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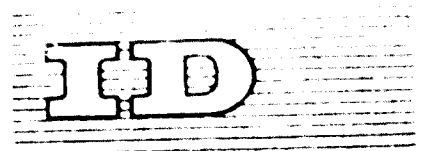
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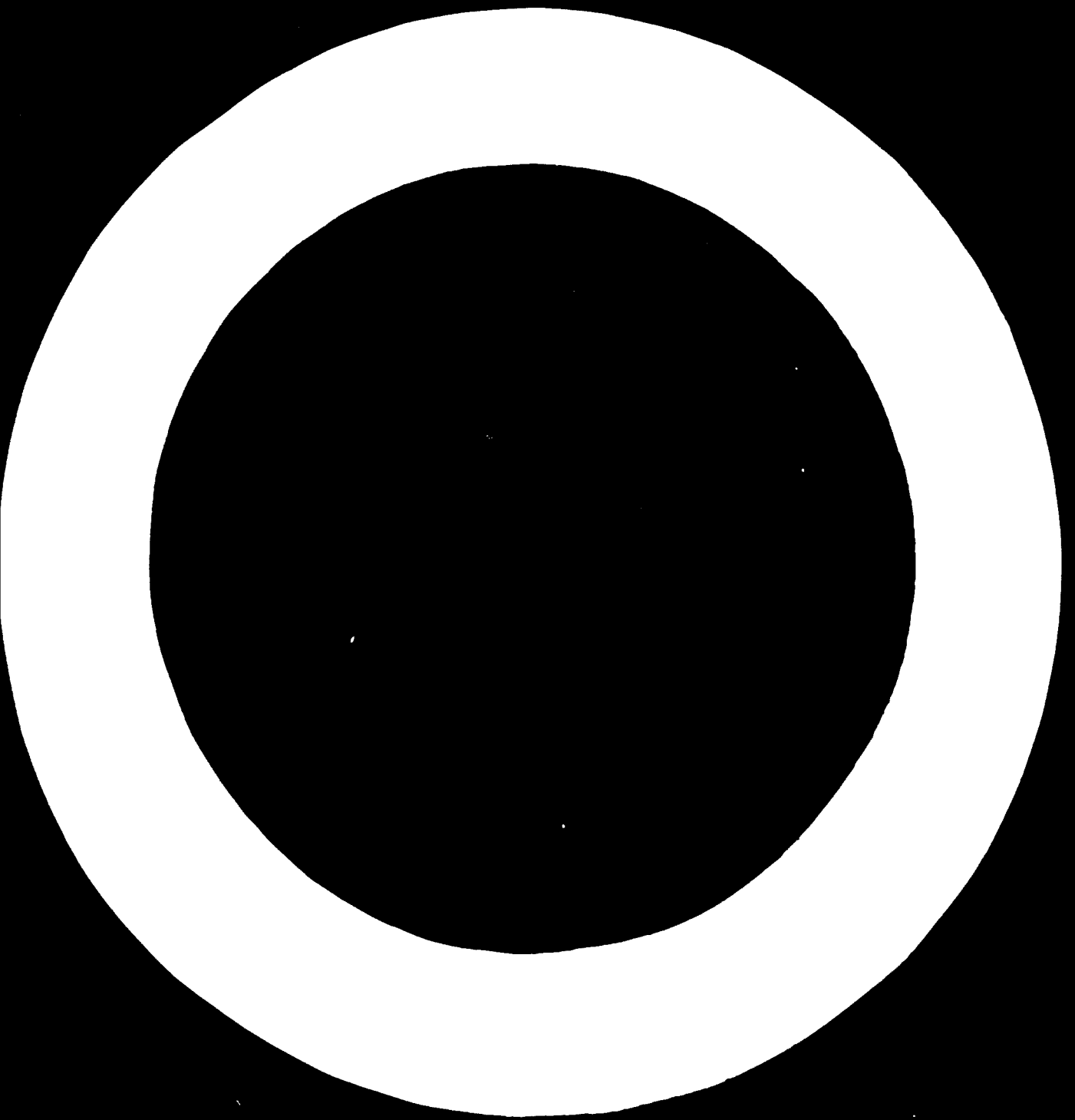
DEVELOPMENT OF THE PETROCHEMICAL INDUSTRY

IN IRAQ^{1/}

by

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Preface

The petrochemical industry has now become one of the world's most important industries. Over the past twenty years chemical production has increased more rapidly than any other large scale industry. Because petrochemical products affect almost every phase of modern life, they are essential to all industrially advanced countries. In fact, the more industrialized the country is, the more important will be the role of chemical products.

Tremendous increases have taken place in the production of petrochemicals, for instance, synthetic ammonia fertilizers, plastics, synthetic detergents and fibres. There are a number of factors that account for this development which we shall touch upon in brief as follows:

1. The availability of large amounts of raw materials produced from petroleum and natural gases.
2. The increasing demands for petrochemicals products because of the improvement in the standard of life, all over the world.
3. Large scale process research and development.
4. New markets.

During the early period of this century, the world chemical production grew at a very modest rate, reaching an estimated level of \$10,000 million in the late 1930's. Production reached US\$50,000 million by 1955 and will probably exceed US\$120,000 million by 1970.

The number of the world petrochemical plants in 1961 was about 723 which produced 55 thousand million pounds of chemical products and this figure increased in 1967 to about 1,096 besides that there will be 375 plants under construction.

Eight countries are the main sources for the world total production of petrochemicals viz. USA, USSR, Federal Republic of Germany, United Kingdom, France, Italy, Italy, Japan and Canada.

India is considered as one of the developing countries which had established a good number of petrochemical plants during the last three years and now it has nine petrochemical plants and it will have another nineteen plants during the next few years. In India, the major feedstocks for this industry are naphtha, natural gas and refinery gases but the use of naphtha predominates.

Investments in petrochemical plants based on petroleum products continue to

grow at a high rate throughout the world and for this reason the developing countries encounter difficulties in establishing such industries in spite of having cheap and abundant raw materials. This calls upon the UNIDO to help these countries to establish large scale petrochemical industry.

Chemical companies, petroleum companies and governments desire to participate heavily in the petroleum products base feed chemicals and this is resulting in over production practically in all areas of the world and highly competitive situation is developing with a corresponding decline in price and profits within the last five years but still we notice the prices started increasing again during the last two years due to the fact that the demand, especially for plastics, is increasing at a faster rate than the production because of the great number of new fields of plastics applications. In the near future, stable prices for some petrochemicals can be expected however.

The developing countries should pay a particular attention to these trends especially with regard to chemicals based on petroleum products that are planned to be produced in the future.

The possibility of building petrochemical industry for IRAQ

Iraq does not yet have a petrochemicals industry (except a fertilizer plant of 180,000 ton/year under construction) but it is on the threshold of development in this sector. Guidelines for development have been suggested in some reports prepared by some consultants and experts during the last few years. These reports were surveyed but no final conclusions were reached. They dealt with the possibility of establishing petrochemical industries such as plastics, fertilizers, synthetic rubber, synthetic detergents and carbon black.

The need for building petrochemical industries has become important and urgent because of the continuously growing demand for these petroleum products and because of the abundance of light distillates and, natural gas and refinery gases which can be utilized for such a purpose.

The possible petrochemicals plants that can be built in Iraq:

1. P l a s t i c s

The uses of plastics are already firmly established to Iraqi consumers, as films for packaging, houseware appliances and toys. The plastic packaging (including bottles), is growing at a very rapid rate and is expected to replace steel, aluminium and other matter in the next few years. Agriculture is also

expected to make use of plastics in such application as mulch film, silo covers and water pipes. Considerable attention is being given to plastics for construction, particularly in areas where other building materials are scarce.

The estimated Iraqi demand for plastics for 1970 is about 5,000 tons and this quantity is expected to increase to 15,000 tons in 1975. The major consumption of plastics is based on PVC and low density polyethylene.

A preliminary feasibility study has been carried out involving a marketing survey and an economical evaluation for establishing a 33,000 tons/year plastics production project. This project consists of the following units:

1. Ethylene plant of 20,000 tons/year utilizing either natural gas or naphtha as feedstock.
2. Polyethylene plant: to produce 7,000 tons/year of low density polyethylene using the high pressure process (I.C.I.).
3. Chlorine caustic soda unit of 20,000 tons/year capacity of chlorine which is needed for the PVC production.
4. Polyvinylchloride plant: 25,000 tons/year capacity utilizing a combination of direct chlorination and oxychlorination processes to minimize chlorine consumption and to avoid production of hydrogen chloride.

Investment, operating cost and payout time have been estimated too and they revealed that the estimated total investment is around US\$ 44 million (16 million Iraqi Dinar) and the payout time about 10 years at full capacity when the product is sold at the current market prices.

The capacity of these units were estimated economically after taking into consideration the possibility of the wide indigenous increase in the use of plastics in the future and the possibility of exporting the surplus to neighbouring countries.

Locations

There are two possibilities of location for this project viz: Baghdad and Basrah; each of which is suitable geographically with respect to availability of raw material utilising the by-products energy, labour, market (domestic and export) and transportation.

Synthetic rubber, carbon black and tyre plant

No detailed studies concerning the possibility of producing synthetic rubber in this country have been made in the last years. But the preliminary and general

studies have shown that the local consumption of synthetic rubber is rather low so it is not economically encouraging to build such a plant in the near future to supply only the local demand, unless there is a major export market outlet. For this reason, an attempt has been made to study the possibility of establishing a synthetic rubber plant of economical size in order to supply both the local and the market of mainly neighbouring countries with its products.

In addition, a feasibility study of building a tyre plant has been prepared. This project has been recommended to begin with 1,000 pieces per day capacity of conventional tyres and to be erected in Baghdad because this location has certain advantages. The total investment cost is estimated to be about 5.5 million Dinar and the payout time about three years.

The recommended capacity was based on the expected indigenous consumption in 1972 and this was based on the sales in 1966 increased by 5 per cent per annum.

Rubber as a raw material for this project should be imported.

Studies on the carbon black project resulted in a recommendation to build a 7,000 ton/year capacity plant of carbon black using furfural extract (60 L.V.I. stock) as raw material. This capacity was considered as the minimum economical size. However, the marketing survey study has indicated that the country demand is too low and unless we find other outlets and a considerable quantity of carbon black will be surplus.

Studies have been made to gather all information on this subject and particularly the raw material which will play a big role in the economy of the plant. For this reason, detailed analyses had been carried out on furfural extract of different lube oil stocks in order to select the proper feedstock suitable for the production of carbon black.

The above studies and reports are but preliminary and require further investigations and larger marketing surveys. Iraq can of course go ahead with this project provided the economic aspects of it are given less weight. However, we ought to contact other Arab countries to establish a co-ordinated project, if possible, which will be both economical and sufficiently large in capacity for at least the Arab Common Market now under serious consideration. I emphasize the importance of UNIDO aids to helping to bring about such an industry for our Arab Common Market.

Difficulties and problems

Many difficulties and problems are frequently faced throughout the course of preparing the feasibility studies on any of those petrochemical projects due to the following reasons:

1. Lack of experience in the field of petrochemical industry, as regards the technique and operation.
2. Lack of enough information e.g. know-how on processes because most of them are patented and rapid development and extensive research are taking place on petrochemical products and processes.
3. No accurate data are available on marketing statistics.
4. Too many factors influencing the economical evaluation of the project and to reach final and comprehensive conclusions, a computer programme must be provided and evaluated.

What UNIDO can do to help us

1. To supply us with all technical bulletins and reports concerning the petrochemical industry and its progress.
2. To acquaint Iraqi personnel with existing petrochemical complexes.
3. To train Iraqi technical people in the field of process studies and evaluations.
4. To arrange for experts to visit Iraq to exchange with them views and discuss technical problems.





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