual cost of production has been much higher than the cost envisaged in DPR. The Committee were informed that the large variation is stated to be due to low capacity utilisation and increase in prices particularly of raw materials and fuel oil. The Committee recommend that Corporation should take suitable steps to ensure strict adherence to the norms for the consumption of the raw materials as fixed by the Process Licensors, critically analyse any

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		variations between the actual consumptions and the standards so that suitable remedial measures may be taken in time to effect economics in costs. The Committee find that the consumption of materials has decreased during 1974-75 with the increase in production. The Committee recommend that the Corporation should take concerted measures to attain full capacity of the plant at the earliest, to obtain economic cost of production.
21	5.73 & 5.79	The Committee note that according to the guidelines issued by the Government, the pricing of products of enterprises operating under monopolistic and semi-monopolistic conditions should be within the basis of the landed cost of comparable imported goods which would be the normal ceiling. The enterprises can fix prices within the ceiling of the landed cost and the prices so fixed should be operative for a period of 2-3 years. If it is necessary to fix prices higher than this ceiling, the matter should be referred to the administrative Ministry concerned for examination in depth in consultation with the Ministry of Finance etc. The Committee were informed that the IPCL had not been able to arrive at firm cost figures in the initial period of operations due to a number of problems dealt with elsewhere in this report and the determination of landed costs itself presented some difficulties in early 1973. The Committee note that the pricing of the products of IPCL had been undergoing frequent revisions and every time the prices fixed were provisional. While the price of DMT varied from Rs. 6,000 per M.T. in April 1973 to 7,000 in August, 1973, it was again increased to 12,000 in January, 1974 and 16.000 in March, 1974. In the case of the Oxylene the price has increased from 2,000 in August 1973 to 3,000 in January, 1974 and

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further increased to 6,000 in March, 1974. The Committee are informed that the Corporation had been following a pricing policy based on (a) cost of inputs, (b) realisation of reasonable return on capital invested, (c) level of production achieved or achievable over a period of 18 to 24 months and (d) keeping prices in line with landed cost of identical products to the extent possible. The Committee are also informed that while the initial price fixed at first was based on estimated landed cost, since no fixed cost data was available. Subsequently the price of Rs. 7,000 in August, 1973 was based on estimated landed cost as also the estimated availability of imported paraxylene.

In January, 1974, the revision proposed was based on the resumption of production after repair of propane compressor and estimated average production of 60 per cent over a period of 18—24 months from April, 1973 and a reasonable return of 15 per cent on capital employed. The further revision in March, 1974 was however stated to be on account of high cost of inputs.

The Committee recommend that the Corporation should take steps to reduce the cost of production by achievement of full rated capacity, stabilising production and keeping the overheads to the minimum. The Committee also recommend that Government/Corporation should consider fixing the prices on a fairly long term basis taking into account all the relevant factors and the Board should review the prices periodically to ensure that the prices are competitive and the price increase does not contribute to the inflationary trend. The Committee need hardly stress that since petro-chemical intermediates are the raw materials for a number of industries, Government should take effective measures to see that the prices of the petro-chemicals

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		which are used as raw materials are reasonable and internationally competitive and the benefit of any reduction in the prices is always available to the common man.
		The Committee find that the price of orthoxylene and mixedxylene are higher than the landed price. The Committee would like that this aspect should be gone into by Government so that the prices of xylene are in accordance with the guidelines issued by Government in this regard. The Committee also expect that the Corporation should fix the price of its products within the framework of the recommendations of BPE and wherever there had been deviations, the Corporation obtain the prior approval of Government.
		The Committee find that while the cost of DMT, the base product for polyester fibre cloth is not high, the cloth produced by using DMT is sold at a price which is higher. The Committee feel that with the stabilisation of production of DMT the prices of and other products manufactured with DMT as base should be so fixed that the benefit of reduction in price of DMT could ultimately be passed on to the public.
		The Committee have come across cases where the Private Sector has been making use of the products manufactured by the Public Sector and making huge profits at the expense of the Public Sector, as in the case of basic drugs of IDPL and steel. The Committee feel that there should be a correlation between the price of the raw material and the cost of the end product. The Committee, therefore, recommend that Government/IPCL should take steps to evolve a procedure by which any reduction in the cost of the raw material ultimately goes to the benefit of the consumer.

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22	5.86 & 5.87	The Committee note that the question of fixing a uniform FOR destination price for DMT any Xylenes was considered by the Corporation on the basis of an estimated production and distribution during 1973-74 and it was found that Rs. 110 per metric tonne in the case of DMT and 115 per metric tonne in the case of ortho-xylene and mixed-xylene would have been added to the ex-works price to arrive at a uniform FOR destination price. The Committee were informed that the Corporation would not like to take all the responsibility for booking and despatch of DMT and bulk supplies of Ortho-xylene and it would be convenient for the bulk purchaser to take delivery ex-works. For this purpose, the Corporation would be giving a rebate on the uniform FOR destination price equal to railway freight to the particular destination at the rate used in the freight equalisation calculation. The Committee were also informed that the recoveries on account of freight would be reviewed periodically and adjustments made either by way of refunds to the parties over-charged or by fresh invoicing to the undercharged. In the case of ortho-xylenes and mixed xylenes, supplies would be available at the regional offices at uniform prices.
		The Committee, however, note from the minutes of the meeting of the Board of Directors held on 26th February, 1973 that one of the directors had warned that 'unless a uniform F.O.R. price was introduced, the polyester fibre units situated at a distance from Baroda would be put to a disadvantage. This might also set in motion demands for establishing petrochemical projects in other areas; a large petrochemicals complex has been set up at Baroda on techno-economic considerations including the consideration to avail of economics of large scale operation and this benefit should be available to the entire coun-

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		try." and the Board decided to refer the matter to the Government. The Secretary of the Ministry, however, stated during evidence that "broadly speaking, I would say the freight equalisation is an economic concept that can be operated in the economy as a whole. It should not be attempted for individual product and for such products like DMT." While the Committee agree with the views of tre Secretary that freight equalisation is an economic concept, the Committee need hardly stress that petro-chemicals industry being hardly employment-oriented, the benefit of the price including freight should be available to the country as a whole irrespective of the distances. The Committee, therefore, recommend that the question should be examined carefully with reference to its effect on the profitability of the project and development of industries particularly in the backward areas. The Committee would like to be informed of the action taken in the matter.
23	6.7	The Committee note that in the various units of the Aromatics Projects, vigorous quality control is exercised over raw materials supply in various stages, intermediates and over final products. In addition to this a Central Laboratory which is well equipped with modern analytical instruments analyses and approves samples from each batch of production. The IPCL products, namely; Orthoxylene, DMT and Paraxylene are stated to have achieved and maintained internationally accepted quality standards. Though there have been no complaints either from Indian or foreign customers in respect of Orthoxylene or mixed xylenes. A few complaints have been received on the quality of paper bags used for packaging of DMT. Even though the complaints are stated to be of minor nature and did not affect either the sales or the customers production, the Committee feel that all possible

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		steps should be taken by IPCL to see that its products which are claimed to be of internationally accepted quality continue to maintain such high standards and are free from complaints even of a minor nature and are to the satisfaction of the consumers. The Committee recommend that the Corporation should introduce strict standards for quality control and these should be meticulously enforced so that the products of the Public Sector Corporation, establish a name in the world market for their quality.
24	7.10	The Committee find from the schedule F of the Annual Accounts for 1973-74 that a sum of Rs. 805484 representing the difference between the revaluation of physical inventory of stores and spares transferred from the capital stores and that shown in the financial records has been kept under Material Suspense. The Committee are informed that this discrepancy was due to the difference between the book value and the valuation at the time of return of the materials to store. As custody of stores during construction was with E.I.L., they have been requested to investigate and reconcile the difference. It has been stated that the discrepancy has been narrowed down. The Committee were also informed that physical verification of construction stores in the custody of E.I.L. was being carried out regularly at the close of each financial year. The Committee feel that if E.I.L. had been required to render proper accounts for the consumption of material, such a situation at the completion of the work would not have arisen. The Committee recommend that steps should be taken to have the discrepancies settled and amount under material suspense cleared at an early date. The Committee would also like that suitable instructions about the maintenance of proper store accounts at construction sites should be issued to avoid similar situation in future.

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25	7.13	The Committee regret to note that though the Company Auditors have been pointing out in their reports about the absence of Manuals for accounts, internal audit, inventory procedure and control right from 1970-71 to 1972-73, it is only now that the Corporation has prepared the inventory control manual, purchase manual and accounts manual. The Committee would like these manuals should be implemented without any delay so that the cash, stores accounts and other accounts records are maintained systematically. The Committee also recommend that a system of Management Accountancy should be developed so that the Management is kept fully informed in time of the different facts of the working of the Corporatoin, both in financial and physical terms, so that effective measures could be taken to arrest any adverse trends. The Committee also recommend that the procedure for internal audit should also be finalised keeping in view the recommendation of the Committee on Public Undertakings in their 15th Report (4th Lok Sabha-1967-68) in this regard that the functions of the internal audit should include a critical review of the systems, procedures and the operations of the Undertaking as a whole.
26	8.12 & 8.12	The Committee note that a full fledged Research and Development Centre has been set up a part of the IPCL with a view to effecting improvements in the technology purchased for the projects from overseas, developing engineering know-how so that expenditure of foreign exchange is reduced if not eliminated and using the by-products and coproducts available from the plants rationally and profitably. A sum of Rs. 80 lakhs was allocated for R & D in the 4th Five Year Plan and as against this a sum of Rs. 61 lakhs was spent during the period. The capital expenditure already approved for the period 1974-75 is Rs. 90 lakhs and the reve-

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		nue expenditure for this period is estimated to be Rs. 9 lakhs. The centre is stated to have been working since 1970-71 and has done research on raw material specifications effect of different type of crude on the plants, optimisation of operational conditions etc. The Committee hope that the results of research would be advantageously utilised in the operation of plants. The Committee further note that important research projects which have to be investigated by R & D Centre have already been identified and a priority list has already been drawn up. The suggestions of NCST have also been taken into consideration. The work of R & D Centre is stated to be supplemented by sponsoring the work in National Laboratories and other research institutions. The Company has in fact sponsored work on certain processes in the National Chemical Laboratory, Poona, and in the University of Bombay. There is stated to be close coordination between the National Chemical Laboratories and IPCL in the field of applied research. The Committee are glad to note that due importance has been given to the research and development work in the IPCL right from the beginning and adequate funds have been placed at its disposal for the purpose. Needless to say, the success of the centre will be indicated not by the amount of money spent by it on capital account or revenue account but by its achievements in the research projects which it has chosen to investigate. The Committee recommend that Government should undertake to an objective appraisal by an Independent Expert Body of the work done by the Research and Development Centre from year to year in order to see how far the centre has succeeded in achieving the objectives for which it has been set up. Among other things, they would like the Centre to pay attention to the problems which arise in the day-to-day wor-

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		king of the various plants of IPCL and not only suggest measures to solve those problems but also to devise techniques to bring about efficiency and economy in the general working of the various plants. The Committee understand that Engineers India Ltd. is also interested in research on chemical engineering oriented subjects. Initially it was thought that the Division on Chemical Engineering would be organised and managed jointly by EIL and IPCL. On reconsideration, however,the IPCL has decided to do it alone as the total quantum of research work on chemical engineering that would be required by IPCL would be substantial. In view of the fact that both EIL and IPCL are public sector organisations interested in more or less the same field, the Committee recommend that there should be close coordination between the two undertakings to obviate any duplication of activities and efforts should be intensified in more critical areas by pooling the talents and bringing about economies in overheads.
27	9.9	As Petro-Chemicals is a sophisticated technology and engineering intensive industry, the Committee stress that there is should be an increase in the number of technical hands on the Board of Directors, especially when the Corporation is in the process of setting up down stream units so that they may be in a position to view the problems in their correct perspective and take decisions in the best interests of the Corporation.
28	9.20 & 9.21	The Committee note that as against 79 supervisory and 141 non-supervisory posts indicated in the DPR of Gujarat Aromatics Project, the actual staff in position in the Project is 58 supervisory and 436 non-supervisory. The Committee are informed that because provision

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		for staff in the DPR/Feasibility Report had not been realistically worked out, the Institute of Applied Man-power Research had been commissioned to assess the staff requirements of each plant when it was operational. According to their report the Committee find the Institute had suggested a strength of 389 against the present sanctioned strength of 498 for the project and existing strength of 420. After discussion it was agreed to have a strength of 436 after adjustment of the leave reserve. The Committee were also informed that in the light of the experience gained by IPCL the Institute has been entrusted with another study on the requirements of staff for the Olefins and Downstream Units. Although the Committee has been assured that there is no surplus staff with the Corporation at present the Committee recommend that the Corporation should keep the position under constant review and in the light of the experience of operations fix realistic staff standards and ensure that there is no overstaffing at any stage in any of the projects.
29	9.24	It is no doubt a challenge to recruit a large number of qualified and experienced scientists and engineers from India and abroad and the Committee note that the IPCL is reported to have had a fair degree of success in this field. But in their opinion, there is bigger challenge ahead in creating a climate in which the highly qualified and experienced scientists and engineers recruited by IPCL can work with creative zeal in an atmosphere of co-operation with one another, have a feeling of job satisfaction and do not feel frustrated for lack of recognition of their talent and achievements. The Committee hope that the IPCL will continue to attract scientific and engineering talent from India and

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		abroad and will soon work out a detailed career development plan which will provide openings for advancement for the competent technical and scientific personnel at all levels.
30	9.31 to 9.34	The Committee note that the IPCL has introduce a number of training schemes to prepare the technical and other personnel to handle the maintenance and production of the plants properly and efficiently and to keep them abreast of latest information and techniques related to their professional subjects. They cannot over-emphasise the importance of training and refresher courses in petrochemicals field in which new and far-reaching technological developments are taking place very fast and IPCL cannot afford to ignore them. The Committee note that the Task Force of Planning Commission has emphasised the need for closely linking the training with the experience to be obtained by the trainees in actual operation and maintenance of production facilities. The Committee recommend that these observations would be kept in view in organising the Training Schemes. The Commitee are glad to note that the IPCL has introduced a training scheme for the children of persons whose land was acquired for establishing petrochemicals projects with a view to fulfil the social obligation of rehabilitating the land losers. Of the 47 trainees initially recruited under this scheme, 43 are currently under training and the question of recruiting a fresh batch of such apprentices is to be considered in due course if considered necessary. The Committee also note that the expenditure on training has been of the order of Rs. 6.9 lakhs in 1971-72, Rs. 1.2 lakhs in 1972-73 and Rs. 5.6 lakhs in 1973-74. The Committee would like the

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		Corporation to undertake evaluation of the training programme so as to assess the usefulness of the training in actual operation and maintenance of production facilities. The Committee need hardly stress that the Corporation should ensure that there are no drop-outs in the trainees and there is a systematic follow-up to see that the persons trained are usefully deployed in the appropriate fields.
31	9.41	The Committee are glad to note that the relations between the Management and the employees have been cordial and welfare amenities have been provided to the employees of the Corporation. The Committee recommend that the IPCL should keep in view the recommendation made by the Committee in their 17th Report (5th Lok Sabha) on Personnel Policies and Labour-Management Relations in Public Undertakings and shape their Labour Management relations in the light thereof.

GMGIPND—LS II—421 LS—2-7-75—1425.