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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

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**FIRST  
CONSULTATION  
MEETING  
ON THE  
PETROCHEMICAL  
INDUSTRY**

Mexico City, ~~12~~-16 March 1979

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**REPORT**

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Explanatory notes

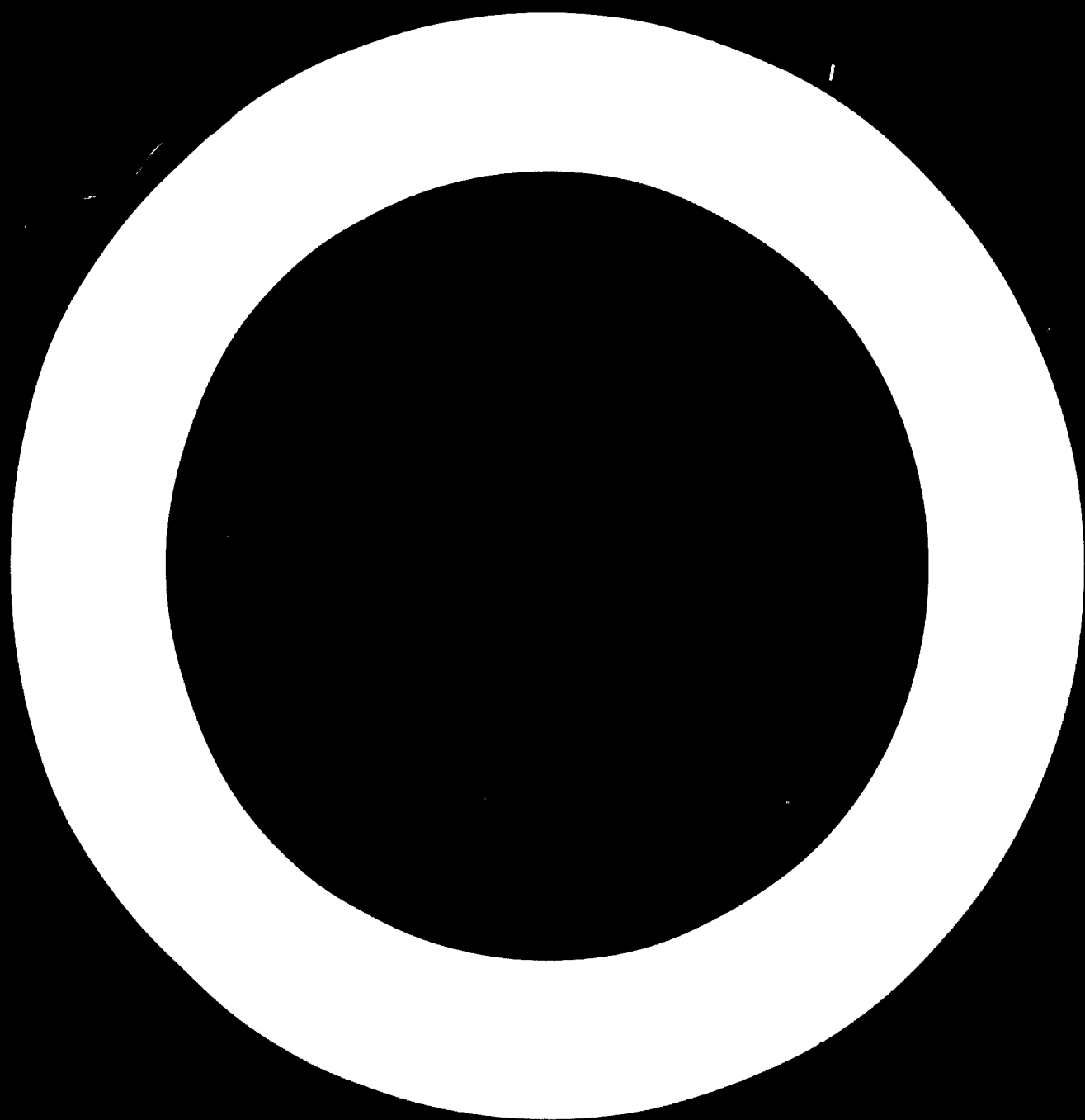
References to dollars (\$) are to United States dollars.

A barrel equals 42 US gallons.

A billion equals one thousand million.

The following abbreviations of organizations are used in this document:

ASEAN	Association of South-East Asian Nations
CEFIC	European Council of Chemical Manufacturers' Federations
CMEA	Council for Mutual Economic Assistance
ECE	Economic Commission for Europe
GOIC	Gulf Organization for Industrial Consulting
IDCAS	Industrial Development Centre for Arab States
OAPEC	Organization of Arab Petroleum Exporting Countries
OECD	Organisation for Economic Co-operation and Development
OPEC	Organization of Petroleum Exporting Countries
UNCITRAL	United Nations Commission on International Trade Law
UNCTAD	United Nations Conference on Trade and Development
WIPO	World Intellectual Property Organization



## PREFACE

The Second General Conference of the United Nations Industrial Development Organization (UNIDO), held at Lima, Peru, in March 1975, recommended that UNIDO should include among its activities a system of continuing consultations between developed and developing countries with the object of raising the developing countries' share in world industrial output through increased international co-operation (ID/CONF.3/31, chap. IV, para. 66).<sup>1/</sup>

The General Assembly, at its seventh special session in September 1975, by resolution 3362 (S-VII), decided that the system of consultations called for by the Lima Declaration and Plan of Action should be established at global, regional, interregional and sectoral levels<sup>2/</sup> and that UNIDO, at the request of the countries concerned, should provide a forum for the negotiation of agreements in the field of industry between developed and developing countries and among developing countries themselves.

The Industrial Development Board at its tenth and eleventh sessions in 1976 and 1977 decided that consultations should be convened among member countries, the participants from interested countries to include officials of Governments as well as representatives of industry, labour, consumer groups etc.<sup>3/</sup>, <sup>4/</sup> It authorized consultations on priority industrial sectors namely fertilizers, iron and steel, leather and leather products and vegetable oils and fats.

The Industrial Development Board at its twelfth session in 1978 authorized UNIDO to convene a consultation meeting on the petrochemical industry.<sup>5/</sup>

The First Consultation Meeting on the Petrochemical Industry was held in Mexico from 12 to 16 March 1979.

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<sup>1/</sup> "Report of the Second General Conference of the United Nations Industrial Development Organization" (ID/CONF.3/31), chapter IV, "The Lima Declaration and Plan of Action on Industrial Development and Co-operation", para. 66.

<sup>2/</sup> Official Records of the General Assembly, Seventh Special Session, Supplement No. 1, para. 3.

<sup>3/</sup> Ibid., Thirty-first Session, Supplement No. 16, para. 60.

<sup>4/</sup> Ibid., Thirty-second Session, Supplement No. 16, para. 162.

<sup>5/</sup> Report of the First Consultation Meeting on the Iron and Steel Industry (ID/WG.243/6/Rev.1).

CONTENTS

<u>Chapter</u>		<u>Paragraph</u>	<u>Page</u>
	INTRODUCTION .....	1	5
	CONCLUSIONS AND RECOMMENDATIONS .....	2	6
I.	ORGANIZATION OF THE MEETING .....	3	12
II.	FIRST UNIDO WORLD-WIDE STUDY ON THE PETROCHEMICAL INDUSTRY: 1975-2000.....	12	14
III.	ESTABLISHMENT OF A WORKING GROUP ON WORLD SUPPLY OF AND DEMAND FOR PETROCHEMICALS .....	21	16
IV.	MEASURES TO FACILITATE THE MARKETING OF PETROCHEMICALS PRODUCED IN DEVELOPING COUNTRIES	24	18
V.	PREPARATION OF A MODEL CONTRACT FOR THE LICENSING OF PATENTS AND KNOW-HOW IN THE PETRO- CHEMICAL INDUSTRY .....	43	23

Annexes

I.	List of participants .....	30
II.	List of documents .....	41

### INTRODUCTION

1. The First Consultation Meeting on the Petrochemical Industry was held at the Conference Centre of the Secretaría de Relaciones Exteriores, Mexico D.F., Mexico, from 12 to 16 March 1979. The Meeting was attended by 149 participants (annex I) representing Governments, industry, labour and consumer groups from 52 countries and 12 international, intergovernmental and non-governmental organizations.



## CONCLUSIONS AND RECOMMENDATIONS

2. The Meeting agreed on the following conclusions and recommendations:

Establishment of a permanent working group on world supply  
of and demand for petrochemicals

(a) UNIDO should establish a permanent working group on world supply of and demand for petrochemicals with the following terms of reference:

- (i) To prepare and regularly update a 10-year forecast of demand for petrochemicals, expressed in terms of demand for basic petrochemicals, in major consuming countries and at regional and world levels;
- (ii) To prepare and regularly update a 10-year forecast of feedstocks available for the production of basic petrochemicals at regional and world levels;
- (iii) To prepare and regularly update estimates of capacities in operation, under construction and planned, and their effective capacity to supply basic petrochemicals in major producing countries and at regional and world levels;
- (iv) To extend the demand/supply exercise described above to selected intermediate and end-products as appropriate;
- (v) To invite countries to supply to UNIDO updated information required by the Working Group;

(b) The Working Group on World Supply of and Demand for Petrochemicals should assemble information on 10 basic petrochemical products: ethylene, propylene, butadiene, benzene, paraxylene, orthoxylene, toluene, methanol, ammonia, acetylene; and on the following intermediate and final petrochemical products: acrylonitrile, caprolactam, dimethyl terephthalate (DMT), terephthalic acid (TPA), styrene, vinyl chloride, polyvinyl chloride (PVC), high and low density polyethylene, polypropylene, polystyrene, styrene butadiene rubber (SBR), acrylic, polyamide and polyester fibre; and other products as deemed appropriate by the Working Group;

(c) UNIDO, as secretariat of the proposed Working Group, should invite to participate representatives of:

- (i) CMEA, OECD and OPEC;
- (ii) Groups of countries such as the Andean Group, ASEAN, the Gulf Organization for Industrial Consulting (GOIC), the Industrial Development Centre for Arab States (IDCAS) and OAPEC;
- (iii) Industrial associations or federations formed by groups of countries such as CEFIC and the ASEAN Chemical Industry Club;
- (iv) Individual countries that either are, or have the potential to become, large consumers or producers of petrochemicals;
- (v) Organizations of the United Nations system such as ECE and UNCTAD;

(d) The Working Group should meet for the first time in September 1979 and twice yearly thereafter. The first meeting of the Working Group should be preceded by meetings at the regional level to develop information available from countries within each region;

(e) The Working Group should establish its own procedures, the approach to be adopted to its work, and the way in which its findings should be presented for publication.

#### Updating of the UNIDO World-wide Study

(f) The UNIDO secretariat should prepare an updated version of the World-wide Study for submission to the Second Consultation Meeting, taking into account the comments made during the Meeting by participants, those submitted in writing at a later date, and the progress made by the Working Group;

(g) The revised UNIDO World-wide Study should consider the effect on the competitiveness of petrochemicals resulting from the impact of increases in the cost of energy on the cost of such products as metals, glass and paper, which are the current preferred alternatives to petrochemical products in certain end-uses.

#### The marketing of petrochemicals produced in developing countries

##### The importance of the petrochemical industry to developing countries

(h) Since the petrochemical industry processes raw materials exported by developing countries and consumes large quantities of energy, it should be considered as one of the industries that will make an essential contribution to the achievement of the Lima target;

(i) Developing countries with oil and gas resources may increasingly have a competitive cost advantage in establishing this industry; therefore, it is recommended that future plants for basic and intermediate products should be constructed preferably in these developing countries, taking into account all other cost factors, such as labour, equipment and transport of end-products to markets as well as socio-economic considerations;

(j) Although the developing countries will have substantially increased their petrochemical output by 1985, further large increases in their output will be required after 1985 in order to meet the increasing demand of their own markets as well as to obtain a larger share of world markets.

##### The common interest of developing and developed countries in the development of the petrochemical industry

(k) The development of the petrochemical industry in developing countries will be beneficial to other countries if it produces petrochemicals at a lower cost; it may also have a positive impact on the economy of the developed countries through the possible export of the services and equipment required for the establishment of the industry in developing countries. Both developing and developed countries are vitally interested in reducing or eliminating the ongoing waste of exhaustible resources such as flared associated gas,

Action to be taken by Governments of developed and developing countries

(l) In order to provide a favourable basis for the growth of the petrochemical industry in developing countries and to facilitate trade in petrochemicals among all countries, these Governments should:

- (i) Implement and apply to the petrochemical industry appropriate decisions taken by other international forums serving the increased industrialization of developing countries;
- (ii) Not restrict, except in special circumstances such as for infant industries, the imports of petrochemical products by excessive tariffs, hidden barriers or by restrictive business practices.

Action to be taken by Governments of developed countries

(m) In order to provide a stable long-term basis for the import of petrochemical products produced in developing countries, these Governments should make every possible effort:

- (i) Not to hamper the development of long-term supply contracts entered into by the industry in their country with producers in developing countries;
- (ii) Not to provide public assistance to the continuing operation of existing petrochemical plants or the development of new production capacities that are not economical as compared with supplies offered in fair competition by the developing countries.

Action to be taken by Governments of developing countries

(n) In their concerted efforts to achieve the Lima target, these Governments should:

- (i) Examine the long-term contribution that petrochemical products can make as a complement to natural products in achieving national objectives in such fields as agriculture, housing, packaging, transport and construction;
- (ii) Promote and expand the market for petrochemical end-products by supporting the research efforts needed to adapt end-uses to local market requirements and climatic conditions;
- (iii) Promote investment in downstream industries providing the end-products that the country requires;
- (iv) Support the establishment of units producing basic and intermediate petrochemicals with financing, investment guarantees, incentives etc.;
- (v) Encourage co-operation with other developing countries that produce basic and intermediate petrochemicals, in particular, for the establishment of downstream industries for the production of final products.

Action to be taken by the petrochemical industry

(o) The international petrochemical industry in its present phase of restructuring should assist developing countries to increase their share of total world petrochemical production, taking into consideration technological and economic viability, by:

- (i) Making greater use of the raw materials available in developing countries by establishing new petrochemical plants;
- (ii) Assisting developing countries in establishing and operating petrochemical plants through joint ventures or other mutually agreed arrangements;
- (iii) Assisting developing countries in marketing their petrochemical products in world markets by entering into medium- and long-term arrangements, such as long-term sales agreements or other agreements;
- (iv) Including in the transfer of technology to developing countries: (1) assistance in the development of new end-uses appropriate to local conditions; (2) establishment of an extension service to support market development; and (3) research and development on new end-uses of petrochemical products, such as plastics, in the agricultural, housing, packaging, transport and construction sectors.

Action to be taken by UNIDO

(p) UNIDO should take the following action and report on the results to the Second Consultation Meeting:

- (i) Inform all Governments of the conclusions and recommendations of the Meeting and invite their comments on the actions recommended to Governments;
- (ii) Inform the petrochemical industry through such channels as federations and associations of the conclusions and recommendations of the Meeting and invite their comments on the actions recommended to the industry;
- (iii) Explore ways to ensure that the plant-contracting industry contributes to the rapid build-up of the petrochemical industry on fair and equitable terms;
- (iv) Continue to study marketing, including long-term agreement for the sale of petrochemicals, as a means to assist the orderly flow of petrochemicals into existing and future markets;
- (v) Expand its efforts to promote investment in the petrochemical industry in developing countries, through meetings such as the Petrochemical Project Promotion Meeting for Andean Group Countries to be held at Madrid in October 1979;
- (vi) Work out ways and means of securing co-operation between developing and developed countries, as well as between developing countries themselves, to establish downstream plants in developing countries that have neither financial nor raw material resources;

- (vii) UNIDO should study alternative sources of feedstock for petrochemical production such as natural gas, coal and fermentation alcohol; convene an expert group meeting on this subject; and report the results to the Second Consultation Meeting;
- (viii) UNIDO should make a detailed study of the associated gas that is presently flared in oil-producing developing countries in order to give a clear picture of the advantages of setting up economic projects to use these wasted resources.

Preparation of a model contract for the licensing of know-how and patents in the petrochemical industry  
(action to be taken by the UNIDO secretariat)

- (q) Prepare a model contract covering the licensing of patents and know-how in the petrochemical industry and a set of guidelines on its use. The following timetable should be followed:

First UNIDO draft by 31 August 1979

Written comments on the first UNIDO draft by 30 November 1979

Second UNIDO draft by 29 February 1980

Expert group meeting to consider the second UNIDO draft by June 1980

Third UNIDO draft, taking into account comments of the expert group meeting, by October 1980. (This draft would be submitted to the Second Consultation Meeting in 1981.)

- (r) Invite countries, licensors and licensees to co-operate with UNIDO by submitting examples of licensing agreements and written suggestions for items to be covered by the model contract, without prejudice to confidentiality and secrecy provisions of such agreements;

- (s) Prepare a manual of available technologies in the petrochemical industry and a set of guidelines on the selection of the most suitable technology. As appropriate, UNIDO should convene expert group meetings to review the information collected before this is published;

- (t) Make an in-depth study of arrangements for the payment of fees in licensing agreements used in the petrochemical industry in time for submission to the expert group meeting mentioned above in June 1980;

- (u) Collect and analyse the experience of developing countries in arbitration cases relating to the chemical industry with a view to recommending to the Second Consultation Meeting new rules and procedures and a possible new forum more suitable for the arbitration of such technically complex cases;

- (v) Examine how the model contracts it is preparing for the construction of a fertilizer plant can be adapted for petrochemical plants, and prepare specific recommendations for the consideration of the Second Consultation Meeting.

### Second Consultation Meeting

#### Convening of a second consultation meeting

(w) A second consultation meeting should be convened in 1981 to consider work undertaken to implement the recommendations of the First Consultation Meeting.

#### Venue of the Second Consultation Meeting

(x) The Government of Turkey offered to host the Second Consultation Meeting. This proposal was warmly appreciated by all participants.

#### Continuing role of the Bureau

(y) The Bureau of the First Consultation Meeting should meet as a preparatory committee for the Second Consultation Meeting in July 1979 and September 1980 (i) to review follow-up activities; and (ii) to advise on topics to be included on the agenda of the Second Consultation Meeting, respectively.

### Related international meetings

#### Second International Seminar on Petrochemical Industries, Baghdad, November 1979

(z) Participants should note that the delegation of Iraq announced that the Second International Seminar on Petrochemical Industries would be convened at Baghdad from 8 to 13 November 1979 in co-operation with IDCAS, UNIDO and GOIC. The aim of the Seminar would be to draw conclusions and recommendations to help developing countries develop their petrochemical industries. It would also provide a forum for the exchange of experts and technical know-how between countries that export and import technology.

#### Petrochemical Project Promotion Meeting

(aa) Participants should also note that UNIDO will convene an investment promotion meeting at Madrid in October 1979. In addition to the sponsors of petrochemical projects in the Andean Group countries, representatives of potential investors and international financing institutions will be invited to attend.

## I. ORGANIZATION OF THE MEETING

### Inauguration of the Meeting

3. The First Consultation Meeting on the Petrochemical Industry was inaugurated by His Excellency the President of Mexico, Lic. José López Portillo, on 12 March 1979.
4. The Meeting was addressed by the Executive Director of UNIDO, Dr. Abd-El Rahman Khane.
5. The Meeting was then addressed by César O. Baptista, Sub-director of Industrial Production, PEMEX.

### Election of the Chairman

6. José Luis García Luna (Mexico), Manager of Petrochemicals Development, PEMEX, was elected Chairman of the Meeting.

### Election of four Vice-Chairmen

7. The following were elected as Vice-Chairmen:

Shawkat AKRAWI (Iraq), Adviser to the Minister of Industry and Minerals  
Jürgen HEISS, Representative of the European Council of Chemical  
Manufacturers' Federations (CEFIC)  
A.I. JOUDAEV (Union of Soviet Socialist Republics), President of the  
Association of Petrochemical Plants of the Bashkirian Republic  
Abdou SIBY (Senegal), Directeur Technique de la Société Africaine de  
Raffinage

### Adoption of the Agenda

8. The Meeting adopted the following agenda:

1. Opening
2. Election of the Chairman and Vice-Chairmen
3. First World-wide Study on the Petrochemical Industry: 1975-2000, and a proposal to establish a working group on the world supply of and demand for petrochemicals
4. Consideration of the following issues:

The future world production of petrochemicals up to 2000, and the location of new production capacities to achieve the developing countries' share in accordance with the Lima Declaration and Plan of Action on Industrial Development and Co-operation.

Measures recommended to the parties involved in developed and developing countries in order to achieve the above through co-operation in the following areas:

A. Marketing

1. Access to existing markets

Measures to remove barriers to international trade such as (a) tariffs; (b) quantitative restrictions; (c) hidden barriers to trade; and (d) restrictive business practices.

2. Adjustments in production

Action to be taken in order to adjust the petrochemical sector to facilitate the development of the petrochemical industry in developing countries and the absorption of petrochemical products from developing countries.

3. Promotion and expansion of markets

Co-operation between countries to promote and expand the market for petrochemicals.

4. Joint ventures

The extension of co-operation in the field of marketing in the framework of joint venture arrangements based on fair and equitable terms.

B. Transfer of technology

The principles on which a model contract covering the licensing of process and know-how should be based, and guidelines for its preparation by UNIDO.

5. Adoption of the report of the Meeting.

Establishment of working groups

9. The Meeting decided to establish working groups in order to discuss and propose conclusions and recommendations for the consideration of the plenary session on:

The marketing of petrochemical products produced in developing countries

A model licensing contract for the petrochemical industry

The conclusions and recommendations of the first group are given in paragraph 2, (j) to (p), and of the second group in paragraphs 50-78.

Adoption of the report, and the closing session

10. The report of the Meeting, including the conclusions and recommendations of the Working Groups, was unanimously adopted in plenary on 16 March 1979.

Dr. Sergio Garcia Ramirez, Vice-Minister de la Secretaria de Patrimonio y Fomento Industrial addressed the closing session of the Meeting.

Documentation

11. Documents issued prior to the Meeting are listed in annex II.



## II. FIRST UNIDO WORLD-WIDE STUDY ON THE PETROCHEMICAL INDUSTRY: 1975-2000

12. The UNIDO secretariat introduced the First World-wide Study representing one of the first attempts to assess the world situation in the petrochemical industry. The Study showed that:

(a) The developing countries produced approximately 8 per cent of world petrochemical output in 1975 and that that share could be increased to between 18 and 35 per cent by 2000, depending on the hypotheses adopted;

(b) The demand for petrochemicals in developed countries with market economies had stagnated since 1974, leaving temporary excess capacity to supply petrochemicals;

(c) A major shift in the cost structure of producing petrochemicals had taken place since 1972 raising the proportion of total costs attributable to feedstocks in the cost of ethylene from 44 per cent in 1972 to approximately 80 per cent with current naphtha spot prices. Therefore the profitability of petrochemical production would in future depend more on the prices of feedstocks than on the scale of production;

(d) The resources required for the construction of petrochemical plants throughout the world during the period from 1980 to 2000 were from \$500 to \$700 billion;

(e) More intensive international co-operation would be needed to achieve the objectives and targets of the Lima Declaration and Plan of Action.

13. The Study suggested the following main instruments for international co-operation:

(a) The establishment of a working group to examine world supply of and demand for selected petrochemical products up to 10 years ahead. The working group might develop estimates as authoritative as those of the UNIDO/FAO/IBRD Working Group on Fertilizers, which had been carrying out similar work for the past seven years;

(b) An analysis of the objectives of different groups of countries to produce petrochemicals based on an analysis of projects being implemented and planned throughout the world;

(c) The elaboration of alternative scenarios for the future development of the industry on a world-wide scale.

14. The Study was commended as adopting an honest approach in tackling economic, social and political problems related to the world-wide development of the petrochemical industry. However, it was pointed out that without access to the underlying calculations it was not possible to assess the consistency of the Study with the statistics that were presented in the Appendix to the Study.

15. There was general agreement that the forecasts of demand for petrochemical products in developed countries with market economies were too high. The UNIDO estimates were prepared in mid 1977; since that time conditions had changed and other forecasters had revised downwards their projections of demand.

16. Several participants stressed the importance of considering the role that the cost and availability of feedstocks would play in the future development of the petrochemical industry throughout the world. For example, it was suggested that following recent sharp increases in the price of naphtha, the proportion of the cost of manufacture of the ethylene that could be attributed to the cost of feedstock was now probably approximately 80 per cent compared to approximately 40 per cent seven years ago.

17. The Study should have paid more attention to the possibility of using natural gas as a petrochemical feedstock. Also, alternative sources of feedstocks should be examined and reported to the Second Consultation Meeting.

18. It was pointed out that the energy used in making certain metals, paper and glass was greater than that used in producing petrochemicals that were frequently used as substitutes. It was therefore important that the effect of increases in the cost of energy on the cost of those products should be examined so that the future demand for petrochemical products could be accurately assessed. It was further suggested that since some natural materials were not available on easy terms to some developing countries, the use of petrochemical products as a substitute should be considered and developed.

19. During the discussion, the importance was stressed of the integration of petrochemical development in developing countries with engineering services and the production of equipment for petrochemical plants. The realization of that task would open the door for co-operation between developing countries and between developing and developed countries.

20. It was agreed that UNIDO should revise the Study on the Petrochemical Industry, taking into account the significant and rapid changes in the world situation and, in particular, those that had taken place in the six months up to March 1979. It was agreed that changes in the petrochemical industry were so rapid and so far-reaching that UNIDO would need to update its Study on a regular basis. In that context, the need to establish a working group on world supply of and demand for petrochemicals was emphasized.

### III. ESTABLISHMENT OF A WORKING GROUP ON WORLD SUPPLY OF AND DEMAND FOR PETROCHEMICALS

21. The Meeting considered the document (ID/WG.291/5) in which the UNIDO secretariat reported the recommendations of the Global Preparatory Meeting for Consultations on the Petrochemical Industry and provided further information relating to the proposal to establish a working group.
22. Bearing in mind the rapidly changing conditions in the petrochemical industry, it was agreed that the proposal to establish such a working group was useful and that the group should meet regularly to update the information collected and the forecasts made. The participants indicated their support for the working group because they felt that the results of its work would help them in planning the development of the petrochemical industry.
23. It was further noted that there had been a tendency to underestimate the demand for petrochemical products in certain developing countries with the result that when new capacities were established, they were insufficient to meet demand.
24. The UNIDO secretariat reported that it had invited the co-operation of CMEA, OECD, and OPEC in establishing and running the working group. It was hoped that the response of these organizations would be positive since member countries of each of the organizations present at the Meeting supported the proposal to establish the working group.
25. With regard to the 23 products that UNIDO had suggested be covered by the working group, it was suggested and agreed that toluene and acetylene should be added. The view was expressed that it was an enormous task to cover, at the same time, all of the 25 products suggested; a step-by-step approach, starting with the collecting of information on the basic petrochemical products, was therefore recommended. Another view was that if the working group was to produce a study on basic petrochemicals, it needed to consider the important intermediate and final products. It was agreed that the working group should make forecasts for the basic petrochemical products, as well as for intermediate and final products.
26. It was suggested that the terms of reference of the working group should make clear the need to prepare and regularly update estimates of capacities in operation, under construction, and planned.

27. The Meeting noted that the UNIDO secretariat had proposed (ID/WG.291/5) that the working group should elaborate forecasts of supply of and demand for selected petrochemical products for 10 years ahead on the basis of three different scenarios. It was pointed out that those scenarios could not be developed by the working group itself but would need to be developed by UNIDO with guidance from the working group.

28. It was agreed that the working group would need to meet twice yearly and that the first meeting should be held in September 1979. It was suggested that regional meetings should be convened prior to the first meeting of the working group so that information available from countries within the same region could be collected as an input for the deliberations of the working group. That proposal was widely supported.

#### IV. MEASURES TO FACILITATE THE MARKETING OF PETROCHEMICALS PRODUCED IN DEVELOPING COUNTRIES

29. The UNIDO secretariat introduced the document "Action in the field of marketing needed from Governments and industry in developed and developing countries in order to increase the share of developing countries in world petrochemical production" (ID/WG.291/6). That document was based on the recommendations of the report of the Global Preparatory Meeting (ID/WG.291/2) and the report of the Regional Meeting for the Arab States to Prepare for Consultations on the Petrochemical Industry (UNIDO/EX.59). It also drew on the recommendations of the First UNIDO World-wide Study on the Petrochemical Industry: 1975-2000 (UNIDO/ICIS.83 and Add.1).

30. To facilitate the marketing of petrochemicals produced in developing countries, the following measures could be taken:

(a) The establishment of a working group on the world supply of and demand for petrochemicals;

(b) Evaluation of the possible competitive advantage of oil-producing developing countries in establishing new petrochemical capacities, in particular, those based on the substantial quantities of associated gas that were currently flared;

(c) Joint ventures that would exploit associated gas available in developing countries for the production of petrochemical products;

(d) Support of Governments of developed countries for long-term supply contracts with producers of petrochemicals in developing countries;

(e) Support of Governments of developed countries to reduce and finally remove barriers to trade in petrochemicals;

(f) Stimulation of the production, by the Governments of developing countries, of basic, intermediate and final products, by, among other things, the reduction of barriers to trade, the promotion of complementary production between developing countries and the establishment of joint ventures for downstream industries;

(g) Long-term supply contracts and other arrangements made by the petrochemical industry itself for marketing petrochemicals produced in developing countries including technical assistance for the development of new end-uses.

31. It was stated that the future demand for petrochemicals was dependent on the prices of raw materials. Many of the oil-producing developing countries produced large quantities of associated gas; it was estimated that in the Middle East, 100 billion cubic metres of associated gas were flared each year, equivalent to approximately 2 million barrels of oil per day worth approximately \$10 billion. It was therefore suggested that UNIDO should make a detailed study of that subject in order to give a clear picture of the advantages of setting

up joint venture projects between the gas-producing developing countries and developed countries for petrochemical production. Such joint venture projects located in developing countries would have the following advantages:

- (a) A secured supply of raw materials at reasonable prices;
- (b) Less complicated and more economical projects because of the availability of ethane as a raw material for producing ethylene;
- (c) A means to avoid environmental pollution and siting problems in developed countries;
- (d) A supply of petrochemicals at lower prices, which would accelerate the shut-down of plants in developed countries with marginal efficiency.

32. Another participant indicated that the Meeting should face up to the reality of the restructuring of the petrochemical industry on a world scale that was bound to take place. If that restructuring was to be beneficial to all parties concerned, it must be planned. It could be planned because Governments, even in countries with market or mixed economies, did have ways to influence events. It would therefore be both useful and appropriate if UNIDO were to prepare the study mentioned above.

33. Participants recognized that developing countries required assistance with the marketing of petrochemical products and in particular with the development of applications in the agricultural, housing and other sectors of the economy. It was pointed out that marketing problems were different for (a) bulk petrochemicals; and (b) speciality performance petrochemicals. For bulk petrochemicals, an approach could be to own the production facilities and to take full responsibility for marketing the product whereas for speciality performance petrochemicals, help from an experienced producer was required. Such help cost between 8 and 12 per cent of the sales value of the petrochemicals and sometimes took a form that did not allow the developing country to develop its own expertise in marketing; therefore, the view was expressed that such assistance should be provided on fair and equitable terms that would allow the developing country to develop its own marketing expertise within a period of five years.

34. The question was addressed to developing countries that had a market for petrochemicals but not oil or gas resources whether they would be interested in establishing joint ventures to transform basic and intermediate chemicals imported from an oil-producing country into final products for the local market. Such co-operation could be a useful way to expand the market for petrochemicals produced in developing countries.

35. Another participant stressed that the petrochemical industry served the poor and middle-income groups in developing countries rather than the rich who tended to prefer natural to synthetic materials. He further indicated that if the petrochemical industry was to contribute effectively to achieving the Lima target for the developing countries to produce 25 per cent of world industrial output by 2000, such countries must start as soon as possible to develop that industry. Its development required money, marketing, materials and management; the most important of those was management, which had to be learnt by practice. In his view, know-how was less important because that was readily available for sale. Developing countries should start with transforming industries in order to develop the management that they would need later on to undertake backward integration involving the manufacture of basic and intermediate petrochemical products.

36. Another participant with experience of a joint venture indicated that co-operation in such ventures could become one-sided when the foreign partner derived the most benefit. He therefore recommended that UNIDO study joint ventures in the petrochemical industry with a view to drawing conclusions from the experience of developing countries that could be applied globally.

37. The attention of participants was drawn to the contribution that co-operation between developing countries could make to the expansion of markets for petrochemicals. Such co-operation should be based on the common interest of the parties involved and take into account the different nature of basic, intermediate and end-products. Buy-back agreements and other forms of arrangement were recommended to implement such co-operation. Another participant indicated that co-operation between developing countries could extend to making use of the know-how that the more advanced developing countries had accumulated in developing their petrochemical industry. Those two proposals were widely supported.

38. The position of private industry in countries with a market economy was explained. It was indicated that the role of Governments was restricted to providing a framework within which such industry operated. Such instruments as rules of competition and legislation on trusts and monopolies were used; in addition, Governments performed a steering function as regards the economy and money supply. Governments could not force private industry to invest abroad or to transfer their technology; nor could Governments force a relocation

of such industry. Furthermore, it would not be possible for one of the countries to give up a share of its market to a producer in a developing country because such action would require a co-ordination of interests that would violate antitrust or monopoly legislation.

39. There were two ways open to producers in developing countries to market petrochemicals in OECD countries, which were:

(a) To market the product themselves, abiding by the rules of competition, including that of no dumping;

(b) To find a partner from the recipient country who would undertake the marketing.

There was no reason why the petrochemical industry in such countries should not be willing to help build up the petrochemical industry in developing countries on a sound economic basis. Such co-operation would be encouraged if the partner from the developed country was able to obtain (a) a secure supply of raw materials at reasonable prices; (b) a reasonable fiscal regime; and (c) the freedom to remit dividends from the profits that the venture earned. Naturally, apart from its legitimate concern for profitability, the petrochemical industry of the market economy countries was aware that it could contribute to the development of the petrochemical industry in the developing countries. To that end, it was ready to offer any form of economic and technical co-operation, including pre-investment studies, the training of qualified personnel, and the development of specially adapted products.

40. Recent years had witnessed substantial changes in the petrochemical industry all over the world. An increasing number of countries possessing abundant hydrocarbon resources had become involved in the international division of labour in that sector. The production of a wide range of petrochemicals had been progressively developed in those countries and part of that production had been delivered to the developed countries that lacked sufficient hydrocarbon resources. Imports into those countries of both petrochemical feedstocks and downstream products had made it possible to reduce the costs of production of petrochemicals and increase the competitiveness of finished products. In that sense, the supplies of feedstocks and downstream products from those countries had improved the international division of labour and benefited the consumers of developed countries.

41. Another view was that in the development of the petrochemical industry there generally were two main factors to be considered: the marketing concept, which required consumers with a certain level of purchasing power, and the interests of those developing countries that did not have domestic resources of



oil and gas. To commence industrial activities with making end-products would be particularly suited to such countries because that would be a labour-intensive operation, it did not require substantial investment and the plant could economically be of a smaller size than a petrochemical plant. At a later stage backward integration could take place.

42. The Meeting agreed that a working group on the marketing of petrochemicals produced in developing countries should be established to further consider that issue and to prepare draft conclusions and recommendations for consideration at the plenary session (paragraph 2, (j) to (p)). It was further agreed that the list of measures prepared by the UNIDO secretariat would be a useful starting point for the working group's deliberations (ID/WG.291/6, pp. 6-8).

V. PREPARATION OF A MODEL CONTRACT FOR THE LICENSING OF PATENTS  
AND KNOW-HOW IN THE PETROCHEMICAL INDUSTRY

Essential principles of the model form of contract

43. The UNIDO secretariat introduced the document "The preparation of a model form of contract covering the licensing of patents and know-how in the petrochemical industry" (ID/WG.291/4). That document was based on the recommendation of the report of the Global Preparatory Meeting and listed the essential principles which that Meeting had enumerated as a basis for preparing a model form of contract.

44. Based on those recommendations, the UNIDO document identified the following essential elements of a model contract that required discussion:

- (a) Definition of the know-how package and access to process improvements;
- (b) Obligations of the licensee;
- (c) Performance guarantees and tests;
- (d) Mechanical warranties;
- (e) Obligation of the licensor/contractor to "make good" in-plant deficiencies;
- (f) Insurance for design defects;
- (g) Arrangements for payment of licensing fees;
- (h) Manpower development;
- (i) Access to export markets;
- (j) Settlement of disputes and arbitration.

The list was not exhaustive and it was hoped that participants would add other clauses to which they attached great importance. In particular, it was pointed out that it would be necessary for the UNIDO model form of contract to cover all the points that the developing countries felt were important. For example, one point not covered in the UNIDO list was the mechanisms required for obtaining as much equipment as possible from local suppliers in developing countries. Another suggestion was made concerning the usefulness of preparing a code of good practice in the licensing field.

45. The UNIDO secretariat pointed out that a simple licensing agreement might not be able to provide the guarantees of performance and "make-good" clauses that the developing countries at the Global Preparatory Meeting desired to be included in the model form of contract. For that reason, the UNIDO document listed three other types of contract that were similar to those being prepared

for the construction of a fertilizer plant. The view was expressed that even with those four variations, the types of contract that the developing countries wanted to use might not all be covered.

46. Attention was drawn to Guidelines for Licensing Agreements prepared by WIPO, a Code of Conduct on the Transfer of Technology prepared by UNCTAD, and Rules of Arbitration prepared by UNCITRAL, and to the need to co-operate closely with those and other appropriate organizations.

47. The Meeting took note of the activities of UNCTAD in the transfer of technology. The UNIDO secretariat and the representative of the UNCTAD secretariat confirmed that the secretariats were co-operating so as to make their work complementary and not a duplication. The UNIDO secretariat stressed that by considering contracts applicable in a single sector of industry, a practical form of contract that could readily be put to use was being developed.

#### Establishment of a working group on a model form of contract

48. The Meeting decided to establish a working group to prepare conclusions and recommendations for review by the plenary session. The Working Group on a Model Licensing Contract for the Petrochemical Industry was given the following terms of reference:

(a) To consider the essential principles on which a model contract covering the licensing of patents and know-how should be based;

(b) To further define those principles and establish guidelines for the preparation of such a model contract;

(c) To suggest how UNIDO might prepare such a model contract in time to present it to the Second Consultation Meeting in 1981.

Furthermore, the Working Group was asked to elect its own chairman and co-chairman.

#### Organization of the Working Group

49. The Working Group convened on 14 and 15 March 1979 to prepare guidelines for the drafting of a model form of contract covering the licensing of know-how and patents in the petrochemical industry.

50. It elected Lothar P. Helmet and S.S. Saohdeva as Chairman and Co-Chairman.

#### The type of model contract to be prepared

51. The desirability of UNIDO preparing such a model contract was agreed but it was emphasized that it would be a difficult task.

52. It was felt that one model contract could apply to the process used to manufacture all types of petrochemicals; however, in order to make the model contract as specific as possible, it was recommended that the technical annexures for the model contract should be prepared in relation to two or more specific products.

53. It was also agreed that UNIDO should prepare guidelines for the use of the model contract since the main purpose of the exercise was to assist less experienced licensees in developing countries.

54. It was pointed out that in addition to assistance in negotiating licensing agreements, developing countries needed guidance on the selection of sources of technology. The Working Group therefore recommended that UNIDO prepare a manual on alternative sources of petrochemical technology.

55. It was recognized that in addition to the licensing and basic engineering contract, a detailed engineering and construction contract had to be prepared. It was noted that the UNIDO secretariat was preparing model forms of contract for the construction of a fertilizer plant and it was suggested that UNIDO examine how those could be adapted for use in the petrochemical industry.

Guidelines to be followed by UNIDO when preparing the model contract

56. The following guidelines were suggested for the more important areas to be covered by the model contract.

The process know-how package and access to process improvements

57. The principles agreed on were:

(a) The extent and nature of the information supplied must include patented information, where appropriate, together with proprietary and other critical information on know-how;

(b) The information provided must be the latest known to the licensor on the process covered by the contract up to the termination date of the contract;

(c) Information on improvements and modifications related to the processes as defined in the agreement would be given on a reciprocal basis between licensor and licensee during the life of the agreement;

(d) If required, other forms of industrial property, such as trade-marks, might be included in the package and negotiated through separate document(s) that called for separate payment(s);

(e) Any legal or contractual constraints contingent on the right to use patents or the sale of know-how should be made clear between the contracting parties;

(f) The licensing agreement might provide for assistance by the licensor in market development and technical services required for selling the product.

58. Regarding point (f), the view was expressed that it might be possible for the licensee to purchase products from the licensor to build up the local market before commencement of production. The licensee might use the facilities of the product development laboratories of the licensor for developing the specific uses of the product in the country of the licensee. The assistance of the licensor might also be obtained in setting up the product technical services ahead of the production from the proposed plant.

59. Other services such as assistance in training, maintenance and management might be discussed between the parties and be the subject of separate agreements and additional payments.

#### Obligations of the licensee

60. It was agreed that the following main obligations of the licensee would be included in the model contract:

(a) To abide by the provisions related to confidentiality and secrecy for an agreed period normally not exceeding 10 years;

(b) To operate the plant in accordance with basic process requirements and within process specifications and to maintain complete operating records, if appropriate to the provisions of the licensing agreement;

(c) To allow inspection of the process plant by the licensor during construction and operation at times and for limited periods as agreed upon between the two parties.

#### Performance guarantees

61. It was agreed that the model contract should define very clearly the division of responsibilities between the licensor and the contractor of the plant as regards the performance of the plant, to ensure that there was no dilution of their obligations. It was left to the UNIDO secretariat to work out precisely how that might be achieved.

62. It was recognized that in a normal licensing agreement, the licensor would be responsible for basic engineering whereas the contractor would take responsibility for the detailed engineering.

63. It was further recognized that the licensor would be able to give more substantial guarantees if he had the right to check the detailed engineering.

64. It was agreed that the model contract should include guarantees with maximum possible liability to cover:

(a) The capacity of the plant;

- (b) The quality of the product(s) and its(their) processability to service certain applications;
- (c) The consumption of the main raw materials and utilities;
- (d) The quality of emissions and effluents;
- (e) The catalyst performance and life.

Guarantee test procedures

65. The following principles were agreed upon:

- (a) A guarantee test should be conducted only after a reasonable period of steady, sustained and continuous operation of the plant that demonstrated its stability;
- (b) A specific period of days could not be detailed in the model contract because that period would differ from one process to another;
- (c) Test runs should be conducted for a longer period than was current practice;
- (d) The duration of the test run should be provided for in the contract;
- (e) The contract should clearly state the obligations of both licensee and licensor with regard to test run procedures. A separate annex to the contract should provide the technical details of such procedures.

Obligations of the licensor to "make good" deficiencies in the plant

66. The principal guarantees of plant performance for the licensee would be incorporated in the provisions of the contract covering performance guarantees. However, it was suggested that the "make good" clause should oblige a licensor to remedy appropriate defects or deficiencies in the plant arising pursuant to his obligations at his own expense, and that such expenses should not be subject to the ceiling normally established for the licensor's overall liability under the terms of the contract.<sup>6/</sup>

Insurance for design defects

67. It was noted that most licensors carried insurance coverage on their corporate liabilities under their respective licensing agreements made on a world-wide basis. It was recognized that that could provide the licensees with the right to more payments on the licensor's liability for deficiencies than might otherwise be obtained if specific insurance cover was to be taken out on a case-by-case basis.

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<sup>6/</sup> Several participants felt that that condition in particular would not prove acceptable to licensors.

68. UNIDO should investigate the basis of such coverage and also current industry practices as regards other types of insurance that licensors could obtain.

69. If material of construction was exposed in the process to severe conditions (i.e. corrosion and extremes of temperature or pressure) the licensor should generally be responsible for the specifications of such material within the frame of his overall responsibility.

Arrangements for payment of licensing fees

70. The Working Group recognized that arrangements for payment of licensing fees was a complicated issue and it was recommended that the UNIDO secretariat study the subject in depth with a view to making appropriate recommendations in the model contract and in the accompanying guidelines for its use.

Performance bonds

71. It was recommended that the model contract should make provisions for the taking out of performance bonds in order to provide the licensee with greater protection concerning the licensor's performance of his obligations under the contract.

Manpower development

72. The following principles were agreed upon:

- (a) Both the licensor and licensee had a strong mutual interest in the adequate training of the licensee's personnel;
- (b) The model contract should provide for a complete transfer of technological capability as opposed to a simple arms' length transfer of technology;
- (c) Engineers of the buying country should be involved in the design and basic engineering of petrochemical plants;
- (d) Training should be provided by the licensor for the required number of the licensee's operating personnel needed for efficient and safe operation of the plant, maintenance of health and safety standards; creation of suitable working and service conditions; and measures against pollution of the environment should also be emphasized;
- (e) The licensee would pay the full cost of the services of the licensor's personnel used for the start up and initial period of operation of the plant;
- (f) All additional arrangements for training of the licensee's staff should be the subject of a separate annex.

Access to export markets

73. The model contract should provide for licensees in developing countries to obtain access to international markets without undue restrictions.
74. In that connection it was felt that any limitations on exports imposed by licensors would have to be considered in the context of the legal provisions affecting both the licensee and licensor.

Settlements of disputes and arbitration

75. Participants from developing countries reported that they had found existing procedures and facilities for international arbitration inadequate for their needs. It was therefore suggested that new rules and procedures of arbitration should be drafted by the UNIDO secretariat and that consideration should be given to the possibility of establishing a new forum of arbitration for industrial contracts. It was recognized that the clauses of the model contract relating to that matter could only be completed when some progress had been made on the above work.

Most favoured licensee

76. The license agreements provided a most favoured licensee clause with only prospective effect. UNIDO might examine the method of the effective operation of such clauses by keeping a record of contracts entered into by different countries for the petrochemical products.

Patent infringement

77. The model contract should provide for adequate coverage regarding infringement of the patents. It was desirable that the licensee was held harmless against patent infringement.<sup>1/</sup>

Right to expand or improve capacity of the plant

78. The following principles were agreed on:
- (a) The licensee would have the option to expand the capacity of his production facilities on more favourable terms than provided in the initial license;
  - (b) Additional royalties would not be charged if the licensee achieved rates of operation higher than name-plate capacity.

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<sup>1/</sup>Account could be taken of two different types of patent infringement:  
(a) on patented processes; and (b) on non-patented processes.



Annex I

LIST OF PARTICIPANTS

Algeria

Abdenour Ait Ouyahia, Petrochemical Manager  
SONATRACH

Tarik Ouali, Head, Technical Department  
SONATRACH

Ali Ouartsy, Directeur  
M.E.I.P.

Argentina

Gerardo Francisco Covello Marquez, Ministro Consejero  
Económico y Comercial

Carlos Rubén Rodríguez, Gerente  
Producción Petroquímica Bahía Blanca

Australia

Sergio Sergi, First Secretary  
Australian Embassy  
Mexico

Austria

Klaus-Joerg Manning  
Voest-Alpine, A.G.

Werner Stenzel, Cultural Attaché  
Austrian Embassy  
Mexico

Bangladesh

M. Tofail Ahmed, Director  
Bangladesh Chemical Industries Corporation

Aminul Huq, Chief  
Chemical Industries Section, Planning Commission

Serajul Majid Mamoon, Manager, Special Projects  
Petrobangla

Belgium

Françoise de Lacroix, Attaché Economique  
Ambassade de Belgique.  
Mexico

Ronald de Langhe, First Secretary  
Ambassade de Belgique  
Mexico

Brazil

José J. Bezerra Neto, Director  
PETROQUISA

Colombia

Ma. Elena J. de Grovc  
Embajadora de Colombia en México

Alirio G. Tavera, Agregado Militar, Naval y Aéreo

Costa Rica

Joseph Henry Wood, Segundo Secretario y Agregado Comercial  
Embajada de Costa Rica en México

Cuba

Oraldo Morales Ceballos, Jefe Departamento de Ingeniería  
Comité Estatal de Colaboración Económica

Denmark

Holger Larsen, Manager  
Danish Semi-skilled Workers' Federation

Torbjorn Rasmussen, Commercial Secretary  
Royal Embassy of Denmark  
Mexico

Egypt

Soliman El Gohary, Commercial Counsellor  
Embassy of Egypt  
Mexico

Mustafa El Rifal, Director of Refining and Petrochemicals  
Suez Oil Processing

Finland

Mikko Tanner, Vice-president  
National Oil Company NESTE

Tapani Pihlaja, Secretario Comercial  
Embajada de Finlandia en México

France

Annie Cordet  
SEMA

François Chappuis  
Ministère de l'Industrie

Claude Martin, Directeur General  
Union des industries chimiques

Germany, Federal Republic of

Lothar P. Helmet, General Sales Manager  
UHDE GMBH

Wolfgang J.T. Munde, Managing Director  
Association of Chemical Industries

Helmut Sohuster, Assistant Managing Director  
Association of the Chemical Industry

Robert Wandel, Counsellor to the Minister  
Federal Ministry of Economics

Greece

El-Emmanuel Kefalopoulos, Second Secretary  
Embassy of Greece  
Mexico

Hungary

Sandor Szabo, First Commercial Secretary  
Embassy of Hungary  
Mexico

India

Raja Kulkarni, President  
National Federation of Petroleum Workers

Surjit Sachdeva, Adviser  
Ministry of Petroleum and Chemicals

Srinivasan Varadarajan, Chairman  
Indian Petrochemicals Corporation Ltd

Indonesia

Soenaryo Danusaputro, Sub-Directorate of Organic Industries  
Ministry of Industry

Pudjadi Soekarno, Petrochemical Development  
PERTAMINA

Iraq

Shawkat A. Akrawi, Adviser  
Ministry of Industry and Minerals

Mohammed M. Awad, Director General  
Ministry of Planning

Hussain Ali G. Aziz, Assistant Director General  
State Petrochemical Establishment

Hussain El-Ghatta, Laboratories Manager  
State Petrochemical Establishment

Sabah M.A. Omar, Assistant Director of Operations  
State Petrochemical Establishment

Taima Sahah, Director General  
State Petrochemical Establishment

Abdul W. Shekhly Ambassador of Iraq to Mexico

Israel

Yosef Shiloaj, Consejero Económico  
Embajada de Israel en México

Menachem Steinberg, Director  
Institute of Chemistry, Hebrew University of Jerusalem

Italy

Fulvio de Marco  
Ente Nazionale Idrocarburi

Luigi A. Solari, Consejero Comercial  
Embajada de Italia en México

Japan

Ryota Hamamoto, Section Manager, Foreign Relations Department  
Sumitomo Chemical Co. Ltd.

Satoshi Ida  
Ministry of International Trade and Industry

Shohachi Miyamoto, Primer Secretario  
Embajada de Japón en México

Nobuhiko Ozaki, Deputy General Manager, Overseas Department  
Mitsubishi Petrochemical Co., Ltd.

Kuwait

Sayed Behbehani Ameer, Deputy Managing Director  
Petrochemical Industries

Ahmed M. Ghoniem, Planning and Development Manager  
Petrochemical Industries Company

Libyan Arab Jamahiriya

Abdulrazzak A. Breish, Ammonia Marketing Manager  
Brega Petroleum Marketing Co.

Mustafa S. El Houni, Economic Advisor  
National Oil Corporation

Naima Hassan-Bey, Chemical Engineer  
National Oil Corporation

Malaysia

Abdul K. Abdul Azis, Petroleum Development Unit  
Prime Minister's Department

Abdul Aziz Ahmad, Executive Director  
PETRONAS

Mohd S. Omar, Head of Department  
PETRONAS

Tet S. Liew, Engineer  
Federal Industrial Development Authority (FIDA)

Keok Yin Tan, Deputy Director, Project Processing Division  
Federal Industrial Development Authority (FIDA)

Mexico

César O. Baptista Montes, Subdirector de Producción Industrial  
Petróleos Mexicanos  
Presidente de la Delegación

Ramón Gonzalez Jameson, Director General de Coinversiones  
Asuntos Internacionales  
Secretaría de Patrimonio y Fomento Industrial

Agustín García López Santaolalla, Embajador Extraordinario  
y Plenipotenciario  
Representante Permanente de México en Austria

Agustín Straffon, Director General  
Instituto Mexicano del Petróleo

Rafael Decelis, Director General de Asuntos **Técnicos**  
Secretaría de Relaciones Exteriores

Hector Lara Sosa, Asesor del Secretario  
Secretaría de Patrimonio y Fomento Industrial

Antonio Juarez Alvarado, Secretario **Técnico**  
Comisión Petroquímica Mexicana

Fernando Manzanilla, Subdirector General  
Instituto Mexicano del Petróleo

José Luis Garcia Luna, Gerente de Planeación Petroquímica  
Petróleos Mexicanos

Roberto Gamboa Masoarena, Subdirector General de Coinversión y  
Asuntos Internacionales  
Secretaría de Patrimonio y Fomento Industrial

Dante Velasco Leone  
Instituto Mexicano del Petróleo

Victor L. Duran Mendez, Subdirector de **Evaluación**  
Dirección General de Inversiones Extranjeras y  
Transferencia de Tecnología

#### Netherlands

Haas Beyer, Head, Chemistry Department  
Ministry of Economic Affairs

Arnold J. Brouwer  
Ministry of Foreign Affairs

Ivan Charles De Jongh, Head of Delegation

Pieter Scheele  
Industrial Union N.V.V.  
Representative of the **Employee's Organizations**

Jan Van Steenis  
Association of Dutch Chemical Industry

#### Nigeria

Ejike I. Onyia, Deputy **Manager** and Head **Projects Department**  
Nigerian National Petroleum Corporation

#### Norway

Arne Aasheim, Secretary  
Royal Norwegian **Embassy** in Mexico

Peru

Felix Amemiya Hosh, Ingeniero de Proyectos, División Petroquímica  
INDUPERU

Adalberto Vargas Escate, Director de Asesoría y Cooperación Técnica  
Ministerio de Industria

Poland

Janusz Balewski, Commercial Counsellor  
Polish Embassy in Mexico

Aleksander Puchowicz, Deputy of the Head Process Engineer  
Refinery and Petrochemical Works

Portugal

Joao A. Bartolo, General Manager  
Companhia Nacional de Petroquímica

Carlos A. López-Vaz, General Manager  
PETROGAL

Carlos M. Macedo, Director General de Industrias Químicas  
Ministerio de Industria

Qatar

Fouad S. Al-Mahmoud, Head, Engineering  
Qatar General Petroleum Corporation

Taher Hadidi, Managing Director  
Qatar General Petroleum Corporation

Fahd Shurayh, Head of Research Section  
Qatar General Petroleum Corporation

Romania

Constantin Carloganu, Directeur technique  
Institut des projets technologiques pour  
l'industrie chimique

Vasile Ciuca, Segundo Secretario de la  
Embajada de Rumania en México

Saudi Arabia

Mashhor M. Abdulaziz, Economic Researcher  
Royal Commission for Jubail and Yanbu

Abdullah Nojaidi, **Manager, Marketing Division**  
Saudi Basic Industries Corporation

Nasser A. Sayyari, **Manager**  
Downstream and Support Industries (**SABIC**)

Senegal

Mody Diouf, **Adjoint au Directeur des Mines et Géologie**  
Ministère du Développement Industriel

Abdou Siby, **Directeur Technique**  
Société Africaine de Raffinage à Dakar

Spain

Eloy E. Cercas, **Director de Organismos Técnicos y Comunicaciones**  
Ministerio de Asuntos Exteriores

Gonzalo Fernández Martín, **Dirección General de Industrias Químicas**  
Ministerio de Industria

Francoiso Monforte, **Subdirector General Organismos Internacionales**  
Ministerio de Asuntos Exteriores

Manuel Sarmiento Garcia, **Jefe División Técnica**  
INITEC

Sudan

Daw Mahdi, **Adviser**  
Ministry of Industry on Petrochemicals and Fertilizers

Sweden

Sven Backlund, **Second Secretary**  
Swedish Embassy

Goran Gustavsson, **Head of Section**  
Ministry of Industry

Switzerland

Jean Mermod  
Embassy of Switzerland in Mexico

Thailand

Boworn Samrithikul, **First Secretary**  
Embassy of Thailand in Mexico



Trinidad and Tobago

Chiang K. Awong, Chief Technologist  
Trinidad and Tobago Oil Co.

George H. Legall, Permanent Secretary  
Ministry of Petroleum and Mines

Frank C. Sealy, Foreign Service Officer  
Ministry of Petroleum and Mines

Hayden C. Toney, Senior Economist  
Ministry of Petroleum and Mines

Tunisia

Moncef Ben Abdallah, Directeur Général Adjoint  
National Oil Industry Company

Turkey

Ayse Ceyhan, Expert  
State Planning Organization of Turkey

Hikmet Gursev, Manager, Project and Implementation Department  
Turkish Petrochemical Company

Union of Soviet Socialist Republics

Gerus Vladislav, Head of Section  
Ministry for Foreign Trade

Alexander Yudaev, Chief, Department of Petrochemical Industry

Evgeni Korevich, Chief Engineer  
Committee for External Economic Relations

United Kingdom of Great Britain and Northern Ireland

Robin P. Hope, Assistant Secretary, Chemicals and Textiles Division  
Department of Industry

United States of America

George T. Dempsey, Alternative Permanent Representative  
Permanent Mission of the United States of America  
to UNIDO in Austria

Richard G. Dodge, Manager, International Marketing Research  
Shell Chemical Company

James E. Gentel, Manager, Government Regulations  
Dow Chemical Company

Ralph W. Kienker, Director, Energy Affairs  
Monsanto Company

Juan B. Tampier, Director, Latin America  
SRI International

Venezuela

Sergio W. Saez, Gerente Relaciones Internacionales  
Petroquímica de Venezuela S.A.

Viet Nam

Tham Le, Ambassador  
Embassy of the Socialist Republic of Viet Nam  
in Mexico

Xuan V. Nguyen, Private Secretary of the Ambassador  
Permanent Mission of Viet Nam in Mexico

Yugoslavia

Vladimir Kerecki, First Secretary  
Permanent Mission of Yugoslavia in Mexico

Lazak Materic, Manager  
SODASO Institute

Velimir Rajkovic, General Director  
PETROKEM

Zaire

Lutula Kitenge, Administrateur Directeur  
Enterprise Pétrolière du Zaire (PETROZAIRE)

United Nations Secretariat

Economic Commission for Latin America (ECLA)

C.R. Guha, Asesor Regional

United Nations Conference on Trade and Development (UNCTAD)

M. Chon, Manufactures Division

United Nations Environment Programme

Francoisco Szekely, Adviser on Environment

United Nations bodies

United Nations Development Programme (UNDP)

Danilo Jiménez, Resident Representative in Mexico

Tulio de Andrea, Senior Industrial Development Field Adviser

Intergovernmental organizations

European Economic Community (Commission)

R. Wyatt, Administrateur, Direction générale des relations extérieures

Gulf Organization for Industrial Consulting (GOIC)

Ali A. Alkhalaf, Secretary General

Ahmed B. Alnaib, Assistant Secretary General

Mohammed Y. Shana'a, Director, Sectoral Development Department

Industrial Development Centre for Arab States (IDCAS)

Abdul K. Hilmi, Adviser to the Secretary General of the Arab League

Organization of Arab Petroleum Exporting Countries (OAPEC)

Mostafa A. Borham, Manager of Projects Department

Tayeb Ounada, Senior Chemical Engineer, Department of the Petroleum Industries

Organization of the Petroleum Exporting Countries (OPEC)

Omar Shinshin, Head, Downstream Operations

Bismarok W. Andrade, Refining/Processing Engineer

Non-governmental organizations

Conseil Europeen des Federations de l'Industrie Chimique (CEFIC)

Jurgen H. Heiss, Counsellor

World Federation of Trade Unions (WFTU)

Pal Forgacs, General Secretary

World Confederation of Labour (WCL)

Alfredo Dominguez Araujo, Secretario General del Frente auténtico del trabajo

Salvador Garcia Cano, Secretario General del sindicato nacional del hierro y del acero

Annex II

LIST OF DOCUMENTS

Information documents

Provisional agenda ID/WG.291/1  
Advance information for participants ID/WG.291/3

Document which defines the issues to be discussed

Report of the Global Preparatory Meeting to Prepare for  
Consultations on the Petrochemical Industry ID/WG.291/2

Notes to assist discussion by the Consultation Meeting

The preparation of a model form of contract covering the  
licensing of patents and know how in the petrochemical  
industry - Note by the UNIDO secretariat ID/WG.291/4

The establishment of a working group on the world supply  
and demand of petrochemicals - Note by the UNIDO secretariat ID/WG.291/5

Action needed from governments and industry in developed  
and developing countries in order to increase the share  
of developing countries in world petrochemical production -  
Note by the UNIDO secretariat ID/WG.291/6

Background documents

First World-wide Study of the Petrochemical Industry:  
1975-2000 (prepared by the International Centre for  
Industrial Studies) UNIDO/ICIS.83  
Appendices (statistical etc.) UNIDO/ICIS.83/Add.1

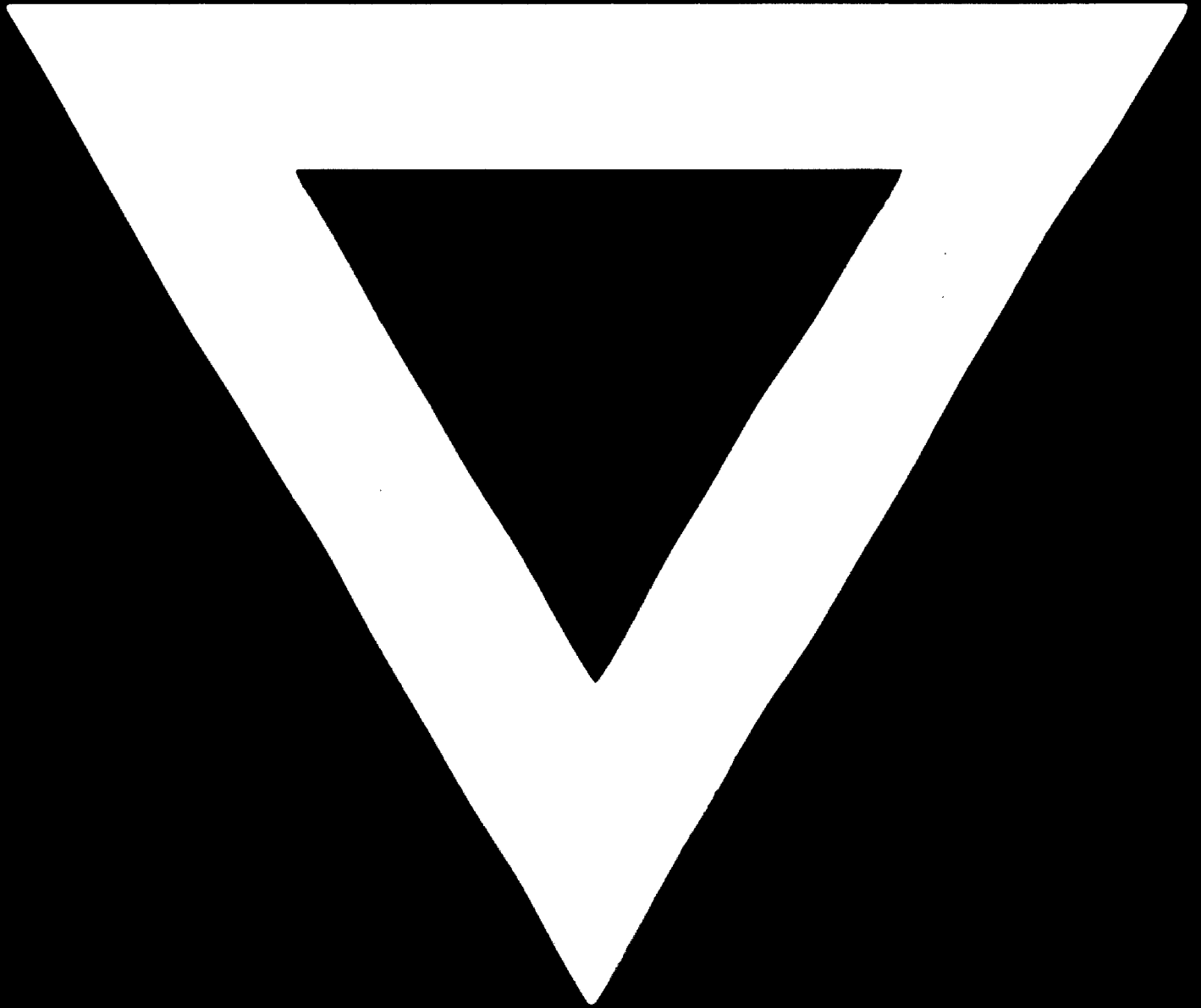
Preliminary draft of the UNIDO model form of cost  
reimbursable contract for the construction of a  
fertilizer plant ID/WG.281/12

Technical annexures to the UNIDO model form of  
cost reimbursable contract ID/WG.281/12/Add.1

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**G - 86**



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