

**FIFTEENTH REPORT**  
**COMMITTEE ON PUBLIC**  
**UNDERTAKINGS**  
**(1986-87)**

(EIGHTH LOK SABHA)

**INDIAN PETROCHEMICALS CORPORATION LTD.—**  
**PROJECT IMPLEMENTATION**

**(MINISTRY OF INDUSTRY—DEPARTMENT OF**  
**CHEMICALS & PETROCHEMICALS)**

*Presented to Lok Sabha on* 10 MAY 1987

*Laid in Rajya Sabha on* 10 MAY 1987



**LOK SABHA SECRETARIAT**  
**NEW DELHI**

*February, 1987/Magha, 1908 (Saka)*

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## COMMITTEE ON PUBLIC UNDERTAKINGS

(1986-87)

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Shri K. Ramamurthy

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#### Lok Sabha

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1. Shri N. N. Mehra—*Joint Secretary*
2. Shri S. S. Chawla—*Chief Financial Committee Officer*
3. Shri G. S. Bhasin—*Senior Financial Committee Officer*

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\*Elected w.e.f. 22-8-1986 in the vacancy caused by appointment of Miss Saroj Khaparde as Minister of State.

## INTRODUCTION

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

2. The Committee's examination of the working of the Company was mainly based on the Report of the Comptroller and Auditor General of India, 1982, Union Government (Commercial) Part XII.

3. The Committee took evidence of the representatives of the Indian Petrochemicals Corporation Limited on 30 October, 3, 4, 5, 30 and 31 December, 1985 and also of the representatives of the Ministry of Industry (Department of Chemicals and Petrochemicals) on 6, 24 and 25 March, 1986.

4. The Committee considered and adopted the Report at their sitting held on 23 January, 1987.

5. The Committee wish to express their thanks to the Ministry of Industry (Department of Chemicals and Petro-chemicals) and Indian Petrochemicals Corporation Limited for placing before them the material and information they wanted in connection with examination of the company. They also wish to thank in particular the representatives of the Department of Chemicals and Petrochemicals and the Undertaking who appeared for evidence and assisted the Committee by placing their considered views before the Committee.

6. The Committee also place on record their appreciation of the assistance rendered by the Comptroller and Auditor General of India.

NEW DELHI;

January 30, 1987

Magha 10, 1908 (Saka)

K. RAMAMURTHY,

Chairman,

Committee on Public Undertakings.

## CHAPTER I

### PROJECT ESTIMATES AND APPROVALS

The Petrochemicals Complex of IPCL consists of several plants. These plants were commissioned during the period from March, 1973 to October, 1984. The scheduled and actual dates of mechanical completion and the commissioning of different plants are as given below:

Sl. No.	Unit	Dates			
		Mechanical completion		Commissioning	
		Scheduled	Actual	Scheduled	Actual
1	2	3	4	5	6
<i>(a) Aromatics Plant</i>					
1	Xylenes	April 1971	20-6-1973	Between 21-6-1973 and 12-11-1973	
2	Dimethyl Terephthalate	April 1971	20-3-1973	20-3-1973	
<i>(b) Olefins Plant</i>					
1	Naphtha Cracker	April 1973	December 1977	February 1978	28-3-1978
2	Benzene Extraction	February 1975	December 1977	February 1978	31-8-1978
3	Butadien Extraction	September 1975	December 1977	February 1978	30-5-1978
4	Pyrolysis gasoline hydrogenation		December 1977	February 1978	30-4-1978
<i>(c) Downstream Units</i>					
1	Low Density Polyethylene	February 1976	March 1978	March 1978	14-5-1978
2	Polypropylene	January 1976	December 1977	March 1978	29-5-1978
3	Ethylene Oxide/Ethylene Glycol	February 1975	December 1977	March 1978	8-6-1978
4	Acrylonitrile	December 1975	March 1978	July 1978	16-1-1979
5	Acrylic Fibre	July 1976		June 1978	15-3-1979

1	2	3	4	5	6
6	Polybutadiene Rubber	September 1975	December 1977	March 1977	3-8-1978
7	Linear Alkyl Benzene	June 1975	December 1977	March 1978	12-12-1978
<b>(d) Other Projects</b>					
1	Lower Acrylate	December 1981	30-6-1982		November 1982
2	Higher Acrylate	December 1981	November 1982		September 1983
3	Vinyl Chloride Monomer (VCM)	July 1983	January 1984		March 1984
4	Polyvinyl Chloride (PVC)	July 1983	March 1984		August 1984
5	Petroleum Resins	February 1984	August 1984		October 1984

1.2 It would be seen from the above that there have been delays in commissioning of most of the projects. Such delays have ranged from a few months to several years.

1.3 The Audit Report brings out that in respect of the projects under Olefins Plant, the Detailed Project Report and Feasibility Report envisaged a schedule of commissioning 33 months from the date of effect of foreign engineering contract. However, the schedule had to be revised five times before the actual dates of commissioning of various projects. Similarly in the case of the downstream units comprising of a number of plants, the Feasibility Report for each unit envisaged a certain number of months for completion from the date of effect of foreign engineering contract. However, the actual schedule of commissioning had to be revised five times before the actual date of commissioning in all the seven projects under the scheme.

1.4 It is seen that due to slippages in the time schedule for the completion of the various projects, the costs of projects originally estimated escalated substantially and the actual expenditure on completion was much more *vis-a-vis* the originally projected estimates. The actual cost of Olefins Project for which DPR provided an outlay of Rs. 29.80 crores, came to Rs. 76.33 crores. Similarly, the Feasibility Report prepared between January and June, 1971, envisaged an investment of Rs. 127.70 crores (including foreign exchange of Rs.

43.55 crores) on Downstream units. The actual expenditure on these units, which could be commissioned between May, 1978 and 1979, amounted to Rs. 262.02 crores. Thus the actual expenditure on the two projects namely Olefins Plant and Downstream Units amounted to Rs. 338.35 crores against the original estimate of Rs. 157.50 crores. The schedule of completion of the Olefins Projects was revised five times and the delay in completion of the Olefins Projects ranged between 28 months to 60 months as compared to the schedule of completion originally assessed and the completion schedule of Downstream projects was also revised five times, the delay in completion of the projects ranging between 26 months to 41 months.

1.5 During evidence, the Committee asked about the reasons which led to long delay in completion of various projects of I.P.C.L. The Chairman and Managing Director of I.P.C.L. informed the Committee as under:—

“The first and most important factor that was prevalent from 1973 to 1978 was the Balance of Payments situation and lack of freedom for the Corporation to have a foreign exchange of its choice. The second was this very important objective which the Government set before itself. The Corporation accepted firstly to become self-reliant in its indigenous capability. As you know, unlike what the private sector people do and what we try to do, we essentially try to make use of the indigenous resources right from the human resources to the hardwares which are available. Even in the Olefins Complex from 1978 when we finished various projects, the indigenous content was as high as over 70 per cent. So far we have to pay for the price of learning and price of some mistake in the fabrication and all that we have set for ourselves. So these two basic things are necessary for the completion of the projects. Even today in the public sector we do not have the kind of foreign exchange and the time that we want for getting the project completed through indigenous vendors.”

1.6 The Chairman and Managing Director, IPCL further informed the Committee that:

“We decided deliberately at the instance of the Government to use an engineering consultancy organisation called the Engineers India Limited as our primary consultant. And both EIL and IPCL have learnt how to implement complex designs of advanced technologies, translating the basic



designs supplied by the foreigners to the detailed designs construction, commissioning. Everything was done by Indians. So, I would say that from those days of 1973 to 1980, let us say, we were in the period of learning."

1.7 Referring to the projects implemented after 1980, the Chairman and Managing Director, IPCL, stated:

"You may kindly see our performance after 1980 in terms of scheduled completion, commissioning and actual performance. You will see now that whereas in the past, as the figures show the slippage itself took us about 5 years, the gaps are now being reduced to six months or so. Nowadays we are trying to finish it within a maximum period of 42 to 48 months. Previously that was taking about 60 to 65 months. We are now definitely making most of the things by learning. But two problems still remain which you have to appreciate... This procedural aspect of getting approval from the Government for foreign exchange for various plants and equipment that we require. We import not more than 30 to 40 per cent of the total cost of plants. We have to observe the procedures in terms of firstly establishing that there is no indigenous capability. Secondly, whether foreign exchange will be cleared and even if it is cleared what is the source of foreign exchange? Whether it is direct or indirect credit. That takes its own time running, may be as much as six to nine months of time, from the time we ask for the release of foreign exchange till we can establish what, in our parlance, we call the letter of credit which is essential. The second difficulty of course is that generally whereas the Indian Engineering Industry has made a remarkable progress in the last three plan periods we feel that there is a very clear evidence in terms of their capability to adhere to schedule, I am afraid that the results are not entirely satisfactory."

1.8 The Committee enquired whether the slippages in the time schedule for commissioning of various plants came to the notice of the Ministry and if so, what action was taken to ensure that projects of IPCL were completed within the specified time-frame. In a written note, the Department of Chemicals and Petro-Chemicals has stated as under:—

"The slippage in commissioning schedules of various plants did come to the notice of the Government. The slippages were mainly due to various reasons including longer time

taken in tying up of contracts and technologies, firming up of foreign credits, delays in supply of equipment by indigenous fabricators and longer time taken in detailed engineering than originally envisaged. Many of these factors were beyond the control of IPCL or for that matter the Government. In this connection, it is important to note that fabrication of various equipments for these projects was being attempted in the country for the first time. The softer option of importing such equipment could possibly have cut down the gestation period but that would have come in the way of development of indigenous capabilities. Similarly, it was for the first time that the Engineers India Limited attempted detailed engineering for such high-tech projects. The longer time taken in commissioning of these projects was the inevitable price paid for indigenisation of equipment fabrication and engineering."

1.9 Elaborating on the reasons for the delay in completion of various projects of IPCL, the Secretary, Department of Chemicals and Petro-Chemicals stated during evidence as under:

"I find that the project cycle issued at the time was for 33 months. It was rather ambitious because even today a project of that complexity cannot be executed in 33 months' time, or even if it is envisaged, it cannot be of the order of the plan, and it might take a few months more. It may be that in this way 36—39 months would have been a more realistic schedule instead of 33. It may be a few months more, on account of that. But the most important reason for the delay and which being controlled by the Government, may naturally take some time more for the credit negotiations. Because in all these cases, unless the credit negotiations are finalised, the question of ordering the equipment from U.K. does not arise. And the 33 months' time was set from the date of ordering of the equipment. So, indirectly, the credit finalisation has been delayed by almost three years, or it may be a little more than three years even."

1.10 On being pointed out that a large number of projects had been delayed because a lot of time was taken in clearance by Government, the Secretary stated:—

"A major decision has been taken by the Government recently that project clearance, particularly for large projects, technology oriented projects, should not be in one step. The

clearances are now being given in two stages. The first stage is that the organisation comes forward with a feasibility report and also indicates the cost of doing a detailed study. In some cases, the study may need appointment of foreign consultants and preparing a detailed project report. But at the first stage itself, the feasibility report should be able to justify the economics of the new investments."

1.11 To a question why long time was taken by Government in approving the project, the Secretary, Department of Chemicals and Petro-Chemicals stated during evidence:—

"Clearance part as was being practised till last year, was taking only 6 to 8 months. In earlier cases the total investment decision going upto the Cabinet was being taken on the basis of a feasibility report and not on the basis of a detailed project report, whereas in this type of projects the complete technology, scope of equipment, scope of various sub-technologies they get fully identified only through the medium of detailed project reports. In the end, there is a difference even in the scope of taking steps. To rectify that many steps have been taken by the Government. One is first stage clearance will not go to the Cabinet but it authorises an organisation to spend a much smaller amount only for preparation of the detailed project report. The intention is that while preparing the detailed project all the loose-ends will be tied up before it is submitted to a body like Cabinet and it takes a final decision for investment. Apart from realistic cost estimates, there are realistic schedules."

1.12 Referring to the procedural delays and the remedial measures taken to bring about improvement in project clearance, the witness stated:—

".....the two reasons which were not being gone into at the stage of the approval of the project, will be plugged now by getting more realistic cost estimates as well as time schedule. Secondly, for import of technology agreement certain procedures have been simplified. That is another area where the time cycles would be reduced. Thirdly, the total time taken for clearance and for giving approval of the project, can be reduced if it is controlled properly."

There may be a project which may need nine to ten months and there may be a project which may take only four months. That is another thing. So, I do not think one would be able to give a precise figure for total cycle of a detailed project report. But this may be six months plus three months. Beyond that I do not think it will take even for a complex project."

1.13 In reply to another question, the Secretary clarified that in future on an average project clearance was likely to take about six months' time. On being pointedly asked about the delay in approval of the Naphtha Cracker Plant, the witness stated:—

"Here what happened is that when the authors of this full complex developed the feasibility report, the intention of the Government was that the main crack plant was to be done by a public sector organisation and the other thing would be done by the private sector. When the petrochemical industry was not so established, the private enterprise have boldness to invest in that area, but all of them slowly backed out. So, the Government had to decide that if this project was to be set up, then the downstream investments also have to be done by the public sector. I find from the papers that negotiations went on for three years. It was only perhaps in August, 1973 that was signed. The major credit for the project was with the British. The project was supposed to be completed in April, 1973 whereas the credit was signed in August, 1973. Only after the credit signing, quantity was ordered and 32 months from the date of ordering, project completion was ready. It automatically landed us somewhere in 1977 and that was the date it was commissioned."

1.14 Apart from the long delay in commissioning of different projects, it is seen that there have been frequent revisions of the cost estimates. Asked about the reason for such frequent revision of cost estimates, the IPCL have in a note explained that some of the major factors which necessitated revisions of estimates were as under:—

"(1) the original estimates were prepared in 1968-69 based on information given in the technical proposal of one of the foreign consultants in the area of naphtha cracker technology,

- (ii) the overall escalation in cost was due to unforeseen delay in finalisation of U.K. loan and consequent time taken to establish operable letters of credit in respect of U. K. items,
- (iii) the impact of oil crisis of October, 1973 influenced the vendors to revise the prices."

1.15 In the same context, the Ministry have pointed out the following:—

"The original cost estimates for these projects were mostly prepared in 1969 and were based on the order of magnitude estimate of European/American erected costs prevailing at that time as obtained from prospective foreign collaborators and using general factor applied to such erected plant cost abroad to arrive at an estimated Indian cost. A provision of approximately 11 per cent of the total cost so estimated was provided for utilities and off sites facilities. However, in the following years there was unprecedented escalation in the cost of equipment due to the oil crisis. Besides, the parity rate of exchange also underwent significant change to the disadvantage of the rupee. Furthermore, there were variations in the rates of import duty. Also with progress of detailed engineering and availability of additional information, it became apparent that certain qualitative changes in the scope of the projects would be necessary. In this situation, IPCL in 1973 suggested upward revision in the cost estimates. Time was taken in checking on the firmness of revised cost estimates proposed by IPCL. An opportunity was also taken to delineate the scope of off sites which were then conceived as an integrated facility for the complex as a whole rather than apportioning the costs plant-wise. A clear picture in this regard emerged by 1974-75. Based on this updating the revised cost estimates for the naphtha cracker project and down stream units were approved by the Government in July, 1976."

1.16 While reviewing the performance of the Company, the Committee on Public Undertakings had recommended in their 64th Report (1974-75) that estimates in DPR should be as realistic as possible taking into account all foreseeable items of expenditure and be based on correct data to obviate the necessity of frequent revision of estimates, that IPCL and Government should take measures

to control at least those factors (like timely supplies of materials) which could be controlled by the undertaking itself or through the intervention of the Government of India and that the undertaking/Government should take timely concerted measures to keep the costs well within the estimates sanctioned by the Government. The Committee desired to know what steps were taken by Govt. after receipt of the recommendations of the Committee on Public Undertakings in regard to the concerted measures to control the cost of the projects of IPCL. In a note, the Ministry have explained as under:—

“The strategy to control the costs of the projects has two aspects to it, namely,

- (i) Adoption of Realistic Cost Estimates, and
- (ii) Avoiding time over runs leading to cost over runs.

So far as (i) above is concerned, at the time of receipt of the recommendation of Committee on Public Undertakings, the proposal of IPCL for revision in the cost estimates of Naphtha cracker and downstream unit was before the Government. Care was taken to arrive at realistic revised cost estimates. Detailed discussions were held with IPCL and EIL. The costs were cross-checked with reference to the price indexes of the Central Statistical Office of U.K. in regard to the imported equipment and with those of the Reserve Bank of India for the indigenous equipment. The scope of projects was determined in the light of the latest progress of detailed engineering and additional information received from foreign technical collaborators. As a result, the revised cost estimates approved in 1976 came to be highly realistic. It is observed that the actual total cost of the projects on completion more or less conformed to these approved estimates.

As regards (ii), concerted measures were taken to ensure that the projects were completed in accordance with the revised completion schedules. This was done through closely monitoring the implementation of the projects.

The above strategy continues to be followed and an effort has been made to improve upon it. In 1981, a Ministry Monitoring Cell was instituted in the Ministry of Petroleum to monitor the progress of implementation of the major

projects. Based on the flash reports received from the project authorities, measures are taken to remove the bottlenecks wherever necessary. Further more, to have more realistic cost estimates, Government has recently introduced a two staged clearance procedure. In the first stage, based on the preliminary information, approval in principle is accorded to enable the organisation to incur expenditure on software such as obtaining of technologies etc. Subsequently, based on the detailed feasibility report prepared after obtaining all the relevant details, comprehensive investment approval is accorded for project."

1.17 When enquired about the systems and procedures since introduced to take care of the deficiencies in the project implementation and the extent to which IPCL had benefited from them, IPCL informed the Committee in written note as under:—

"Many measures have been taken in the recent past by the Government and by the Corporation to monitor the progress of projects effectively. The Government of India have recently introduced a two stage clearance for project proposals. The first stage will be approved for feasibility report followed by investment decision. Full justification is to be sent to the administrative division in the Ministry seeking approval even for the preparation of the feasibility report. Where the project cost is not expected to exceed Rs. 20 crores and the cost of preparation of a feasibility report thereto is not likely to exceed Rs. 20 lakhs, the proposal for preparation of feasibility report will be decided by the Ministry. Where the cost of the project is more than Rs. 20 crores and the cost of preparation of the feasibility report exceeds Rs. 20 lakhs, PIB will consider such proposals. It has been decided by the Government that detailed engineering should be done with full involvement of the domestic capital goods manufacturers and the project report should bring out the contribution to be made by them. The investment approvals by the Government should specify the role to be assigned to the domestic public sector manufacturers. As a further step, it has been decided that the preparation of Detailed Project Report should be undertaken with involvement of public sector capital goods manufacturers. These measures have been taken after an analysis of the reasons for the cost over-runs which revealed

that apart from escalation arising from the present system of approving projects on the basis of fixed cost, factors like change in scope of projects, under provision for items etc. also contribute for increase in cost."

1.18 IPCL have further intimated that the following measures have been taken in the Company to have control on progress of projects:

- (i) A project monitoring division has been established whose main function is to interact with the project implementation group and with the consultant and to identify periodically areas of concern noticed and likely areas of concern which would emerge in the immediate future.
- (ii) Monthly Executive Committee meetings are held presided over by the Chairman-cum-Managing Director in which the progress of projects are critically reviewed and areas of constraints examined in detail.
- (iii) In the monthly D.O. letter sent by Chairman-cum-Managing Director to the Secretary of the Ministry, areas of constraints in implementation of the projects are highlighted and wherever necessary, Ministry's assistance is sought.
- (iv) In the quarterly performance review meeting held by the Ministry, major areas of constraints are brought to the notice of the Secretary of the administrative Ministry.
- (v) Periodical review meetings are held with the consultants and the Chairman-cum-Managing Director attends this meeting to have first hand information on the progress of the projects. This apart, in the weekly Directors' meeting, the physical progress and the financial expenditure pattern is also reviewed. With all these measures a very close monitoring system has been evolved with a view to identify areas of constraints immediately on its emerging so that solution could be brought to the constraint without loss of time."

1.19 About the mechanism within the Company to see how far these projects are implemented in time, the CMD informed the Committee during evidence:—



“A project monitoring division has been established whose main function is to interact with the project implementation group and with the consultant and to identify periodically areas of concern noticed and likely areas of concern which would emerge in the immediate future. I personally take regular monthly meetings for each project to find out where slippages, if any, are taking place and what steps have been taken to arrest slippages. That is done now on a quarterly basis with the CMD of EIL also. Every quarter I make sure that the Chief Executive of the EIL sits with me and gives directions as to what should be done where slippages are taking place. We have also performance review meetings in the Ministry where we highlight the problem we experience. I sit with the Secretary to the Government of India, where we need his help to expedite decision-making—for example, there are decisions to be taken in the Department of Economic Affairs or in the office of the Chief Controller of Imports and Exports where delays occur.”

1.20 Asked whether the Department of Chemicals & Petrochemicals has also a monitoring cell, the Secretary of that Department informed the Committee “We want to set up a small cell which will do item by item scrutiny.” He also added:—

“Monitoring cell or Audit cell will be set up. There will be people there who have done large projects. They would be able to put their fingers at the right place and we will see that these delays are avoided. I am talking about technology audit, project audit.”

1.21 As regards the mechanism in the Ministry to watch timely completion of various projects, the Department of Chemicals & Petrochemicals had informed the Committee in a written reply that the following Institutional arrangements have been made for monitoring the timely implementation of projects:—

- “1. The bar-charts etc. indicating the key milestones for project activities are prepared at the time of commencing the work on the projects. These are revised and updated from time to time. The implementation is reviewed on monthly basis by IPCL in association with Engineers India Ltd.

2. The Ministry receives monthly reports regarding progress of implementation from the Chairman and Managing Director of IPCL. These enable the Ministry to oversee the progress of various activities such as process design, detailed engineering, procurement, civil works etc.
3. The progress of implementation of projects in hand is reviewed in detail in quarterly progress review meetings convened by the Ministry.
4. More recently, a Ministry Monitoring Cell had been Instituted under the Ministry of Petroleum to monitor the progress of implementation of selected projects. Flash reports are received from the project authorities and ways and means are devised to remove the bottlenecks wherever found necessary. With the separation of Petrochemical Division from the Ministry of Petroleum, it is proposed to institute separate arrangements to ensure regular monitoring of major projects in hand.
5. The Government Directors on the Board of IPCL are associated with the monitoring of implementation of projects; agenda items in this regard are regularly brought up before the Board which meets five to six times a year."

1.22 The reasons for delay in commissioning of IPCL projects have also been attributed to:—

- (1) Delayed deliveries of equipment from indigenous fabricators on account of the decision to maximise procurement of plant equipment from indigenous sources; and
- (2) Limited availability of contractors for undertaking civil and mechanical erection of equipment involved.

1.23 The Committee enquired whether Government are aware of the nature of problems faced by public undertakings in the matter of acquiring equipments for their projects and if so, what remedial action has been or is proposed to be taken to overcome these problems. In a note, the Ministry have stated:—

"Government is aware of the problem faced by public undertakings in acquiring the equipments for the projects. Some of the main reasons for delay in the delivery schedule of the indigenous equipments are also the non-availability of raw material, power problem, labour unrest, etc. The Government assists by holding inter-Departmental

discussions alongwith indigenous suppliers if they happen to be public sector undertakings. Further with more experience some of the manufacturers have improved their capabilities and are able to supply sophisticated equipment in shorter time schedules. For example, supplies from BHPV have substantially improved against the recent orders. Government, however, permits even now import of critical equipments if it is established that indigenous equipment would not be available as per the time schedule and that such delay would lead to time and cost overruns in the implementation of the project."

1.24 In regard to constraints being faced by IPCL in project implementation, it has been stated that the time cycle required for the DGTD clearance, international tendering, evaluation of offers and selection of suppliers, tying up of foreign exchange, award of import licence and opening of letters of credit in banks nominated by selected suppliers, is quite long. In this connection, IPCL is reported to have given several suggestions to the Ministry for consideration from time to time. Some of the suggestions are:

- (1) Instead of Finance Ministry, the administrative Ministry should be authorised to accord foreign exchange clearance for import of equipments.
- (2) The final judgment for placing an order on a foreign vendor should be left to the management of the undertaking.
- (3) It takes time on the part of the Ministry in specifying the nature of credit to be made use of for purchasing some of the equipments. This time delay could be avoided, if at the PIB clearance stage itself based on details given by the public sector, details of credit available are indicated as a part of the PIB/Investment Approval.
- (4) The foreign collaboration agreements are examined by SIA/CCI&E and they seek the views of DGTD, Department of Economic Affairs, and other agencies. It takes three months by the time SIA intimated the points raised by the various agencies. This time factor could also be minimised if the agencies are asked to seek clarifications directly from the public sector under intimation to SIA.
- (5) In the case of balancing equipments and materials (i.e. small value items and urgent items) required in the last stage of construction of a project, the project authorities

should be permitted to import them under free foreign exchange without DGTD clearance, even for items which are manufactured within the country but are not available within a reasonable time ex-stock for the completion of the project. The maximum limit of such imports should be limited to 20 per cent of the total foreign exchange requirement of the project.

- (6) If some equipments are recommended by the process licensor and the proving of performance guarantee of the plant is tied with those equipments then it is imperative that approval is given by the licensing authority under OGL to obtain those equipments.
- (7) As per the current procedure a consolidated application is called for giving full details of proforma invoices of recommended factors for all the equipments that figure in one IEB advertisement. This procedure causes considerable time and keeping in view the practical problems, it is essential that separate applications for foreign exchange and import licence should be entertained as soon as a purchase is finalised, even though the IEB advertisement may include several items."

1.25 Asked whether the Ministry had considered the above suggestions put forth by IPCL and if so, with what results, the Ministry stated in a note:—

"Such issues have been discussed in the Government Departments a number of times. The position in regard to IPCL's suggestions listed above is as follows at seriatim:—

Suggestion (1):—

It may not be possible to agree to this suggestion primarily because the overall implications of foreign exchange position, credit availability, etc. is known to Ministry of Finance only. However, the procedure has been liberalised so that once a block of foreign exchange is sanctioned, the releases are by the Administrative Ministry.

Suggestion No. 2:—

The final selection of vendor is always with the management of the undertaking. In most cases the final choice of the undertaking is approved by the Government for import of

equipment. Only in extra-ordinary circumstances where a credit tie up or foreign exchange non-availability may be a factor, the organisation is advised to change the source of purchase.

*Suggestion No. 3:—*

The question of specifying the credit for purchase of equipment being identified at PIB|Industrial Approval, does not arise as the identification and selection of equipment by the undertaking itself takes place at a much later stage i.e. after the basic engineering has been done. However, under the revised procedure (which has been introduced about a year back) the public sector undertaking applies for import of capital goods to the Ministry of Industry (Secretariat for Industrial Approvals) and this is processed by the CG Committee in the same way as the applications from private sector parties are processed. Under this procedure, credit|foreign exchange identification is done at the time of clearance of the application for import of capital goods in the CG Committee itself.

*Suggestion No. 4:—*

The procedure of taking foreign collaboration agreements on record has been dispensed with and the Government has introduced a new procedure under which the undertaking can submit the agreement to Reserve Bank of India directly for release of foreign exchange.

*Suggestion No. 5:—*

Such dispensations have been allowed in the past and can be considered in future on merits on case to case basis.

*Suggestion No. 6:—*

As mentioned earlier the procedure prescribed for import of equipment (advertisement and indigenous clearance) is designed for maximising the indigenous supply and thereby supporting and protecting indigenous capability. If a blanket clearance for proprietary equipments is given, this may lead to misuse of provision. However, any project which has a proprietary equipment tied with performance guarantees, DGTD usually clears such equipments after satisfying themselves about the need for it. However, a prior OGL clearance for such equipments is not feasible.

*Suggestion No. 7:—*

Normally the proforma invoice is expected to cover all the items in the advertisement. If, however, this is not possible, DGTD could be requested to consider part proforma invoices as well as foreign exchange release subject to normal procedural clearances."

*New Projects*

1.26 IPGL is setting up a gas cracker complex at Nayathane Maharashtra at an approved cost of Rs. 1167 crores and capital expenditure on the complex during the Plan period was expected to be of the order of Rs. 955 crores. The Committee wanted to know whether the Government considered and approved the gas cracker project of IPCL and what stipulations, if any, have been made in regard to financing of the project. In a note, the Ministry have stated:—

"The Government's approval to IPCL for setting up Maharashtra Gas Cracker Complex was given in August, 1984 at an estimated capital cost of Rs. 1167 crores (December 1982 prices). It is proposed to provide an outlay of Rs. 955 crores during the VII Five Year Plan. This amount is proposed to be met from the World Bank loan of Rs. 240 crores, non-convertible debentures of Rs. 300 crores and the balance from the internal resources of IPCL."

1.27 Asked whether the economic viability of such a project involving huge investment of scarce resources had been carefully examined in the context of the availability of petrochemicals at low prices in the international market, the Ministry stated:—

"While approving the project in August, 1984, the economic rate of return of the project was examined and it was found that the economic rate of return without premium worked out to 12.5 per cent and with premium at 14.6 per cent. Further large scale dependence on international market may not be feasible in view of scarce foreign exchange situation as we have.

The project was also appraised by the World Bank who have found the project to be viable."

The Committee enquired whether, going by the past experience of IPCL in the matter of project implementation, the Government was satisfied that a project of this magnitude will be executed within a given time frame so that there are no time and cost over-runs, the Ministry replied as under:

"IPCL has worked out a PERT/CPM chart for identifying important milestones to ensure that MGCC project is completed within the given time schedule i.e. August, 1989 (mechanical completion). Till now the progress is satisfactory. The Ministry is receiving reports every month from IPCL in a prescribed format. IPCL is also providing reports highlighting the constraints and problems faced in the implementation of the project. All efforts are being made to ensure that the project is implemented within the given time schedule."

1.29 The Committee wanted to know about the downstream units envisaged to be set up for ensuring maximum utilisation of capacities to be created by the completion of this project. In a note, the Ministry stated:

"The complex consists of a gas cracker of 300,000 tonnes of ethylene and the following major downstream units:

Name	Capacity (000' tonnes)
LDPE	80
LLDPE/HDPE	135
Ethylene Oxide	5
Ethylene Glycol	50
Polypropylene	60

1.30 From the above it seemed that the availability of plastic raw materials will almost double as compared to 1986 by 1990-91 with the commissioning of MGCC. It is estimated that the increased availability of plastic raw material will provide support to around 3,500 plastic processing units in the small scale sector providing direct employment to about 20,000 persons."

1.31 The Committee on Public Undertakings of Fifth Lok Sabha which reviewed the performance of Indian Petrochemicals Corporation Limited in April, 1975 had inter alia, gone into the reasons for variations in project cost estimates and delay in commissioning of projects of IPCL. In their 64th Report (1974-75) the Committee had

recommended that estimates in DPR should be as realistic as possible taking into account all foreseeable items of expenditure and be based on correct data to obviate necessity of frequent revision of estimates, that IPCL and Government should take measures to control at least those factors (like timely supplies of materials) which can be controlled and that the management of IPCL 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.

1.32 In the action taken replies furnished by Government the Committee had been assured that effective timely measures were being taken to control, as far as possible, the factors responsible for increase in the cost estimates of the projects and that all possible measures to ensure that there is no further slippage in the project schedules were being undertaken.

1.33 A review of the cost estimates and the time schedules of the projects undertaken by IPCL, thereafter, however, reveal in unmistakable terms that no lessons have been learnt by IPCL management from their past experience. The project planning and implementation machinery remains as weak as before. The cost estimates of each project have been subjected to frequent revisions and time schedules have been revised from time to time so as to render the setting of targets a futile exercise.

1.34 The Committee feel concerned to note that the cost estimates of Olefins Project and Downstream Units originally assessed at Rs. 157.50 crores in 1970-71 were initially revised to Rs. 331.93 crores in 1973-74 and were finally revised upwards to Rs. 346.33 crores against which the actual expenditure amounted to Rs. 338.35 crores. This represents an increase of 120 per cent over the original estimated cost. The main reasons for increase in the cost over the initial estimates in the case of Olefins Project have been attributed to escalation in cost of equipment, increase in the quantity of equipment, increase in customs duty and handling charges, additional systems preproduction expenses and interest. Similarly in the case of Downstream Units the increase in cost was chiefly on account of customs duty and handling charges (Rs. 12.36 crores), escalation in equipment cost (Rs. 35.08 crores), new items (Rs.42.90 crores), quantity changes and understimation (Rs. 26.65 crores), additional preproduction investment and management expenses (Rs. 10.37 crores), variations in exchange rates (Rs. 7.61 crores) and contingencies (Rs. 10.47 crores). All these reasons have been repeated time and again.



1.35 The Committee have no doubt that the foremost reason for revision of cost estimates was nothing else but inadequate project formulation. The Committee feel that in the interest of expediting project implementation and keeping down the cost, the Ministry should have ensured preparation of realistic project estimates and effective monitoring through monthly or quarterly reports. The Secretary, Department of Chemicals & Petrochemicals admitted during evidence that "the two reasons which were not being gone into at the stage of the approval of the project will be plugged now by getting more realistic cost estimates as well as time schedule." It is very surprising that Government have only now realised that realistic cost estimates and time schedules were the two main essentials for approval of the projects although the Committee had stressed as far back as 1974-75 the importance of these imperatives. The Committee have no doubt that had the IPCL and Ministry cared to implement the recommendations of the Committee in their letter and spirit, it would not have been necessary to revise the cost estimates so frequently and the huge escalations could have been avoided. It is regrettable that the recommendations of the Committee in this regard were followed more in breach than in observance resulting in extra expenditure which could have been avoided. The Committee recommend that Government may go into this aspect and fix responsibility and take further necessary action under intimation to them.

1.36 The Committee find that in order to cut delays Government have now reportedly streamlined the procedure for clearance and approval of the projects and the procedure for import of technology has also been simplified. Under the two stage clearance procedure now being adopted by PIB, the approvals are given in the first stage for incurring the expenditure towards technology purchase, selection of consultant, preparation of Feasibility Report etc. based on which detailed project reports for investment decisions are submitted as a second stage of the proposal. The Committee note with satisfaction that Government have at last realised that in large technology oriented projects, the complete technology, scope of equipment, scope of various sub-technologies get fully identified through Detailed Project Report and that the recent DPRs are being prepared in accordance with the recommendations of the Committee made in their 64th Report. The Committee trust that in order to avoid frequent revisions in cost estimates, Government would in future thoroughly scrutinise initially the cost estimates from all angles before according approval and critically watch timely implementation of the projects to avoid undue escalations.

1.37 The Committee note with regret that not only were there frequent revisions of cost estimates, but also the schedules of com-

pletion of the projects were frequently revised. The Olefins Projects which were originally scheduled to be completed between 1973 to 1975 were actually commissioned in 1978. In accordance with the Detailed Project Report and Feasibility Report, as against a period of 33 months envisaged for completion of the projects from the date of effect of foreign engineering contract, the schedule of completion was revised as many as five times and the delay ranged between 28 months to 60 months. Similarly, in the case of Downstream Units, the Feasibility Report originally assessed a period of 26 to 33 months for completion of the plants from the date of effect of foreign engineering contract but the schedules in this case were also revised five times and the delay in completion of the projects ranged between 26 months to 41 months. Such heavy delays in completion of the projects cannot but be considered as abnormal. The Committee have no doubt in saying that the quality of the feasibility studies left much to be desired.

1.38 The Committee fail to understand the logic behind laying down the schedules by the Company if these were not to be scrupulously adhered to. It can be said without the risk of contradiction that the schedules of completion of Olefins Project and Downstream Units were not realistically drawn. This is amply confirmed by the Secretary, Department of Chemicals & Petrochemicals himself who while referring to the time schedules of the project deposed before the Committee that "I find that the project cycle issued at the time was for 33 months. It was rather ambitious because even today a project of that complexity cannot be executed in 33 months' time or even if it is envisaged, it cannot be of the order of the plan and it might take a few months more. He also stated that the total time taken for clearance and for giving approval of the project can be controlled if it is controlled properly. This is exactly what the Committee have been emphasising from time to time that most of the factors leading to time and cost overruns in the implementation of the various projects were such which could be controlled by the Management or the Government provided there was a will to do so.

1.39 The Committee note that Government have now made certain institutional arrangements for monitoring timely implementation of the projects like:

- (i) Preparation and updating of bar-charts indicating the key milestones for project activities at the commencement of work on the projects and monthly review of implementation by IPCL in association with Engineers India Limited;

- (ii) Receipt of monthly reports of progress of implementation from IPCL;
- (iii) Quarterly progress review meetings with the Ministry; and
- (iv) Regular monitoring of major projects in hand.

The Committee feel that if the Ministry had closely monitored implementation of the Olefins Project and Downstream Units, identified areas of slippages and had taken timely corrective measures such huge delays would not have occurred. The Committee expect that with proper use of the monitoring systems now devised and adequate inter-ministerial coordination, wherever required, it would be possible hereafter to ensure timely completion of the projects undertaken.

1.40 Among the constraints reportedly being faced by IPCL in their project implementation programmes, the CMD has listed out a number of impediments which came in their way. It has been stated that the time cycle required for the DGTD clearance, international tendering, evaluation of offers and selection of suppliers, tying up of foreign exchange, award of import licences and opening of letters of credit in banks nominated by selected suppliers is quite long. Another major factor hindering the timely completion of projects is the failure of indigenous engineering industry to adhere to their delivery schedules. The Committee have no doubt that all these factors are such which could be monitored and controlled with appropriate interaction between the various agencies involved. The Committee would particularly like the Government to carefully analyse the constraints faced by IPCL and the suggestions made by them to overcome these and take necessary remedial measures in the matter.

1.41 IPCL is now in the process of setting up a new complex at Nagathane, Maharashtra at an approved cost of Rs. 1167 crores and the capital expenditure on the complex during the Seventh Plan period was expected to be of the order of Rs. 955 crores. Going by the past experience of IPCL in the matter of project implementation, the Committee cannot but caution the Government to keep a strict watch and ensure that the project of this magnitude gets executed within the time frame settled well in advance. The Committee need hardly emphasise that delays in project implementation have grave financial and economic implications. Organising project construction activities to ensure timely completion was, therefore, a major responsibility not only of the project management but of the Government also. The procedures, practices and organisation involved in project construction and implementation, therefore, require critical analysis and review.

## CHAPTER II

### PROJECT IMPLEMENTATION

#### *Vinyl Chloride/Poly-Vinyl Chloride Unit (VC/PVC)*

2.1 Out of 1,30,000 tonnes, per annum, of designed production of **Ethylene** from naphtha cracker, 99,750 tonnes were required for manufacture of LDPE, EG and Polypropylene, leaving a balance of 30,250 tonnes. A feasibility report for manufacture of 35,000 MT of VC/PVC utilising the balance ethylene at an estimated capital expenditure of Rs. 22 crores was submitted to GOI in December, 1974. After the Gujarat State Fertilizer Corporation Ltd., which showed interest in the project, decided to drop its proposal, this was re-examined and the cost of the project was revised to Rs. 45.27 crores and approved by GOI in 1977 for an investment of Rs. 43.35 crores. Based on enquiries floated in January, 1978 and discussions with date of commissioning of VC/PVC unit as furnished by IPCL are as process licensors, the cost estimates were firmed up in March, 1979 at Rs. 74.16 crores on the ground that the original estimates were based on preliminary information with no firm data regarding equipment specification, sizing, etc. IPCL finalised the process technology in April, 1979 and was approved by GOI in December, 1979. According to Audit the increase of Rs. 30.82 crores is mainly on account of escalation in cost (Rs. 19.55 crores), design change (Rs. 5.98 crores), additions (Rs. 6.51 crores) and under-estimation in the original estimates (Rs. 4.30 crores), partly offset by reduction in basic engineering, pro-production interest and contingencies (Rs. 5.52 crores).

2.2 Approval of GOI for the revised project report was received in December, 1982 for Rs. 75.66 crores, including Rs. 1.5 crores for escalation. The schedule of completion envisaged in the feasibility Report as July, 1983, was extended to December, 1983 on account of delays in the delivery of equipment by indigenous vendors, poor response from foreign supplier for certain specific pumps, delayed receipt of process package etc.

2.3 Meanwhile, till the PVC Plant was commissioned, the production of Ethylene had to be restricted to the intake of LDPE and EG Plants only, with consequent reduction in the Co-products from the naphtha cracker.

2.4 The VC/PVC project was stated to have been commissioned in August, 1984 and the actual cost on completion of the project was Rs. 70.36 crores. The scheduled date of commissioning and actual date of commissioning of VC/PVC unit as furnished by IPCL are as under:—

	Scheduled date of mechanical completion as per original feasibility report/project report sanction	As per latest revised sanction	Actual dates of mechanical completion	Actual dates of commissioning
Vinyl Chloride Monomer	July, 1983	Dec., 1983	Jan., 1984	March, 1984
Polyvinyl Chloride	July, 1983	Dec., 1983	March, 1984	August, 1984

2.5 When enquired whether the Feasibility Report of the project submitted in December, 1974 envisaging an estimated capital expenditure of Rs. 22 crores was not faulty as the increase of Rs. 30.82 crores was mainly on account of escalation in cost, design change, additions and underestimation in the original estimates, the IPCL Management stated in a written reply as under:—

“The feasibility report which was submitted to the Government of India in December, 1974 was for the manufacture of 35,000 tonnes per annum of polyvinyl chloride. The capacity of the contemplated plant was subsequently increased from 35,000 to 55,000 tonnes per annum on account of increased anticipated availability of ethylene, economies of scale and market projections. Additional availability of ethylene was as a result of decision of Gujarat State Fertilizers Company not to proceed with styrene/polystyrene project for which earlier about 9600 tonnes of ethylene had been earmarked.”

2.6 It was also stated in the reply that the above factors responsible for cost escalations could not be anticipated at the time of preparation of the Feasibility Report.

2.7 The Committee decided to know why I.P.C.L. failed to implement the down stream project of VC/PVC in time. The Chairman and

Managing Director of the company informed the Committee during evidence:—

"I agree with you that this particular project does not leave a very satisfactory taste, even with a good record of the enterprise. But there are some factors which indicate that the Corporation is not entirely responsible for this poor state of affairs.

IPCL in December 1974 went to Government with a feasibility report for the manufacture of 35,000 TPA of PVC. Between December 1974 and November 1977, Government did not approve the proposal for making 35,000 TPA of PVC. It so happens from the records we see today that Government finally approved the proposal for making 55,000 TPA of PVC in 1977. It was only one year from the time of scheduled completion of the cracker complex. . . . When we went to choose the technology, we had 34 offers from all over the world; by March 1979 i.e. two years from the date we went to the world market we could finalize the choice of technology. This explains the broad difference in the capital cost, from Rs. 43 crores to Rs. 74.15 crores, i.e. for the purpose of completion of the PVC project. We finished this project well within the estimated cost limit made in March 1979. We completed the project in two stages, viz. March, 1984 and August, 1984. This period between 1974 and 1979 was too long, which led to this unfortunate situation in our cracker operations, and which led to inadequate production of Ethylene. It is a fact which we do not deny. But the important point is what I have conveyed to you."

2.3 On an enquiry whether the delay in implementing the project has deprived IPCL of an additional production of the value of Rs. 267.61 crores of PVC that could have been achieved if the ethylene plant had been operated to its full capacity, the witness stated:—

"The delayed completion of the PVC plant certainly deprived us to run the Naptha Cracker Plant to full capacity for the first four years. But apart from that we cannot report to you that the production loss has taken place on account of delayed completion because the ethylene plant has got two more users—LDPE and EG. Power cut and power shortage is due to factors which are beyond our control, but the delay in completion has primarily affected the Ethylene production. I cannot comment on the value of money

that has been worked out. Because of lack of Ethylene production there was a consequential loss of production of Acrylonitrile and polybutadiene. These are given products. If you do not make Ethylene, you don't make a corresponding amount of Propylene and Butadiene. These down-stream users of Propylene and Butadiene cannot run it because of the shortage of Ethylene. Similarly, our production plant suffered because Ethylene was not there. So, it is a vicious cycle. Due to the inadequate capacity, Ethylene user plants suffered in the case of PVC; and other plants suffered because of the lack of other bi-products."

2.9 In reply to a question if the production loss had been worked out, the witness stated "It is very significant."

2.10 Asked if he agreed with the figure of production loss of Rs. 267.61 crores as calculated by Audit, the CMD stated:

"I don't agree with this. I will properly calculate it and give it to you. It should be based on certain realistic assumptions. Our performance should be judged against achievable performance, not a theoretical figure. This is what Audit has done. It ignores the history, it ignores the circumstances and facts; it is a hypothetical figure and out of context and we should not have discussion in this august body on that basis. It should be against achievable performance."

2.11 Subsequently in a written note the production loss of Rs. 267.61 crores during the years 1978-79 to 1981-82, was explained by the company as under:—

"1. The value of the production loss (Rs. 267.61 crores) indicated in para 4.15 of the Audit Report is based on:

(a) Shortfall in production computed with achievable capacity as the base.

(b) Actual unit cost of production in the respective years.

2. The achievable capacity assumed in the report in respect of Polypropylene, Acrylonitrile and Polybutadiene is based on a capacity build up of 60 and 80 per cent in the first and second year of the commencement of production which

has no relation to the achievable capacity of the intermediates i.e. Propylene & Butadiene. Ethylene, Propylene and Butadiene are associated products and the production of Propylene and Butadiene is directly related to Ethylene production.

3. The value of production loss as given in the report has been calculated based on the actual unit cost of production in the respective years. Since the actual unit cost of production is relevant only to the actual volume of production and not to the achievable capacity the value of production loss given in the report stands overstated. Based on the selling prices of the products in the respective years the theoretical loss works out to Rs. 175 crores.
4. The value of the potential production loss (Rs. 175 crores) indicated in above, represents the sales value. The corresponding financial impact works out to Rs. 64 crores.
5. During the years 1979-80 and 1980-81 there was a reduced offtake of the products due to:—

(a) Free imports of Acrylic Fibre:—

This affected the operation of Naphtha Cracker and the downstream units:

(b) Steep increase in the price of Naphtha and Fuel:—

The price of Naphtha was increased from Rs. 1100 to Rs. 2650/MT and fuel from Rs. 930 to Rs. 1276/MT effective from August 1979. This affected the growth of Low Density Polyethylene processing industry. Due to reduced offtake of LDPE, the operating level of Naphtha Cracker had to be curtailed.

The value of potential production unachieved as a result of the reduced offtake was Rs. 63 crores. The net financial impact of this was Rs. 24 crores.”

2.12 The Committee find that IPCL submitted to the Government a Feasibility Report for the manufacture of 35,000 tonnes per annum of PVC at an estimated capital expenditure of about Rs. 22 crores in December, 1974. Since the Gujarat State Fertilizer Company Limited which was planning to set up a PVC plant to utilise Ethylene from IPCL dropped the proposal, IPCL submitted a Revised Feasibility report in January, 1977 at an estimated cost of Rs. 45.27



crores. The project was approved by Government in December, 1977 for an investment of Rs. 43.35 crores. In September, 1981 the cost of the project was further revised upwards to Rs. 74.16 crores on the ground that the original estimates were based on preliminary information with no firm data regarding equipment specifications etc., the estimates of which had been worked out on the advice of Engineers India Limited. The approval of Government for the revised project report was received in December, 1982 for Rs. 75.66 crores. The project was actually commissioned in August, 1984 and the actual cost on completion of the project was Rs. 70.36 crores.

2.13 It is distressing to find that a project conceived in December, 1974 was actually completed and commissioned in August, 1984 i.e. after a lapse of a full decade. The Chairman-cum-Managing Director was candid enough to admit that the implementation of this particular project "does not leave a very satisfactory taste, even with a good record of the enterprise". The frequent revisions of estimates resulted in huge cost escalations and consequent delays in completion of the project. It is interesting to analyse that between December, 1974 and November, 1977 the Government could not take a decision on the proposal given by IPCL. This pushed up the cost-estimates of the project from Rs. 22 crores to Rs. 45 crores. After Government approval had come, it took IPCL another two years to finalise the choice of technology and in September, 1981, when the revised estimates were prepared the cost of the project went up from the estimated Rs. 45 crores to Rs. 74 crores.

2.14 Not only the estimates had to be revised too often, IPCL could not keep their schedule of completion of the plant as originally envisaged. The VC/PVC plant which was originally due for mechanical completion in July, 1983 was actually completed in January/March, 1984 and the actual commissioning was done in March/August, 1984. The main reasons for delay in completion of the plant have been attributed to delay in delivery of equipment by indigenous vendors, poor response from foreign vendors for certain specific pumps and delayed receipt of process package and consequent delay in detailed engineering.

2.15 The Committee also find that the delay in completion of the PVC plant had primarily affected the Ethylene production which had to be restricted to the intake of LDPE and EG plants with consequent reduction in the production of co-products. Audit has brought out that the value of production loss due to under-utilisation of capacity was Rs. 267.61 crores. The loss was computed with reference to the actual cost per unit. IPCL has contended that the value of production loss of Rs. 267.61 crores during the years 1978-79 to

1981-82 is based on shortfall in production computed with achievable capacity as the base and actual unit of cost of production in the respective years. According to the company, the actual unit cost of production is relevant only to the actual volume of production and not to the achievable capacity. In the Company's view the value of production loss comes to Rs. 175.00 crores. Whatever be the quantum of production loss in monetary terms, the important point that stands out is the fact that there has been avoidable delay in the completion of the project and this delayed completion has resulted in significant loss of production. The Committee cannot but deplore this huge loss suffered by the Company on account of delay in completion of the PVC plant.

2.16 At this stage the Committee can only express the hope that IPCL would have taken suitable lessons from their experience of tardy implementation of the project and would not allow the same thing to be repeated in the projects now under implementation or those which will be undertaken in future.

#### (2) 25 MW Captive Power Plant

2.17 One of the major constraints affecting production in IPCL was power shortage, voltage fluctuation and trippings resulting in sudden plant shut-down leading to process problems. As shutdown of plants due to sudden stoppage of power could damage costly catalysts and critical equipment, the Company processed a proposal for power plant for generation of 25 MW emergency power, which was approved by the Board of Directors in August, 1973. The proposal envisaged installation of two turbine generation (TG) sets of 12.5 MW each to enable safe shutdown in case of sudden stoppage of power. These sets were to use the energy that otherwise went waste in stepping down the pressure of available steam.

2.18 The original estimate (Rs. 5.68 crores) was submitted to GOI in September 1973. This was approved by PIB in August 1975 and finally approved by GOI in February 1978. The Company placed orders on BHEL in July 1979 and the supply was made in January 1981, as against the scheduled date of June 1980. One of the sets (12.5 MW) was installed in March 1982 while the second set was commissioned in September 1982 only. The estimated cost of the power plant was also revised from Rs. 5.68 crores to Rs. 7.26 crores, mainly on account of increase in the cost of civil works (Rs. 0.14 crore) and escalation in the cost of plant and machinery (Rs. 1.14 crores). The actual expenditure incurred upto December 1982 was Rs. 7.07 crores.

2.19 There had thus been considerable delay in installing and commissioning of the 25 MW power plant, proposals for which were initiated as early as August 1973. The extent to which such frequent shutdowns had affected the life of the costly equipment is not ascertainable.

2.20 Even the two 12.5x2 MW generators were meant mainly to enable safe shutdown in case of power cuts and to supplement the power supply from GSEB but not for providing the energy for full normal running. Although power dips and trips have a damaging effect on the costly equipment and also production loss (as even a slight dip in the voltage or power trip for a short duration results in complete stoppage of plants and on-spec production takes from 24 to 72 hours after each start ups) it was only in December 1982 that the Company decided to have a techno-economic study for a 60 MW Captive Power Plant. The study was entrusted to M/s. Tata Consulting Engineers (fee payable Rs. 1.30 lakhs) based on whose report, the Company had prepared a Feasibility Report (June 1983).

2.21 The proposal to set up a 60 MW Captive Power Plant at an estimated cost of Rs. 72.51 crores (including foreign exchange component of Rs. 31.75 crores) was approved by the Board of IPCL on 4-5-1984, by PIB on 6-12-84 and sent by the Ministry of Petroleum to the Cabinet Committee on 19-1-1985 for approval.

2.22 Asked about the present capacity of the power plant, the representative of IPCL stated during evidence:—

“Installed capacity in IPCL is 25 MW. Its running strength is between 18 MW and 22 MW. Capacity utilisation is about 85 per cent. Government has approved the grant to IPCL of additional power capacity to the extent of as much as 56 MW. So, my capacity on the ground will be 81 MW.”

He also added:

“My plant today is very inefficient, the efficiency is not more than 30 per cent. But the Plant that I am going to put up would be 80 per cent efficient.”

2.23 When enquired about the present and future requirements of power and the extent to which the Gujarat State Electricity Board would meet their demand, the CMD explained as under:—

“Our estimated requirement of power today is of the order of 65 MW. Of late we are generating internally 18 to 20 MW

and we are getting from them 40 MW on a regular basis subject to power cuts. Power cuts in Gujarat today are of the order of 50 per cent. But, for us they gave a special dispensation of not more than 30 per cent provided our maximum demand does not exceed 40 MW. So, with 40 MW and 20 MW we are able to manage. By 1987-88 our requirement will go upto 82 MW and the way we have planned it, by that time Gujarat will be in the worse situation because their generation capacity is falling and we forecast that there will be not only major power shortages but there will be major interruptions also. So, we are taking steps of expediting the purchase of 2x28 MW gas turbine. If we do that, we will have 56 MW of gas turbine based electricity and 25 MWA of other electricity. But the actual sustained availability will be of the order of 70 to 80 per cent. We are still depending on Gujarat."

2.24 When enquired why Government have taken such a long time to approve the proposal of captive power plants submitted by this continuous process industry, the Department of Chemicals and Petrochemicals explained the position in a written reply as under:—

"The proposal for setting up of two 12.5 MW power generation facility by IPCL was required to be considered in the context of actual requirement of power by IPCL, availability of steam within the plant, the overall supply position from Gujarat Electricity Board. It was also necessary to consider with reference to installation of oil firing boilers as installation of such boilers were discouraged at that time. Besides it was also necessary to consider with reference to total energy concept. All this required consultation with other departments such as Energy, Finance etc. IPCL was also advised to discuss the problem with BHEL and finally IPCL submitted a revised proposal. This proposal was also considered in consultation with other Departments/agencies and then final approval was given in February, 1978."

2.25 On enquiry why it took Government 5 years to approve the proposal, the Secretary, Department of Chemicals and Petrochemicals informed the Committee during evidence "it was not needed. That is why the clearance was delayed."

**2.26** Asked about the reasons for which the installation of captive power plant to meet full requirement was thought of only in 1982, the witness stated during evidence:—

“The 1973 proposal of having these 2x12.5 MW power was primarily an insurance proposal to ensure that if there is power interruption from outside, we can shut down the plant in a safer manner. It was never envisaged that IPCL would be required to generate power for its own requirements. Upto the year 1980, there was no problem whatsoever with regard to quality and quantity of power that they used to give. From 1980, we found that the situation was becoming bad not only in terms of the interruption of voltage trips, and frequency changes but cuts have also been imposed. It took us again perhaps long time to get over this difficulty. First time in 1980, for 109 days there was 25 per cent power cut. But it gradually became worse and worse to the extent that we had to bring forward this proposal. We were not able to run the power plant to full capacity. The combined cycling cost is very high but it is the most appropriate for generating electricity in a continuous process and it makes very efficient use of energy. It took five years to convince the Government that the IPCL should put forward the proposal.”

**2.27** While admitting delay in implementation of the power project the Secretary Department of Chemicals and Petro-Chemicals stated during evidence:—

“In some cases there has been some delay on the part of the project implementation authorities. The project was sanctioned in 1978. The project consisting of 25 MW should not take more than 25 to 30 months for commissioning. If it had been commissioned in time, 1980-81 onward the position would have been better. But it was commissioned in 1982.”

**2.28** Asked when the proposal for setting up a 60 MW Captive Power Plant was approved by the Government, the Department of Chemicals and Petro-Chemicals informed in a written reply that the proposal for setting up 2x28 MW gas turbine generators associated with waste heat boiler was approved by the Government on 8th July, 1985.

2.29 As regards the production loss due to power cuts during the years 1980-81 to 1984-85, IPCL has informed in a written reply as under:—

“The value of production loss due to power cuts during 1980-81 to 1984-85 is given below:—

	(Rs. Lakhs)
1980-81	925
1981-82	588
1982-83	1135
1983-84	207
1984-85	801
	3656

2.30 During evidence the CMD informed the Committee that in 1983-84 their Plant was shut down for two and a half months. 1984-85 was the first year when most of the plants ran 90 per cent and the production loss was exactly 1.3 per cent of the total sales value of Rs. 600 crores.

2.31 When asked to confirm if it was a fact that the power trips cost a production loss of about Rs. 1.5 crores per trip, the representative of IPCL stated that ‘per trip we lose a potential production of 600 to 1000 tonnes and the cost per tonne is Rs. 1400. So it works out to Rs. 1.5 crores.’

2.32 In view of the heavy losses, the Committee desired to know the measures proposed to be taken to minimise the losses. In reply, the witness stated:—

“IPCL has taken three very major steps. The first step is that we have installed very sophisticated devices that in the event of voltage trips or power trips the plant gets separated and some of our critical units like boiler plant, cracker unit etc. do not get tripped and we have achieved some success in the field.

Secondly, we are going to instal two very powerful diesel-generating sets again in the boiler house and the cracker unit which will enable us to run them in the event of power failure.

The third major step is to take help from the BHEL which has supplied all existing sets. We have tried to improve our

power plant and we are largely successful. We have achieved over 85 per cent capacity utilisation in our power plant.

Fourth step we have taken is to expedite this gas-turbine based power plant. We hope that the Government will be good enough to give us permission and within 15 months, I will be virtually insuring my plant against such kind of very large losses that we have been incurring."

2.33 When enquired about the latest position of setting up of the 60 MW Captive Power Plant, IPCL in a written reply stated:—

"The Government of India had approved the proposal for installation of 2x28 MW Gas Turbine with waste heat recovery boilers at a total cost of Rs. 72.51 crores with foreign exchange component of Rs. 31.75 crores. The latest position in respect of this project is as follows:—

Gas Turbine generators are not being manufactured in India. The Corporation, therefore, had floated global tenders after seeking permission from Department of Petroleum. Against global tenders issued in October, 1984, 10 international bids were received. Messrs Tata Consulting Engineers after preliminary evaluation of the bids recommended in September, 1985 for placement of orders on Messrs General Electric, USA. The proposal is before the Government for approval since 28-9-1985."

2.34 Asked how long will it take IPCL to commission a 56 MW power plant after Government's approval, the witness in reply stated:

"30 months. This particular plant will do in a novel manner. We will commission the power plant first within 18 months' time from the date of getting Government's permission that we can import. The boiler which is required next, will take another 12 months."

2.35 IPCL was reported to have submitted to the Government a proposal for 3x28 MW units in order to ensure against future power shortage. But in the inter-Ministerial meetings they were advised that not more than 2x28 MW units would be considered. On an enquiry why IPCL submitted the revised proposal for 2x28 MW units

when their requirement was of 60 MW, the CMD informed the Committee during evidence:—

“In the pre-PIB meeting, we were directed by both the Planning Commission and our administrative Ministry to re-submit the proposal for 2x28 MW units. Since they directed us, so we had to listen to them. But even that took one year, for the Government to give us the final approval. We have still not got the permission to place orders.”

2.36 Asked about the reasons for not agreeing to the original proposal of IPCL for setting up of 3x28 MW units, the Department of Chemicals and Petro-Chemicals informed the Committee in a written reply as under:—

“On the basis of existing units of IPCL, the power requirement is 49 MW. There were also a number of expansion schemes and new projects which were under various stages of implementation by which the power requirement was expected to increase to 82 MW by 1987-88. On this basis IPCL submitted a feasibility report for 3x28 MW gas turbine associated with waste heat boiler to meet the total power requirement of 82 MW at an estimated cost of Rs. 107.07 crores with the foreign exchange component of Rs. 43.94 crores. IPCL is at present drawing power from Gujarat Electricity Board to the extent of 49 MW. Besides they have already installed 25 MW capacity power plant (2x12.5 MW TG Sets). The proposal of IPCL was considered in the inter-departmental meeting with Planning Commission Ministry of Energy etc. and it was felt that the capacity of 3x28 MW gas turbine generator would be rather on the high side. Even if 2x28 MW sets are installed it was considered that it would be adequate and provide the necessary cushion for possible shutdown. The investment cost on the 2x28 MW set was indicated as Rs. 79.75 crores. Besides it was also felt that since IPCL will continue to draw deficit power from the Gujarat Electricity Board for which expenditure has already been incurred and this investment would go infructuous in case it was decided not to draw power from Gujarat Electricity Board. Taking all these factors into considerations it was decided that the IPCL may be asked to submit a revised feasibility report for setting up of gas turbine of 2x28 MW each.”



2.37 In this connection, the Secretary, Department of Chemicals and Petro-Chemicals explained the position during evidence as under:—

“This proposal was initiated by the IPCL in July, 1983 for establishing three units of 28 MW units. This particular scheme is a very interesting scheme. It is technologically different from the previous schemes. Since they were going for expansion, they had to set up more boilers. There is a concept in certain types of industries where captive power stations are needed, what is called ‘co-generation’; they put up a plant of a type where initially steam is produced to generate power and after generating power, the same steam at a lower pressure and temperature is taken for process use, so that economics becomes much better—which was not the case in the first one of 12.5 Megawatt; there the cost of generation was very high. Right from the beginning, I find, all that was said was, to the extent possible indigenous equipment should be used. Nobody was against this. But there were differences whether we should go in for one unit or two or three units. The end-picture, what I find from the papers, is that if we have two units in order to enable the IPCL to become self-sufficient in power requirement, to meet their total requirement, the gap would be of the order of eight to ten Megawatts. It was thought that dependence on State Electricity Board only to the extent of eight to ten Megawatts was not a risky decision. The total requirement was going to be of the order of 82 MW and against 82 MW dependence on State Electricity Board only to the extent of 8 to 10 MW was not considered risky and one could take a reasonable chance of going in for only two units and then seeing what happened. The provision is there for the third if at all at some stage the position becomes so bad which I do not presume it can happen; if at all it happens, the third unit can be added. But the investment decision had been taken for two units based on the considerations I have explained now.”

2.38 When asked why Government took one year to accord approval to the revised proposal of 2×28 MW units, that Department explained the position in a written reply as under:—

“The revised proposal of 2×28 MW units was received from IPCL in May 1984. This proposal was discussed at various

stages from time to time, and was discussed by PIB on 6th December 1984. The Government wanted to examine the possibility of setting up of a cooperative captive power plant for meeting the pooled requirements of several industrial units located in the region nearby so as to derive the economies of scale and achieve greater efficiency in the utilisation of existing resources. Accordingly, IPCL was directed to examine the pros and cons of setting up of cooperative power project in Baroda region *vis-a-vis* their proposal to set up captive power plant for their own use of 2x28 MW. IPCL after examination in February 1985 clarified that cooperative captive power project to meet the pooled requirements would involve long gestation period against a period of 30 months within which IPCL could implement its proposal for 2x28 MW generators. There may be some problems in the cooperative power project because of the lack of demand of steam by the other industrial units which would not permit full utilisation of the benefits of economies of scale. The power requirement of IPCL was critical in the light of its expansion programmes and, therefore, Government, after careful consideration gave final clearance to the proposal of IPCL for setting up of 2x28 MW captive power plant in July 1985."

2.39 As stated by that Department, IPCL was given permission to place orders for equipment in January, 1986. Regarding delay in approval of the proposal, it was stated during evidence by the Secretary, Department of Chemicals and Petrochemicals that the proposal was initiated by IPCL in July, 1983, for establishing three units of 28 MW Units and 'it took us two years. I am prepared to say that this period could have been reduced'. Justifying this delay he added that under the present system where the Central Electricity Authority, the Ministry of Energy and the State Government were involved, it naturally increased the time factor.

2.40. This is yet another typical case of bad handling of a project by IPCL and the Government. One of the major constraints affecting production in IPCL's plants was power shortage, voltage fluctuations and trippings which resulted in sudden plant shutdowns leading to process problems. In order to overcome this problem the IPCL proposed in August, 1973 to set up a 25 MW power plant consisting of 2 Turbine Generation sets of 12.5 MW at an estimated cost of Rs. 5.68 crores, mainly to enable safe shutdown of plants in case of sudden stoppage of power. This proposal made by the Board

of Directors in August, 1973 was approved by PIB in August 1975 and finally by the Government in February, 1978, so that it took almost 5 years to reach the approval stage. Thereafter orders were placed by IPCL on BHEL in July, 1979 and the first set was installed in March, 1982 while the second set was commissioned in September, 1982 only. In the nine years' period which elapsed between the time the proposal was initiated and the time the sets were actually commissioned, the estimated cost went up from Rs. 5.68 crores to Rs. 7.26 crores. Though the extent to which frequent power shutdown affected the life of the costly equipment is not ascertainable, a rough idea of the total production loss can be had from the fact that with each power trip there is a potential production loss of Rs. 15 crores.

2.41 It is unfortunate that it took 5 years to convince the Government that IPCL needed its own power unit to ensure against power interruptions from outside. There has also been delay on the part of the project implementation authorities as it took more than four years to commission a plant, which according to the Secretary, Department of Chemicals and Petrochemicals should not have taken more than 25 to 30 months for commissioning. The Committee are constrained to express their displeasure at the utter lack of planning and the scant regard on the part both of IPCL and the Ministry for timely implementation of the important projects like captive power plants.

2.42 Apart from the two 12.5 MW Turbo generators commissioned in 1982, the Company decided in December, 1982 to have a techno-economic study for a 60 MW Captive Power Plant. On the basis of a study done by M/s. Tata Consulting Engineers, the Company prepared a Feasibility Report in June 1983. The proposal to set up a 60 MW power plant at an estimated cost of Rs. 72.51 crores (including foreign exchange component of Rs. 31.75 crores) was approved by the Board of IPCL on 4.5.1984, by the Public Investment Board on 6.12.1984 and was sent by the Ministry of Petroleum to the Cabinet Committee on 19.1.1985 for approval. This was finally cleared by the Government on 8th July, 1985. As stated by the Department, IPCL has been given permission to place orders for equipment in January, 1986 and according to IPCL it will take 30 months after Government's approval to commission the power plant. Thus the project initiated in December 1982 is likely to be commissioned sometime in first half of 1988. The Committee cannot but emphasize that the project clearance should be accorded priority at all levels and the cumbersome procedures involved in the process should be streamlined with a view to reduce delays. It is needless to point out that delayed clearance of projects not only adds to the cost of the

project but vitiate the viability of otherwise well thought-out projects and schemes.

2.43 The Committee are not happy to note that even after the commissioning of the two 28 MW power units, IPCL will not be totally self-reliant in the matter of its power requirements. Even then a small part of its power requirements will have to be met by the Gujarat State Electricity Board. The Committee feel that once a decision has been taken to permit an undertaking to go in for captive power plant, it seems a little ironical that even after providing such a facility at huge cost, the undertaking needs to depend on the vagaries of power supplies from the State grid. This could and should have been avoided.

### (3) Acrylates

2.44. Audit has stated that establishment of a plant for manufacture of ACN as one of the downstream units, was approved (June 1971) by GOI for an installed capacity of 24,000 tonnes per annum. The captive consumption of ACN by Acrylic Fibre Plant, another downstream unit sanctioned in November 1971, is 12,000 tonnes per annum. To firm up the utilisation pattern of ACN, IPCL prepared (April 1975) a feasibility report envisaging capital investment of Rs. 3.49 crores for the manufacture of lower acrylates (2,000 tonnes per annum of Methyl and 1,000 tonnes per annum of Ethyl Acrylates). Feasibility Report for the manufacture of higher Acrylates requiring capital investment of Rs. 3.82 crores was prepared in November 1975. On the basis of discussions with the Directorate of Technical Development, Bureau of Public Enterprises and Planning Commission and the country's anticipated annual requirement of 12,000-13,000 tonnes of Acrylates by 1983-84, a revised Feasibility Report for manufacture of 10,000 tonnes of Acrylates with built-in flexibility to vary product-mix, depending on market requirement at an estimated cost of Rs. 13.67 crores was prepared (February 1977) and was approved (December 1977) by GOI.

2.45. As a result of detailed engineering, the cost was revised (February 1980) to Rs. 18.86 crores and was approved on December 1980 by GOI for Rs. 17.86 crores subject to ultimate cost not exceeding Rs. 18.85 crores. The increase of Rs. 5.18 crores in the cost estimates is account of escalation in cost (Rs. 3.50 crores), under estimation (Rs. 1.20 crores), design change (Rs. 0.80 crore) and additional items (Rs. 0.40 crore). Though the project was first envisaged in April 1975, the Schedule for mechanical completion after prolonged gestation period, was fixed as December 1981, the

project for lower Acrylates was completed in June 1982 and that for higher Acrylates in November 1982 (Expenditure to end of December 1982 was Rs. 16.82 crores. Over-heads to be allocated).

2.46. When asked about the reasons for the prolonged gestation periods for completion of the projects for lower Acrylates and higher Acrylates, IPCL informed the Committee in a written note as under:

“The technology for the manufacture of Acrylates (Lower and Higher) has so far been closely guarded by multinationals. With a view to develop self reliance in this area NCL at the instance of IPCL were requested to develop a workable process for reproducibility and subsequent scale up. Ordinarily development between laboratory scale and full plant scale for complex chemicals it takes between 5 to 8 years of continuous efforts. NCL had developed in 1974 processes for the manufacture of different Acrylates. Bench scale trials were carried out by NCL but no prototype pilot plant was designed and put up by NCL due to financial constraint. However, the process developed by NCL was reviewed in detail by EIL and IPCL and feasibility report submitted to Government in December, 1976. In the absence of pilot plant studies, bench scale data has to be developed for the commercial plant design. Eventhough all design aspects and main reactions were reviewed by EIL/IPCL, it was not possible to predict or assess the behaviour and effect of numerous side reactions that take place in a commercial plant. In the case of foreign collaborations, basic design package is provided and only the detailed engineering is done by Indian Engineering Contractor. In this case both basic as well as detailed engineering was done by EIL. Waste acid treatment plant for Acrylates is also based on the indigenous PDIL technology. This section had to be designed from scratch and put up without any experience of a prototype unit already working. Apart from these the delay in mechanical completion of the project was mainly because of labour unrest and lock-out in the units of the equipment fabricator. There was also delay in the procurement of imported equipments.”

2.47. In this connection, the Chairman & Managing Director of IPCL informed the Committee further during evidence as under:—

“This project is the first project of its kind in the country where three leading public sector agencies work together to produce a product which has been the monopoly of major multi-nationals in the world who are not willing to share their technology. From this merely laboratory scale we had put up a plant of over 10,000 tonnes per year at the cost of Rs. 17 crores. We did it with considerable risk. We are not out of wood, because we are learning from deficiencies in the process, in the design parameter.”

2.48. When asked to elaborate further the reasons for delay in completion of the projects, the CMD stated during evidence:

“IPCL’s experience of implementation of a project has been that we have to go through a lot of procedure and difficulties. It takes us anything between 42 to 48 months after the final approval is given by the Government. In this case the Government approved this project in December, 1980. We completed the project partly in 1982 November and finally in 1983. It has been done in three years time. Why we took so much time from 1975 to 1980 for finalising this project is a very legitimate question and it is answered by the fact that this was the first venture of this kind that we have made. A lot of people were unsure and a lot of data had to be generated in the laboratory, in the pilot plant, a lot of design and calculation work had to be done. But after the project was approved by the Government, with a capital cost of Rs. 18.86 crores, we were able to complete this project within the cost and within the time.”

2.49 The Committee observed that Government of India had approved the Revised Feasibility Report in December, 1977 but the revised capital estimate of Rs. 18.86 crores based on detailed engineering was prepared in February, 1980. On being enquired about the reasons for this inordinate delay, the CMD stated during evidence:

“Feasibility report does not give you any idea about what is the realistic estimate of the final cost of the plant. So, it is true that the IPCL, as a management of this project, took time from December, 1977 to February,

1980 to prepare what we call the detailed design of this project and that two years two months was taken in the context of the entire data, for this complex plant being generated. Normally, when we do other bigger projects, we get from the foreign licensors, what is known as basic design within six months to eight months from the time the Investment Board approves the proposal. After that, it takes about 12 months. Now it has taken 26 months."

2.50 The Committee noted while the production of lower acrylates was satisfactory, the production of higher acrylates had been severely affected due to design and operational problems. In this context, the CMD explained the position during evidence as under:

"This plant was designed from laboratory data, from bench scale data straight to the large plant of 10,000 tonne capacity, where its performance was established. In butyl acrylate, we saw two or three major deficiencies.

First deficiency is material of construction. This is highly corrosive reaction. It is now being found to be inadequate. We have got to change it. This was not revealed in the laboratory work which NCL carried out.

Second major deficiency is in the butyl acrylate processing where you have distillation operation. The plant designed by EIL is not working to our satisfaction. This is also a design limitation. The operational deficiency is because of the first product that we are making in India with our own know-how. We have run into some problems in the conversion. There has been sometimes poor reaction efficiency which is affecting the yield in the long run. So, today we have design problems and also some operational problems... We have stainless steel, which is highly corrosive. We have to replace it with tantalum which is very expensive. We have to improve in the area of distillation columns also. We know what exactly we have to improve. Once we get these improvements, the efficiency of production also will improve."

2.51 As regards the standard of lower and higher acrylates as compared to the advanced countries of the world, the CMD stated during evidence:

"In terms of the quality of the finished product, the lower acrylates are comparable to the international standards.

As for the higher acrylates, we have sold it to a dozen parties in India and they are quite satisfied with the product. The quality of the higher acrylates produced by us is comparable to international standards. But the efficiency of production is not upto the mark so far because of the technical deficiencies. Once we are able to remove the constraints, both technical and operational, it should be possible for us to match, at the variable cost limit, the international standards."

2.52 Regarding improvement in the quality of the products, the Committee were informed by Director (Operation) during evidence:

"Regarding quality or standard, there is nothing called improvement. We have to improve the efficiency of the operations, to see that from a given input we get the maximum output, to reduce the cost and to see that the plant is working at the maximum rated capacity, efficiently and safely."

2.53 In reply to a question when IPCL would reach the maximum rated capacity utilisation in the field of acrylates, the CMD informed the Committee during evidence:

"We have got two streams-5000 tonnes per year in lower acrylates and 5000 tonnes per year for higher acrylates, which are based on certain norms. As the plant is running today, we do not think it can reach any higher percentage of capacity, unless we make the basic changes. It is our belief that between now and next one year, we should be able to complete the desirable modifications and at that time we should be able to assess realistically. And at that time we shall be able to assess rationally whether the plant can run up to that time or not... The demand for higher acrylates is less than my installed capacity. So even if I start producing, I think it will take some considerable time before the plant can be used to its rated capacity."

2.54 With respect to capacity utilisation in the field of lower acrylates, the CMD informed the Committee during evidence:

"Still some gap is there because local demand is not there. 5,000 tonnes is the capacity of our Lower Acrylates



plant. I think the demand today is not more than 1,500 tonnes or so of methyl acrylates and about 600 tonnes of ethyl acrylates. So, it is only 50 per cent 60 per cent of the present planned capacity that we are utilising.... We are producing about 1500 tonnes per annum of methyl and three to four hundred tonnes of ethyl acrylate yearly."

2.55 In reply to a question about import of acrylates, the CMD stated:

"Imports of Methyl Acrylate and Ethyl Acrylate are not taking place. To the best of our knowledge the lower acrylates are being produced by us only and we have become self-reliant. But the imports of higher acrylates are still being made. In the case of the higher acrylates we have taken the initiative and asked the Government that they should not allow imports of those two products."

2.56 As regards foreign exchange outflow on account of import of acrylates, IPCL informed the Committee in a written note that "for 1983-84 and 1984-85, the total outflow is of the order of Rs. 166.44 lakhs. Lower acrylates imports since 1984-85 are nil."

2.57 Asked to state the extent of value of loss of production suffered by the IPCL on account of not having any pilot plant, the Company informed in a written reply as under:

"As regards loss incurred by IPCL on account of not having a Pilot Plant, it is submitted that the higher acrylates plant was commissioned only in 1983-84 and assuming normal plant operation in the first and second year, it should have been possible to meet the local demand which was otherwise met through imports. On this basis the value of imports that could not be supplied on account of non-availability of local production amounted to Rs. 117 lakhs in 1983-84 and Rs. 49 lakhs in 1984-85."

2.58 Asked why a Prototype Pilot Plant was not set up before setting up a commercial plant for manufacture of Acrylates, IPCL informed the Committee in a written note as under:—

"The decision, if any, to put a Prototype Plant should have been taken between November 1975 and February 1977 by which time the feasibility report of the project was prepared based on preliminary information available

from pilot plant set up by NCL and advice rendered by EIL for piping, electrical and instrumentation. Based on the records available with us, there is no evidence to suggest as whether the question of installing a prototype Pilot Plant complete in all respects to simulate actual working conditions and other variable was considered by the Management of IPCL/Board of Directors between April 1975 till February 1980. The available records indicate that NCL had carried out process development work in bench-scale reactor having a capacity of 500 gram per batch. These results were subsequently confirmed in a pilot scale reactor of 25 kg. per batch. The available evidence also suggests that since the process was essentially of batch type the critical areas of the process were studied on the pilot scale and necessary design data collected. No integrated pilot plant was, however, set up. The development work was carried out by NCL in collaboration with EIL who were responsible for the design of commercial plant.

As there is no evidence to suggest that the installation of a proto-type pilot plant was considered the only surmise at this point of time which can be made is that financial and time constraints could have been the most likely consideration for not putting up a proto-type pilot plant. It is also stated that the rough estimate of an integrated proto-type pilot plant for this type of chemical product would be the order of Rs. 3.00 crores."

2.59 On an enquiry if the necessity of having a pilot project was considered and also in the absence of clear idea about the technology and technical know-how should IPCL not have gone in for a pilot plant, the CMD stated *inter alia* during evidence:

"It would not have been an investment which later on people would have felt badly about it. Ordinarily, in a situation of free will and freedom from constraint a pilot plant is a very desirable objectives to do so.....At that time we decided that it may not be proper to invest Rs. 3 crores. In retrospect it would have been very desirable to have a pilot plant. I entirely agree with your statement."

2.60 The Committee were informed during evidence that no prototype pilot plant was designed and put up by the National Chemical Laboratory due to financial constraint. When asked about the

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nature of the financial constraint, the CMD *inter alia* stated as under:—

“By 1976 the Government of India agreed with our recommendations that we should put up this plant. It just took 4 years to finalise the capital cost of the plant which came to be Rs. 18 crores. All these estimates were based on the data NCL produced in their laboratories plus also from a small pilot plant. When you talk of proto type, it is a miniature plant in all respects. We were under great pressure to implement this project. At that time based on the technical knowledge that we had, at the level of NCL, EIL, and IPCL, it was considered prudent that we need not go through the proto type pilot plant operation. This reference of “financial constraint”, I can say, may be an after thought because financial constraint would be that we have to spend another three or four crores of rupees to set up a proto type plant.”

He further stated:

“It is a joint decision. I can go on record that it was a combined decision of the IPCL, NCL and EIL, not to go for a proto type pilot plant but to go to the plant direct based on all available data on which there was a confidence.”

2.61 In reply to a question if Government were also a party to the decision to erect the commercial plant without carrying out pilot plant studies and the reasons for not going in for a pilot plant, the Department of Chemicals and Petrochemicals stated in a written reply as under:—

“IPCL’s proposal for setting up of Acrylates plant was based on the process know-how given by M/s Asahi free of charge as part of their agreement on process know-how for the manufacture of acrylic fibre. IPCL had sponsored a research scheme at NCL to confirm on bench scale/pilot plant the process data given by Asahi. NCL in collaboration with EIL and IPCL had adopted the Asahi technology for the production of ethyl acrylate and also developed the process technologies for other acrylates (butyl and ethyl hexyl acrylates). In order to ensure smooth transfer of basic design data into commercial plant, M/s Asahi were requested to check the detailed engineering

documents prepared by EIL and also provide expatriate assistance and training of Indian personal in their plant. The process design and engineering was thus done by EIL. The Government had cleared the proposal based on the technology and engineering between IPCL and EIL as mentioned above. The question of setting up of a separate integrated pilot plant for commercial basis in addition to the work already done in NCL was, however, not considered."

2.62 In another note, the Department has explained as under:--

"NCL had built a pilot plant in bench scale reactors having a capacity of 500g/batch for developing this technology. These results were subsequently confirmed in a pilot scale reactor of 25/kg. batch. The original cost estimates were prepared with the assistance of Engineers India Limited at a time when there was no precise data on equipment specifications. Equipment specifications in the case of some acrylates were based on the preliminary pilot plant information supplied by NCL. IPCL had, therefore, submitted the revised cost estimates after the engineering had reached a sufficient advanced stage and had been modified in the light of a review carried out by M/s. Asahi. When the pilot plant was translated into commercial plant, some upscaling had necessarily to be attempted by IPCL/EIL and it was felt that setting up of commercial plant is feasible and therefore, no further commercial testing by way of larger pilot plant was done."

2.63 Asked his views about setting up of the proto-type pilot plant in acrylates, the Secretary, Department of Chemicals and Petro-chemicals informed the Committee during evidence as under:--

"We have explained that a 25 Kgs. per batch pilot reactor was set up. Size-wise a 25 Kg. per batch plant would mean equipment of 30 tonnes per year which is reasonable. What went wrong, at least in my personal analysis is that a little over-confidence in the computation of NCL, EIL and IPCL. So, the entire consequences of the plant will also function which did not come to be true. The intention was good. I can appreciate the enthusiasm that it was trying to do on an indigenous basis instead of getting something from abroad. But all I can say is that the over-confidence part of it was not called for. When they had set up a 30 tonnes reactor they could have spent a little

time in setting the plant on that scale. It is an error of judgement."

He added:

"They could have developed the total range plant which they did not do because they were so confident that there was no need for it."

2.64 The Committee note that a feasibility report envisaging capital investment of Rs. 3.49 crores for the manufacture of lower acrylates was prepared by IPCL in April, 1975. Another feasibility report for the manufacture of higher acrylates requiring capital investment of Rs. 3.82 crores was prepared in November, 1975. A revised feasibility report for the manufacture of 10,000 tonnes of acrylates was prepared at an estimated cost of Rs. 13.67 crores in February, 1977 and was approved by Government in December, 1977. Thus the cost estimates of Rs. 7.31 crores projected in the earlier feasibility reports of 1975 were pushed up to Rs. 13.67 crores in February, 1977. Further as a result of detailed engineering, the cost was revised in February, 1980 to Rs. 18.86 crores and was approved by the Government in December, 1980. As a result of upward revision of cost estimates, the internal rate of return anticipated came down to 19.10 per cent against the earlier anticipation of 27.5 per cent. Though the project was first envisaged in April, 1975 the schedule for mechanical completion after prolonged gestation period was fixed as December, 1981. The project for the lower acrylates was actually completed in June, 1982 and that for higher acrylates in November, 1982.

2.65 The above recital of key milestones for the acrylates project reveals how the feasibility reports for the projects were being prepared in IPCL on the basis of incomplete information. The project formulation was in the nature of haphazard guess-work and entailed frequent revision and re-revision of estimates. No wonder the actual costs were always much more than the projected costs and the completion schedules could never be adhered to.

2.66 The Committee were informed during evidence that the technology for the manufacture of Acrylates had been closely guarded by multinationals who did not want to share their technology. To develop self-reliance in this field IPCL requested National Chemical Laboratory to develop a workable process for reproducibility and subsequent scale up. NCL developed processes for the manufacture of different Acrylates which were reviewed by EIL and IPCL and a

Feasibility Report was submitted to Government in December, 1976. NCL had built a pilot plant on bench scale reactors having a capacity of 500 g/batch for developing their technology. This pilot plant (laboratory scale) was thereafter translated into commercial plant and the Company put up a plant with a capacity of 10,000 tonnes per annum (5000 tonnes of lower Acrylates and 5000 tonnes of higher Acrylates). The equipment specifications in the case of higher acrylates were based on the preliminary pilot plant information supplied by NCL.

2.67 The Committee note that production of lower Acrylates (the technology for which was supplied by M/s. Asahi Chemicals, Japan) had stabilised and their imports had been discontinued. But, serious problems were faced in the higher Acrylates plant due to deficiencies in the technology developed by NCL. The main drawbacks noticed by IPCL in the Higher Acrylates plant are the operational and design deficiencies which were not revealed in the laboratory work carried out by NCL. The C&MD had also stated during evidence "we are not out of woods, because we are learning from deficiencies in the process, in the design parameters." Due to plant deficiencies local demand for higher acrylates could not be met which was otherwise made good through imports valuing Rs. 166.44 lakhs during 1983-84 and 1984-85. The Committee feel that in view of the highly sophisticated technology required in production of Acrylates it was expected of IPCL to have gone in for an integrated prototype pilot plant before venturing into a project of 10,000 tonnes capacity. Why the normal intermediate stage of a prototype pilot plant was not gone through before setting up a plant for commercial production of 10,000 tonnes of Acrylates, has not been convincingly explained. The Chairman-cum-Managing Director, IPCL made the plea that because of financial constraints it was not considered wise to make an investment of about Rs. 3 crores on a prototype pilot plant even though such a prototype was desirable. The Secretary, Department of Chemicals and Petrochemicals, however, has opined that this was a case of over-confidence on the part of NCL, EIL and IPCL, which was not called for and it is a case of error of judgement. The Committee are constrained to say that the project was neither well conceived nor properly executed. Even after the setting up of the plant imports of higher acrylates are being made and the plant itself needs to be modified for the rectification of the deficiencies noticed after implementation. The Committee would like to emphasize that desirable modifications in the plant may be carried out expeditiously.

**(4) Expansion of DMT Plant**

2.68 Audit has pointed out that the DMT Plant (installed capacity of 24,000 tonnes per annum) was commissioned in March 1973. Keeping in view the growing demand for DMT by polyester fibre units in the country, studies to maximise production of existing plant were undertaken by IPCL as it was noted that some equipment in a section of the plant had excess capacity over the rated capacity. Based on such studies and trial runs, it was found that the capacity of the plant would be raised from existing 24,000 to 30,000 tonnes per annum by addition of some balancing equipment and machinery. Accordingly, a feasibility report envisaging capital investment of Rs. 2.66 crores was approved by the Board in July, 1976. The cost was revised (September 1976) to Rs. 6.42 crores taking into account the additional balancing equipment considered necessary and quotations received for equipment/machinery. These additional facilities were expected to be installed within 36 months from the date of obtaining final clearance from Government and commencement of operation three months thereafter. The proposals were approved (December 1977) by GOI for Rs. 5.60 crores. The expansion programme (Phase I) anticipated to be completed by May 1981 was, however, completed in October, 1982 and the actual capitalised cost on completion was Rs. 1.68 crores, excluding horizontal oxidator which is being implemented separately at an estimated cost of Rs. 5.52 crores.

2.69 The reasons for slippage in schedule were stated to be: (i) non-availability of vendor data from foreign manufacturers for engineering and equipment, (ii) poor response from foreign vendors, (iii) delay in issue of import licence and foreign exchange, (iv) (a) labour problems in the firm of indigenous fabricator entrusted with fabrication of columns, vessels and heat exchangers and (b) non-availability of raw material with the fabricators leading to delay of 12 to 14 months in supply.

2.70 When enquired about the justification for revision of cost from Rs. 2.66 crores to Rs. 6.42 crores just within 3 months of approval of the Feasibility Report, IPCL stated in a written reply as under:

"The revised estimate of Rs. 6.42 crores included provision for one more oxidator. The provision of this additional oxidator was to attain sustained production of 30,000 metric tonnes per annum of dimethyl terephthalate. The estimated cost of the horizontal oxidator was Rs. 3.08

crores. While preparing the Feasibility Report full data on equipment specification etc. for the balancing items were not available. With the subsequent availability of more information, a realistic estimate could be prepared."

2.71 In this connection, the Department of Chemicals and Petrochemicals stated in a written reply as under:

"Initially, IPCL's plan was to expand the capacity of DMT plant from 24,000 to 30,000 tonnes per annum through de-bottlenecking i.e. by installing some balancing equipment such as additional oxidation pumps, crystallisers, centrifuges etc. at an incremental cost of Rs. 2.66 crores. This was approved by the Board of Directors of IPCL in July 1976 under its delegated powers i.e. without reference to the Government.

Simultaneously, IPCL was also examining the question of installing certain other equipments in the DMT plant for reliable and sustained operation of the plant at the expanded capacity level. IPCL held discussions in this regard with their process licensor, M/s. Dynamite Noble. Based on these deliberations it was considered advantageous to go in for installation of a horizontal oxidator in the DMT plant on considerations of better and reliable performances and energysaving. The proposal in this regard was received from IPCL in September 1976 and after due consideration it was approved by the Government on 29-12-1977. It will thus be observed that it is not as if the cost estimates for the expansion project escalated from Rs. 2.66 crores to Rs. 6.42 crores based on same concept and that both were approved within a period of 3 months.

The cost estimate of Rs. 6.42 crores approved by the Government for the first time was on the basis of qualitatively expanded scope of the project proposals."

2.72 In reply to a question why the installation of horizontal oxidator was not considered 3 months earlier, that Department informed in a written note that the need for installation of horizontal oxidator became apparent after IPCL's discussions with their processor licensor M/s. Dynamite Noble. Horizontal oxidator was in the process of being developed at that stage.



2.73 When asked about the cost of import of the DMT that could have been avoided but for such delays in commissioning of the project, the Committee were informed in a note:—

“The DMT Expansion Phase-I was scheduled to be completed in May, 1981, but was actually completed in July, 1982. The loss of production as a result of the delay in commissioning and the corresponding CIF cost of imports is given below:

Year	Loss of production (MT)	CIF cost of imports (Rs./lakhs)
1981-82	43	3
1982-83 upto July, 1982	3210	185
Total		188

2.74 Asked why IPCL did not go in for a new plant instead of expanding the existing plant, the CMD, IPCL stated during evidence:

“This is very complex decision for anyone to take. The decision to marginally expand the plant from 24,000 tonnes to 30,000 tonnes or putting in a new grassroot plant is primarily determined according to what we call the total investments that are required. Unless the technology has been altered from what it was before, capital cost is likely to be substantial, it will not be found to be economical. It will be economical by gradually duplicating the plant. This is what the IPCL had tried to do. Now, we are going from 30,000 tonnes to 40,000 tonnes, because it will open the fundamental technology for making DMT which has not undergone any revolutionary change. But if it is proved, as some people suspect that over a period of time DMT will become an obsolete product, then we will not produce the product. The grassroot plant would have been far more expensive. That is why we took to expanding from 24,000 tonnes to 30,000 tonnes at the cost of Rs. 6 crores.”

2.75 In this connection, the witness also stated during evidence:—

“This is the least cost option in the country. So far on 10,000 tonnes of additional capacity, I am going to spend not more than Rs. 15 crores. Whereas a new plant of 60,000 tonnes

would cost anywhere between Rs. 90 crores and Rs. 100 crores. We are incorporating some features which will make the cost of production more competitive than what we are achieving now. This is the modern technology. Our old capital is fully depreciated. It is now ten year old. To use it in India, I think, will be a fundamental economic idea, not technological decision. We can certainly take care of any new entrant. There is a party who is claiming to put 75,000 tonnes per annum plant. He is going to spend something like Rs. 200 crores. Now, if you kindly calculate the capital charge against my capital charge which will be virtually nil or Rs. 18 crores in future, then it is nothing. We are confident of taking care of entry of PTA."

He further added:

"The capital cost for a new PTA plant of 75,000 tonnes capacity will be in excess of Rs. 150 crores. That means 20,000 rupees per tonne. IPCL is putting up a plant of 30,000 to 40,000 tonne capacity at a cost of Rs. 15 crores only. The cost of servicing capital would be Rs. 15,000 per tonne of DMT as against Rs. 20,000 per tonne of PTA. If we charge depreciation and interest it would be Rs. 2600 and Rs. 3500 per tonne. Because of expensive chemicals involved, no one in this country could suggest that PTA when made in India would be cheaper. It will be at par, if not more expensive because of the cost of new capital."

2.76 A second DMT expansion project is under implementation by IPCL to bring up the total capacity to 40,000 MT per annum. This expansion project is expected to be completed by 1988.

2.77 These projects envisaged, *inter alia*, the production of DMT, the second generation product in respect of which viz. Purified Terephthalic Acid (PTA), was already being produced in US & Europe by 1965. It is also noted that among the advanced industrialised nations, Japan stands out as the major country that uses more PTA than DMT. In Government of India owned, Bongaigaon Refinery & Petrochemicals also, a DMT project (45,000 MT capacity) was taken up in 1975-76 and commissioned in March, 1985. It is accepted that PTA gives superior yield and economies in operation.

2.78 In response to a query when IPCL would take a decision to produce PFA, the CMD, stated during evidence:

"Knowing from the fact that there is at least today on the ground over 66,000 tonne DMT based capacity and the new plants are going to produce DMT and PTA and this low cost production of IPCL is not going to be a deterrent. In the event we are keeping ourselves ready to go in for conversion from DMT to PTA. As soon as we are satisfied we will go to the Government with the proposal rather than being forced with such a situation."

2.79 As regards the time needed for conversion from DMT to PTA, the witness stated "As of today we are engaged in expansion of the capacity which will be completed by 1988. If we get this suggestion in the next six months, then by 1990 IPCL will be able to convert from DMT to PTA, if required."

2.80 On his attention being drawn to a news-report which appeared in a section of the press which stated that DMT yielded 13 to 15 per cent less than PTA in terms of output value, the CMD, IPCL stated during evidence, *inter alia* as under:—

"PTA is a simpler chemical which does not affect the monolythic structure. It does not produce methanol as a co-product, while the polyester chips are being made. As a result, some part of the plant equipment is not necessary when PTA is used. It is also efficient to the extent that if you use this on tonne to tonne basis you need 12 to 15 per cent less of the product than DMT. These are technical facts. It is not appropriate for anyone to claim that PTA has made DMT obsolete. This is not technically or commercially tenable. What is commercially tenable is that DMT price, should at all times, be attractive as compared to PTA and the price should be about 15 per cent lesser at any time than the corresponding PTA price.... The Government had licensed the manufacturing capacity to as much as 1,35,000 tonnes per annum of DMT by three producers. First is the IPCL, the oldest company, second is the Bombay Dyeing, a Private Sector which is a textile manufacturer, while the third is the Bongaigaon refinery near Guwahati, Assam. They also have a capacity of 55,000 tonnes of DMT. Now, some of the polyester fibre users claim that they have production process with the use of imported PTA which for us is very difficult to swallow because, until recently, they have been using out DMT to make these polyester

fibre of a suitable nature.... The Government has now very rightly decided that those people who claim with a lot of emotion that their plants are going to be shut down because PTA are not allowed to be imported as minus stocks, all others will not be allowed to change henceforth to PTA till the local DMT has been used. And the new fibre plant, Indian Polyfibres and Orissa Synthetic fibre plant are going to use DMT or PTA. I think that in the next three to four years the local DMT will continue to be used for which we require a kind of protection. In my cost of production there are two important elements—one is the para-xylene and the other is chemical-methanol. Para-xylene is produced by the IPCL, Bombay Dyeing have to import it. But Methanol is another product which is available at the international price of Rs. 1500 tonne. The IPCL and others are using the product sold by RCF and STC at a price exceeding Rs. 7,000 per tonne. The international price is Rs. 1500 while the internal price is Rs. 7,000. Half a tonne of methanol is used for making one tonne of DMT. So in 2 to 4 months' time, I think, if the Government accepts our point of view, there will be no problem whatsoever. The price of local DMT will be brought down. No one will refuse to use the local DMT."

He further added:—

"For equal selling price, a PTA user will get an advantage of 15 per cent to 20 per cent. In regard to DMT selling price the polyester fibre user makes his own choice taking into account the economic conditions. It is the economic condition which is basically the decisive factor. If the customer is given free choice to have PTA or DMT at the same price and he will certainly go in for PTA. The PTA producers, because of most distress condition in the synthetic fibre, are marketing PTA at lower price. Now IPCL has been in operation from 1973. BRPL in Bongai-gaon took 10 years to commence their plant in early 1965. The third unit is in the private sector and they got the permission from the Government in the year 1981-82 to bring a second-hand plant and instal it in India and they had installed it in 1984 in the third quarter. This is the whole story how 1,35,000 tonnes of DMT capacity was created in this country. The production of polyester

staple filament is little over 1,30,000 tonnes a year at present."

2.81 It had also been reported that polyester manufacturers in advanced countries had long discarded the use of DMT in preference to the use of PTA which was regarded as cost effective. When asked about his views in the matter, the witness stated:—

"The fact is that in the world including India, the use of PTA is of the order of 55 per cent and the DMT is 45 per cent. In the case of synthetic fibre in USA, the DMT usage is 65 per cent. In the countries like Japan, DMT virtually is not used. In Europe, it is of the order of 50:50. As of today, we cannot say which is superior and which is not. But if you talk of the technology for tomorrow, new plants should be based on PTA.

We are using a particular technology, based on the German technology supplied by a German company through Krupps. That German Company claims to develop a process of PTA from DMT at a reasonable cost. We have sent an officer to Germany, to find out the relative cost. If we consider it appropriate over a length of time, we may go in for it."

2.82 When enquired why Government went in for the first generation production viz. DMT in IPCL and Bongaigaon Refinery and Petrochemicals Ltd. (BRPL), when PTA was already being produced in USA, Europe and Japan, the Department of Chemicals and Petrochemicals stated in a written reply as follows:—

"The question of choice between DMT and PTA production is rather a complex one. DMT has been the only raw material for polyester industry world over, till mid 1965 when PTA was commercially introduced as raw material to the polyester industry. The share of PTA has grown from that time to current level of about 50 per cent in 1985 (in the period of 20 years).

The decision to go for DMT in IPCL was taken in 1960s when PTA was not in commercial production in the world. The decision on BRPL's plant was taken in 1973 by which time use of PTA as raw material for polyester industry had started growing. However, on considerations such as cost of production of DMT vs. PTA, the investment required in DMT and PTA plants constraints in avail-

ability of the technology of PTA at that time and also the familiarity of DMT technology in India and the improvements made in the DMT process and the catalysts by DMT licensor from the time IPCL Plant had been commissioned, it was decided that BRPL's plant should also be DMT plant."

2.83 Elaborating further in this regard, the Secretary, Department of Chemicals and Petrochemicals stated during evidence before the Committee:

"DMT and PTA are alternative materials for producing polyester fibres and polyester filament. When IPCL was set up in mid sixties, PTA was not produced in the world. It was developed later i.e. in 1980 or 1981. It remained their proprietary knowledge, and whenever somebody wanted it, the price they would ask for was so fantastic. Although PTA is a better material, once you have it and if its price is the same as that of DMT, the former would be 17 per cent more efficient. If PTA is more costly, and the cost of production is more than 17 per cent higher than DMT, the advantage would be lost. Lately they have started setting up some plants in eastern Asia, particularly in Taiwan, South Korea and Japan. I have not been able to get the exact details, but the hunch is that e.g. in Japan, an American company could set up a Plant. Here, we wanted to set up and produce technology which nobody was willing to sell. After mid-70s when Government of India and other organizations knew that there was a better material, the knowledge of that material was not purchaseable. When the decision about Bongaigaon was taken, although people knew about this material, either people had to pay a lot of money, or it was not available. Only later, these organizations started coming to India, saying that they were prepared to sell the technology at a reasonable price. Now, one plant is under construction, with a private company (PICOP) at Saleempur. An aromatic company is to be set up in U.P. and one more aromatic complex in Tamil Nadu. All these new developments are going to be based on PTA, because it is more efficient, and easily available."

2.84 Asked about the investment required for setting up a plant for PTA, the witness informed that 'one plant is under erection, it is of 75,000 tonnes capacity. And it is estimated that on develop-

ment upto 1,00,000 tonnes a much bigger plant of that size will cost Rs. 300 crores.'

2.85 When enquired whether the coming up of PTA has affected the DMT production, the Secretary, Department of Chemicals and Petrochemicals stated during evidence:

"Even now when for a number of years PTA has been known world over, the production of DMT in 1984 was 3.78 million tonnes and it is going to reach a figure of 4.3 million tonnes. So, it is not that new process are not being done. DMT is going to increase from 3.8 million tonnes to 4.3 million tonnes in a period of five years whereas in the case of PTA, in 1984 it was 3.4 million tonnes, a little less than DMT, and in 1990 it is going to become 5.06 million tonnes, much more than DMT. In fact, in 1990, the ratio between PTA and DMT in our situation will be much better in favour of PTA as compared to the international position. In 1984, the ratio of DMT and PTA was 49:51 and in 1990, the ratio will be 42 : 58."

2.86 In reply to a question about the present ratio of use of DMT and PTA, the witness replied in evidence:

"Roughly I think it will be half-half. Today PTA is not being produced in the country, it is imported. There is one plant in the private sector which is under erection. The second plant for which licence has been given, will come up in U.P. and that will be a very large plant. The production in the private sector is 75,000 tonnes. The capacity of the DMT plant of IPCL is 30,000 tonnes which is going to be increased to 40,000 tonnes. In these projects one of the interesting conditions is that the private party will not go to the financial institutions. That is why we tried to give it to the private sector. If that is achieved, that should not take the financial resources of the country."

2.87 When asked about his reaction to a fact that DMT production was not enough and PTA was being imported, the witness stated:

"Bongaigaon got commissioned. Lot of additional DMT production capacity was added in the country. However, corresponding users did not come up. What is required is this. You have to do certain modifications. Certain

changes are to be made. You have to do some investments and convert the DMT-using plant to PTA-using plant and vice versa. In other words, we must have dual facilities so that they can make use of either of these two."

2.88 To a query how the private sector was surviving in this area, the witness stated, "I think in this case public sector happens to be more efficient than the private sector. The cost of production of IPCL is much lower."

2.89 Asked about the justification for expansion of DMT capacity rather than creating new capacity for more economical and efficient product namely PTA, the Department of Chemicals and Petrochemicals informed in a written reply as under:—

"DMT & PTA are alternate raw materials for production of polyester Industry. PTA is a later entry and stoichiometrically 17 per cent more DMT is required for one tonne of polyester. However, the economic choice between DMT & PTA for the existing polyester plant depends on the user. New plants may prefer to go to PTA route depending on the market price of PTA or DMT.

These factors have been considered while creating the DMT capacity and planning for PTA capacity in the country. Thus future capacity planned could be DMT plant expansions if it could be achieved at an incremental cost and new grass-root units of PTA."

2.90 The Committee note that the DMT plant of IPCL with an installed capacity of 24,000 metric tonnes per annum was commissioned in 1973. Keeping in view the growing demand for DMT by polyester fibre units in the country, an expansion programme for raising the capacity from 24,000 to 30,000 tonnes per annum was initiated. For this purpose a feasibility report envisaging capital investment of Rs. 2.66 crores was approved by the IPCL, Board in July, 1976. Three months after i.e. in September, 1976 the cost estimates for the expansion programme were revised to Rs. 6.42 crores. In December, 1977 the Government approved these proposals for Rs. 5.60 crores. The expansion programme anticipated to be completed by May, 1981 was, however, completed in October, 1982. The loss of production as a result of the delay in commissioning as also the CIF cost of resultant imports during 1981-82 and 1982-83 work out to Rs. 1.88 crores. This case once again illustrates lack of sense of urgency and casualness on



the part of IPCL in preparing project estimates and feasibility reports. After having approved a feasibility report involving an estimated expenditure of Rs. 2.66 crores, the IPCL had to prepare a revised estimate of Rs. 6.42 crores just within 3 months of the first report. Obviously the original estimates were unrealistic and based on incomplete data. The Committee do not find any justification whatsoever for IPCL rushing through a feasibility report which had to be revised and updated within an unbelievably short duration of 3 months. This is a typical case of poor project formulation and planning on the part of a public undertaking.

2.91 It is also regrettable that there was delay of about 17 months from the scheduled date in the completion of the expansion project and the delay resulted in avoidable loss of indigenous production and imports of DMT of the order of Rs. 1.88 crores. The Committee deplore this undue delay in commissioning of the plant and consequent avoidable loss of foreign exchange due to imports.

2.92 The Committee find that IPCL has undertaken a second DMT expansion project at a cost of Rs. 15.50 crores. This expansion project, which will bring up the total capacity to 40,000 MT per annum of DMT on completion is expected to be completed by 1988. The Committee hope that all necessary measures will be taken by IPCL to adhere to the time schedule for completing the expansion project with a view to avoid cost and time overruns.

2.93 The Committee are informed that all over the world the polyester manufacturers are changing over from DMT to PTA as the feedstock material for the production of polyester fibre. It is accepted that PTA gives superior yield and economies in operation. PTA, which is the second generation product was commercially introduced as raw material for the polyester industry in 1965 and the share of PTA has grown from that time to current level of about 55 per cent. In USA, Europe, Japan and other East Asian countries PTA is being increasingly used and among the advanced industrialised nations Japan stands out as the major country that uses only PTA as it is considered to be cost effective. In India the first plant for production of DMT with an installed capacity of 24,000 tonnes was commissioned by IPCL in 1973. The capacity of this plant was subsequently expanded at a cost of Rs. 6 crores to 30,000 tonnes. In 1975-76, in Government of India owned Bonga'gaon Refinery & Petrochemicals also a DMT project with 45,000 MT capacity was taken up and commission-

ed in March, 1985. Permission was also given to a Company in private sector to bring a second-hand plant for DMT production in 1981-82. This was installed in 1984. Currently the IPCL are in the process of further expanding their DMT production capacity, which is likely to be completed in 1988. In the context of the general trend in the industrial world to go in for PTA in preference to DMT as the main feedstock for polyester industry, which is considered to be better and more efficient raw material, the Committee find it difficult to appreciate why the Government of India chose a first generation product viz. DMT and went on creating fresh and expanding existing capacities. The relative economics of the two products does not seem to have been considered at any stage with any seriousness.

2.94 The Committee find though PTA is not being manufactured in India at present an industrial licence has been issued to a private sector party for the manufacture of 75,000 tonnes of PTA annually and the plant is expected to be commissioned towards the end of this year. A letter of intent for setting up of another plant at Saleempur in U.P. for manufacture of PTA has also been issued in favour of M/s. PICUP. The Committee also find that new plants based on PTA are being set up in the country because PTA is more efficient and easily available. The textile industry is very keen to switch over from DMT to PTA to keep pace with the latest technological developments in the world and to effect savings in production. In fact the new polyester units are creating facilities for the use of both DMT and PTA. The bulk of the demand of PTA is currently being met through imports and the demand has gone up at an unexpectedly faster pace.

2.95 The Committee feel that in view of the tremendous increase in demand for PTA in the textile industry and since more and more units are shifting from DMT to PTA, the later being cheaper and cost effective, IPCL should examine the feasibility of developing a process either for converting DMT into PTA, in consultation with their process Licensor M/s. Dynamite Noble, or should go in for second generation PTA technology before DMT becomes totally obsolete in the fast changing technological developments in this field. The Committee have been informed that IPCL was keeping in readiness to go in for conversion from DMT to PTA and would approach the Government with the proposals, as soon as they were satisfied about the need for that.

2.96 The Committee would also like to be apprised as to how the DMT capacity created in Bongaigaon Refinery as late as in 1985 was being utilised. A similar assessment of the utilisation of the DMT capacity by the private sector company who were permitted to import a second hand plant needs to be made to ascertain how far the import of an old technology involving huge foreign exchange outgo was economically justified.

NEW DELHI;  
January 30, 1987  
Magha 10, 1908 (Saka)

K. RAMAMURTHY,  
Chairman,  
Committee on Public Undertakings.

## APPENDIX

### *Statements of Conclusions/Recommendations of the Committee on Public Undertakings contained in the Report*

S. No.	Reference to Para No. in the Report	Conclusion Recommendations
1	2	3
1	1.31 to 1.33	<p>The Committee on Public Undertakings of Fifth Lok Sabha which reviewed the performance of Indian Petrochemicals Corporation Limited in April, 1975 had <i>inter alia</i>, gone into the reasons for variations in project cost estimates and delay in commissioning of projects of IPCL. In their 64th Report (1974-75) the Committee had recommended that estimates in DPR should be as realistic as possible taking into account all foreseeable items of expenditure and be based on correct data to obviate necessity of frequent revision of estimates, that IPCL and Government should take measures to control at least those factors (like timely supplies of material) which can be controlled and that the management of IPCL 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.</p>

In the action taken replies furnished by Government the Committee had been assured that effective timely measures were being taken to control, as far as possible, the factors responsible for increase in the cost estimates of the projects and that all possible measures to ensure that there

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is no further slippage in the project schedules were being undertaken.

A review of the cost estimates and the time schedules of the projects undertaken by IPCL, thereafter, however, reveal in unmistakable terms that no lessons have been learnt by IPCL management from their past experience. The project planning and implementation machinery remains as weak as before. The cost estimates of each project have been subjected to frequent revisions and time schedules have been revised from time to time so as to render the setting of targets a futile exercise.

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The Committee feel concerned to note that the cost estimates of Olefins Project and Downstream Units originally assessed at Rs. 157.50 crores in 1970-71 were initially revised to Rs. 331.93 crores in 1973-74 and were finally revised upwards to Rs. 346.33 crores against which the actual expenditure amounted to Rs. 338.35 crores. This represents an increase of 120 per cent over the original estimated cost. The main reasons for increase in the cost over the initial estimates in the case of Olefins Project have been attributed to escalation in cost of equipment, increase in the quantity of equipment, increase in customs duty and handling charges, additional systems pre-production expenses and interest. Similarly in the case of Downstream Units the increase in cost was chiefly on account of customs duty and handling charges (Rs. 12.36 crores), escalation in equipment cost (Rs. 35.08 crores), new items (Rs. 42.90 crores), quantity changes and under-estimation (Rs. 26.65 crores), additional pre-production investment and management expenses (Rs. 10.37 crores),

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variations in exchange rates (Rs. 7.61 crores) and contingencies (Rs. 10.47 crores). All these reasons have been repeated time and again.

The Committee have no doubt that the foremost reason for revision of cost estimates was nothing else but inadequate project formulation. The Committee feel that in the interest of expediting project implementation and keeping down the cost, the Ministry should have ensured preparation of realistic project estimates and effective monitoring through monthly or quarterly reports. The Secretary, Department of Chemicals and Petrochemicals admitted during evidence that "the two reasons which were not being gone into at the stage of the approval of the project will be plugged now by getting more realistic cost estimates as well as time schedule." It is very surprising that Government have only now realised that realistic cost estimates and time schedules were the two main essentials for approval of the projects although the Committee had stressed as far back as 1974-75 the importance of these imperatives. The Committee have no doubt that had the IPCL and Ministry cared to implement the recommendations of the Committee in their letter and spirit, it would not have been necessary to revise the cost estimates so frequently and the huge escalations could have been avoided. It is regrettable that the recommendations of the Committee in this regard were followed more in breach than in observance resulting in extra expenditure which could have been avoided. The Committee recommend that Government may go into this aspect and fix responsibility and take further necessary action under intimation to them.

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The Committee find that in order to cut delays Government have now reportedly streamlined the procedure for clearance and approval of the projects and the procedure for import of tech-

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nology has also been simplified. Under the two stage clearance procedure now being adopted by PIB, the approvals are given in the first stage for incurring the expenditure towards technology purchase, selection of consultant, preparation of Feasibility Report etc. based on which detailed project reports for investment decisions are submitted as a second stage of the proposal. The Committee note with satisfaction that Government have at last realised that in large technology oriented projects, the complete technology, scope of equipment, scope of various sub-technologies get fully identified through Detailed Project Report and that the recent DPRs are being prepared in accordance with the recommendations of the Committee made in their 64th Report. The Committee trust that in order to avoid frequent revisions in cost estimates, Government would in future thoroughly scrutinise initially the cost estimates from all angles before according approval and critically watch timely implementation of the projects to avoid undue escalations.

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The Committee note with regret that not only were there frequent revisions of cost estimates, but also the schedules of completion of the projects were frequently revised. The Olefins Projects which were originally scheduled to be completed between 1973 to 1975 were actually commissioned in 1978. In accordance with the Detailed Project Report and Feasibility Report, as against a period of 33 months envisaged for completion of the projects from the date of effect of foreign engineering contract, the schedule of completion was revised as many as five times and the delay ranged between 28 months to 60 months. Similarly, in the case of Downstream Units, the Feasibility Report originally assessed a period of 26 to 33 months for completion of the plants from the date of effect of foreign engineer-

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ing contract but the schedules in this case were also revised five times and the delay in completion of the projects ranged between 26 months to 41 months. Such heavy delays in completion of the projects cannot but be considered as abnormal. The Committee have no doubt in saying that the quality of the feasibility studies left much to be desired.

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The Committee fail to understand the logic behind laying down the schedules by the Company if these were not to be scrupulously adhered to. It can be said without the risk of contradiction that the schedules of completion of Olefins Project and Downstream Units were not realistically drawn. This is amply confirmed by the Secretary, Department of Chemicals and Petrochemicals himself who while referring to the time schedules of the project deposed before the Committee that "I find that the project cycle issued at the time was for 33 months. It was rather ambitious because even today a project of that complexity cannot be executed in 33 months' time or even if it is envisaged, it cannot be of the order of the plan and it might take a few months more. He also stated that the total time taken for clearance and for giving approval of the project can be controlled if it is controlled properly. This is exactly what the Committee have been emphasising from time to time that most of the factors leading to time and cost overruns in the implementation of the various projects were such which could be controlled by the Management or the Government provided there was a will to do so.

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The Committee note that Government have now made certain institutional arrangements for



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monitoring timely implementation of the projects like:

- (i) Preparation and updating of bar-charts indicating the key milestones for project activities at the commencement of work on the projects and monthly review of implementation by IPCL in association with Engineers India Limited;
- (ii) Receipt of monthly reports of progress of implementation from IPCL;
- (iii) Quarterly progress review meetings with the Ministry; and
- (iv) Regular monitoring of major projects in hand.

The Committee feel that if the Ministry had closely monitored implementation of the Olefins Project and Downstream Units, identified areas of slippages and had taken timely corrective measures, such huge delays would not have occurred. The Committee expect that with proper use of the monitoring systems now devised and adequate inter-ministerial coordination, wherever required, it would be possible hereafter to ensure timely completion of the projects undertaken.

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Among the constraints reportedly being faced by IPCL in their project implementation programmes, the CMD has listed out a number of impediments which came in their way. It has been stated that the time cycle required for the DGTD clearance, international tendering, evaluation of offers and selection of suppliers, tying up of foreign exchange, award of import licences and opening of letters of credit in banks nominated by

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selected suppliers in quite long. Another major factor hindering the timely completion of projects is the failure of indigenous engineering industry to adhere to their delivery schedules. The Committee have no doubt that all these factors are such which could be monitored and controlled with appropriate interaction between the various agencies involved. The Committee would particularly like the Government to carefully analyse the constraints faced by IPCL and the suggestions made by them to overcome these and take necessary remedial measures in the matter.

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IPCL is now in the process of setting up a new complex at Nagathane, Maharashtra at an approved cost of Rs. 1167 crores and the capital expenditure on the complex during the Seventh Plan period was expected to be of the order of Rs. 955 crores. Going by the past experience of IPCL in the matter of project implementation, the Committee cannot but caution the Government to keep a strict watch and ensure that the project of this magnitude gets executed within the time frame settled well in advance. The Committee need hardly emphasise that delays in project implementation have grave financial and economic implications. Organising project construction activities to ensure timely completion was, therefore, a major responsibility not only of the project management but of the Government also. The procedures, practices and organisation involved in project construction and implementation, therefore, require critical analysis and review.

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The Committee find that IPCL submitted to the Government a Feasibility Report for the manufacture of 35,000 tonnes per annum of PVC at an estimated capital expenditure of about Rs. 22 crores in December, 1974. Since the Gujarat

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State Fertilizer Company Limited which was planning to set up a PVC plant to utilise Ethylene from IPCL dropped the proposal, IPCL submitted a Revised Feasibility Report in January, 1977 at an estimated cost of Rs. 45.27 crores. The project was approved by Government in December, 1977 for an investment of Rs. 43.35 crores. In September, 1981 the cost of the project was further revised upwards to Rs. 74.16 crores on the ground that the original estimates were based on preliminary information with no firm data regarding equipment specifications etc., the estimates of which had been worked out on the advice of Engineers India Limited. The approval of Government for the revised project report was received in December, 1982 for Rs. 75.66 crores. The project was actually commissioned in August, 1984 and the actual cost on completion of the project was Rs. 70.36 crores.

It is distressing to find that a project conceived in December, 1974 was actually completed and commissioned in August, 1984 i.e. after a lapse of a full decade. The Chairman-cum-Managing Director was candid enough to admit that the implementation of this particular project "does not leave a very satisfactory taste, even with a good record of the enterprise". The frequent revisions of estimates resulted in huge cost escalations and consequent delays in completion of the project. It is interesting to analyse that between December, 1974 and November, 1977 the Government could not take a decision on the proposal given by IPCL. This pushed up the cost-estimates of the project from Rs. 22 crores to Rs. 45 crores. After Government approval had come, it took IPCL another two years to finalise the choice of technology and in September, 1981, when the revised estimates were prepared the cost of the project went up from the estimated Rs. 45 crores to Rs. 74 crores.

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Not only the estimates had to be revised too often, IPCL could not keep their schedule of completion of the plant as originally envisaged. The VC/PVC plant which was originally due for mechanical completion in July, 1983 was actually completed in January/March, 1984 and the actual commissioning was done in March/August, 1984. The main reasons for delay in completion of the plant have been attributed to delay in delivery of equipment by indigenous vendors, poor response from foreign vendors for certain specific pumps and delayed receipt of process package and consequent delay in detailed engineering.

The Committee also find that the delay in completion of the PVC plant had primarily affected the Ethylene production which had to be restricted to the intake of LDPE and EG plants with consequent reduction in the production of co-products. Audit has brought out that the value of production loss due to under-utilisation of capacity was Rs. 267.61 crores. The loss was computed with reference to the actual cost per unit. IPCL has contended that the value of production loss of Rs. 267.61 crores during the years 1978-79 to 1981-82 is based on shortfall in production computed with achievable capacity as the base and actual unit of cost of production in the respective years. According to the company, the actual unit cost of production is relevant only to the actual volume of production and not to the achievable capacity. In the Company's view the value of production loss comes to Rs. 175.00 crores. Whatever be the quantum of production loss in monetary terms, the important point that stands out is the fact that there has been avoidable delay in the completion of the project and this delayed completion has resulted in significant loss of production. The Committee

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cannot but deplore this huge loss suffered by the Company on account of delay in completion of the PVC plant.

At this stage the Committee can only express the hope that IPCL would have taken suitable lessons from their experience of tardy implementation of the project and would not allow the same thing to be repeated in the projects now under implementation or those which will be undertaken in future.

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This is yet another typical case of bad handling of a project by IPCL and the Government. One of the major constraints affecting production in IPCL's plants was power shortage, voltage fluctuations and trippings which resulted in sudden plant shutdowns leading to process problems. In order to overcome this problem the IPCL proposed in August, 1973 to set up a 25 MW power plant consisting of 2 Turbine Generation sets of 12.5 MW at an estimated cost of Rs. 5.68 crores, mainly to enable safe shutdown of plants in case of sudden stoppage of power. This proposal made by the Board of Directors in August, 1973 was approved by PIB in August 1975 and finally by the Government in February, 1978, so that it took almost 5 years to reach the approval stage. Thereafter orders were placed by IPCL on BHEL in July, 1979 and the first set was installed in March, 1982 while the second set was commissioned in September, 1982 only. In the nine years' period which elapsed between the time the proposal was initiated and the time the sets were actually commissioned, the estimated cost went up from Rs. 5.68 crores to Rs. 7.26 crores. Though the extent to which frequent power shutdown affected the life of the costly equipment is not ascertainable, a rough idea of the total production loss can be had from the fact that with

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each power trip there is a potential production loss of Rs. 1.5 crores.

It is unfortunate that it took 5 years to convince the Government that IPCL needed its own power unit to ensure against power interruptions from outside. There has also been delay on the part of the project implementation authorities as it took more than four years to commission a plant, which according to the Secretary, Department of Chemicals & Petrochemicals should not have taken more than 25 to 30 months for commissioning. The Committee are constrained to express their displeasure at the utter lack of planning and the scant regard on the part both of IPCL and the Ministry for timely implementation of the important projects like captive power plants.

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Apart from the two 12.5 MW Turbo generators commissioned in 1982, the Company decided in December, 1982 to have a techno-economic study for a 60 MW Captive Power Plant. On the basis of a study done by M/s. Tata Consulting Engineers, the Company prepared a Feasibility Report in June, 1983. The proposal to set up a 60 MW power plant at an estimated cost of Rs. 72.51 crores (including foreign exchange component of Rs. 31.75 crores) was approved by the Board of IPCL on 4-5-1984, by the Public Investment Board on 6-12-1984 and was sent by the Ministry of Petroleum to the Cabinet Committee on 19-1-1985 for approval. This was finally cleared by the Government on 8th July, 1985. As stated by the Department, IPCL has been given permission to place orders for equipment in January, 1986 and according to IPCL it will take 30 months after Government's approval to commission the power plant. Thus the project initiated in December, 1982 is likely to be commissioned sometime in first half

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of 1988. The Committee cannot but emphasize that the project clearance should be accorded priority at all levels and the cumbersome procedures involved in the process should be streamlined with a view to reduce delays. It is needless to point out that delayed clearance of projects not only adds to the cost of the project but vitiate the viability of otherwise well thought-out projects and schemes.

The Committee are not happy to note that even after the commissioning of the two 28 MW power units, IPCL will not be totally self-reliant in the matter of its power requirements. Even then a small part of its power requirements will have to be met by the Gujarat State Electricity Board. The Committee feel that once a decision has been taken to permit an undertaking to go in for captive power plant, it seems a little ironical that even after providing such a facility at huge cost, the undertaking needs to depend on the vagaries of power supplies from the State grid. This could and should have been avoided.

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The Committee note that a feasibility report envisaging capital investment of Rs. 3.49 crores for the manufacture of lower acrylates was prepared by IPCL in April, 1975. Another feasibility report for the manufacture of higher acrylates requiring capital investment of Rs. 3.82 crores was prepared in November, 1975. A revised feasibility report for the manufacture of 10,000 tonnes of acrylates was prepared at an estimated cost of Rs. 13.67 crores in February, 1977 and was approved by Government in December, 1977. Thus the cost estimates of Rs. 7.31 crores projected in the earlier feasibility reports of 1975 were pushed up to Rs. 13.67 crores in February, 1977. Further as a result of detailed engineering, the cost was revised in February, 1980 to Rs. 18.86 crores and

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was approved by the Government in December, 1980. As a result of upward revision of cost estimates, the internal rate of return anticipated came down to 19.10 per cent against the earlier anticipation of 27.5 per cent. Though the project was first envisaged in April, 1975 the schedule for mechanical completion after prolonged gestation period was fixed as December, 1981. The project for the lower acrylates was actually completed in June, 1982 and that for higher acrylates in November, 1982.

The above recital of key milestones for the acrylates project reveal how the feasibility reports for the projects were being prepared in IPCL on the basis of incomplete information. The project formulation was in the nature of haphazard guess-work and entailed frequent revision and re-revision of estimates. No wonder the actual costs were always much more than the projected costs and the completion schedules could never be adhered to.

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The Committee were informed during evidence that the technology for the manufacture of Acrylates had been closely guarded by multinationals who did not want to share their technology. To develop self-reliance in this field IPCL requested National Chemical Laboratory to develop a workable process for reproducibility and subsequent scale up. NCL developed processes for the manufacture of different Acrylates which were reviewed by EIL and IPCL and a Feasibility Report was submitted to Government in December, 1976. NCL had built a pilot plant on bench scale reactors having a capacity of 500 g/batch for edveloping their technology. This pilot plant (laboratory scale) was thereafter translated into commercial plant and the Company put up a plant with a capacity of 10,000 tonnes per annum (5000 tonnes of lower Acrylates and



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5000 tonnes of higher Acrylates). The equipment specifications in the case of higher acrylates were based on the preliminary pilot plant information supplied by NCL.

The Committee note that production of lower Acrylates (the technology for which was supplied by M/s. Asahi Chemicals, Japan) had stabilised and their imports had been discontinued. But, serious problems were faced in the higher Acrylates plant due to deficiencies in the technology developed by NCL. The main drawbacks noticed by IPCL in the Higher Acrylates plant are the operational and design deficiencies which were not revealed in the laboratory work carried out by NCL. The C&MD had also stated during evidence: "we are not out of woods, because we are learning from deficiencies in the process, in the design parameters." Due to plant deficiencies local demand for higher acrylates could not be met which was otherwise made good through imports valuing Rs. 166.44 lakhs during 1983-84 and 1984-85. The Committee feel that in view of the highly sophisticated technology required in production of Acrylates, it is expected of IPCL to have gone in for an integrated prototype pilot plant before venturing into a project of 10,000 tonnes capacity. Why the normal intermediate stage of a prototype pilot plant was not gone through before setting up a plant for commercial production of 10,000 tonnes of Acrylates, has not been convincingly explained. The Chairman-cum-Managing Director, IPCL made the plea that because of financial constraints it was not considered wise to make an investment of about Rs. 3 crores on a prototype pilot plant even though such a prototype was desirable. The Secretary, Department of Chemicals & Petro-Chemicals, however, has opined that this was a case of over-confidence on the part of NCL. EIL

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and IPCL, which was not called for and it is a case of error of judgement. The Committee are constrained to say that the project was neither well conceived nor properly executed. Even after the setting up of the plant imports of higher acrylates are being made and the plant itself needs to be modified for the rectification of the deficiencies noticed after implementation. The Committee would like to emphasize that desirable modifications in the plant may be carried out expeditiously.

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The Committee note that the DMT plant of IPCL with an installed capacity of 24,000 metric tonnes per annum was commissioned in 1973. Keeping in view the growing demand for DMT by polyester fibre units in the country, an expansion programme for raising the capacity from 24,000 to 30,000 tonnes per annum was initiated. For this purpose, a feasibility report envisaging capital investment of Rs. 2.66 crores was approved by the IPCL Board in July, 1976. Three months after *i.e.* in September, 1976 the cost estimates for the expansion programme were revised to Rs. 6.42 crores. In December, 1977, the Government approved these proposals for Rs. 5.60 crores. The expansion programme anticipated to be completed by May, 1981 was, however, completed in October, 1982. The loss of production as a result of the delay in commissioning as also the CIF cost of resultant imports during 1981-82 and 1982-83 work out to Rs. 1.88 crores. This case once again illustrates lack of sense of urgency and casualness on the part of IPCL in preparing project estimates and feasibility reports. After having approved a feasibility report involving an estimated expenditure of Rs. 2.66 crores, the IPCL had to prepare a revised estimate of Rs. 6.42 crores just within 3 months of the first report. Obviously the origi-

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nal estimates were unrealistic and based on incomplete data. The Committee do not find any justification whatsoever for IPCL rushing through a feasibility report which had to be revised and updated within an unbelievably short duration of 3 months. This is a typical case of poor project formulation and planning on the part of a public undertaking.

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It is also regrettable that there was delay of about 17 months from the scheduled date in the completion of the expansion project and the delay resulted in avoidable loss of indigenous production and imports of DMT of the order of Rs. 1.88 crores. The Committee deplore this undue delay in commissioning of the plant and consequent avoidable loss of foreign exchange due to imports.

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The Committee find that IPCL has undertaken a second DMT expansion project at a cost of Rs. 15.50 crores. This expansion project, which will bring up the total capacity to 40,000 MT per annum of DMT on completion is expected to be completed by 1988. The Committee hope that all necessary measures will be taken by IPCL to adhere to the time schedule for completing the expansion project with a view to avoid cost and time overruns.

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The Committee are informed that all over the world the polyester manufacturers are changing over from DMT to PTA as the feedstock material for the production of polyester fibre. It is accepted that PTA gives superior yield and economies in operation. PTA, which is the second generation product was commercially introduced as raw material for the polyester industry in 1965 and the share of PTA has grown from that time to current level of about 55 per cent. In USA, Europe, Japan and other East Asian countries

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PTA is being increasingly used and among the advanced industrial nation Japan stands out as the major country that uses only PTA as it is considered to be cost effective. In India the first plant for production of DMT with an installed capacity of 24,000 tonnes was commissioned by IPCL in 1973. The capacity of this plant was subsequently expanded at a cost of Rs. 6 crores to 30,000 tonnes. In 1975-76, in Government of India owned Bongalgaon Refinery & Petrochemicals also a DMT project with 45,000 MT capacity was taken up and commissioned in March, 1985. Permission was also given to a Company in private sector to bring a second-hand plant for DMT production in 1981-82. This was installed in 1984. Currently the IPCL are in the process of further expanding their DMT production capacity, which is likely to be completed in 1988. In the context of the general trend in the industrial world to go in for PTA in preference to DMT as the main feedstock for polyester industry, which is considered to be better and more efficient raw material, the Committee find it difficult to appreciate why the Government of India chose a first generation product viz. DMT and went on creating fresh and expanding existing capacities. The relative economics of the two products does not seem to have been considered at any stage with any seriousness.

- 18      2.94      The Committee find though PTA is not being  
          &            manufactured in India at present an industrial  
          2.95      licence has been issued to a private sector party  
          for the manufacture of 75,000 tonnes of PTA  
          annually and the plant is expected to be commis-  
          sioned towards the end of this year. A letter  
          of intent for setting up of another plant at Saleem-  
          pur in U.P. for manufacture of PTA has also  
          been issued in favour of M/s. PICUP. The  
          Committee also find that new plants based on PTA  
          are being set up in the country because PTA is

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more efficient and easily available. The textile industry is very keen to switch over from DMT to PTA to keep pace with the latest technological developments in the world and to effect savings in production. In fact the new polyester units are creating facilities for the use of both DMT and PTA. The bulk of the demand of PTA is currently being met through imports and the demand has gone up at an unexpectedly faster pace.

The Committee feel that in view of the tremendous increase in demand for PTA in the textile industry and since more and more units are shifting from DMT to PTA, the later being cheaper and cost effective, IPCL should examine the feasibility of developing a process either for converting DMT into PTA, in consultation with their process Licensor M/s. Dynamite Noble, or should go in for second generation PTA technology before DMT becomes totally obsolete in the fast changing technological developments in this field. The Committee have been informed that IPCL was keeping in readiness to go in for conversion from DMT to PTA and would approach the Government with the proposals, as soon as they were satisfied about the need for that.

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The Committee would also like to be apprised as to how the DMT capacity created in Bongaigaon Refinery as late as in 1985 was being unutilised. A similar assessment of the utilisation of the DMT capacity by the private sector company who were permitted to import a second hand plant needs to be made to ascertain how far the import of an old technology involving huge foreign exchange outgo was economically justified.