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19427

Distr.
LIMITED

PPD.216(SPEC.)
4 February 1992

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

ORIGINAL: ENGLISH

Interregional Meeting on Cooperation
in Process Technologies of Petrochemical
Industries between selected Developing
Countries

Cairo, Egypt, 7-11 October 1991

REPORT*

* This document has not been edited.

V.92 50856

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I. INTRODUCTION

The Interregional Meeting on Co-operation in Process Technologies of Petrochemical Industries between selected Developing Countries was held in Cairo, Egypt, from 7 to 11 October 1991. The meeting was jointly organized by the United Nations Industrial Development Organization (UNIDO) and the Egyptian Petroleum Research Institute (EPRI), as a result of recommendations made in the meeting held in Aliage/Izmir, Turkey, in October 1989.

The objectives of the meeting are:

- to establish a forum for the direct exchange of views and experience between developing countries in Middle East and North Africa in the field of process technologies of the petrochemical industries;
- to explore practical ways and means of co-operation in process technologies and to facilitate the integration of the petrochemical industries in the Middle Eastern and African countries. It is also an effort to solve the technological difficulties which face these industries.

II. ORGANIZATION OF THE MEETING

The meeting was attended by Eight (8) Countries :

ALGERIA - BAHRAIN - EGYPT - JORDAN - LIBYA - MOROCCO - OMAN - SAUDI ARABIA - TUNISIA and TURKEY.

OPENING OF THE MEETING

The meeting was officially opened on October 7, 1991, by H.E. Dr. Adel Ezz, Minister of Scientific Research, H.E. Dr. Hamdy El Banby, Minister of Petroleum, Mr. Taher Bishr, Chairman of Chemical Industries Sector and Representative of the Minister of Industry, the UND Representative, Dr. Bahram Hamed Mahmoud, Director of EPRI and the Representative of UNIDO.

In a key note speech, Dr. Adel Ezz, Minister of Scientific Research welcomed all delegates in Egypt and expressed his thanks to UNIDO for taking a leading role in the organization of such meetings.

He indicated that countries of the region should discuss ways and means of putting their resources, experience and future plans to the benefits of the region as a whole as cooperation prospects for the 90's should be even more important.

H.E. the Minister of Petroleum and Mineral Resources, Dr. Hamdy El Banby took the floor and welcomed all delegates from various countries for attending this meeting jointly organized by UNIDO and Egyptian Petroleum Research Institute. He indicated that petrochemicals have now developed to the extent that it has become one of the most important part of our life and is found in every home, community and industry. The great importance is to learn from each other's experience and to come together to form a blueprint for cooperation and mutual development of the countries. Different technologies, upstream to produce the petrochemical raw materials are available, yet one has to keep in mind how that would affect the technologies of the downstream processes.

On behalf of H.E. the Ministry of Industry, Mr. Mohamed Abdel Wahab, the Chairman of Chemical Industries Corporation, Mr. Taher Bishr emphasized the role of industry played in the Egyptian productive activities. He indicated that the region has no alternatives to survive peacefully unless it can assure to maximise producing what is consumes, maximising the value added to all natural resources, including human resources.

The Director of Egyptian Petroleum Research Institute (EPRI) Dr. Bahram Hamed Mahmoud welcomed all participants on the premises of his institute and paid tribute to UNIDO for the efforts exerted to hold such meetings for the benefit of the region. He indicated that petrochemical industry has developed considerably during the last 40 years and being the fruit of intensive R and D efforts, has developed rapidly in hundreds of different directions and one can only truly say that it exists in all the sectors of modern life. He also indicated that the well proven economic theory of the 3M's, men, money and material is particularly applicable to the petrochemicals industry. He said that Egypt made in its country paper some concrete proposals on cooperation between the countries of the region.

Succeeding to the above government officials, the UNDP and UNIDO representatives presented their statements and pointed out the availability of their organizations to act and support all concrete measures and recommendations that may come out of the meeting. The UNIDO representatives thanked, on behalf of Director General of UNIDO, the Egyptian authorities and in particular EPRI for all facilities provided for the meeting and the hospitality extended to all participants.

ELECTION OF THE BUREAU

The delegates elected the Bureau composed of :

- Dr. Bahram Hamed Mahmoud (Egypt) as Chairman.
- Dr. Omar Tumc Savasci (Turkey) as Vice-President.
- Dr. Emad Eldin Ali Baddar (Jordan) as Raporteur.
- UNIDO acts as Secretariat.

ADOPTION OF THE AGENDA

The Meeting adopted the following Agenda and Work Program herewith annexed in the report as Annex II.

- Opening of the Meeting.
- Election of the Chairman and Drafting Committee.
- Preparation of technical papers by UNIDO.
- Preparation of national papers by delegates and discussions.
- Conclusion and recommendations.
- Adoption of the draft report and closing of the meeting.
- The list of participants is attached as Annex I.

III. SUMMARY OF COUNTRY PAPERS AND DISCUSSIONS

EGYPT

By the year 2030, the Middle East and North Africa will be the only oil exporting regions in the world and domestically approx. 90% of their primary energy needs will be met by oil and gas.

Natural gas and naphtha have been the main feed stocks for petrochemicals production, yet in the long run, it is expected that petrochemical feedstocks will shift in emphasis from naphtha to either higher (natural gas) or heavier fractions.

The policy of developing petrochemical industries should be thoroughly studied in the light of the requirements of our region.

The bulk consumption of plastic materials in our region is polyethylen and polyvinyl chloride. Steam crackers operating in the region mainly depends upon natural gas as a feed stock which limits the production of other types of plastic materials. However, future expansions whether in plastic synthetic fibers, fertilizers or any other major petrochemical products must be looked at within a general contest and an overall view of the availability and price of the raw materials required as feed stocks.

JORDAN

Jordan has a relatively small proven reserve of natural gas and even smaller oil reserves. Oil and gas needs of Jordan are met by importation, mainly from Iraq and Saudi Arabia.

The lack of the prime raw materials, gas and oil, the low consumption of petrochemical products in the local market due to the relatively small population, and the existence of large production capacities of petrochemicals in the neighbouring countries, forced Jordan not rush in developing a huge basic petrochemical industry.

Nevertheless, Jordan with its well educated population and the existence of qualified people, got involved in the development of industries which use basic and intermediate petrochemical products to produce finished consumer's products, mainly in the plastics, rubber, lubricating oils, fertilizers, detergents, and paint industries.

MOROCCO

The plastic industry in Morocco has known through the world during the last third decade a prodigious development, which has widen the field of intervention at all activities. In Morocco the industry of transformation of plastics is getting growing, today this field is represented by 400 firms (in 1977, there were only 65 firms, and in 1980, 200 firms).

The principal field which utilizes products of plastics are: packaging, domestic equipment, building, electrical sector, garments, toys, etc.

The principal polymers concerned by this industry are by important order:

- the polyethylene low density (P.E.L.D.)
- the PVC
- the polyethylene high density (P.E.H.D.)
- the polyethylene low density linear (L.L.D.P.E.)
- the polypropylene (PP)
- the polystyrene

Except PVC, which is produced in Morocco by the entreprise "SNEP", the other polymers, are imported from Europe, USSR and Saudi Arabia.

The Moroccan consumption of imported polyethylene (all varieties) has reached in 1988: 43.560 tons, of resins. The polyethylene low density represents the important part of importation (64%).

The polyethylene high density represents 31% of the market and occupies the second position. The principal applications of polyethylene high density are: moulding, blowing of containers, extrusion of tubes, films high stranger and moulding by injection.

The consumption of polyethylene low density linear is low in Moroccan market (5%). Its part of the market is limited and the principal utilization for polyethylene low density linear is the production of films.

The evolution of PELD consumption during the last years shows the performances of Moroccan economy. The last dryness years have slightly affected the PELD consumption. Since, the demand of this variety has progressed in consequence of the developments of agricultural sector (packaging of fertilizers, food for cattles) and films for greenhouses.

In Morocco, the PVC production is realized only by one firm (SNEP).

The production of this firm is ventilated by product in the following board:

Product	1987	1988
PVC suspension	9906	9408
PVC emulsion	1232	1440
Compounds	10314	10960
Total:	21452	21808

SAUDI ARABIA

SABIC is a Saudi joint stock company incorporated in 1976 for the purpose of establishing basic industries which utilize and upgrade the Kingdom's resources, and develop Saudi manpower. SABIC operates primarily through joint venture partnerships with a number of multinational industrial corporations.

SABIC utilizes the most advanced technologies, selected based on certain criteria. In 1990 SABIC and its partners produced more than 13 million tons of chemical, plastic resins, fertilizers and metals through 15 of SABIC affiliates located mainly in Al Jubail and Yanbu.

SABIC is also a partner in the regional petrochemical and aluminum in Bahrain. SABIC marketing companies are meeting needs of customers worldwide.

SABIC is building a new world-class research and development complex. It will enable SABIC quickly to reformulate current products and develop new products.

This complex includes pilot plant, bench scale reactors, facilities for testing.

SABIC also intends to broaden its R and D activities. This will include development of local and international research liaison with leading universities, research organizations and technical services, laboratories that perform R and D for basic and derivative petrochemicals and other SABIC products sectors.

TUNISIA

Having modest oil and gas reserves enough just to secure its energetic self-sufficiency by year 2000, Tunisia acquired its own tool of refining but did not rush in pursuit of Petrochemical Industry. Taking into account that condition, Tunisia got rather involved in the development of industries to transform the basic products. It is the case of the following sectors:

- Plastics
- Rubber
- Textile fibers
- Detergents and paints

Concerning the fertilizers sector, the Tunisian industry produced in 1988 about 3 million tons of fertilizers among which 700,000 tons of nitrogenous fertilizers (Mono Ammonium Phosphate, Di-Ammonium Phosphate, Ammonium Nitrate and NPK fertilizers). This sector consumed 270,000 tons of ammonia in 1988 and about 350,000 tons by year 2000.

TURKEY

Petrochemical industries in Turkey has a short but rather dynamic history in Turkey. Although petrochemicals have been consumed in the country since late forties, a boom in the consumption of such chemicals have been realized since early seventies in line with the production of PETKIM plants established in Yarimca. Consumption of plastics, thus demand for them, have been increasing so fast that a second complex was planned in early seventies, erected in late seventies and started up as a grass-root complex in early eighties. As of 1990, about 2.5 million tons of various petrochemicals was produced by PETKIM alone, out of which about 1.5 million tons are marketable petrochemicals and/or intermediates. At the same period other companies, mostly private sector, produced about 600,000 tons of such chemicals which were mostly synthetic fiber raw materials such as DMT, PET, polyacrylics, etc. PETKIM's marketable products on the other hand have been PVC, PCC, LDPE, DHDPE, PP, PS, ACN, PTA, MEC, CL, SBR, CBR, DDE, PDB, (NH₄)₂SO₄, NaOH, ethelene, benzene, toluine, xylene, DEG, PA, etc... Based on sales revenue, 75% of PETKIM's marketable production was for domestic sales, 23% for exports and 2% for export oriented sales.

51.40% of the exports was to European Community while 21.22% for Middle East and Africa, 12.59% for Asia and Far East, 1.97% for East Europe, 10.71% America, 2.11% other European countries.

PETKIM spends about 0.8% of its sales revenue to R and D activities. The company has a R and D centre which carries out mostly applied research and involved in more in development work than research. It has been supported by UNIDO through joint projects. With its publications, visiting researches, joint projects with other countries like Azarbaijan of USSR, the centre has also started international activities.

The demand for petrochemicals in Turkey has been increasing. It is estimated that by 2000 the present consumption will be doubled. To meet this ever increasing local demand, PETKIM has a short-term plan to rehabilitate the present plants to increase their capacities which will add about 200,000 to the present total capacity. This plan is being implemented presently which is to be finished by the end of 1992 by investing about 90 million US dollars. PETKIM also has a long-term plan to erect new plants together with partners, which is also part of its privatization plans.

Following the presentation of country papers (see above), UNIDO representatives, Turkey and Egypt presented technical papers on following topics:

UNIDO

- Technical assistance of UNIDO in the field of R and D in petrochemical industries.
- Research and development tends in the petrochemical industry.

TURKEY

- Environmental aspects of PVC
- Degradable plastics
- Discussion on MTBE as a gasoline additive and its production technologies

EGYPT

- Feasibility of producing viscosity index improvers in petrochemical complex within the region
- Plastic culture and irrigating
- The impact of radiation cross-linking reactions on the mechanical thermomechanical and electrical conductivity and properties of polyethylene materials

IV. CONCLUSIONS AND RECOMMENDATIONS

After long and detailed consultation and discussions the delegates have unanimously agreed and adopted the following recommendations.

They requested the Chairman of the meeting to officially bring to the attention of the Director-General of UNIDO the measures and programme of co-operation that should be implemented for obtaining an efficient and concrete co-operation in the petrochemical industries in the concerned region. It was also agreed that a working group composed of Egypt and Turkey, as a start and open for the participation of other countries in the region, be established and consult with UNIDO secretariat for setting up possible mechanism and modality for the implementation, among others, the following:

1. Establishment of an interregional permanent secretariat representing all the countries of the region under the auspices of UNIDO to undertake but not limited to:
 - Setting up a focal point for a system of information on the petrochemical industries of the region, and its continuous updating;
 - Issuing a regular circular sheet to member countries of the region providing technical and commercial data on petrochemical products available for exports;
 - Developing joint R and D programmes between countries of the region such as a project for the production of heterogeneous catalyst to be discussed during the next regional meeting;
 - Organizaing training programmes;
 - Extending the fields of co-operation through the exchange of personnel between concerned countries of the region in areas of common interest;
 - In this connection the participant expressed their appreciation for the fellowships programme offered by Turkey and invited other countries to do the same;
 - Promoting closer co-operation between countries of the region including joint ventures and other co-operative activities.
2. Emphasizing the need to take special care of all aspects related to the protection of the environment from the stage of design of petrochemical plants to their operation as well as the use of petrochemical products.
3. The meeting also recommended that the topic for the forthcoming interregional meeting to be held in 1992 to be devoted to patents, licensing and know-how. The meeting will also consider the heterogeneous catalyst programme mentioned in (1) above.

Annex I.

List of Participants

EGYPT

Dr. Bahram Hamed Mahmoud, Director of Egyptian Petroleum Research Institute (EPRI)
Chemist Mohamed Hamed Ghanem, Chairman, Egyptian Petrochemical Company
Mr. Mohamed Rashad Abdelhamid, Vice-Chairman, Egyptian General Petroleum Corporation
Dr. Ismail K. Abdou, Petrochemical Expert
Dr. Mohammed Mahmoud El Sukkary, Head of Petrochemical Department, Egyptian Petroleum Research Institute (EPRI)
Dr. Shaker Hamed El Ashry, Professor of Petrochemicals (EPRI) and Secretary General of the Meeting
Eng. Ashry Mohammed Ashry, General Manager of Technical Service, Egyptian Petrochemical Company
Dr. Labiba Ismail Hussein, Researcher, Petrochemical Department (EPRI)

JORDAN

Dr. Emad Eddin Ali Baddar, Royal Scientific Society

LIBYA

Mr. Ahmed Abdelsalam Abudaheer, Industrial Research Center

MOROCCO

Mr. Chakour Abderrahim, Ingenieur d'Etat à l'Administration de l'Industrie

OMAN

Mr. Jamal Bin Shames Bin Samad Al Houti, Engineer, Assistant to the Director General of Industry

SAUDI ARABIA

Mr. Fahd Abdel Mohsen Al-Dous

TUNISIA

Mr. Abid Ftouh, Cadre Ste Tunisiene Industries, Raffinage de bizerte

TURKEY

Dr. 8. Tunc Savasci, Director, R and D Centre, PETKIM Holding Inc.
Mr. Serdar Bilgi, Assistant Manager, PETKIM PETROKIMYA
Ms. Beyhan Oytun, Project Engineer, PETKIM PETROKIMYA

UNDP

Mr. Tewfiq Ben Ammar

UNIDO

Mr. J. Ghani
Mr. M. Derrough
Mr. Y. Sabri

Annex II.

Programme of Work

Monday, 7th October 1991

- 09.00 - 10.00 Registration
- 10.00 - 11.00 Opening Ceremony
- Prof. Dr. Adel Ezz, Minister of Scientific Research
 - Dr. Hamdy El Banby, Minister of Petroleum and Mineral Wealth
 - Eng. Mohammed Abdul Wahab, Minister of Industry
 - Prof. Dr. Bahram H. Mahmoud, Director of EPRI
 - Mr. T. Benamar, Deputy Resident Representative, UNDP, Cairo
 - Mr. Y. Sabri, Representative of UNIDO
- 11.30 - 12.00 Election of the Chairman, Bureau and Members of the Committee
- 12.00 - 13.00 Opening of the Exhibition
- 14.30 - 16.00 Presentation of UNIDO
Presentation of Country Papers: Tunisia and Jordan
- 16.30 - 18.00 Presentation of Country Paper : Egypt

Tuesday, 8th October 1991

- 09.00 - 10.30 Presentation of Country Papers: Morocco and Saudi Arabia
- 11.00 - 12.00 Presentation of Country Paper : Turkey
- 12.00 - 13.00 Visit to ENPPI
- 14.30 - 17.30 Presentation of technical papers
Turkey (3)

Wednesday, 9th October 1991

- 09.00 - 10.30 Presentation of Country Papers
- 11.00 - 13.00 Presentation of Country Papers
- 14.30 - 17.30 Presentation of Country Papers

Thursday, 10th October 1991

08.00 Departure to Alexandria
Visit to the Egyptian Petrochemical Company
and other sites in Alexandria

14.30 Lunch offered by EPC

16.00 Return to Cairo

Friday, 11th October 1991

09.00 - 10.30 Adoption of the Report

20.00 Closing dinner party