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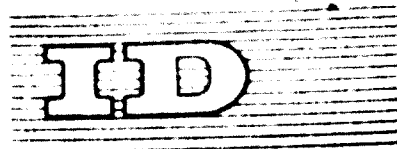
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Expert Group Meeting on the Development of the Plastics  
Industry in Developing Countries

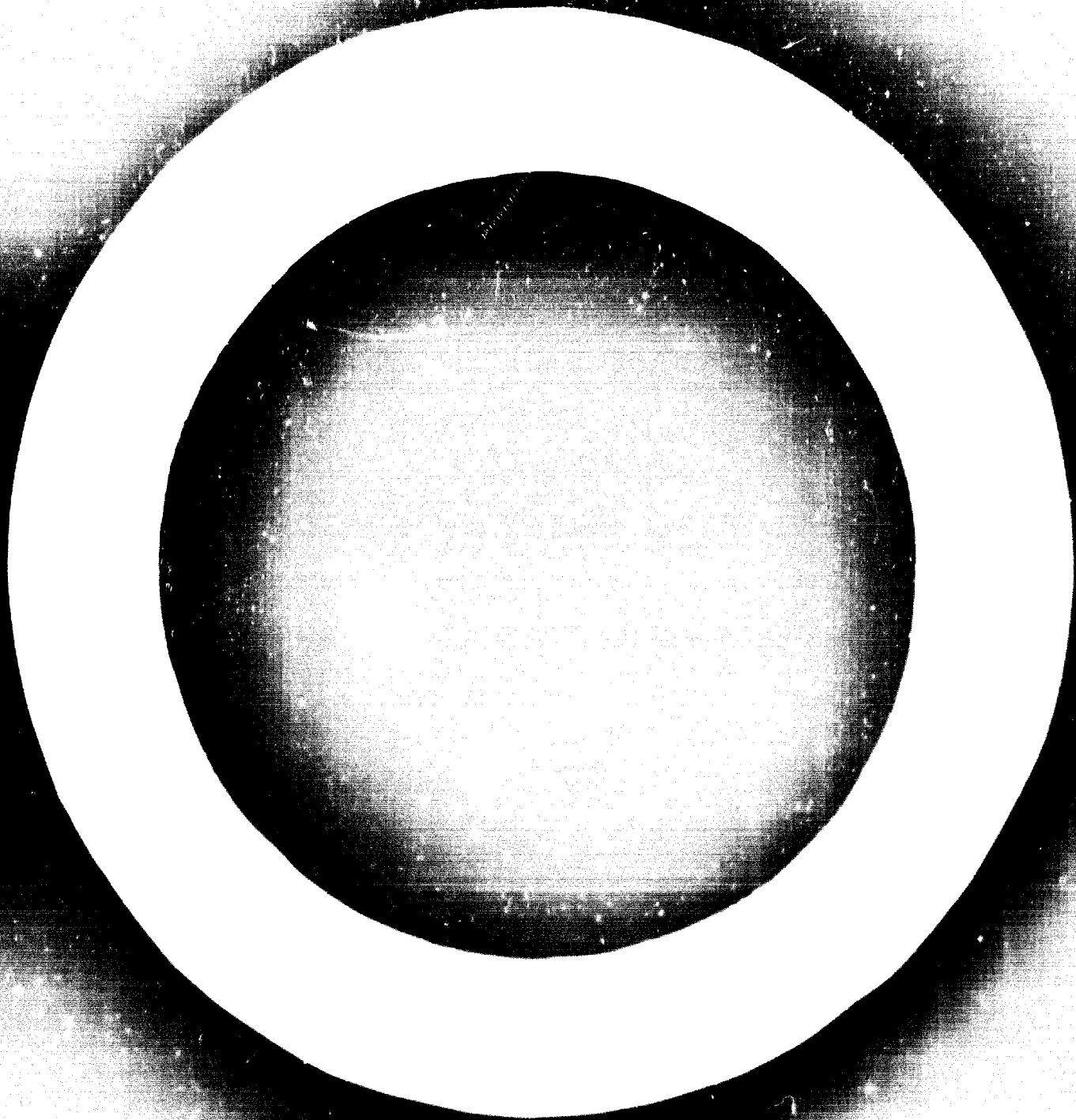
Vienna, Austria, 11 - 15 November 1968

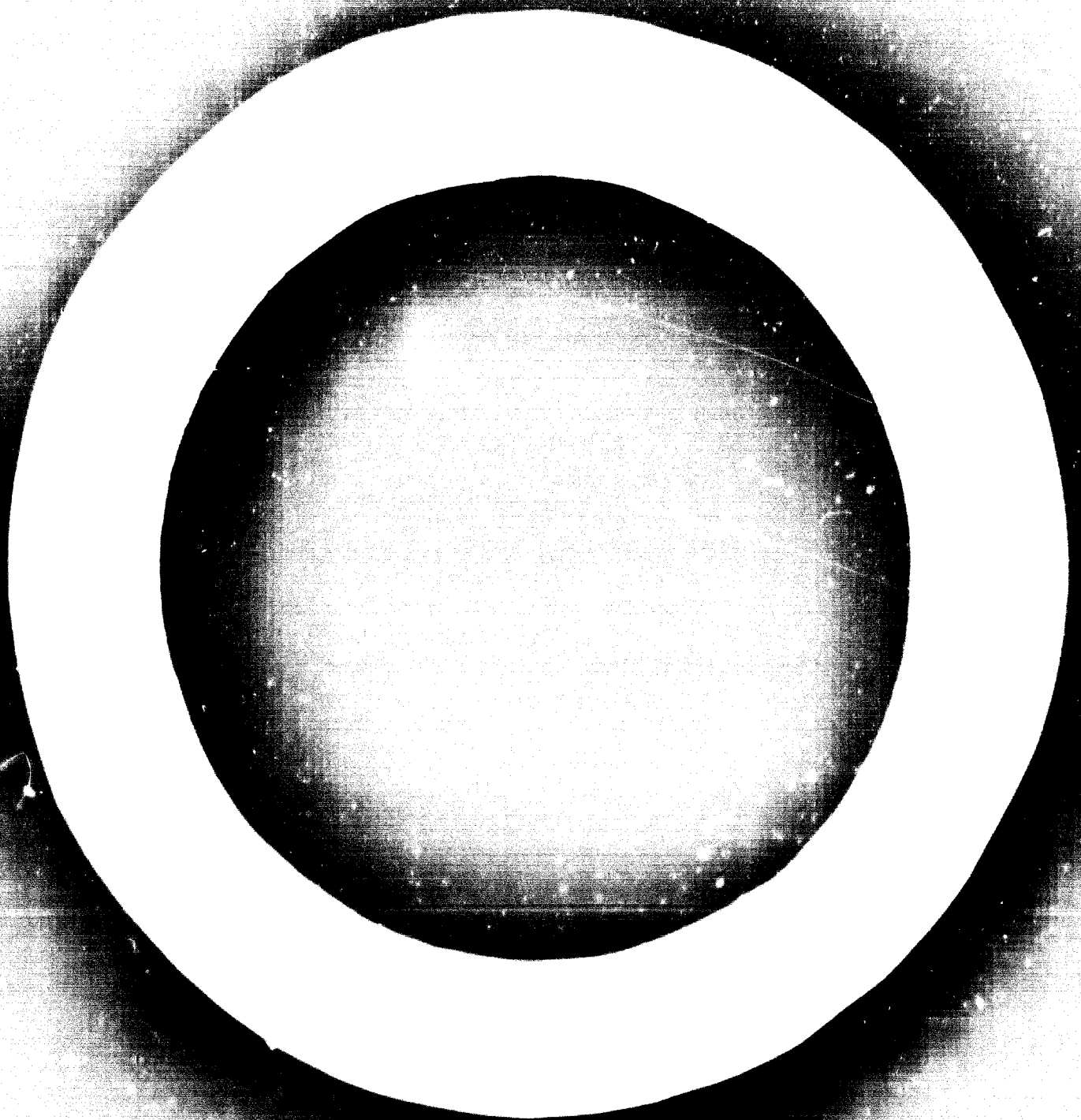
RECOMMENDATIONS OF THE EXPERT GROUP  
MEETING ON THE DEVELOPMENT OF THE  
PLASTICS INDUSTRY IN DEVELOPING COUNTRIES<sup>1/</sup>

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1. The Expert Group Meeting noted the development of new processes in the petrochemical industry since the last Petrochemical Conference at Teheran in 1964. It recommended that developing countries should give particular attention to the technological changes which have influenced the selection of processes and size of units in recent years.
2. The Expert Group Meeting noted with interest the increase of plastics demands in the developed and developing countries of the world. It was of particular interest to note that on a volume basis, it is anticipated that world plastics production may overtake steel production by the 1980's. The meeting recommended that in planning development, the developing countries should look at the problem of developing building materials as a whole and in deciding upon the relative importance to be given to steel or plastics industries, the advantages of establishing plastics industries, which can be established at lower relative capital costs and at smaller levels of production than the steel industry, should be kept in view.
3. The Expert Group Meeting recommended that the countries of the various regions should standardize their nomenclature for purposes of identifying imports, consumption, production, etc. in order to assist planning for the development of the petrochemical industry in each country. The Expert Group Meeting noted that even the Brussels nomenclature was rapidly being outdated and recommended that a group of experts under UNIDO suggest modifications to this nomenclature for discussion at the forthcoming Petrochemical Seminar.
4. The Expert Group Meeting recommended that all countries, and particularly developing countries should lay down a criteria for the minimum size of plants which should be permitted to be established in individual countries; the exact size of such plants should be guided by the conditions prevailing in the country and the higher selling prices that an individual country is willing to tolerate.
5. The Expert Group Meeting noted that a number of countries are establishing petrochemical operations behind relatively high tariff walls. While this was an acceptable method of initiating the petrochemical industry, the Expert Group Meeting recommended that these plants should be designed in such a manner that they reach economic operating levels by international standards, as early as possible.

6. The Expert Group Meeting noted the fact that in very small petrochemical operations, the savings in foreign exchange, particularly where profits were remitted abroad were marginal. At the same time, the Expert Group Meeting noted that where substantial quantities of local equipment were utilized or profit remittances abroad were not involved, the foreign exchange savings were substantial and these are further increased when the import substitution characteristics of the products of the plastics industry are considered.
7. The Expert Group Meeting noted that developing countries were converting alcohol and carbide based operations to petrochemical feedstocks, and recommended that the newly developing countries should carefully consider commencing operations based on alcohol or carbide in the future, only in very exceptional circumstances.
8. The Expert Group Meeting suggested that in initiating petrochemical projects, detailed market and feasibility studies should be undertaken before finalizing such projects. The meeting recommended that UNIDO should provide experts and institution facilities for such studies and these studies should include detailed surveys on markets and applications.

In deciding on the manufacture of products, the basic elements to be considered should include:

product prices on the internal market in developed countries vs. prices of imported products;

share structure of the petrochemical company, financing possibilities and consequently incentives which might be granted by public or private investors;

raw material prices, utilities and man-power prices.

All these factors have to be scrutinized in the feasibility study.

The Expert Group Meeting suggested that in building up the plastics industry in developing countries, the following sequence of operations would be logical:

- a) Build up a fabricating industry, moulding extrusion etc. based in the first instance on imported machinery and tools, imported raw materials, know-how supplied with machinery and materials;

- b) Set up plant to make own moulds or recondition second-hand moulds purchased overseas;
- c) Commence production of thermosetting resins and moulding powders from imported chemicals. If fertilizer interests will co-operate, set up an ammonia-urea methanol-formaldehyde complex;
- d) Possibly buy in base polymer, particularly in the case of PVC, and compound or colour, subject of course to the easy availability of the necessary foreign exchange for imports;
- e) Undertake economic studies for the manufacture of plastics with considered time phasing which may take into account term imports of certain monomers for the domestic manufacture of selector polymers, possible manufacture of certain monomers from imported olefins on a viable basis and erection of olefin plants - if advantageous in co-operation with neighbouring countries to improve over-all viability.

10. The Expert Group Meeting noted the development of plastic raw materials and synthetic fibres which are penetrating traditional fields of natural products. It recommended that countries of the region with interest in industries such as furniture, jute, surgical instruments, etc. should keep a watch on developments in this field in order to develop indigenous fabricating facilities of a competitive nature. It was felt by the Expert Group Meeting that if proper attention was paid to such industries, these plastics would augment the versatility of traditional products rather than to replace them.

11. However, the Expert Group Meeting recommended that developing countries should concentrate on a limited number of plastics for domestic production in order to establish economic sized plants, and to make intensive efforts to better utilize such materials. The Expert Group Meeting recommended that UNIDO undertake studies on the economics of size and selection of traditional plastics which should be manufactured first in newly developing countries. These studies should be available in time for the next Petrochemical Seminar. These studies should also consider fabricating techniques so as to minimize the number of resin products selected for manufacture in a country.

12. In order to lower the investment of the petrochemical plants in developing countries and the operating cost of these plants, the Expert Group Meeting recommended that these countries:

- a) Prepare very accurately for the start-up of the plant by training engineers, operators, etc. during the design and erection of the plant;

- b) Develop Civil Engineering and Construction Services at an early date;
- c) Develop as soon as possible engineering design facilities in order to minimize overseas engineering fees which might in course of time be limited to basic engineering fees only;
- d) Develop as soon as possible facilities to produce in the country a major part of the equipment and the catalysts and auxiliary materials;
- e) Emphasize training for better maintenance and for the inspection of plants already in operation.

13. The Expert Group Meeting noted that the cost of know-how and engineering for developing countries from certain developed regions of the world represents a very high percentage of the erected costs of petrochemical plants. In some cases this has been about 25-30% of the erected costs of a plant. The Expert Group Meeting recommended that methods for lowering such costs should be considered at the next Petrochemical Seminar and requested UNIDO to consider ways and means for helping developing countries to lower such costs.

14. The Expert Group Meeting felt that it may be possible to reduce engineering fees by undertaking the detailed engineering of the plants in developing countries, or in other countries with lower engineering costs. The Expert Group Meeting also noted that in some countries, the Government taxes remittance of fees with the result that the fees are enhanced to an equivalent extent. The Expert Group Meeting recommended that countries should study the possibility of lowering capital costs by making the remittance fees tax-free, and customs duties should also be payable only on the net cost of the machinery excluding such fees.

15. The Expert Group Meeting recommended that UNIDO set up a basic documentation centre where documentation would be available on problems connected with petrochemical technology and information on the past experience of developing countries. The Expert Group Meeting also recommended that UNIDO maintain a list of experts who could help with the evaluation of technology and processes for developing countries.

16. The Expert Group Meeting recommended that where developing countries are purchasing new plants, they should have direct access to the process licensors. In this way they can often obtain competitive terms and in addition they would be able to obtain continuing know-how over a relatively longer period, and better training facilities than are provided by machinery suppliers.



17. The Expert Group Meeting noted that in many of the developing countries insufficient information is resulting in the adoption of out-of-date methods for the fabrication of plastics. It recommended that UNIDO give serious consideration to this problem and suggested that:

- a) A touring exhibition should be organized by UNIDO which could visit developing countries to demonstrate new techniques;
- b) UNIDO should make available experts to assist the developing countries in establishing competent extension services to help small plastic fabricators, visit their plants and give advice on production and processing techniques and designs;
- c) UNIDO could help in making available experts and identifying available training facilities for the establishment of mould centres in countries of the region.

18. Because of the significant progress made in the use of radio-isotopes for polymerizations, UNIDO should in co-operation with IAEA, examine the various production processes currently in progress, e.g. plastics-wood, and those about to be commercialized (polyethylene and polyformaldehyde) with the object to keep the developing countries informed about the new possibilities. The plastics-wood combinations are already receiving considerable interest by many developing countries as building materials. UNIDO in co-operation with IAEA should provide feasibility studies to consider further possibilities of development in developing countries.

19. The Expert Group Meeting noted with interest that certain Organizations have offered training facilities to UNIDO. The Expert Group Meeting recommended that these facilities should be utilized and additional facilities for start-up, maintenance and processing in operating plants should be arranged by UNIDO.



24 . 1 . 72