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Supply of Petrochemicals

Vienna International Centre, 24-28 March, 1980

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THE APPROACH TO BE ADOPTED IN PREPARING
ESTIMATES OF WORLD DEMAND FOR AND SUPPLY OF
25 PETROCHEMICAL PRODUCTS*

Suggestions by the UNIDO Secretariat

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INTRODUCTION

1. The Working Group is being convened by UNIDO as recommended by the First Consultation on the Petrochemical Industry held in Mexico City, 12-16 March 1979. (See Report of the Consultation ID/221).

2. The Consultation had the opportunity to consider the UNIDO World-Wide Study of the Petrochemical Industry, 1975-2000 that included forecasts of demand for 28 petrochemical products up to the year 2000 at the regional and global levels. It felt that UNIDO should revise the Study to take into account changes in the world situation in the industry. In that context, the need to establish a Working Group on world supply of and demand for petrochemicals was emphasized.

3. The terms of reference of the Working Group proposed by the Consultation are given in Annex A. They suggest that the world demand for and supply of petrochemicals should be prepared for 25 products ^{1/}.

4. The purpose of this document is to suggest how these terms of reference should be implemented by the Working Group. In particular, the first meeting of the Working Group should agree on:

- (a) The list of countries included in each region and who should be responsible for preparing the estimates in each region;
- (b) The petrochemical products on which regional and world estimates can be prepared by March 1981 for presentation to the Second Consultation;
- (c) Uniform definitions of and approaches to be used when estimating "demand", "capacity", "capability to supply" and "production";
- (d) The scope and timetable of the future work required.

^{1/} Five of the 28 products covered by the UNIDO World-Wide Study, were not included: Adipic Acid, Alkyl benzenes, Detergent Range Alcohols, Hexamethylene Diamine, Polybutadiene. Ammonia and Acetylene were added by the Consultation.

1. DEFINITION OF REGIONS AND SOURCES OF INFORMATION THE WORKING GROUP MIGHT USE

Definition of 12 Regions

5. It is suggested that the Working Group's estimates should be prepared as totals for different regions so that the information can be collected by different parties and can be discussed with a minimum loss of confidentiality.

6. The UNIDO World-Wide Study classified all countries of the world into regions. In a paper prepared for the First Consultation^{1/} UNIDO suggested a breakdown into regions as follows:

<u>Industrialized Countries</u>	<u>Developing Countries</u>
Western Europe	Latin America
USSR	Africa - Arab States
Eastern Europe	Africa - Other States
North America	Asia - Arab States
Japan	Asia - Other States
Other States	China

7. Annex C shows in which region, each country would be included. Since little consideration was given to this matter at the First Consultation, the Working Group is invited to agree to or amend the classification suggested above.

8. The Working Group is also invited to consider whether in addition to the above presentation it would be useful to present information on:

- (a) Other grouping such as OPEC, OECD, CMEA, EEC, ASEAN, ANDEAN Group;
- (b) Information on individual countries whose demand or supply is of particular importance (as was recommended by the Consultation).

^{1/} The paper was prepared at the suggestion of the Global Preparatory Meeting for the Consultation, Vienna, November 1978.

Sources of Information the Working Group might use

9. When considering the division of the world into regions for estimating purposes, the Working Group is invited to take into consideration:

- (a) The availability of information that is prepared for groups of countries at present;
- (b) The need to decentralize responsibility of preparing estimates for a group of countries to an organization or individual who will become a permanent member of the Working Group.

10. A list of organizations and individuals invited to the First Meeting of the Working Group is provided in Annex B.

11. UNIDO has invited to participate in the Working Group organizations that already prepare some of the required information for the proposed Regional groups of countries. UNIDO expects these organizations to be willing to prepare estimates for their respective Region or Group of countries on behalf of the Working Group. UNIDO would then concentrate on filling the gaps, in co-operation with the remaining countries. The Working Group's main task would then be to review the estimates prepared for the 12 Regions and check their overall consistency.

12. Organizations which collect information on a global basis for particular products will also be invited to become members of the Working Group and to prepare estimates in accordance with the definition of Regional groups adopted by the Working Group. Organizations dealing with synthetic rubbers and synthetic fibres have been invited to participate at the first meeting.

II. THE PETROCHEMICAL PRODUCTS ON WHICH ESTIMATES ARE TO BE PREPARED FOR THE SECOND CONSULTATION IN 1981

13. The Consultation recommended that the Working Group prepare estimates for 25 petrochemical products; namely:

Basic Petrochemicals: Ethylene, Propylene, Butadiene, Ortho-xylene, Para-xylene, Toluene, Methanol, Ammonia, Acetylene.

Intermediates: Acrylonitrile, Caprolactam, DMT, TPA, Styrene, Vinyl Chloride.

Final Products: L-D Polyethylene, H-D Polyethylene, Polypropylene, PVC, Polystyrene
Polyamide, Polyester and Acrylic Fibres
Styrene butadiene rubber (SBR).

14. The First Consultation recommended that priority should be given to preparing demand/supply estimates for the basic petrochemicals. It is suggested that basic petrochemicals include: ethylene, propylene, butadiene, benzene, o-xylene, p-xylene and methanol.

15. Acetylene and toluene might be omitted at the first stage; acetylene because world production is small and toluene because only a small quantity is used to produce downstream petrochemicals^{1/}.

16. Estimates on world demand/supply of ammonia have been prepared by the UNIDO/FAO/World Bank Working Group on Fertilizers. They will be presented to the Working Group for review and comment as an example of what has been achieved by a Working Group similar to the one now being established.

17. The Working Group is invited to consider the approach suggested above and the technical definitions of the basic petrochemicals for measurement purposes given in Annex C.

^{1/} Toluene is used mainly to produce benzene/xylenes or in motor fuels.

18. The estimates of demand for basic petrochemicals in the UNIDO World-Wide Study were based on estimates of demand for the main plastics, synthetic fibres and synthetic rubbers and the demand for intermediates required for their production. The Consultation recognized this and recommended that the Working Group develop information of LD and HD polyethylene, polypropylene, PVC and polystyrene; polyamide fibres, polyester fibres, acrylic fibres and one type of synthetic rubbers ^{1/}.

19. The Working Group is invited to consider whether supply/demand estimates can be prepared for these final products for the Second Consultation and to approve the technical definitions for measurement purposes given in Annex C.

^{1/} Although the Consultation Meeting recommended only SBR be considered, the Working Group may decide to consider all types of synthetic rubbers.

III. DESIGN OF THE TABLES PRESENTING ESTIMATES OF THE WORKING GROUP

20. It is suggested that the Working Group prepare five basic tables to present the estimates of World demand for and supply of each of the petrochemical products that it covers:

- I. World demand for product _____
- II. World capacity to produce product _____
- III. World capability to supply product _____
- IV. World production of product _____
- V. World feedstocks used for petrochemical production.

The suggested format of these tables is annexed to this document and if approved will be used by UNIDO to collect the estimates relating to individual regions and countries.

21. The Working Group is invited to decide that metric tons shall be the unit for all statistics it collects. Information should be presented in thousands of metric tons per annum, relating to a calendar year ^{1/}.

22. Production, demand and capability to supply should all relate to a calendar year.

23. Capacity should be recorded as the capacity installed at the beginning of the year in question. If the capacity is stated in tons per day, this figure should be multiplied by 330 to give the annual production capacity.

24. In Tables I to IV annexed to this paper, it is suggested that the following periods be covered by the first set of estimates prepared by the Working Group:

^{1/} The UNIDO/FAO/World Bank Working Group on Fertilizers prepares estimates on the basis of a Fertilizer year (1 July to 30 June).

Demand : Actual 1974-79; Forecasts for 1984 and 1989
Capacity ^{1/} : Actual 1974-80; Forecasts for 1981-85
Capability
to supply : Actual 1974-80; Forecasts for 1981-85
Production : Actual 1974-79;
Feedstock : Actual 1978 ; no forecasts

The Working Group is invited to discuss and approve the format of these Tables.

^{1/} As of 1 January in each year.

IV. UNIFORM DEFINITION OF AND APPROACHES TO BE USED IN ESTIMATING DEMAND, CAPACITY, CAPABILITY TO SUPPLY AND PRODUCTION OF PETRO-CHEMICAL PRODUCTS

Uniform definition of and approach to estimating demand

25. It is suggested that for the basic and intermediate petrochemicals, demand shall be measured as the quantity required for all downstream production uses in the country. For final products, demand shall be measured as the quantity required for use in the country.

26. The Working Group is invited to note the need to consider the impact of imports and exports when making demand estimates. Countries publish import statistics in some detail but export statistics are usually published only under major classifications such as 'plastics'. Assumptions must be made in interpreting and dividing these totals among the different petrochemical products covered. The imports of plastics, fibres and synthetic rubbers into many developing countries is of particular importance in estimating national demand.

27. In order to verify the consistency of the demand/supply estimates for 12 regions, it is desirable that estimates of exports and imports be divided between (a) trade between countries in the same region and (b) trade between countries in different regions. However information is only available for some groups of countries at present, such as the EEC. Other information might be developed by UNCTAD/GATT/ITC but only for the classifications used in International Trade Statistics. The Working Group is invited to consider this matter and suggest what further work is required.

28. The Working Group needs to outline a uniform approach to forecasting demand for 5 and 10 years ahead that are to be included in Table I for each product. It might be based on the following factors:

- Population growth: UNIDO will provide the latest estimates of the United Nations.

- Growth of real income per capita: Here members are expected to bring information based on economic forecasts of national planning bodies or regional organizations, such as CMEA or OECD.
- Substitution of natural materials: The Working Group is expected to discuss whether any uniform approach can be developed. Detailed assumptions were made in the UNIDO World-Wide Study.
- Major new uses: The Working Group is invited to identify major new uses which will affect demand such as new modifications of major plastics, fibres or rubbers which give improved characteristics in end-uses.

29. In some developing countries the potential demand for plastics materials, synthetic fibres and synthetic rubbers has been restricted by import controls on those materials and products made from them. The level of demand in the past may be far below that which would prevail if these materials would be made more freely available. In these cases estimates of demand for 5 and 10 years ahead should assume greater availability of imported supplies. Where local supply becomes available in the interim period, four years should be allowed for demand to reach its full potential.

30. Bearing in mind the suggestions made above, the Working Group is invited to agree on the definition of demand and a uniform approach to forecasting future demand to be adopted by the Working Group.

(b) Uniform definition and approach to estimating capacity

31. Capacity will be defined on the nameplate capacity announced by the owners of the plant or the contractors^{1/}. It may need to be modified in the light of further information that becomes available. Where ethylene is concerned, unless the feedstock is ethane, the intended weight of propylene recovery and/or butadiene extraction (if any) will also need to be ascertained.

^{1/} As indicated in para.23, capacity will be measured in metric tons per annum. If capacity is given on a per-day basis, 330 working days per year should be assumed.

32. In Table II, the following terms have been used: plants "in operation", "under construction" and "planned". It is suggested, these terms be defined as follows:

- In operation: when the plant is on stream and has produced at a rate of at least 50 per cent of its nameplate capacity for a period of one month.
- Under construction: when the contract has been signed and site work has commenced until the plant is "in operation".
- Planned: when construction of the plant has been announced by the owner and/or contractor but the plant has not yet reached the stage of "under construction" as defined above.

33. The first columns of Table I estimate the total available capacity at the beginning of each year. Additions to that capacity should be included under the year following the year in which the plant is planned to come on stream (that is 1980, 1981 or 1982 for plants "under construction" or 1983 or 1984 for "planned" plants).

34. Table I should make allowance for plants closed down permanently; such reductions in total capacity should be reported to the Working Group in the same way as are additions to capacity and, it is suggested, should become part of its Report. Where a plant is temporarily closed ("moth-balled"), no reduction in capacity should be assumed. Ways of differentiating between these two situations should be discussed by the Working Group.

35. The Working Group is invited to agree on the definition of capacity and approach to estimating capacity described above.

(c) Uniform definition of and approach to estimating "capability to supply"

36. Capability to supply is defined as the maximum production that could be obtained from the plant in a given year, independent of demand for the product. The world's capability to supply a product is unlikely to be used 100 per cent and the comparison of such capability with actual production and forecast demand will help the Working Group

- (a) to check the consistency of its demand and supply estimates and
- (b) to consider when additional capacity will be needed.

37. It is suggested that capability to supply (a) base petrochemicals and (b) intermediates and (c) final products be calculated as a percentage of the nameplate capacity as shown in Annex E.

38. The Working Group is invited to examine this approach carefully and amend the assumptions as required, with a view to agreeing on a uniform approach to preparing Table III.

(d) Uniform definition of production

39. Production statistics will be collected as a means of checking the estimates of capability to supply and the consistency of estimates of demand and supply in past years.

40. The Working Group is invited to approve the format of Table IV as an internal working table for the Group that will not be published.

(e) Uniform definition of and approach to estimating feedstocks used for petrochemical production

41. It is suggested that the following types of petrochemical feedstocks be considered:

- The methane content of natural gas, including associated gas and flared gas.
- The ethane content of natural gas, including associated gas and flared gas.
- Other contents of natural gas, associated gas and flared gas.
- Liquid petroleum gas (LPG).
- Naphthas
- Gas oil

42. As a first step it is suggested that the Working Group attempt to estimate the actual quantity of different types of feedstock used for the production of the nine basic petrochemicals in 1978, namely: ethylene, propylene, butadiene, o-xylene, p-xylene, toluene, methanol, ammonia and acetylene.

43. The Working Group is invited (a) to consider the feasibility of this suggestion and (b) to suggest what additional information can be collected:

- (a) To estimate the proportion of world hydrocarbon resources used for petrochemical production;
- (b) To identify under-utilized resources existing in the world;
- (c) To assess future trends in the availability of feedstocks and their impact on the petrochemical industry.

V. SCOPE AND TIMETABLE OF FUTURE WORK OF THE WORKING GROUP UP TO THE SECOND CONSULTATION IN 1981

44. It is proposed that the Working Group should meet twice before the Second Consultation (selected for June 1981) from 15 to 19 September 1980 and from 2 to 6 March 1981.
45. Members of the Working Group who assume responsibility for preparing the tables for a particular country or group of countries should complete the information and forward it to UNIDO by 31 July 1980. UNIDO will then assemble the information for discussion at the Second Meeting in September 1980.
46. UNIDO recognizes that completing the five Tables is an ambitious task. It is also important that the Working Group should interpret the information thus collected for presentation to the Second Consultation.
47. It is anticipated that a Third Meeting in February 1981 would adopt a Report for presentation to the Second Consultation in June 1981 containing:
- (a) A completed set of Tables ready for publication;
 - (b) A brief report interpreting the trends in the development of the industry as revealed by these Tables.
48. The Report of the Working Group would be published as a document for the Second Consultation in March/April 1981.

RECOMMENDATION OF THE FIRST UNIDO CONSULTATION MEETING ON THE
PETROCHEMICAL INDUSTRY

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.

ANNEX B

ORGANIZATIONS INVITED TO PARTICIPATE IN THE FIRST MEETING OF THE
WORKING GROUP

WESTERN EUROPE

APME	Association of Plastics Manufacturers in Europe
CEFIC	Conseils Européen des Federations de L'industrie Chimique
EEC	Commission of the European Economic Communities

NORTH AMERICA

CMRA	Chemical Marketing Research Association
ACS	American Chemical Society
SPI	Society for the Plastics Industry
CCPA	Canadian Chemical Producers' Association

JAPAN

JPIA	Japan Petrochemical Industry Association
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USSR

Country Representative

EASTERN EUROPE

CMEA	Council for Mutual Economic Assistance
German Democratic Republic	Country Representative

OTHER INDUSTRIALIZED COUNTRIES No representative (UNIDO)

AFRICA

IDCAS	Industrial Development Centre for Arab States
Algeria	Country Representative
Nigeria	Country Representative

ASIA

OAPEC	Organization of Arab Petroleum Exporting Countries
GOIC	Gulf Organization for Industrial Consulting
ASEAN	Association of South East Asian Nations, Chemical Industry Club
India	Country Representative
Korea, Republic of	Country Representative
Saudi Arabia	Country Representative
Singapore	Country Representative

LATIN AMERICA

IPLA	Instituto Petroquimico Latino Americano
ANDEAN GROUP	Secretariat of the Acuerdo de Cartagena
Mexico	Country Representative
Brazil	Country Representative
Venezuela	Country Representative

INTERNATIONAL ORGANIZATIONS SPECIALISING IN PETROCHEMICAL PRODUCTS

CIRFS	Comite Internationale de la Rayonne et des Fibres Synthetiques
IISRP	International Institute of Synthetic Rubber Producers

UNITED NATIONS ORGANIZATIONS

ECE	Economic Commission for Europe
FAO	Food and Agriculture Organization
ITC	International Trade Centre (UNCTAD/GATT)
UNCTAD	Conference on Trade and Development

OBSERVERS

IBRD	World Bank
OECD	Organization for Economic Co-operation and Development
OPEC	Organization of Petroleum Exporting Countries

INDUSTRIALIZED COUNTRIESWestern Europe

Austria, Belgium, Denmark, Finland, France, Germany (Federal Republic of), Greece, Iceland, Ireland, Italy, Liechtenstein, Luxembourg, Malta, Monaco, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, U.K.

USSREastern Europe

Albania, Bulgaria, Czechoslovakia, German Democratic Republic, Hungary, Poland, Romania, Yugoslavia

North America

U.S.A., Canada

JapanOther countries

Australia, New Zealand, South Africa

DEVELOPING COUNTRIESLatin America

Antilles, Argentina, Bahamas, Barbados, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Trinidad and Tobago, Uruguay, Venezuela

Africa - Arab States

Algeria, Egypt, Libyan Arab Jamahiriya, Morocco, Tunisia

Africa - other states

Angola, Benin, Botswana, Burundi, Cape Verde, Central African Empire, Chad, Comoros, Congo, Djibouti, Equatorial Guinea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Ivory Coast, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mauritania, Mauritius, Mozambique, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Somalia, Sudan, Swaziland, Togo, Uganda, United Republic of Cameroon, United Republic of Tanzania, Upper Volta, Zaire, Zambia

Asia - Arab States

Bahrain, Democratic Yemen, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, United Arab Emirates

Asia - other states

Afghanistan, Bangladesh, Bhutan, Burma, Cyprus, Democratic Kampuchea, Fiji, Hong Kong, India, Indonesia, Iran, Israel, Lao People's Democratic Republic, Malaysia, Maldives, Mongolia, Nepal, Pakistan, Papua New Guinea, Philippines, Republic of Korea, Singapore, Solomon Islands, Sri Lanka, Thailand, Turkey, Vietnam

China

ANNEX D

TECHNICAL DEFINITIONS OF SELECTED PETROCHEMICAL PRODUCTS

Ethylene: Demand for and capacity to produce ethylene is easily estimated. Care should be taken to include ethylene produced for captive use. Ethylene is usually produced from ethane or from naphtha. The source of ethylene is important in determining the amount of propylene and butadiene produced.

Propylene: Propylene should be recorded on a 100 per cent basis. Propylene is a major by-product of ethylene production but it is also produced from cracker gases and a 50 per cent stream.

Butadiene: Butadiene is a by-product of the production of ethylene but the quantities can be increased by the special treatment of other streams, e.g. the dehydrogenation of butane.

Benzene: Benzene availability should be that produced in 99.5 per cent purity from pyrolysis gas or by working up a catalytic reformat or by the de-alkylation or disproportionation of toluene. The benzene content of an aromatic stream used (a) to upgrade gasoline or (b) for other purposes should not be recorded.

O-xylene and p-xylene: These are normally separated from crude xylenes with or without some isomerisation and statistics should be recorded on the basis of the pure chemicals. Crude xylene streams used for other purposes should not be recorded.

Methanol: Methanol should be recorded on a 100 per cent basis. In view of the growing importance of this product as a chemical produced from natural gas, total production should be recorded whatever its final use may be. Methanol used to upgrade gasoline or for other fuel uses should be included.

Polyethylenes: Record polyethylene resin so that double counting is avoided.

Polypropylene: As for polyethylene.

PVC: Record PVC resin. Where such information is not available, e.g. for flexible compounds, these should be assumed to contain 70 per cent of the actual PVC resin.

Polyamide fibres: Care should be taken to exclude any polyamides used as plastics.

Polyester fibres: As for polyamides.

Synthetic Rubbers: Definitions to be prepared

ANNEX E

ASSUMPTIONS FOR CALCULATING CAPABILITY TO SUPPLY A PERCENTAGE OF
NAMEPLATE CAPACITY

A. FOR BASIC PETROCHEMICALS

	<u>Industrialized countries</u>			<u>Developing countries</u>		
	<u>first year</u>	<u>second year</u>	<u>subsequent years</u>	<u>first year</u>	<u>second year</u>	<u>subsequent years</u>
	per cent	per cent	per cent	per cent	per cent	per cent
ethylene ^{1/}	50	70	85	40	60	75
propylene ^{1/}	40	60	75	30	50	60
butadiene ^{1/}	40	60	75	30	50	60
benzene	60	80	90	50	70	80
xylene	60	80	90	50	70	80
methanol	60	80	90	50	70	80

B. FOR INTERMEDIATES

Same assumption as for the basic petrochemical from which the intermediate is derived.

C. FINAL PRODUCTS

	<u>Industrialized countries</u>		<u>Developing countries</u>	
	<u>first year</u>	<u>subsequent years</u>	<u>first year</u>	<u>subsequent years</u>
	per cent	per cent	per cent	per cent
Polyethylene	60	80	50	70
polypropylene	60	75	50	65
polystyrene	75	90	60	85
PVC	75	85	50	75
polyamide fibres	75	90	60	80
polyester fibres	75	80	60	80
acrylic fibres	75	90	60	80
synthetic fibres	75	85	60	75

^{1/} Since propylene and butadiene are normally completely dependent on ethylene supply, a lower rate of production must be assumed. The possibility of additional propylene from cracker gas or butadiene from butane must be taken into account in the "capability to supply".

TABLE IV. WORLD PRODUCTION IN THE PERIOD 1974/79
 for the product ...
 (000 metric tons per annum)

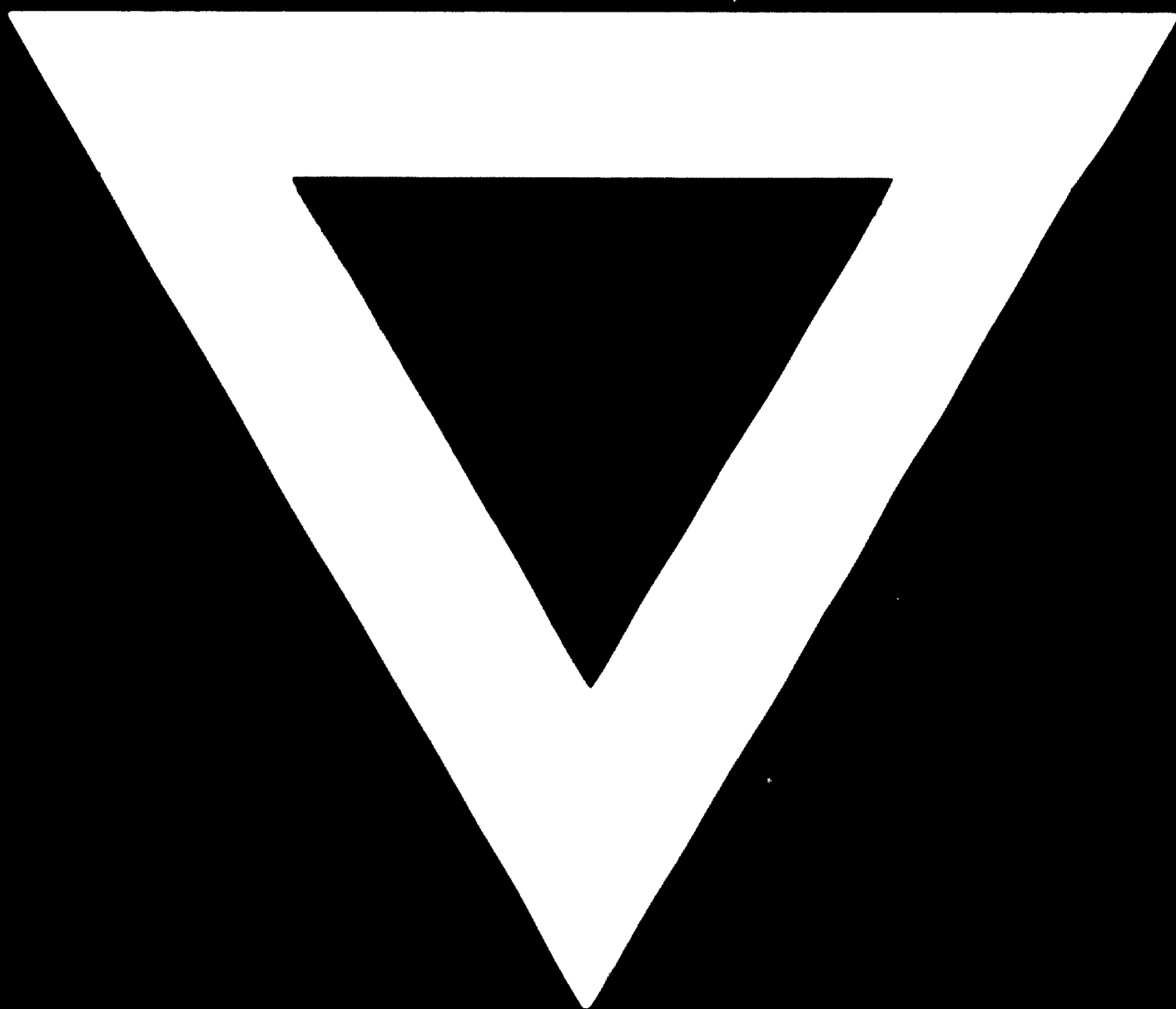
	Production					
	1974	1975	1976	1977	1978	1979
Regional groups of countries						
<u>INDUSTRIALIZED COUNTRIES</u>						
Western Europe						
North America						
Japan						
USSR						
Eastern Europe						
Other countries						
TOTAL						
<u>DEVELOPING COUNTRIES</u>						
Africa:						
- Arab States						
- Other States						
Latin America and Caribbean						
China						
Asia:						
- Arab States						
- Other countries						
TOTAL						
TOTAL WORLD PRODUCTION						

TABLE V. ESTIMATED USE OF FEEDSTOCKS FOR PETROCHEMICAL PRODUCTION IN 1978

Regions	Natural gas 1/			LPG 2/			Naphtha 2/			Gas Oil 2/		
	total available	used for petrochemical production	proportion used for petrochemicals (per cent)	total available	used for petrochemical production	proportion used for petrochemicals (per cent)	total available	used for petrochemical production	proportion used for petrochemicals (per cent)	total available	used for petrochemical production	proportion used for petrochemicals (per cent)
ORGANIZED COUNTRIES												
Western Europe												
North America												
Japan												
Other												
Eastern Europe												
Other countries												
TOTAL												
UNORGANIZED COUNTRIES												
Africa:												
- Arab States												
- Other States												
Latin America and Caribbean												
- China												
- Arab States												
- Other countries												
TOTAL												
TOTAL WORLD												

1/ Includes Associated Gas and Flared Gas. Measure in million cubic feet or cubic meters.
 2/ Measure in thousand metric tons

G - 525



81.06.23