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STAFF APPRAISAL REPORT

JORDAN

SECOND ARAB POTASH PROJECT

December 24, 1986

Industry Department

CURRENCY EQUIVALENTS
(as of October 24, 1986)

JD 1.00	=	US$2.92
US$1.00	=	JD 0.342

WEIGHTS AND MEASURES

1 Metric ton	=	1,000 Kilograms (Kg)
1 Metric ton	=	2,204.6 Pounds
1 Kilometer (Km)	=	0.62 mile

PRINCIPAL ABBREVIATIONS AND ACRONYMS USED

AMC	-	Arab Mining Company
APC	-	Arab Potash Company
CIF	-	Cost, Insurance and Freight
EMC	-	Entreprise Miniere et Chimique
FOB	-	Free on Board
GOJ	-	Government of Jordan
IsDB	-	Islamic Development Bank
JFI	-	Jordan Fertilizer Industries
JPMC	-	Jordan Phosphate Mining Co.
KCl	-	Potassium Chloride (Muriate of Potash)
K_2O	-	Potassium Oxyde
mtpy	-	million tons per year
tpy	-	ton per year
USAID	-	US Agency for International Development

FISCAL YEAR

January 1 to December 31

JORDAN

SECOND ARAB POTASH PROJECT

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JORDAN

SECOND ARAB POTASH PROJECT

I. INTRODUCTION

1.01 The Arab Potash Company (APC) has requested the World Bank, through the Government of Jordan (GOJ), to finance a project including optimization investments at the Dead Sea potash extraction and refinery complex, aimed at ensuring reliable plant operation, increasing output, and enhancing the Company's long-term competitiveness through development work for technology improvement, production cost reduction and business growth. The proposed project, which, including contingencies and interest during construction, has an estimated cost of US$26.7 million equivalent, consists of (i) an Investment component, with corrective and optimization measures to allow an output increase of 15% over the initial design capacity of 1.2 million tons per year; and (ii) a Technical Assistance component, which consists of research and development studies to assess the potential and feasibility for future project expansion, and which, in addition provides for staff training. The Project also entails a financial rehabilitation plan to strengthen the financial structure of the Company, put it on the path to profitability following the losses incurred in the initial operating years, and open the way for broadening its capital base to new, private sector, interests. APC is a Bank borrower which implemented the 1978 project to exploit the potash-rich Dead Sea brines.

1.02 The Project would be in line with the Bank's industrial sector strategy for Jordan in supporting domestic resource based activities, transferring new technology into the country, and promoting exports. The Project would have an attractive economic return, and a positive impact on APC's profitability and finances. The risks associated with the Project are moderate, while the provision for training, and the transfer of know-how and demonstration effects associated with the Technical Assistance component will enhance APC's capability towards efficient plant operation, and strengthen its competitive edge.

1.03 This report presents the main findings and recommendations of Bank missions which visited APC in the course of the implementation of, and follow-up on, the initial Arab Potash Project. The proposed project--the concept and scope of which draw largely on a set of consultancy studies commissioned by APC in the past two years to improve plant reliability--was appraised in March 1986. The report recommends a Bank loan in an amount of US$12 million towards the financing of the proposed project.

II. JORDAN'S INDUSTRIAL SECTOR

A. Background

2.01 Jordan's economy is based on free enterprise, yet in a system characterized by an intensive promotional involvement on the part of the Government. Due to paucity in natural resources and arable land, the economy has a narrow commodity-producing base. From the early 1970s through 1982, however, a favorable regional environment combined with political stability allowed Jordan to achieve a good economic performance. Helped by substantial inflows of workers' remittances and transfers from neighboring oil producing countries, investment, income and employment grew rapidly, and significant progress was achieved in modernizing and diversifying industry. Since 1982 however, the economic slowdown in the neighboring countries has affected the Jordanian economy in many ways, leading to a decline of domestic activity and a reduction in the inflow of external transfers. The economic growth rate slowed to about 4.2% in 1983, and declined further to about 3% in 1984 and 1985.

2.02 The Five-Year Plan (1981-85) aimed at maintaining the growth momentum of the economy experienced during the 1970's, with further diversification in favor of the commodity-producing sectors. Assuming a continuation of the favorable trends of the past decade, the Plan called for ambitious capital investments (JD 3.3 billion or US$9.5 billion equivalent) aiming at an annual GDP growth rate of 11 percent led by the mining and manufacturing sector (18 percent). Actual performance through 1985 however, fell short of these targets. As a consequence of financial constraints, investment expenditures were 80% below the planned levels. Expenditures in housing and transportation sectors exceeded the planned amounts while there were large shortfalls in all other sectors. As a result, the average annual rate of real GDP growth during 1981-85 fell below 6%. In external trade, the Plan put heavy reliance on merchandise exports with a growing contribution from the domestic natural resource-based large industries sponsored by the Government (phosphate mining and fertilizer, potash and cement). However, the disproportionate size of imports in relation to exports led to large, although declining,trade deficits of US$2.4 billion in 1983, US$2 billion in 1984, and an estimated US$1.9 billion for 1985. By the end of 1985, Jordan's external public debt service payments amounted to 10% of total exports of goods and services (including workers remittances).

2.03 Manufacturing grew at 5.2%, broadly in line with the GDP during the period 1980-85, and accounted for 23% of GDP. The 1981-85 industrial investment program allocated 23% of overall investments, or JD 760 million (US$2.2 billion equivalent) to the manufacturing and mining sectors. Of this, about 75% was allocated to the large projects (phosphate mining and fertilizer, potash, cement and oil refining), 7% for mineral (including energy) exploration and industrial estates, 7% for medium-sized projects, and the rest for other investments in the private sector. Mining production, essentially phosphate rock, grew rapidly, while manufacturing activities also progressed, with large increases in chemicals production,

food, beverages and tobacco. The large industrial projects which are now in the production stage accounted for over half of the increase in mining and manufacturing output, and for almost two thirds of the increase in industrial exports. The overall industrial structure is dominated by these few large enterprises although there are numerous small private sector firms engaged in food processing and the production of textiles, detergents, furniture, and building materials. The small and medium scale industry has promising growth potentials, given existing workers skills, preferential access to neighboring Arab markets, and available support in terms of development finance and industrial estates. There is, however, a widely diverging productivity performance in the various subsectors, and on the whole, industrial productivity is still low, reflecting diseconomies of scale and the scarcity of managerial/technical know-how.

2.04 Rapid expansion and diversification of industrial production and growing regional demand for products have enabled Jordan to sustain a strong export performance in manufacturing. The mining and manufacturing industries accounted for about three quarters of exports during the period 1980-85. Although starting from a low level, manufacturing exports recorded a sixfold increase in value between 1975 and 1980, with chemicals (mainly detergents and soap) accounting for the bulk of exports (11 percent), followed by wood products and cigarettes. Since 1980 however, the rate of export growth slowed considerably. With a few exceptions, the main manufactured exports have a high import content. However, some of the large export projects (potash and cement) have more favorable balance of payments effects.

B. Industrial Strategy Issues

2.05 In the industrial sector, the 1981-85 Plan outlined specific objectives notably: (i) forward integration of the mining sector, with special emphasis on phosphate and potash derivatives; (ii) encouragement of the development of competitive export industries; (iii) intensified exploration of the country's energy and mineral resources; and (iv) creation of new geographical growth centers with a view to relieving industrial congestion in the Amman area, and fostering regional development. The Plan also highlighted the need for a broader introduction of up-to-date technologies and management methods, particularly through the large, key projects.

2.06 By 1986 industrial output was expected to have benefited from important contributions by the large projects, notably in potash, phosphate fertilizers and cement. However, these large new industries, because of falling international prices and excess world capacity, declined in 1985 (with the exception of Potash) and may not contribute much toward restoring a healthy rate of growth beyond 1987. Therefore, identifying sources for industrial growth is a major concern, since Jordan may no longer be favored by a low cost of capital (grants and concessionary lending). Instead, it must seek to develop a comprehensive advantage in skills, technology and productivity.

2.07 In the long run, because of the small size of Jordan's domestic market, industrial growth depends heavily upon the development of exports.

Aside from balance of payments criteria, only exports can provide the market necessary for adequate economies of scale, employment generation, and meaningful industrial integration. There is a considerable potential for manufacturing exports to neighboring countries, resulting from Jordan's favorable geographic location and links within the region, as well as a relatively good position as regards labor skills and industrial finance. Excessive reliance, however, upon these few markets could, and has, become a constraint to sustaining industrial growth and maintaining a good export performance. Industries in which Jordan is currently competitive in the region include cement, glass and bricks, for which transportation costs are an important factor. Exports of manufactured products to industrialized market economies are negligible. Only in targeting segments of the world markets particularly responsive to its resource endowment and industrial potential (including potash and derivatives), can Jordan partly overcome dependence on limited nearby markets, and alleviate the risk of a changing regional situation.

2.08 Moreover, regional development in the Jordanian context implies the creation of new development poles outside the Amman area. Towards this end, a major new industrial estate has been developed about 30 km south of Amman, and a similar estate is planned for the main city of Irbid in the North. Development of the Safi Dead Sea pole, through growth of the potash operation, would further serve this objective.

2.09 In summary, given the changed situation and outlook in the neighboring oil producing countries (declining revenues, draw-down on reserves, scaling down of investment programs and cut-down on foreign aid), continued growth in Jordan at the rates projected under the 1981-85 Plan appears no longer feasible in the medium-term. A GDP real growth rate closer to 5 percent p.a. is forecast through 1990, which inter-alia, reflects a reduction in the exceptionally high level of investments achieved during the early 1980s as a result, mainly, of the implementation of the major new industrial projects. The industrial sector is nonetheless expected to take the lead in the growth of GDP, with the new industries contributing nearly one fourth of incremental GDP during 1986-90, with total industrial output (including construction) projected to grow at an annual rate of about 5.7 percent. The construction industry is forecast to grow at a modest annual rate of 3.5 percent during 1987-90. Thus, industrial growth through the 1990's, which assumes an expansion of phosphate mining and cement production, will have, also, to rely strongly on the development of a competitive higher technology medium-scale manufacturing industry, largely for exports. Using to a greater extent the Dead Sea mineral resources becomes, in this context, even more critical. In the long run, because of a small domestic market, dynamic industrial growth depends largely upon the development of exports, which calls for the identification of investment opportunities aiming at broadening Jordan's export base in building upon the country's comparative advantages in factor endowment, access to markets, and competitiveness of specific industries. A high rate of growth in export-based industries is indispensable not only to reduce the external deficit and enhance the country's creditworthiness, but also to stimulate employment, promote new technologies and improve quality of domestic production. In this context, a potential expansion of the Dead Sea Potash pro-

duction would be fully warranted, particularly if accompanied, as is the objective under the proposed Bank loan, by an optimization of production process, overall reduction in production costs and hence, enhanced competitiveness.

C. Bank Role and Sector Lending Strategy

2.10 Jordan's last two development plans aimed at restructuring the economy to achieve a wider manufacturing base, reduce dependence on external grants, and spread development among different regions. The Bank's assistance to Jordan has been designed to support these objectives, and in particular help the Government: (i) diversify the country's economic base and promote exports; (ii) alleviate manpower and infrastructure constraints in the productive sectors; and (iii) encourage more balanced growth among regions. The macroeconomic framework to assess the long-term potential for Jordan's export-oriented industrial growth has been provided under the Bank's review of the 1981-85 Five Year Plan (Report No. 4179-JO of May 1983), and further recommendations in this regard were formulated in the study on Export Strategy and Promotion in Manufacturing Industries (Report No. 4170-JO of June 1983). A manpower development study discussing strategies for employment and growth in the context of a weakening regional demand for Jordanian labor, was also carried out by the Bank (Report No. 5117-JO of June 1984).

2.11 Bank assistance in the industrial sector has thus been directed at fostering Jordan's comparative advantages based on domestic resource endowment and manpower skills, and contributing towards the establishment of a broader export-oriented industrial base. Hitherto, Bank involvement in the sector consisted of a credit to the Industrial Development Bank of Jordan (1974) including financial and technical assistance to the small and medium scale industries, a pilot engineering credit (1975) to help prepare the Arab Potash Dead Sea project, for which a loan for the full scale project was approved in 1978. An Energy Development Project in 1983 included financing and measures for improving and promoting energy efficiency in industry. Technical assistance is currently being provided to devise and implement a master plan for the phosphate mining industry. IFC's investments in Jordan have been geared to the production of ceramic tiles, aluminum fluoride, phosphate fertilizers and bricks, and to the development of the Amman capital market. Finally, Bank's involvement in the optimization of APC's activities, will be within the continued strategy of enhancing Jordan's ability to fully develop its export industries.

D. Rationale for Bank Involvement in the Project

2.12 A key element of the Bank strategy in Jordan is to support resource-based export industries. Under the present economic situation, these industries play a crucial role in reducing the foreign exchange constraints arising from falling remittances and grants. Gross foreign exchange earnings from potash exports exceeded US$82 million (about 10 percent of all merchandise exports) in 1985, and by 1990, following inter-alia the improvements under the proposed project, APC's revenues would increase by about one-third, with a highly attractive yield on the incremental investment.

2.13 Bank support for the project would involve essential technical advice to APC on a relatively sophisticated technology, particularly the evaluation of a new "cold crystallization" process for potash refining. It also involves reinforcing the middle level operational staff, streamlining responsibilities in the production and maintenance areas, as well as training and appropriate deployment of technical assistance. On a different front, the financial difficulties of the "mixed" enterprises have extinguished private interest in, and demand for, participation in such ventures and derailed government plans for increasing private ownership in mixed companies. If APC is able, as expected, to return to a profitable position in 1988, this would open the way towards boosting private participation, no doubt with positive impact on other industries as well.

III. THE WORLD POTASH INDUSTRY AND TRADE

3.01 Potassium is a common element in the earth's crust but, due to its high reactivity and affinity for other elements, does not exist in the elemental form. It is found both in igneous rocks such as silicates and feldspars, and in sedimentary deposits formed by evaporation of sea water. Economic recovery of potassium salts is almost entirely limited to those from sedimentary deposits. Potassium is an essential element for animal and plant growth, and with nitrogen and phosphorous, is one of the three main macronutrients for agricultural production. About 90% of potassium salts produced are used as fertilizers, generally referred to as potash. Potassium content is expressed on a (K_2O) equivalent basis, in which world potassium demand and reserves are usually expressed. Potassium salts were first mined commercially around 1860 after their value as a fertilizer had been demonstrated. In the beginning of this century, about 0.2 million tons per year of (K_2O) were being produced, reaching 4 million tons by 1950 and 31.0 million tons in 1985.

A. World Potassium Reserves

3.02 Estimates of potassium deposits vary widely, depending on the definition of "reserves" as opposed to "resources." "Reserves" are described as ores that can be recovered at, or near, current market prices, whereas "resources" are potentially mineable ores which, because of cost or other constraints, might not necessarily be recovered. Economic recovery costs vary significantly from one deposit to another depending, inter alia, on transport costs to markets. World total figures for reserves and resources derived from agreed data regarding location and geological nature of deposits, place known reserves at 17 billion tons (K_2O) and estimated resources at 150 billion tons. The breakdown of reserves and resources on a country basis is available in the Project File (Ref. A). More than 80% of these reserves and resources occur in Canada and the USSR. The Dead Sea deposits, being exploited by Jordan and Israel, translate into reserves of 0.2 billion tons (K_2O) and resources estimated at 1 billion tons.

B. World Potash Supply and Demand

a. Historical Capacity and Production Growth

3.03 World potash production has grown by about 5.9% over the period 1980/81-1984/85, while world capacity utilization averaged 81%. The 1984/85 supply capability was 31.5 million tons K_2O, with Western Europe, North America, the USSR and the German Democratic Republic accounting for about 94% of world capacity, as the two East European countries and Canada have substantially increased their capacity in the recent past.

3.04 World potash capacity for the year 1984/85 was as follows:

	Million Tons K_2O	Percent
USSR	13.3	36
German Democratic Republic (GDR)	3.5	10
Canada	9.5	26
USA	2.0	5
Western Europe	6.0	16
Others	2.3	7
World Total	36.6	100

World potash actual supply capability in 1984/85, taking into account the phasing in of new mines and capacity utilization rates was as follows:

	Million tons K_2O	Percent
USSR	10.7	34
GDR	3.5	11
Canada	8.4	27
USA	1.7	5
Western Europe	5.5	17
Others	1.7	6
World Total	31.5	100

3.05 World fertilizer potash production--which represents around 97% of total potash production--for the period 1980/81-1984/85, broken down by main region, is summarized in Table-I.

Table-I

World Fertilizer Potash Production, 1980/81-1984/85
(in million tons K_2O)

	1980/81	1981/82	1982/83	1983/84	1984/85
Germany, FRG	2.70	2.29	2.23	2.57	2.62
France	1.93	1.73	1.60	1.68	1.73
Other Western Europe	1.10	1.11	1.01	1.08	1.13
Subtotal W. Europe	5.73	5.13	4.84	5.34	5.48
USSR	8.06	8.45	8.08	9.29	9.78
Germany, GDR	3.42	3.46	3.43	3.43	3.46
Subtotal E. Europe	11.48	11.91	11.51	12.72	13.24
Canada	7.34	6.04	5.38	7.15	7.28
USA	2.05	1.63	1.69	1.50	1.28
Subtotal N. America	9.39	7.67	7.07	8.65	8.56
Israel	0.81	0.88	0.94	0.95	1.16
Others	1.03	0.21	0.04	0.22	0.34
TOTAL World	27.44	25.63	24.40	27.88	28.78

3.06 Potash is produced in relatively few locations, but its extensive use throughout the world entails transportation over considerable distances, so that location relative to market is important to assessing market competitiveness. Additional future production is likely to take place in those few countries where major potassium reserves are located. The main capacity increases are planned to occur in Canada and the USSR, while production in the USA and Europe is expected to remain static or slightly decline. Although plans for new capacity in Canada have been delayed because demand during the past three years was low, supply capacity is expected to increase from about 8.4 million tons (K20) in 1984/85 to 12.4 million tons (K_2O) in 1990/91. The USSR, the world's largest producing country with about 10.7 million tons (K_2O) of supply capability in 1984/85, has plans for marginal expansion of its industry. Besides Canada, there are no other major developments foreseen that could significantly change the current structure of the potash industry or have a major impact on world trade before 1990/91. A potash mine, with a capacity of about 0.5 million tons per year of (K_2O) came on stream in 1985 in Sergipe, Brazil. Possibilities for new mines are being examined in Mexico, Tunisia, Chile, Peru, Brazil and China, most of which would be relatively small and unlikely to have an impact on the overall world scene during the remainder of the 1980's and early 1990s. Under these assumptions, the proposed marginal expansion of APC's capacity would come on stream in a

fairly stable world potash market, as well as under a situation of growing demand in APC's main markets (East of Suez). Increasing APC's output to 1.4 million tpy of product (0.84 million tpy K_2O) would keep APC's share of world market below 3%. A detailed country-by-country review of planned potash production facilities is available in the Project File (Ref. B).

b. Historical Consumption and Demand Growth

3.07 Potash fertilizers are used mainly in Europe, the USSR, North America, Oceania and Japan which, together, account for about 90% of all agricultural potash use. About 5% is used in Latin America, and the remainder in Asia and Africa. Potash consumption in developing countries is low, being only 7 kg/ha in Latin America and 3 kg/ha in Asia, as compared with an average of 48 kg/ha in Western Europe. Also, the Nitrogen/Phosphorous/Potassium (N:P:K) ratio in 1977 was 100:62:57 for developed countries, against 100:43:23 for developing countries. Rising potash deficit in the soil could have serious consequences insofar as it could limit the efficiency of nitrogen applied, to the detriment of the yield and quality of crops.

3.08 World demand of potash in 1985 totalled around 27.7 million tons of K_2O, out of which the US market accounted for 5.5 million tons, Eastern Europe for 3.9 million tons, the USSR for about 6.6 million tons, Western Europe for 5.9 million tons, and the rest of the world for about 5.8 million tons. World fertilizer potash consumption from 1980/81 through 1984/85, broken down by main region is provided in Table-II.

Table-II

Historical World Fertilizer Potash Consumption, 1980/81-1984/85
(in million tons K_2O)

	1980/81	1981/82	1982/83	1983/84	1984/85
North America	6.09	5.45	4.72	5.63	5.40
Western Europe	5.32	5.25	5.38	5.52	5.54
Oceania	0.23	0.26	0.24	0.26	0.28
Other Developed Countries	0.67	0.72	0.75	0.77	0.79
Total Developed Countries	12.31	11.67	11.11	12.18	12.00
Eastern Europe	7.90	8.26	8.09	9.29	9.25
China	0.57	0.81	0.68	0.92	0.91
Total Centrally Planned Countries	8.47	9.07	8.77	10.21	10.16
Developing Countries	3.44	3.01	3.00	3.02	3.73
Total World	24.23	23.75	22.88	25.41	25.89

3.09 On average, through 1990/91, potassium demand is expected to increase worldwide at an annual rate of about 3.3%, lower than the average

rates of 6% witnessed between 1956 and 1976, yet higher than the 2.2% rate between 1977 and 1984. Growth rate will be about 1% in developed countries, 4.8% in developing countries, and 4.1% in the centrally planned economies.

3.10 The 1984/85-90/91 regional and world supply/demand balances, shown in Table-III, are based on capacity figures calculated on a mine by mine basis (World Bank/FAO/UNIDO/Industry Fertilizer Working Group). The detailed breakdown for supply and demand is available in the Project File (Ref. C). Supply capacity takes into account the phasing-in of new mines, average country utilization rates, and distribution losses. Capacity utilization rates and distribution losses for the main producing regions are provided in Annex 1-1. The balances show a steadily declining surplus over the next five years.

Table-III

World Potassium Supply Demand Balances
(Million Metric Tons of K_2O) a/

Surplus (-Deficit)

	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91
Region							
North America	3.97	4.80	5.94	6.15	6.27	5.94	5.93
Western Europe	-0.43	-0.29	-0.25	-0.28	-0.31	-0.32	-0.33
Oceania	-0.28	-0.27	-0.28	-0.29	-0.30	-0.31	-0.32
Other Developed Market Economies	0.41	0.40	0.39	0.38	0.37	0.61	0.86
Total Developed Market Economies	3.68	4.64	5.80	5.96	6.03	5.92	6.14
Africa	-0.26	-0.28	-0.29	-0.30	-0.32	-0.34	-0.36
Latin America	-1.69	-1.62	-1.73	-1.82	-1.91	-1.96	-2.01
Near East	0.42	0.48	0.51	0.55	0.59	0.58	0.57
Far East	-1.69	-1.75	-1.85	-1.97	-2.08	-2.21	-2.27
Total Developing Market Economies	-3.22	-3.16	-3.37	-3.54	-3.73	-3.93	-4.08
China	-0.87	-0.50	-0.81	-0.97	-1.09	-1.13	-1.19
Eastern Europe	3.91	3.83	2.83	2.63	2.39	1.95	1.57
World Total	3.49	4.80	4.46	4.08	3.60	2.81	2.44

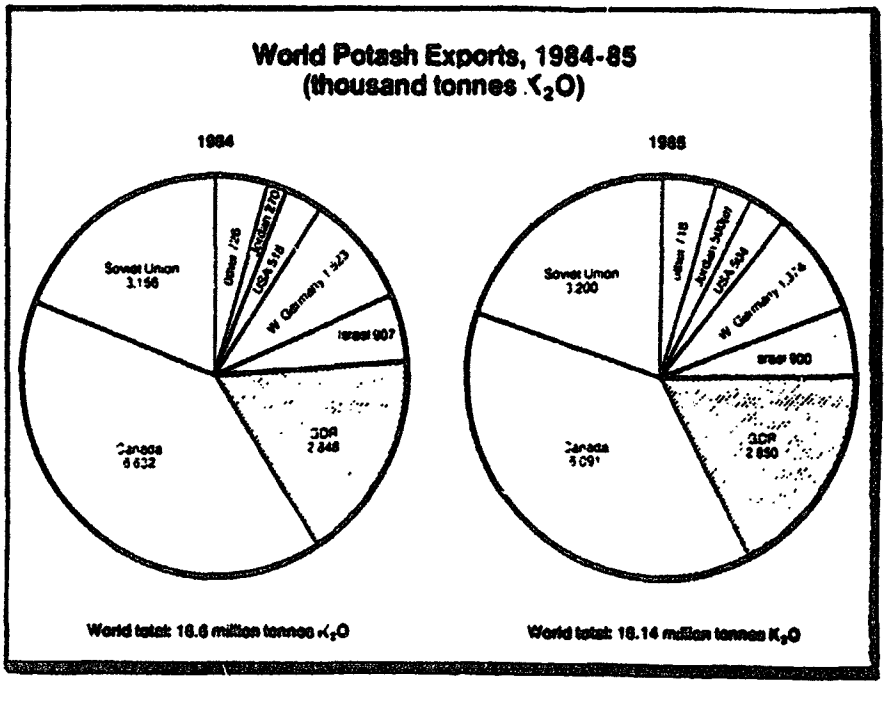
a/ This includes KCl (potassium chloride), K_2SO_4 (potassium sulphate) and KNO_3 (potassium nitrate).

C. Potash Trade

3.11 Due to the limited number of supplying countries, a large part of the potash output is traded in the international market. Of the 28.2 million tons K_2O produced in 1985, about 16.2 million tons, or 57%, was traded internationally as shown in Annex 2-1, which provides the distribution of market shares for main supplying regions in 1985. Canada's export share of world trade represents about 35%, East Germany represents 12%, while West Germany, Israel's Dead Sea Works and France combined account for 25%. Finally the USSR accounts for 10%. Among the major import markets, except for India which is forecast to increase its imports by 400,000 tonnes K_2O between 1986 and 1990, and China by 200,000 tonnes K_2O during this period, comparatively low growth is envisaged in other potash import markets.

3.12 The old co-existence between the long-established producers in North America and Europe is being increasingly challenged by more recently-established producers (Israel, Jordan, and New Brunswick/Canada), which are actively seeking markets, although the share of the latters remains small, with an aggregate production of 1.66 million tons K_2O in 1984 representing a world market share of 5.6%. The new producers have been aggressive in establishing niches for their products: New Brunswick in the US Eastern Seaboard and Latin America; Jordan in India and the East, and Israel in Western Europe and the USA. The drive for sales by the new producers, and the response of the established producers to preserve their market shares, partly acted as a depressant on prices since the beginning of 1985. Although Israel, Jordan and New Brunswick will account for only 8.5% of world potash capacity in 1989/90, the significance of this new production arises from its appearance at a time of relatively stagnant demand. World potash exports, broken down by main exporters for 1984 and 1985 are provided in the Graph-I.

Graph-I



D. Potash Prices

(a) Historical Prices

3.13 Despite the emergence of new producers (Israel, Jordan and New Brunswick), Canada and the USSR remain the only two countries that can substantially increase production, with Saskatchewan expected to remain the most economic large-scale potash source. FOB Vancouver prices are used as reference due to the leadership role of Canada--the world's largest exporter and second major producer (next to the USSR)--with delivery prices principally determined by Canadian producers. Annex 2-2 shows the historical development of Potash prices in current dollars since 1960. Although prices of potash from 1960 onwards showed a tendency to increase overall, there were, for different reasons, strong fluctuations over short spans of 2-3 years. Thus, in 1973, the surge in potash prices accompanied hyper-inflationary commodity price increases after the 1973 oil crisis. In 1980, the rise in price was mainly associated with production and logistics difficulties in Canada and the USSR, while in 1984, the price drop was inter alia caused by depressed US farm economies and, consequently, falling demand.

(b) Price Forecasts

3.14 Several sets of potash price projections are available. The projection of potash prices by APC, on the basis of a linear regression analysis yields a 5% average annual increase in real terms, from the 1986 prevailing levels. Linear regressions however, only provide overall trends, and cannot reflect localised year-to-year fluctuations, resulting inter-alia from supply-demand balances. The medium-term outlook for the KCL market -- as viewed by APC -- indicates that consumption in the major US market will be stagnant, reducing thus the average world growth rate of potash consumption. Therefore, due to low prevailing prices, production cuts in North America, and the existence of high inventories, prices which are expected to be in the levels of US$70/ton (FOB Vancouver) throughout 1986, will remain low in the near term.

3.15 The economic and financial analyses for the proposed project (para 8.01), assume conservative potash prices which in real terms decline from their present 1986 depressed FOB Aqaba level (US$77/ton) to US$75/ton in 1987, US$73/ton in 1988, US$72/ton in 1989 and US$70/ton in 1990. By 1995, prices would still be at the US$72/ton level (in 1986 terms). Adjusted on an FOB Vancouver basis allowing for freight differential, these prices, as derived, translate into levels lower than APC's projections.

IV. MARKET AND MARKETING OF JORDANIAN POTASH

A. APC's Market and Competitive Position

4.01 Jordan's Arab Potash Company began production in late 1982 and the first exports were made to Iraq in the same year. In 1983, production

was 280,000 tons Kcl (170,000 tons (K_2O) equivalent out of which 128,000 tons were exported). In 1984 production amounted to 487,000 tons Kcl (295,000 tons K_2O equivalent, of which exports totalled 273,000 tons), while in 1985 production reached 910,000 tons Kcl (545,000 tons K_2O equivalent with exports of 560,000 tons). Although the steady erosion of freight rates has affected the pattern of world potash trade in reducing the price differentials between potash from different sources, APC remains nonetheless from a logistical viewpoint, in a favourable position regarding a number of markets, and since starting operations, has diversified it outlets to cover more than 20 markets worldwide. Furthermore, the Red Sea being an area of net imports, vessels are available for return cargoes, which provides APC with an edge in freight which extends to Korea in the East and includes India, Malaysia, as well as Indonesia. APC has, relative to Canada, an equal freight position vis-a-vis Japan, China and Brazil, while APC is at a slight freight disadvantage versus Israel vis-a-vis Italy and South of France. Potash freight rates from Aqaba to selected destinations are provided in Annex 3-1. Average net FOB Aqaba potash prices for 1985, are given in Table-IV.

Table-IV

	(in US$/ton KCl)
India	91.0
China	78.5
Korea	83.5
Japan	84.0
Indonesia	74.5
Malaysia	86.5
France	76.0
Turkey	72.0
Brazil	70.0
Venezuela	67.0

4.02 APC's output represents a small share (less than 2%) of world capacity, and can therefore be accommodated within the projected world demand. APC has so far been able to export the bulk of its output (para 4.01), without major marketing problems. The catchment area for APC production, which excludes some parts of Western Europe (UK and Germany), North America and countries with centrally planned economies, represented in 1985, over 10 million tons K_2O, equivalent to about 16 million tons of KCl product. Out of this market, APC production (about 1.0 million tons KCl) accounted for 6-7%. APC, which has marketed 0.95 million tons of KCl in 1985, expects to market 1.25 million tons in 1988 and 1.4 million tons as of 1990, (equivalent to 840,000 tons of K_2O). It has concentrated its marketing efforts in the South Asia, East Asia, and Pacific regions where it enjoys a comparative location and freight advantage. The Arab countries in the Middle East and Africa also constitute natural potential, although small, markets.

4.03 Regarding international trade of commodities, the competitive position of producers is determined by landed costs (CIF price levels), which confers considerable weight to locational factors, first in terms of inland transportation (from production facilities to export harbors), and second, in terms of sea freight to export markets. Inland transportation costs, for instance for one of the main producers and market leaders (Saskatchewan/Canada), account for close to one third of landed prices, which as a consequence, provides a notable edge in selected markets to competitors (including APC) more closely located from export harbors. Thus, whereas Canada's largest potash mining facilities--Saskatchewan--are deep inland at a considerable distance (2400 km) from the main export harbor of Vancouver (which translates into rail freight charges of about US$30/ton), APC's facility at SAFI is at 200 km from Aqaba harbor with associated inland transport charges of less than US$10/ton. APC has directed its marketing efforts into areas where its trading position is further enhanced by the effect of sea freight advantage. This is the case of the growing potentially large markets East of Suez, particularly the Indian sub-continent where APC's prospects to increase its sales are promising. Furthermore, because West Europe is a net importer of potash, and given Jordan's relative proximity, APC--although at a disadvantage vis-a-vis Israeli exports from Mediterranean harbors--is expected to remain a steady source of supply to this active market. Finally, Brazil, because of its potential market size will need to diversify its sources of supplies and maintain a share of imports from Jordan. Because of location however, the return to APC from its Brazilian sales will remain amongst the lowest of all APC's sales.

4.04 India constitutes for APC one of its principal target markets in view of Jordan's freight-favorable location compared to other major suppliers. In 1984/85, India consumed about 1.41 million tons of potassium chloride (0.85 million tons K_2O) all of which was imported, and the Indian Government anticipates potash consumption to continue to increase at a steady rate. The imported potash requirements of other countries in South Asia--Pakistan, Bangladesh, Sri Lanka, Nepal and Burma--are modest, aggregating less than 150,000 tpy of K_2O in 1984/85, and represent limited sales potential, although APC enjoys a measurable freight advantage in these countries also.

4.05 In the Far East and Southeast Asia, Japan is a major potash consumer (631,000 tons of K_2O in 1985), followed by Malaysia (229,000), the Republic of Korea (195,000), Indonesia (151,000), Thailand (87,900) and the Philippines (38,600). In most of these countries the freight advantage enjoyed by APC vis-a-vis Canada is negligible. With a combined consumption of about 1.33 million tons of K_2O in 1985, these markets represent nonetheless an important target for APC.

4.06 The Arab countries consume limited amounts of potash, with the exception of Iraq, Morocco and Algeria, which import measurable quantities. Most of the other Arab countries, which currently consume modest quantities have saline soils, and the bulk of their potash fertilizer use is in the form of potassium sulphate, rather than potassium chloride. Therefore they have not and are not expected to play an important role in the consumption of APC potash.

4.07 The United States (the Midwest and Southeast) is the world's largest consumer and importer of potash. Canada is the major supplier although, since the mid 70's, the USSR and the German Democratic Republic have also entered the US market. APC potash could be sold in the Southeast areas of the US at competitive prices, since Canadian potash (excluding the New Brunswick mines) is shipped through Vancouver and California ports at high transportation and trans-shipment costs.

4.08 A brief description of APC's position and objectives in the main three markets of India, France and Brazil is provided in this paragraph.

(i) India. Since beginning operations, APC has aimed particularly at consolidating its market position in India. It has thus increased its share gradually to around 20% of the Indian market in 1985, with a target of about 25% in 1986. Yet APC has failed to sign a long-term contract with India although the Indian side has indicated preparedness to do so for quantities of around 400,000 tons per year (27%) if Jordan agrees on a countertrade basis to purchase from India goods equivalent to 50% of APC sales to India. APC is unable to do so singularly - but talks are taking place to get the Jordanian government to agree to some of the trade proposals. Although no long-term contract has been signed, both APC and India have an understanding to continue with the yearly contracts now standing at the 400,000 tons level. The main incentive for India is that, on a landed cost basis, APC potash price is slightly lower than that from other sources,whereas the advantage for APC is that, as a result of proximity, sales to India translate into a sale price (FOB Aqaba) about $10 above average APC sale prices.

(ii) France. APC's association with Entreprise Miniere et Chimique (EMC) as agents for Europe and Africa has secured for APC an important share of 100-120,000 tons per year in the French market. EMC enjoys a monopolistic position as the sole importer of potash into France, and APC intends to maintain the EMC arrangement to secure the present level of access into the French market.

(iii) Brazil. APC is aiming at a supply of around 150,000 tons to Brazil. This will be done through local agents who are themselves large potash buyers (80 - 85,000 tons/Year), have excellent country connections and are establishing long-term arrangements with major Brazilian customers.

B. APC Marketing Arrangements and Policies

4.09 In order to secure outlets for its products, APC entered during the pre-production phase into marketing agreements, with specialized marketing and fertilizer companies. The following three main marketing agreements were reached.

(i) Marketing agreement with Mitsubishi Corporation (MC) covering East of Suez and Oceania, excluding Turkey and the Asian Arabic countries. This agreement with MC is essentially a take-or-pay

contract. The initial target for MC, to purchase and sell 50% of APC's total annual production, was later modified to cover 70% of production. The agreement expires by December 31, 1987. In addition, Mitsubishi's commission was revised downwards to 0.5% for India and China (with the option for APC to directly handle these markets), 3% for Indonesia, and 2% for other markets. APC has been considering opening, jointly with Jordanian Fertilizer Industries, resident offices in India, APC's major client with about 25% of market share.

(ii) Marketing agreement with Woodward and Dickerson for North and South American Markets with the original target to cover 25% of APC annual production. The agreement was recently modified to cover only 15% of annual production. This agreement expires by December 31, 1986.

(iii) Marketing agreement with Entreprise Miniere et Chimique (EMC) for West Europe. Originally aimed at covering 25% of APC production, the agreement was recently modified to cover only 15% of APC's annual output.

4.10 In addition APC had entered into a marketing agreement with IMIC (Switzerland) to market 25,000 tons K_2O equivalent annually in the East European market. However, difficulties to implement this agreement have arisen due to coverage of that market by the USSR and East Germany products. APC is nonetheless endeavoring to market given quantities in that area, especially to Romania and Yugoslavia, in the frame of official trade agreements between Jordan and other governments.

4.11 For the past two years, APC has successfully aimed at market sharing with other producers who have made way for APC as a new-comer. APC is now considered a reliable long term supplier with a good position in numerous markets. In view of its relative insignificant size in the market, APC will be a price follower to the leader (Canada). The Canadian International Development Agency has made concessionary funds available to Indonesia, Sri-Lanka, Bangladesh, and various other countries to pay for potash purchases from Canada. These markets, as a result were closed to competition, and have generally yielded attractive prices to Canadian producers. To follow the Canadian example, APC aims at using where relevant, privileged relations to further (potash) countertrade on a case-by-case basis and offer where feasible competitive financing through agents who are being encouraged to buy products from APC customers.

C. Impact of Proposed Capacity Increase on APC Market Position

4.12 The proposed project will bring gradually, by 1990, APC's annual output to the level of 1.4 million tons of KCl, an addition of 350,000 tons over the 1986 level, yet only 200,000 tons over the design capacity for which APC had initially set up its marketing and representation network, entered into specific marketing agreements, and designed its shipping and sales policies. The marketing record of APC, although short, has nonetheless been impressive, as APC has, with little difficulty, been able to

capture a market share close to 1 million tons in a span of 3 years. The risk that APC will be unable to market, through 1990, annual average increments of 70,000 tons, is thus moderate. Moreover, the extension, beyond their respective expiration dates of the existing main three marketing agreements--which APC should be encouraged to do--would further ensure that APC will be able--at no risk--to fully place its incremental output.

4.13 APC's projections through 1990, as regards this expanded output have been prepared on a country-by-country basis, taking into account the experience of the recent past, specific relations with the country involved, the potential for conclusion of long-term contracts, the position of APC agents in the respective areas and, where relevant, APC's competitive edge vis-a-vis the country. The 1984 and 1985 actual sales, and sales estimates on a country-by-country basis, through 1990, are provided in Annex 4-1 and for the main markets, given in Table-V.

Table-V
(in 1000 tons)

Destination	1984	1985	1986	1987	1988	1989	1990
India	98	227	350	400	450	450	450
Brazil	27	100	120	140	150	150	150
France	33	120	120	140	140	140	140
China	54	24	75	75	100	100	100
Others	237	462	435	530	600	610	610
Total	449	933	1,100	1,285	1,440	1,450	1,450

V. THE ARAB POTASH COMPANY

5.01 The borrower, and Project implementing agency, is the Arab Potash Company (APC), a corporate entity registered under Jordanian law, and founded in 1956 to commercially exploit the minerals contained in the Dead Sea brines. In 1958, the Government of Jordan granted a 100 year concession to APC with exclusive rights for the extraction of these minerals, together with fiscal and other incentives. APC's initially authorized capital was JD 4.5 million (US$12.9 million equivalent). In 1978, APC's shareholders authorized a major capital increase to provide adequate equity base for the existing project, a large integrated potash extraction and refinery complex at GHOR-SAFI (IBRD MAP 19875R). The current subscribed capital of APC amounts to JD 72.5 million (US$207 million equivalent) of which JD 65.4 million (US$188 million equivalent) have been paid in.

5.02 Although majority (51%) owned by the Government of Jordan, APC enjoys a special status in Jordan as an inter-Arab venture of a regional, rather than local, dimension. This is due particularly to its capital structure involving the Arab Mining Company (25%), the Islamic Development Bank (6%) and direct equity holdings by the Governments of Kuwait and Iraq

as well as by the Lybian Arab Foreign Investment Company. APC's shareholding structure is presently as follows:

APC Shareholding Structure

Government of Jordan (GOJ)	51%
Arab Mining Company* (AMC)	25%
Islamic Development Bank	6.3%
Government of Iraq	5.7%
Government of Libya	5.0%
Government of Kuwait	5.0%
Government of Saudi Arabia	0.4%
Jordan Post Office Savings Fund	0.6%
Other Shareholders	1%
Total	100.0%

* The Arab Mining Co. is headquartered in Amman, Jordan, and is owned by the Governments of Saudi Arabia (20%), Abu Dhabi (20%), Kuwait (20%), Iraq 20%, and Egypt, Jordan, Syria, Lebanon and other Arab States (2-3% each).

5.03 APC financial statements as of December 31, 1985 are summarized in Table-VI:

Table-VI

APC- Summary of Financial Statements -1985
(in millions)

	JD	US Dollars Equivalent
Current Assets	17,4	49,7
Net Fixed and Other Assets	123,8	353,7
Current Liabilities	25,0	74,3
Long-Term Debt	81,1	88,9
Equity	34,5	98,9
Total Sales	29,1	85,0

A. Board of Directors

5.04 APC's statutes give its board of directors extensive powers to oversee the Company's affairs and provide policy directions, approve capital and operating budgets, and set guidelines on compensation policies. The Company's board has fifteen members, representing the various shareholders. The chairman along with seven members are appointed by the majority

shareholder (GOJ), while the deputy chairman represents the second largest shareholder (AMC). The Board includes members with a broad spectrum of expertise, from government institutions, as well as from the business and banking communities. The board has been closely involved in the decisions aiming at plant optimization and financial restructuring.

B. Management and Information System

5.05 APC's present Managing Director, Mr. Ali Ensour--in his position since mid-1984--had previously held the posts of General Manager of the Jordan Electricity Authority--which he had been instrumental in setting up and organizing--and of the Jordan Phosphate Mines Co. He is a highly experienced and competent manager, well known to the Bank.

5.06 APC has a sound management information system. Reliable information and monitoring systems have been developed in the marketing and personnel areas, as well as for stores and inventories. In finance and accounting, a good computerized system integrates both financial accounts and production control. Long term financial projections are now prepared also periodically. The maintenance activities have so far had to cope with a long series of plant modifications and adjustments, due to the pecularity of the process and the unique chemical characteristics of the Dead Sea brines. However, a good preventive maintenance planning scheme is now being devised. The establishment within APC's organization of a research and development unit is also being considered.

C. Staff and Organization

5.07 APC staff of about 1,320 employees, includes 1,177 Jordanian nationals. The balance consists of a core of foreign experts and over 125 foreign daily laborers. 156 persons are employed at the Safi township and 68 at the Aqaba port terminal. A number of additional technical staff have recently been recruited to ensure efficient plant operation.

5.08 Until the end of 1982, APC was largely devoted to the execution of the pilot and, subsequently, the full scale initial project, including follow-up on the construction of the facility, and the recruitment and training of staff. During the implementation of the initial Bank financed project, a special focus was put on institution building. In that context several groups of consulting firms provided assistance to APC in the design and implementation of its financial control and accounting system, and the organizational structure for project operations.

5.09 An essential component of the institution building, aiming at strengthening operations management, was provided under a long-term contract with an Operations Management Team (OMT) from Jacobs Engineering Group which started in 1980 and extended through May 1986. The contract, in an initial amount of US$16 million, at its peak obtained for APC a team of up to 25 foreign experts, including technical and financial staff. The OMT has been involved in developing pre-production plans and setting APC's

operations into motion and has played a special role in first diagnosing deficiencies in the plant design, and assisting successive teams of independent consultants in devising solutions and modifications to plant design and operating processes. The OMT has also provided on-the-job training to the counterpart Jordanian staff slated to progressively take over the responsibility for plant operation. As the OMT contract expired in May 1986, APC decided to retain a core of four experts out of the original team (including the technical, works and logistics managers), to pursue assistance to APC at least until full design capacity in the plant is reached. Such an arrangement will be further enhanced with the T.A. provided for under the project.

5.10 The Bank appraisal reviewed the organization and procedures of APC and, for enhanced operational effectiveness, agreed with APC on strengthening certain operational areas namely through: (i) reorganization measures pertaining to streamlining responsibilities in production and maintenance; and (ii) retaining/hiring experienced staff given in-line responsibilities in key middle level managerial and craftsman positions. Measures pertaining to the reorganization of the operational functions are outlined in para 5.14, while staffing measures consisted of recruiting/retaining experienced professionals including Works Manager, Technical Manager, Logistics Manager, Maintenance Planning Supervisor, Workshop Supervisor, and Craftsmen (mechanical fitters, fabricators, and mechanics for vehicles). These measures have been carried out by APC. Furthermore, in the context of the proposed research and development program that APC will be embarking upon, the arrangements for consultancy and technical services aim, inter-alia, at ensuring further transfer of technology and know-how to APC. In this respect the demonstration and training aspects of the R&D program will be an essential focus of the consultancy services to be provided.

D. Reorganization of the Operations Function

5.11 APC is organized along functional lines in twelve departments. The finance, marketing, administration and supplies functions report to the the managing director (M.D.) through a Deputy General Manager cum Finance Manager.

5.12 Following the initial period of operations, APC's Marketing Department has been reorganized along three geographical areas--East of Suez; Europe and Africa; and America (mainly Brazil)--and strengthened through recruitment of additional university graduates with background in chemical engineering, agriculture and business. Marketing operations at APC are governed by 3 main agreements signed in 1979-80 when the project was still in the construction phase (para 4.09).

5.13 With regard to the Finance Department, recruitment of additional professionals--some of whom already identified--at the level of Division Head, is planned, particularly to strengthen the financial planning and accounting functions. In due course, the treasury function at APC would also have to be strengthened.

5.14 The operational functions--Production, Maintenance, Engineering and Works, and Research and Development--were initially under the direct control of the Plants and Operations Manager through whom they reported to the M.D. Under such organizational structure, the production complex included over ten functions reporting directly to the plants manager, and created undue overload on the time and capacity of the latter who had direct supervision over the activities related to maintenance, solar pan system, refinery, power plant/utilities, safety and security, technical department, transport, power facilities, vehicle repair shop and training. It was agreed with APC that a works manager, reporting to the plants manager should group and coordinate the functions of maintenance, production and utilities and ensure smooth information flow among operational areas. Improvement in the procurement procedures was also agreed with APC to ensure better coordination between operational departments and warehouses, and hence optimal techno-economic decisions. During negotiations, APC presented its revised organizational chart (APC Staff Organization and Training, December 1986, Project File (Ref. D)) showing the organizational structure recently adopted by APC. Important features of the new structure are the grouping of production and maintenance departments only under a Works Manager to better coordinate production and maintenance, and the reporting of the Safety Manager directly to the plants and operations manager. The Bank is satisfied that the organizational structure is appropriate to APC operations. APC's new organizational chart as recently modified by APC is provided in Annex 5-1.

E. Training

5.15 APC's in-house training unit includes a manager, four engineers, and video technicians. The unit objective is to upgrade employees skills, with focus on operators, craftsmen, especially maintenance technicians, and new recruits. Training is also provided on an ad-hoc basis to university students and local community personnel. Furthermore, APC arranges training in specific areas for various categories of staff with specialized Jordanian institutions, such as the Institute for Labor Education, the Royal Scientific Society, the Public Administration Institute, Jordan University, and the Vocational Training Association. Finally, APC arranges for staff training abroad, where currently 10-15 people are following courses in Holland (Center for Professional Advancement), England (Institutions for Training) and the USA (high management courses at IFDC for maintenance, etc.). Specific courses in the training center are conducted by APC personnel. These training activities have a strong emphasis on the theoretical side. The plant however needs at this stage increased focus on the on-the-job training carried out by experienced operators concerned strictly with operational issues; to this purpose, and to broaden the scope of staff training, the proposed project provides for a training program by outside consultants/specialists, with a focus on middle-level and craftsman levels. In addition, fellowships for training abroad would be provided under the loan for selected staff in middle managerial level positions. However, the bulk of the program will consist of on-the-job training activities as well as specialized courses, mainly in the maintenance area, by outside specialists. Topics to be treated in priority will comprise: rotating machine maintenance, mechanical fitting, welding techniques for

special alloys, fabrication, and materials inspection, and aim at achieving higher operational reliability. The training program as proposed with its emphasis on in-service training as well as the selection of target groups would result in an adequate mix of training instruments available in APC. The three year training program agreed with APC is further detailed in the Project File (Ref. D).

VI. THE PROJECT

A. Background

6.01 In 1978, the Bank approved a US$35 million loan for the construction of a US$460 million potash production facility on the Southern shore of the Dead Sea to exploit one of the few large physical resources available to Jordan--the Dead Sea brines--which are rich in minerals and salts (SAR-NO/ 1922-JO of August 1978). The project thus built and operated by the Arab Potash Company is amongst the largest industrial undertakings in Jordan. Designed to produce 1.2 million tons per year (mtpy) of potash in the form of potassium chloride (KCl), the project started operation in 1983. Its total production is exported. Few similar plants exist in the world, the most relevant being the Dead Sea Works (Israel) and the Great Salt Lake (USA) facilities. Each of these plants is one-of-a-kind, and required the build-up of considerable operational experience to finally prove reliable. Also at APC, the facility has been going through a slow production build-up period, and reached an output level of 910,000 tons in 1985, or about 75% of design capacity. The production process of KCl at APC consists in obtaining carnallite by solar evaporation of Dead Sea brines in a network of ponds, and refining carnallite by hot leaching and crystallization into fertilizer grade potash. Since production came on stream, output has been constrained by bottlenecks, and production targets could not be achieved. Design shortfalls and technological problems have mainly been responsible for the slow build-up of production, which amounted to 280,000 tons of KCl in 1983, 490,000 tons in 1984, and 910,000 tons in 1985, well below projected levels. This slow build-up, together with depressed potash prices, have reduced APC's operating income and partly depleted equity. APC asked the Bank in 1984 to review the status of the project in order to develop a plan of action to overcome the production bottlenecks and the resulting financial problems. Based on independent consultancy studies, which the Bank reviewed, technical and operational measures were implemented by the company in 1985/86. In a first stage, thus, of improvement in the solar evaporation and refining processes, modifications were carried out to upgrade production. The corrective measures implemented through 1985 in the solar pond network have already yielded satisfactory results, bringing the solar pond network potential capacity over its nominal design. The remaining bottleneck, yet to be corrected, is attributed to deficiencies in the refinery where a low conversion efficiency rate results in excessive recycling to the ponds. The improvements in the solar ponds have now eliminated the constraint to carnallite availability and, subject to corresponding improvements in the refinery (the proposed project), production level is expected to reach and

surpass the design capacity at a possible 1.4 mtpy. In the last three years the Company has accumulated a significant knowledge and experience on the process and technological aspects of potash operations based on Dead Sea brines, and appears now able to master the technical complexity of such a unique operation. However, because of previous design deficiencies, the likely sustainable refinery output without the proposed project, will be about 1.05 mtpy. Additional background on the project situation and technical status is given in Annex 6-1. Detailed information on the project's execution and operation is provided in the May 1986 completion report submitted by APC. The completion report concluded that the chemical and physical quality of the potash produced by APC was excellent since startup and this helped in gaining early acceptance of the product in all markets. The report also noted that satisfactory progress has been achieved in staffing and training but these efforts should continue in future years. With reference to plant capacity, separate technical opinions by leading consultants in this field confirm that the proposed refinery modifications would raise production to design capacity and that APC would further need to balance refinery capacity with that of the solar ponds. The proposed project provides for refinery capacity expansion, taking into account the existing marketing arrangements and patterns, and addresses staffing and training needs. A detailed technical diagnosis of the plant is available in consultants reports commissioned by APC to review the technical status of the facility following early indications on capacity constraints. These reports (Jacobs Engineering Group; Great Salt Lake; and Lukes & Bartlett), together with an independent review (Saline Processors) commissioned by the Bank, are available in the Project File (Ref. E).

B. Project Scope and Description

6.02 The sizeable fixed investment already incurred, which includes utilities, township and port facilities, results in a high break-even point. Given APC's low marginal cost of production, an incremental output would yield attractive returns, even if potash prices were not to improve from present (depressed) levels. To build upon this advantage, the proposed project consists of an optimization program which would allow, under its (i) Investment Component, to improve production levels, at a relatively low marginal investment, and ensure that the initial 1.2 mtpy design capacity is first reliably reached, and then, increased to 1.4 mtpy to take full advantage of the potential carnallite feedstock available in the already-optimized evaporation ponds; and (ii) Technical Assistance Component, to devise a long-term program of research and development (R&D) to assess the ultimate potential of APC's facilities--given natural resource and topography constraints--and introduce, in the context and event of an expansion, technological improvements to the refinery through a cold crystallization process. The Technical Assistance (T.A.) component, includes also funds earmarked for on-the-job training to upgrade professional skills in selected areas of production and maintenance. Finally, the Project includes financial rehabilitation measures which would restore APC's financial structure and position to healthy standards, and lay the path for broadening the capital base of the company to new interests, from the private sector.

6.03 (a) The Investment Component, with an estimated installed cost of US$19.45 million, of which US$17.83 million would be in foreign exchange, would be carried out under two separate, yet parallel, programs:

(i) The first program entails a turn-key contract in an amount of US$12 million aiming mainly at refinery modifications to improve performance and efficiency (by removing bottlenecks in the decomposition section). Indeed, following the corrective measures implemented in 1985 in the solar ponds (diversion dike in the salt pan and conversion of pre-carnallite into carnallite area), it has been established that the ultimate capacity of the ponds will exceed the 1.2 million tpy level. The remaining constraints are inherent to the refinery, where the proposed set of modifications required to actually reaching that level could be completed by end-1987. A turn-key contract--awarded in conformity with Bank guidelines--is justified in view of the specific nature of the works envisaged and the technology involved, and allows contractual guarantees to be more easily enforced.

(ii) The second program, in an estimated amount of US$7.5 million aiming mainly at rationalizing the hot leach section of the refinery and providing increased operational flexibility and increasing utility supply and brine intake system, would mainly consist of the acquisition and installation of some proprietary equipment to be directly procured by APC, to expand plant stand-by capacity. The capacity of the refinery could be then increased by over 15%, to 1.4 million,for a marginal capital cost representing about 1% of the initial Project overall cost. Such an investment would be well justified given its attractive return, and can now be committed as APC has gained further experience and knowledge of the pond system's operation and capacity.

The parallel implementation under this component of the two programs as described, is justified by two factors: (i) the process knowledge acquired from the refinery performance throughout the 1985 operating year, now allows to determine the implications of operational bottlenecks under production conditions close to design capacity levels; and (ii) a major modification to the decomposition process, carried out in December 1985, led to improved carnallite particle size distribution, hence increasing production by about 7%. These two factors result in a more reliable forecast of refinery capacity build-up, and indicate that the concurrent implementation of the two programs is justified, whereas their implementation in two successive phases, as has earlier been alternatively envisaged, would retard capacity build-up.

6.04 (b) The Technical Assistance Component is essentially a part of APC's Research and Development Program to assess, given both market position and resource endowment, the long-term prospects of APC operations with a view to continued technology improvement, cost reduction and business growth. The expenditures associated with this component are estimated at US$3.5 million equivalent, of which US$3.2 million would be in foreign exchange. In addition, an amount of US$0.5 million is allocated for a three-year training program consisting of on-the-job training, particularly at the craftsmen level and providing for a number of fellowships. Within this program, improvement of professional skills in the maintenance area will receive special attention. The training component is essential to the success of the investment program.

6.05 Once the corrective and optimization measures have been implemented, APC is looking at the growth prospects of its operations to take, in the long term, full advantage of the potential of its site and facilities. Further growth of APC's operations should be viewed in the context of a continued drive towards reduction of average production costs, in conjunction with the insertion, in the present refining facilities, of a cold crystallization unit which--through initial screening and separate treatment of the carnallite coarse fraction--could increase total capacity by about 50% to a level of about 1.8-2.0 million tpy. The expansion itself would consist of: (i) additional solar ponds for concentrating the brines and depositing the carnallite; and (ii) a modified and integrated plant for the chemical processing and extracting of potash. Presently, the overall cost of such an expansion is broadly estimated by APC at US$100 million which would result in an incremental capital/output ratio of US$175 to 250/ton capacity for the eventual expansion (from 1.4 million tons to 1.8-2.0 million tpy) as compared to a ratio of US$340/ton capacity for the initial project, which makes the development prospects a priori promising. Such a development would call for a thorough set of studies outlined in para 6.06. The first stage, in a cost of up to US$ 3 million, would include, inter alia, the analysis of the potential to further expand the solar pond network capacity, laboratory tests and a pilot unit for an expanded lower-cost production scheme, and a market analysis to derive and justify the optimal level of expansion. Should that first stage yield positive conclusions, a second stage, at a cost of up to US$0.5 million, would provide the preparation of the basic engineering design, including technical specifications and bidding documents on the basis of which contractors can be selected and detailed engineering designs prepared.

6.06 Detailed terms of reference for the proposed study have been jointly prepared by the Bank and APC, and are provided in Annex 7-1. They include a description of the cold crystallization process and its integration in the existing facilities, as well as a suggested process study program. The study will be carried out by consulting firm(s) qualified in potash brine evaporation, harvesting and processing, and would include laboratory and pilot tests. The consulting firm(s) will analyze the impact on production of existing equipment and facilities and make recommendations as to the design of the new equipment to achieve an optimal project integration and expansion. In summary, the study will consist of the execution of: (i) investigation on the potential for expansion of the solar ponds

network; (ii) laboratory and pilot plant tests to identify alternative least-cost routes to process the Dead Sea brines into potassium chloride with a view to expanding production capacity while minimizing investment and operating costs; (iii) economic and financial analyses to determine the recommended route's viability and optimal expansion size with an appropriate plan of exploitation and production, financial projections and related sensitivity tests; and (iv) should such analyses lead to positive results, the basic engineering of the expanded plant and its integration in the existing facilities. With regard to market aspects, the study will: (i) analyze potash consumption in the potential markets and identify increased export potential for Jordan potash; (ii) prepare and analyze potash demand and supply projections on a country-by-country basis; and (iii) assess likely landed prices of Jordan potash from the project to potential markets, and compare them with projected import prices from competitive sources. The major risks of expansion will also be assessed. Cost estimates and implementation schedules for the Project components are provided in Annex 8-1.

6.07 (c) The Financial Rehabilitation Program agreed with APC and the GOJ, entails measures to compensate the effects of past losses, strengthen the capital structure of APC given its partially depleted equity, and relieve the liquidity strain resulting from over leverage. The agreed financial restructuring measures are discussed in paras 9.04-9.07. Their implementation will pave the way for the broadening of the capital base of APC to include private sector participation.

VII. CAPITAL COST, FINANCING PLAN, PROCUREMENT AND DISBURSEMENT

A. Capital Cost

7.01 The total financing required for the Project, including physical and price contingencies, and interest during construction, is estimated at US$26.7 million equivalent, of which US$24.6 million will be in foreign exchange. Interest during construction through 1989 is estimated at US$3.2 million. (Additional working capital requirements to reach the 1.4 mtpy output are estimated at US$3 million.) The capital cost breakdown, given in Annex 8-1, is summarized in Table-VII. The project cost estimates are derived from several sources. Estimates for the refinery modifications (Component A) reflect the final price offer from the firm selected, through ICB, to carry out under a turn-key contract the modifications proposed. Estimates for the complementary expansion (Component B) have been prepared by APC in consultation with Jacobs Engineering Group. Estimates for the R&D (Component C), in its two phases have been prepared by APC in consultations with Bank staff and are essentially based on preliminary proposals received from firms with relevant experience in the field. Finally, estimates for the training component have been prepared by Bank staff in consultation with APC. The estimates were prepared in 1986 constant figures, and adjusted for price contingencies. Contingencies were applied selectively taking into account, where relevant, firm offers

already received. Thus, except for the refinery modifications turn-key contract subject to a firm price offer, physical contingencies of 10% were applied to the base cost of all other project components, and price contingencies for local and foreign currency expenditures were projected at 7%, as per the estimated average increase of the cost of equipment, erection and services related to this specific project.

Table-VII

Preliminary Cost Estimate

	US$ million equivalent		
	Local	Foreign	Total
Component A			
Refinery Modifications[a]/	-	11.96	11.96
Component B			
Complementary Expansion	1.38	5.02	6.40
Component C			
Studies	0.29	2.61	2.90
Component D			
Training	0.08	0.33	0.41
Base Cost	1.75	19.92	21.67
Physical Contingencies	0.18	0.79	0.97
Price Contingencies	0.15	0.66	0.81
Total Installed Cost	2.08	21.37	23.45
Interest during Construction	-	3.23	3.23
Total Project Cost	2.08	24.60	26.68

a/ Turn-key contract installed cost.

B. Financing Plan

7.02 The financing plan for the project is summarized in Table-VIII.

Table-VIII

Financing Plan

	Local	Foreign	Total	Percentage
APC (internal funds)	2.08	3.10	5.18	19
IBRD (Loan)		12.00	12.00	45
IsDB (Loan)		8.00	8.00	30
USAID (Grant)		1.50	1.50	6
Total	2.08	24.60	26.68	100

The Islamic Development Bank (IsDB), a shareholder of APC, has agreed to cofinance the project and completed its appraisal. IsDB procedures and financing instruments permit financing of identifiable equipment under the refinery modifications contract. USAID has agreed to finance US$1.5 million of the technical assistance component's R&D program, estimated to cost about US$3.5 million. 1/

C. Procurement and Disbursement

(a) Procurement

7.03 The refinery modification (decomposition section) contract amounting to about US$12 million has been awarded after international competitive bidding in accordance with Bank procurement guidelines. Bank-financed procurement under the above contract and for the remaining equipment, erection and services consists of (i) ICB for an estimated amount of US$4.50 million; and (ii) LIB for an estimated amount of US$3.30 million, except for equipment proprietary to the process design estimated to cost US$0.80 million to be procured through direct purchase, and small packages estimated to cost less than $200,000 each up to an aggregate of US$1.50 million which would be procured through international shopping from no less than 3 qualified suppliers. Packages over US$500,000 each will be subject to prior Bank review. Packages below US$500,000 each will be subject to ex-post review by the Bank. Under ICB procurement, local qualified suppliers are accorded a preference margin of 15%, or the duty applicable, whichever is lower. The Bank loan will also be used to finance cost of engineering, technical services, training, and interest during construction on the Bank loan. Consultants will be employed in accordance with Bank guidelines. Funds from co-financing sources (IsDB and USAID), will be used along the procurement methods of the relevant lending agencies.

1/ During 1987, APC has to meet additional capital outlays, including expenditures for dikes raising, covered from internal resources. The financial rehabilitation measures under the Project call, separately, for equity injection and for a change in the nature of APC's liabilities. These are outside the frame of the Project financing.

7.04 The consulting engineers prepared bid documents for the refinery modifications main contract, and assisted in issuing the documents and selecting the contractor in accordance with ICB procedures approved by the Bank. Although this is a turn-key contract on a lump-sum basis, arrangements were made to identify specific equipment under the contract which could be financed by the IsDB under lease, or hire-purchase arrangements. A list of equipment itemized in the tender documents and which the IsDB will finance, consists of pumps with motors (12), carnallite and first-stage decomposition thickeners, agitators (2), tanks (4), power transformer and crystallizer coolant piping system. Given different procurement procedures, and in the instance, financing instruments, of the main co-lenders, procurement for the project is being carried out under parallel rather than joint financing with prior allocation of packages to the specific financiers. The Bank loan will be used to finance the categories of items outlined in para 7.05; the IsDB will be financing equipment out of the list provided in this paragraph; the USAID will be contributing its (grant) financing to the works associated with the setting up of the pilot plant and related T.A. services (software) for the cold crystallization unit. The key allocation of procurement categories to be followed during project execution is given in Table-IX.

Table-IX
Procurement Methods a/
(US$ million)

	ICB	LIB	LCB	Other b/	Total
Equipment & Materials	8.50 (0.50)	3.45 (2.55)	- (-)	2.85 (2.30)	14.80 (5.35)
License, Engineering & Consultancy Services	1.00 (1.00)	0.85 (0.75)	(-) (-)	1.65 (0.50)	3.50 (2.25)
Civil Works/Erection	3.00 (3.00)	- (-)	1.65 (-)	- (-)	4.65 (3.00)
Training	- (-)	- (-)	- (-)	0.50 (0.40)	0.50 (0.40)
Total Installed Cost	12.50 (4.50)	4.30 (3.30)	1.65 (-)	5.00 (3.20)	23.45 (11.00)

a/ Figures in parentheses are the respective amounts financed by the Bank Loan.

b/ Includes direct purchase, international shopping, and recruitment of consultants.

7.05 (b) Allocation and Disbursement of Bank Loan

The proposed Bank loan of US$12 million would cover about 45% of the project cost and 49% of its foreign exchange requirements. As has been the case in the first Arab Potash Project, the loan would be made directly to APC, on the standard Bank terms for Jordan (with 17 years maturity including 4 years of grace). APC would bear the foreign exchange and variable interest rate risks. The loan would be guaranteed by the GOJ against a guarantee fee of 0.8% to be paid annually by APC to the GOJ on the principal amount of the loan withdrawn and outstanding. The allocation of the Bank loan is reflected in Table-X.

Table-X
Allocation and Disbursement of Bank Loan

	Category	US$ Million	Disbursement
(1)	Equipment & Materials	8.30	100% of foreign expenditures, and 100% of local expenditures (ex-factory cost)
(2)	License, Engineering and Consultant's Services and Training	1.20	100% of expenditures
(3)	Interest during Construction	1.00	
(4)	Unallocated	1.50	
	Total	12.00	

The Bank loan is expected to be fully disbursed by June 30, 1992, as per the schedule of Annex 9-1 which is in accordance with the Bank standard disbursement profiles. Provision is made under the loan for retroactive financing of up to US$1.2 million for expenditures incurred after June 30, 1986. A special account will be open to cover estimated average expenditures of 4 months, equivalent to US$0.75 million. Disbursements for contracts under US$100,000 will be done under the statement of expenditures (SOE) procedure.

VIII. ECONOMIC ANALYSIS

A. Assumptions and Base Case

8.01 The APC project is essentially export oriented. Revenues, therefore, both in economic and financial terms, are actual potash prices FOB Aqaba, netted as relevant by marketing commissions. For the purpose of the economic analysis on the basis of which the proposed investment has been justified, prices expressed in constant 1986 terms, are projected to decline from their 1986 level of 77 US$/ton (FOB Aqaba) to US$70/ton in 1990, and reach US$72/ton in 1995. Given limited distortions in the

economy, with the notable exception of energy inputs, economic and financial costs are identical. As a conservative measure yet, reflecting essentially a volatile situation, fuel and diesel oil have been valued, in the economic analysis, at local official prices, substantially higher than current international levels. This translates, under today's structure of prices, into a cost penalty on APC.

8.02 APC's existing facility at Safi, in the absence of the proposed investment, already has a projected net benefit stream higher than the opportunity cost of the plant. The economic analysis of the proposed project has therefore been carried out on an incremental basis, and shows that the investment contemplated to bring APC output level to 1.4 mtpy, yields attractive returns. Without the project, production is forecast to reach 1.05 mtpy in 1986. The proposed investment will enable production to slowly build up to 1.15 mtpy in 1987, 1.25 mtpy in 1988, 1.35 mtpy in 1989, and 1.4 mtpy in 1990. The ultimate addition to capacity, attributable to the proposed investment would, therefore amount to 350,000 tpy. This represents, for the proposed investment, a capital output ratio (C/O) of less than 45 US$/ton of annual capacity compared to the initial C/O of over 450 US$/ton. As a consequence of APC's low marginal production cost (16 US$/ton delivered Aqaba, at the 1 mtpy output level) the Economic Rate of Return on the investment would, over a ten-year operating lifetime, be strikingly high and close to 100% (Annex 10-1).

B. Sensitivity Analysis

8.03 Sensitivity tests were carried out under the following scenarios:

(i) Assuming that in the situation of reference--sustainable level of output without further investment--APC facilities are able to produce 1.15 mtpy, the C/O to achieve 1.4 mtpy of production would increase to 62 US$/ton, and the IRR would be close to 55%.

(ii) Assuming that market constraints would prevent APC from selling more than 1.20 mtpy--for instance under a system of quotas imposed by major producers--the C/O of the marginal investment would exceed 100 US$/ton, while the IRR would still be close to 65%.

(iii) Assuming that the situation of reference is 1.15 mtpy, combined with a market ceiling of 1.2 mtpy, the C/O ratio would amount to 310 US$/ton, while the IRR would collapse to 10%.

8.04 Switching Value for Potash Prices. To net a zero present value (at 10% discount rate) on the proposed investment, KCl prices, for the incremental production, could fall to floor levels as low as 20 US$/ton (respectively 25 US$/ton for 1.15 mtpy reference situation). Such a considerable price flexibility which APC could afford in the event of tightening competition, markedly enhances the viability of the proposed investment, and hence of the entire APC facility, and demonstrates that APC, given its low marginal production costs, could grant sizeable price discounts and still generate earnings.

C. Other Benefits

8.05 Once full operating capacity is reached, the proposed investment would yield to Jordan incremental gross foreign exchange earnings, as compared to the 1986 reference situation, of about US$27 million per year (in 1986 terms). These gross earnings should be netted out by (i) the annual service of the foreign debt contracted to fund the investment; and (ii) the annual, direct and indirect, foreign currency expenditures--mainly fuel and diesel oil--incurred on account of the incremental output. The resulting net annual foreign exchange earnings, as of 1990, are estimated at US$20 million equivalent. Thus as a result of the proposed investment, the export base of the APC project, which now accounts for about 10% of Jordan's merchandise exports, would be broadened, and Jordan's dependence on phosphate exports reduced. The assessment of the fiscal impact of the investment on Government budget is less straightforward, as the export tax levied on shipments hauled in Aqaba is aimed at partial recovery of the public investment in infrastructure (mainly the Aqaba terminal) already incurred on account of the APC project. However, on incremental basis, additional tonnage in Aqaba will translate into additional, albeit small, tax levies of about 0.1 million JD/year. Moreover, the proposed investment which will help APC revert to profitability will allow that dividends, long overdue, be paid inter-alia on Government equity. The Project will also have beneficial institution building effects, in adding to the expertise of APC engineering and operating staff, as the investment component will induce more efficient operating practices, while the TA component will allow transfer to APC of up-to-date technology. Finally, the proposed project will permit efficient use, at relatively low cost, of indigenous feedstock resources.

IX. FINANCIAL ANALYSIS

A. Financial Projections

9.01 Financial projections through 1995 are carried out in current Jordanian Dinars (JD). Expenditures, and incremental revenues from the proposed investment, are accounted for as per the implementation schedule outlined in Annex 8-1. Starting from the 1985 actual, and 1986 budgeted figures, the financial projections assume a KCl price increase, in nominal terms, of 4% in 1987 and 1988, and 5% thereafter, while production costs were inflated by 7%, which, compared to projected local inflation, translates into a real fall in KCl prices of about 10% by 1990, and 20% by 1995 from their 1986 levels. Fuel and energy prices, a sizeable share of APC production costs, were kept at their end-1985 official levels, substantially higher than present international prices. Two main sets of projections were carried out to assess APC's position (i) without the

proposed investment, assuming an optimistic level of production capacity (1.05 mtpy in 1986, and 1.15 mtpy thereafter); and (ii) with the proposed investment under a conservative schedule of capacity build-up (para 8.02). The key indicators of cash flow from operations, before and after debt service, allowing the comparison of the two situations are provided in Annex 11-1, and show the preference for the proposed investment.

9.02 The financial performance data of APC, incorporating the proposed project, are summarized in Table-XI.

Table-XI

Summary of Projected Financial Performance
(in JD million)

	1987	1988	1989	1990	1995
Production (1,000 tons KCl)	1,150	1,250	1,350	1,400	1,400
Sales	32.4	36.6	41.5	45.2	57.7
Production Costs	16.2	17.0	18.3	19.7	26.6
Depreciation	8.3	8.3	8.3	8.4	8.9
Operating Profit	5.0	8.4	12.0	17.1	22.2
Financial Costs	7.9	7.5	6.4	5.4	1.7
Net Income (loss)	(2.9)	0.9	5.5	12.2	20.5
Internal Cash Generation	16.2	19.6	23.2	25.6	24.0
Total Assets	128.2	119.1	110.2	105.7	141.3
Long Term Debt	66.7	54.6	42.1	29.8	7.1
Equity	33.3	34.2	39.7	51.9	120.1

The projections show that APC's revenues would increase from JD 32.4 million in 1987 to JD 45.2 million in 1990 and JD 57.7 million in 1995. Operating profit would increase from JD 5.0 million in 1987 to JD 17.1 million in 1990 and JD 22.2 million in 1995. From net losses of JD 2.9 million in 1987, APC would be showing a net income of JD 0.9 million in 1988, rising to over JD 12 million in 1990 and JD 20.5 million in 1995. The production cost structure provided in the income statement is further detailed in Annex 11-2. The debt service coverage ratio would exceed 1 after 1987, and the debt/equity ratio would fall below 60/40 as of 1987 and 55/45 by 1988.

9.03 The financial rate of return on the marginal investment calculated in constant 1986 terms, would be equal to the economic rate of return, as a result of the assumptions on economic and financial prices (para 8.01).

B. Need for Financial Restructuring

9.04 The projections highlight the inadequacy, with and without the proposed investment, of the financial structure of the Company in terms of depleted equity, shortage of liquidity, and default in servicing (Government) debt. Even in the improved case where the proposed investment is implemented, the analysis of the main financial indicators (debt/equity, debt service coverage and current ratios) emphasize the need for financial rehabilitation through equity injection and restructuring of debt.

9.05 APC's board, aware of the financial situation of the Company, called in 1985 for an additional capital subscription of 15% (JD 9.5 million, or US$27 million equivalent) which was decided by the shareholders. Discussions with the two main shareholders--the GOJ (51%) and the Arab Mining Company (AMC) (25%)-- indicate that while these two were prepared to pay in their shares of the capital increase, chances are slim for the other shareholders to do so at the present time. APC's board recently called on the shareholders to pay in,by March 1987, the balance of the capital increase. The GOJ, as the majority shareholder, has confirmed that it would subscribe and pay, by March 1988 at the latest, for any unpaid balance of the capital increase.

9.06 In that context, the question arose--given today's precarious financial position of APC--as to the timeliness of attracting new partners, ideally from the private sector (be it local or foreign interests). The present Government in Jordan has a pragmatic approach to increasing private sector participation into wholly or majority-owned Government commercial activities. As concrete measures in this context, it has altered the legal structure of the National Telecommunications Company, which was converted into a shareholding entity open for subscription from the public. The merger of the Phosphate Mining Company (JPMC) and Jordan Fertilizer Industry (JFI) has also increased, although marginally, non-Government (AMC, the Arab Petroleum Company, etc.) control over JPMC. Although the GOJ may be willing, as a matter of policy, to attract private sector interests into APC, discussions with Government officials revealed the concern that opening the capital of the Company to new partners would not be opportune under APC's present unfavorable financial situation, as existing shares would be sold at a discount. They were of the view that divesting existing shares or issuing new ones should await the Company's financial recovery while, at present, implementing alternative measures for financial restructuring, which over the 1987-89 rehabilitation period would allow APC to maintain its creditworthiness together with an acceptable level of liquidity.

9.07 In line with the financial restructuring plan agreed with APC and the GOJ, APC's outstanding debt to the Government (about JD 13.5 million, or US$39 million equivalent) has been consolidated into long-term debt maturing in 1993, with a 3-year grace period to ease the liquidity constraint. Furthermore, this debt has been subordinated to the rights of other lenders and will, as quasi-equity, strengthen the financial structure

of the Company, without increasing Government control over APC. (The existing liability vis-a-vis the GOJ consists of installments due and not paid, of loans channelled to APC through the Government (JD 3.2 million), interests accrued (JD 9.2 million) and deferred interests due (JD 1.1 million)). The conversion of Government debt, or part thereof, into preferred redeemable shares is an option also provided for under the Government's decree relative to the debt subordination. The financial projections for APC through 1995, incorporating the rescheduling measures are given in Annex 12. (These projections illustrate the case where Government liabilities are consolidated into long-term debt fully repaid by 1990 with a two-year grace period, and assume that the payment of the balance of the share capital increase has been completed by end 1986.)

9.08 The possibility for APC to issue, on the local market, convertible debentures, through public offering or direct placement with local financial institutions was discussed. In addition to raising medium-term funds, this could constitute the first step towards potential broadening of the company's capital base and seeking a larger private sector participation in APC. The optimal timing and comparative cost of such a financing instrument, and the conditions of convertibility, would be carefully assessed. Potential assistance from the World Bank Group to APC during project's implementation in exploring and pursuing this avenue was discussed during negotiations.

C. Financial Covenants and Reporting Requirements

9.09 Under the financial covenants of the 1978 Bank financed project, APC was required to maintain as of 1986, a debt/equity ratio below 55/45 and a debt service coverage (DSC) ratio above 1.5. As these ratios are more stringent than those commonly applied to large industrial projects, it is recommended to relax some of the financial covenants under the proposed project. In addition to the financial restructuring measures approved by the Government of Jordan to pay in the additional share capital increase, and convert/subordinate its outstanding debt to APC into a seven-year maturity debt, with a 3-year grace period, APC has agreed to follow prudent financial policies to restore and maintain the integrity of the company and the value of its stock, and in particular: (i) maintain a debt/equity ratio below 60/40; (ii) maintain, through 1990, a current ratio of no less than 1.0, and 1.4 thereafter; (iii) maintain, through 1991, a debt service coverage ratio of no less than 1.0, and 1.3 thereafter; and (iv) consult with the Bank prior to undertaking capital investment exceeding US$8 million in any fiscal year.

9.10 With regard to accounts, audit and monitoring, APC will be required to submit to the Bank quarterly progress reports during project

implementation, and annually thereafter during the life of the proposed loan. In addition APC would continue to have its accounts audited annually by independent auditors acceptable to the Bank, and submit audited accounts to the Bank within six months from the end of its fiscal year.

D. Project Risks

9.11 Regarding the commercial risk associated with the marginal investment, the analysis shows that potash prices, for the incremental output, could decline sharply from their present depressed levels before the investment be no longer justified. This considerable price flexibility which APC could afford in the event of tightening competition, markedly enhances the viability, while alleviating the risk, of the investment. The main market risk for APC would be associated with a market collapse--for instance resulting from the imposition of quotas--where APC would be unable to market its full production. In the event of tightening market outlets and increased competition, APC strategy would be--as a result of low marginal production costs--to boost sales while increasingly discounting prices, rather than cut back on production. The market position of APC, its short but effective marketing record, and the marketing network and contracts-- Mitsubishi (East of Suez market), EMC (Europe and Africa), and Woodward Dickerson (Americas)--it has entered into (para 4.09), would secure with minimal risk, outlets for the incremental production. As regards the technological risks associated with the investment component and the ability of APC staff to operate effectively the optimized facility, these risks are moderate, as the company has already acquired a satisfactory knowledge and experience on the technological and operational aspects of potash operations, and the optimization measures foreseen under the project will further increase safety margins and add operating reliability to the plant. In addition, organizational and procedural adjustments (para 5.14) have been made to further improve effectiveness, and measures have been taken to enhance mid-level managerial capabilities and staff skills, especially in operational areas such as maintenance, where, the departure of the initial core of expatriates may impair work efficiency. As for the Technical Assistance component, the risks that the cold crystallization study may prove unsuccessful is moderate, as the basic process and technology has been already proven in other potash operations and the focus of the study will mainly concern the definition and optimization of process parameters. The proposed investment, in conclusion, shows an attractive return associated with an acceptable risk, for which Bank assistance is warranted.

X. AGREEMENTS

10.01 Assurances were obtained from, and agreements reached with, the APC that it will:

(i) continue to manage its affairs on a sound basis, and follow prudent financial practices in compliance with the covenants of para 9.09; and

(ii) continue to operate its facilities in compliance with sound environmental and safety standards acceptable to the Bank.

10.02 The GOJ has confirmed that it will complete, as the majority shareholder of APC and guarantor of the Bank loan, the payment by March 1988 at the latest, of the balance of the share capital increase subscribed in 1985 and not paid-in (para 9.05).

10.03 A special condition of effectiveness of the Bank loan would be that all conditions precedent to the effectiveness of the cofinanciers (IsDB and USAID) agreements have been fulfilled.

10.04 Based upon the foregoing assurances and agreements, the proposed project provides a suitable basis for a Bank loan of US$12 million equivalent on standard terms, to the Arab Potash Company, with the guarantee of the GOJ.

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ANNEX 1

JORDAN - SECOND ARAB POTASH PROJECT

POTASH MINES

CAPACITY UTILIZATION RATES AND DISTRIBUTION LOSSES

A. Nominal Mine Capacity Utilization Rates

North America	
Canada	90
USA	90
Western Europe	
France	95
Germany Fed. Rep.	95
Italy	78
Spain	83
UK	95
Other Developed M.E.	
Israel	100
Latin America	
Brazil	50
Near East	
Jordan	80
Socialist Asia	
China	85
East Europe	
Germany Dem. Rep.	100
USSR	85

B. Distribution Losses

North America	2%
Western Europe	2%
Centrally Planned Europe	
Germany Dem. Rep.	2%
USSR	8%
Other Regions	5%

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JORDAN - SECOND ARAB POTASH PROJECT

POTASH - INTERNATIONAL MARKET AND TRADE

Market Shares in 1985
In million tons K_2O

	USSR	Canada	West Europe	East Europe	USA	South Asia	East Asia	West Asia	Total
Capacity	12.5	9.6	6.6	3.5	1.7	-	-	2.0	35.9
Production	9.8	6.8	5.1	3.5	1.4	-	-	1.6	28.2
Consumption	6.6	0.58	5.9	3.9	5.5	0.82	1.6	0.18	25.1
Exports	3.2	6.1	2.3	2.8	0.4	-	-	1.4	16.2
Imports	-	0.02	3.1	3.3	4.6	0.82	1.6	-	13.4

% of Exports to	63% E.E. 18% W.E. 10% E.A. 9% Other	67% USA 16% E.A. 5% Bz. 12% Other	50% W.E. 50% Other	40% Com. 25% W.E. 20% S.Am. 15% Other

E.E. = East Europe
W.E. = West Europe
E.A. = East Asia
S.Am = South America
Com. = Comecon Countries
Bz. = Brazil

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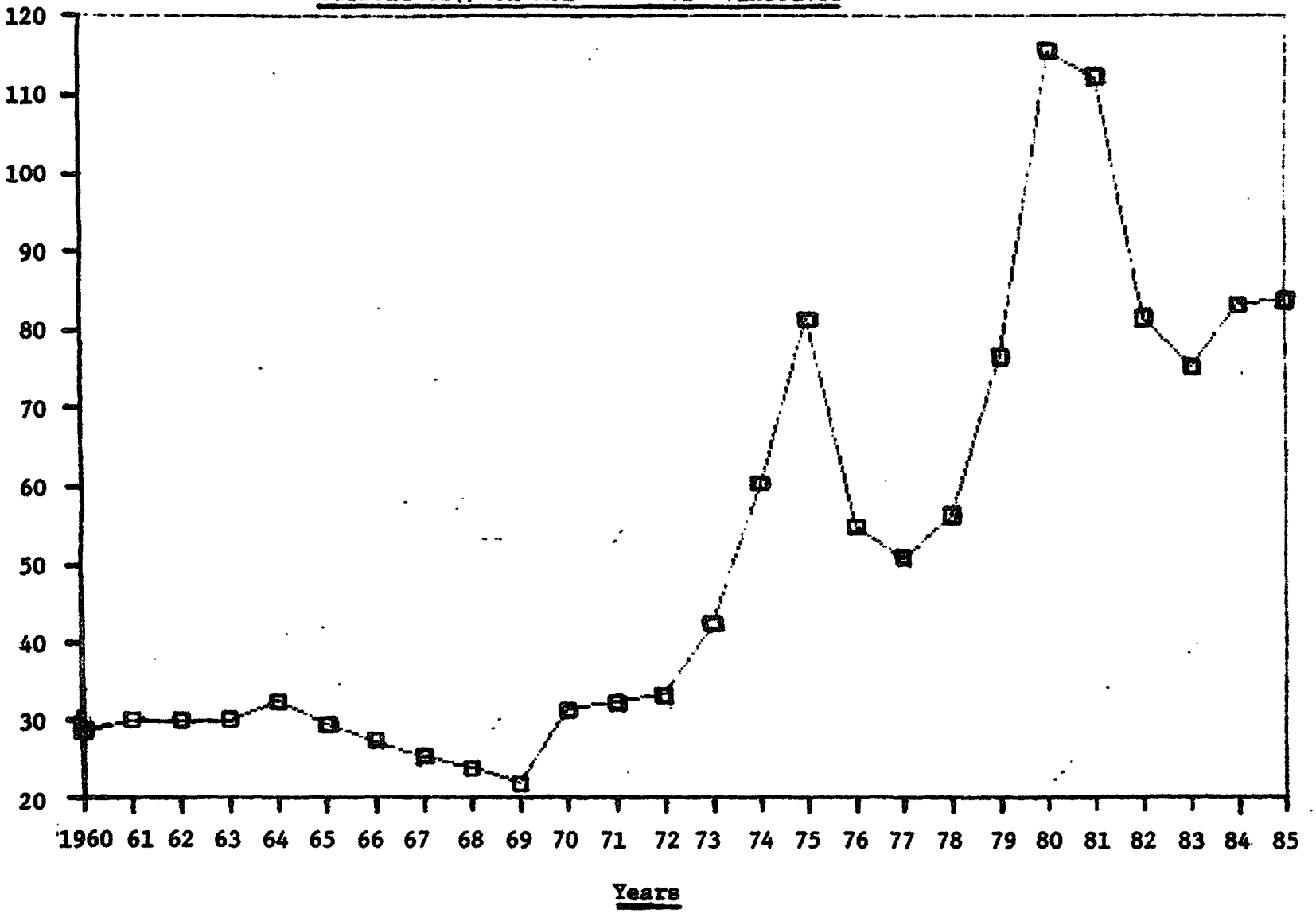
ANNEX 2-2

world potash prices - 1960-1985

Current US$/Ton KCL - FOB Vancouver



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ANNEX 3

JORDAN - ARAB POTASH COMPANY

POTASH SHIPPING RATES AND VESSEL CAPACITY

(AQABA TO SELECT DESTINATIONS)

Destination	Rate US/ton	Vessel Capacity ('000 tons)
S. Africa	18-20	15 - 18
Italy	9-12	5 - 10
France	7.5-8.3	5 - 7
Atlantic Ports	8,5-9.5	10 - 15
Tunisia	9-10	7
China	13-15	20
India	13-14	15 - 20
S. Korea	10-13	7 - 15
Bangladesh	18-22	18 - 21
Japan*	15	5
Taiwan	10-14	15
Indonesia	15-17	15
Philippines	12-13	10
New Zealand	15-18	10
Colombia	30-33	5 - 6
Mexico	16-17	5 - 6
Venezuela	18-19	15 - 18
Brazil	17-20	15 - 18

* Combined shipment with JPMC

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ANNEX 4

JORDAN - SECOND ARAB POTASH PROJECT

APC - Actual and Projected Sales for 1984-1990
(in '000 tons KCl)

Destination	Actual 1984	Actual 1985	Projected 1986	Projected 1987	Projected 1988	Projected 1989	Projected 1990
India	98	277	350	400	450	450	450
China	54	24	75	75	100	100	100
Taiwan	28	25	30	30	30	30	30
Malaysia	40	41	40	40	60	60	60
New Zealand	19	17	15	20	20	20	25
Indonesia	57	74	60	70	70	70	70
South Korea	32	56	70	70	75	75	75
Japan	15	30	40	50	50	60	60
Burma	7	0	0	0	10	10	10
Philippines	0	0	10	15	15	15	15
Australia	0	0	15	10	10	10	10
Sri Lanka	0	11	0	10	20	20	20
Bangladesh	0	20	20	20	20	20	20
Brazil	25	100	120	140	150	150	150
L. America	0	56	15	25	40	40	40
France	33	120	120	140	140	140	140
Italy	5	18	40	40	40	40	40
S. Africa	0	0	0	20	20	20	20
W. Africa	13	13	10	15	15	15	15
N. Africa	0	7	10	15	20	20	20
N. Europe	0	0	0	20	20	20	20
E. Europe	0	0	0	25	25	25	25
Turkey	7	27	20	20	25	25	30
Iraq	8	10	10	15	15	15	15
Other	8	7	30	0	0	0	0
Total	449	933	1,100	1,285	1,440	1,450	1,460

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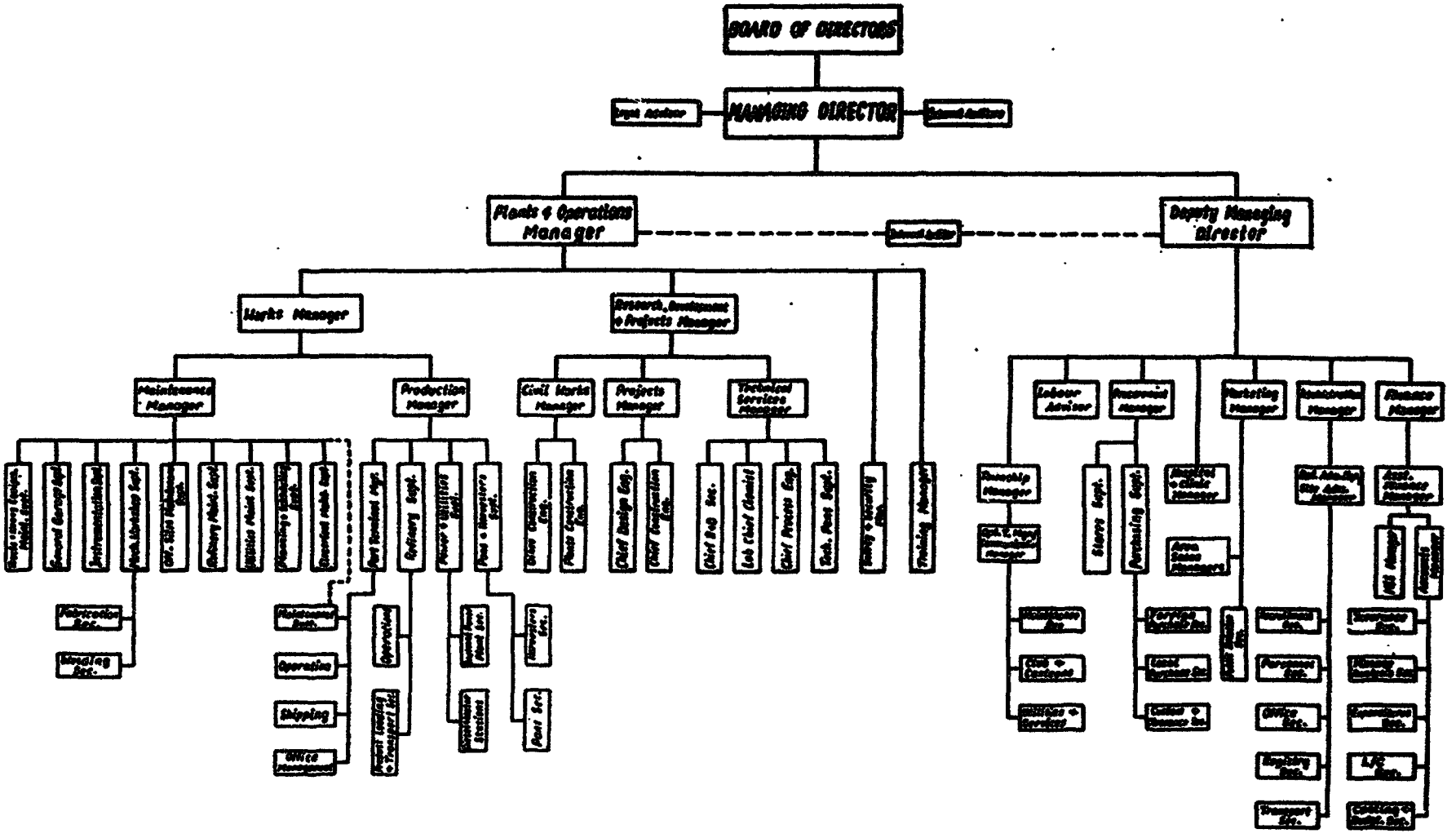
ANNEX 5

ARAB POTASH COMPANY

ORGANIZATION CHART



JORDAN

SECOND ARAB POTASH PROJECT

Summary of Project Situation

1. The Arab Potash Project was mechanically completed and formally inaugurated its operations in 1982. However, shortfalls in the carnallite deposition rate and low yields in the refinery, soon cast doubts upon the ability of the system to perform at the designed capacity of 1.2 million tons per year (tpy). Given growing indications on capacity constraints, APC hired three consulting groups (Jacobs Engineering Group, Great Salt Lake (GSL), and Lukes & Bartlett) to review the design and operation of the solar pan schemes. Jacobs--the design and supervision engineers of the Plant--also undertook a global diagnosis of the refinery's operations. The three groups were asked to predict current production capability, assess the effects on output of various operating variables, and in case of risk of shortfall from design, propose improvements to reach the design capacity level. The Bank employed an independent expert to assess the consultants reports, make independent estimates of current capacity, and recommend future actions/changes to assure the desired production of 1,200,000 tpy. The conclusion, broadly shared by all groups, was that plant capacity was reduced because of the following major problems:

(i) The extrapolation factor used in designing the salt pan section from the results of the pilot tests was overly optimistic and caused the salt pans to be undersized.

(ii) The salt-to-carnallite pond ratio was out of balance, which left the carnallite area comparatively insufficient to provide the required carnallite amount.

(iv) Various start-up, operational and design problems severely reduced the yield of the refinery, resulting in excessive potash loss and recycling to the ponds, with overload at the plant front end.

2. The proposed changes, as suggested by the consulting groups, and retained for execution by APC, were as follows:

(a) Solar ponds. The plan called for building of a diversion dike in the salt pan and the modification of the pan system to balance the salt-to-carnallite ratio through expansion of the carnallite pond. About 6.5 km^2 of pre-carnallite area was converted from PC-1 into carnallite, through the erection of a dyke. A diversion dyke was also planned in the new created carnallite area (hence called C_5 and C_6) to

allow rejection of the flow water in the (Truce Line) flood channel. The incremental carnallite area entered service in May 1985.

(b) Refinery. With regard to the refinery, the modifications as proposed by Jacobs would be effective in improving overall production rate, and would increase yield from the present level of 50-67.5% to 75%. Among the process changes suggested, was the modification of the carnallite decomposition step from a single-stage co-current system to a two-stage counter-current flow to achieve maximum yield efficiency.

3. Modifications to the solar ponds started in early 1984 and were completed in May 1985. By correcting these deficiencies, the solar pond section was brought slightly over its original design capacity and, with further improvements in the refinery, it was established that the plant output could reach about 1.4 million tpy KCl.

4. The delay in capacity build-up and the resulting shortfall in output, combined with depressed potash prices and increases in input (energy) costs, have strained APC's financial position. Net losses amounted to JD 13.8 million in 1983, JD 9.4 million in 1984 and JD 6.5 million in 1985. With major debt repayments coming due as of 1984, and APC's equity base impaired by the cumulative losses, additional capital contribution was required to put back the Company on a sound footing.

Industry Department
December 1986

JORDAN

ARAB POTASH COMPANY

TERMS OF REFERENCE FOR POTASH LONG-TERM EXPANSION STUDIES

General Background

1. The Arab Potash Project was designed to exploit one of the physical resources available to Jordan--the Dead Sea brine--which is rich in minerals and salts, particularly potash. Studies initiated in 1975, confirmed the feasibility of the production of 1.2 million tons per year (tpy) of potassium chloride (KCl), and the resulting project, one the largest in Jordan, was completed in 1982. Production amounted to 908,560 tons in 1985, while the plant reached production level equivalent to 1.0 million tpy in August 1985 as additional carnallite deposition in the solar pans became available.

2. The total production of the Arab Potash Company (APC) is exported; this amount is small as compared to the overall world potash trade. The APC project has a major impact on the Jordanian economy, and helps diversify and strengthen Jordan's export base. If market conditions allow, APC could have an advantage in expanding production beyond existing capacity given the sizeable fixed investment already incurred, particularly in infrastructure and utilities including township and port facilities, and which could accommodate higher production levels. Given large fixed, and low variable, operating costs, resulting in a high profit breakeven point, APC's advantage in increasing production would be significant.

3. A potential expansion would primarily depend on the market prospects for APC potash trade. The competitive position of APC in terms of structure of costs, geographic location and already established market network make the prospects for capacity expansion worth to be studied. Indeed, compared with the major world potash producers and traders, APC is able to compete successfully in world markets, especially in the Indian and Pacific Ocean areas where APC enjoys significant freight advantages. In addition, the main elements of APC's marketing strategy have been established, including organization, representation, and promotion, product specification and packaging, and shipping policies.

4. In Jordan, the production process of potassium chloride now consists in obtaining carnallite by solar evaporation of Dead Sea brines in a network of ponds, and refining carnallite by hot leaching and crystallization into fertilizer grade potash. In a first stage of plant modification, APC has been reviewing the refining process, where analyses are under way on specific production aspects which require upgrading.

Energy consumption levels and balances are also being analysed with a view to devise appropriate conservation measures with saving potentials. After eliminating existing bottlenecks in various production stages, and speeding the build-up in capacity utilization level, APC expects to reach a production level of 1.4 million tpy KCl by 1989/90. The company however intends to act towards further optimization of its production by (i) reducing operating, including energy, costs through optimization of its technological processes; and (ii) increasing output beyond the 1.4 million tpy through plant expansion, to a level to be determined in light of market prospects, possibly with a new technology that may enable substantial reduction in average production costs.

5. For a potential plant expansion beyond 1.4 million tpy KCl, APC is planning to carry out, in two phases, a series of studies the main features of which are described in the following.

Objectives

6. The Arab Potash Company wishes to study the technical feasibility and economic and financial viability of expanding production capacity from the 1.4 million tpy achievable in 1989/90 to about 1.8 to 2 million tpy KCl through expansion of its facilities at Safi. To this purpose, the potential expansion project to be studied would consist of:

(a) Expansion of solar pans capacity using solar evaporation techniques for concentrating the brines and depositing the carnallite;

(b) expansion of the existing plant for the chemical processing and extracting of potash. The modified plant could include a cold crystallization unit; and

(c) expansion of infrastructure, utilities, transportation, storage and shipping facilities, as required.

7. A number of extensive studies and site surveys, which served as the basis for the execution of the existing plant have already been carried out. Copies of all available studies on the project can be examined in the offices of APC in Safi, Jordan.

8. The expansion studies under these terms of reference will be carried out in two phases: in Phase I, the following areas will be covered:

(i) Extension of the solar pans network; under this component aspects related to additional requirements in terms of water and power supply, infrastructure, road transportation, storage and shipping of potash will also be covered;

(ii) development of a cold crystallization process which could be integrated into, or replace portions of, the current refining scheme and would result in expanding the plant's

total output, at the same time substantially reducing production costs. The development of such a process would call for the installation and operations of a pilot unit at the plant site;

(iii) execution of a market and marketing study which would assess the commercialization prospects for increased output and define the maximum realistically marketable level of APC production; and

(iv) execution of a detailed evaluation of the technical feasibility and economic and financial viability of the expansion project. The results of this evaluation will be included in a Phase I Evaluation Report to be submitted to APC for review and approval.

9. Under satisfactory results of the Phase I Evaluation Report and after APC review and approval, Phase II of the feasibility study will start, which will consist of:

(i) Execution of the basic design for the expansion project; and

(ii) preparation of technical specifications and bidding documents for the expansion work.

10. It is anticipated that separate consultancy services will be contracted in Phase I, respectively for: (i) the solar pan/infrastructure expansion study; (ii) the development of a cold crystallization process; and (iii) the execution of the techco-economic evaluation. The market and marketing study will be executed by APC's staff with the assistance of experienced consultants as required. In Phase II the execution of the basic design and preparation of bidding documents for the expanded plant will be implemented under a separate contract. The consultant firm contracted for the execution of the techco-economic evaluation in Phase I will not be permitted to bid for the execution of the work under Phase II. APC will have the right to halt the execution of Phase II, should the results of Phase I work prove discouraging.

Scope of Work

11. Scope of work for each of the above tasks is detailed respectively in attachments 1, 2, 3, 4 and 5.

Schedule of Works

12. A preliminary implementation bar chart is attached. It is expected that overall, Phase I will take 30 months to complete; the solar pan/infrastructure expansion study is expected to take 21 months to complete, the development of a cold crystallization process 25 months, the market/marketing study 6 months and the techco-economic evaluation study 6 months.

13. After completion of Phase I, APC will decide whether to proceed with the project and approve the start of Phase II. Phase II is expected to take 6 months to complete. It is anticipated that after the completion of Phase II, the consultant responsible for the engineering work of Phase II, may be retained as technical advisor to APC, should the company decide to proceed with the execution of the project.

14. During execution of Phases I and II of the feasibility studies, the consultants will be assisted by APC personnel, in number and qualifications to be agreed upon before the start of each study.

Attachments

Industry Department
December 1986

JORDAN - ARAB POTASH COMPANY

TERMS OF REFERENCE FOR SOLAR EVAPORATION PANS/INFRASTRUCTURE EXPANSION STUDY

Introduction

1. These terms of reference concern the development of a study to assess the feasibility and viability of expanding solar evaporation pans and infrastructure capacity to support increased APC production from 1.4 to about 2.0 million tpy KCl.

2. The study will consist of the following three components, which will be carried out by a reputable consultant firm (the Consultant) experienced in this specialized field.

(I) Solar Pan Expansion to produce sufficient carnallite feed for the refinery to permit production of about 2.0 mm tpy KCl. The study will include but will not be limited to:

(i) The identification of additional salt pan area along the west side of the Lisan Peninsula, which is considered the most promising for future expansion.

(ii) The evaluation of the economics of alternative methods of transferring brines from this new area to the present salt pan system.

(iii) The construction of pan C-4 for carnallite.

(iv) The conversion of the present preconcentration pan PC1 to carnallite production area.

(v) The construction of an additional diversion dike in the existing salt pan;

(vi) The relocation of the existing PC1 feed pump station to pump from the salt pan to pan PC2 or alternatively to provide a gravity flow system from the salt pan to pan PC2.

(II) Evaluation of Infrastructure Capabilities at a production rate of about 2.0 million tpy KCl, including; power and water availability, road transportation, storage at, and shipping from, the Aqaba terminal.

(III) Preliminary Identification of Additional Areas which in the long term could be used for salt pan and/or carnallite pan construction for expansion beyond 2.0 million tpy KCl, and evaluation of infrastructure capabilities to support such higher production level. The purpose of this evaluation is

only to provide indicative information on the prospects for further long-term expansion. Field work will not be required at this stage.

Scope of Work

I. SOLAR PAN EXPANSION

This work will consist of, but not be limited to, the following components:

A. SALT PAN EXTENSION

1. Objective

The objective is to examine the technical feasibility and economic viability of increasing the salt pan area by some 20 to 25 sq. km by enclosing the subka to the North East of the Lisan Peninsula between Dike 1 and the vicinity of the Brine Intake Pumping station.

2. Study Requirements

2.1 Evaluate the existing geotechnical and topographical data and define possible schemes for pan areas.

2.2 Prepare tender documents for geotechnical investigations and laboratory testing and topographical survey to confirm the suitability of the area and to obtain design parameters.

2.3 Carry out geotechnical investigations and topographic survey.

2.4 Prepare designs for dikes to enclose the new pan area.

2.5 Review future Dead Sea levels in relation to dike levels.

2.6 Compare alternative schemes with a brine existing level in the extended salt pan equal to that in the Salt Pan versus a brine level in the extended salt pan lower than the existing Salt Pan and a pumping station on Dike 1.

2.7 Prepare schemes for a pumping station on Dike 1 including power supply and fresh water supply for pump flushing.

2.8 Prepare capital cost estimates for the alternative schemes.

2.9 Prepare a report on the results of the investigations and studies.

3. Methodology

3.1 Preliminary Schemes

The Consultant will carry out all the studies indicated in para 2.1 to 2.9 above, with the exception of the work described in para 2.3 which will be assigned to a specialized contractor. The Consultant, however, will supervise the execution of the field work by the contractor. After reviewing all the geotechnical and topographical information, the Consultant will prepare a preliminary action plan. Suitable areas for an extended Salt Pan will be identified from existing maps, survey information and data from ground reconnaissance carried out during the implementation of the Potash Project.

Such preliminary studies would form the basis for determining the locations and extent of field studies required to supplement available information.

3.2 Field Investigations

The Consultant will assist APC in preparing tender documents for the contractor work, analysing tenders and selecting the successful bidder, and will supervise the field investigations carried out by the contractor. The field investigations will include:

(i) Topographical Survey. This may need to be carried out by aerial photography if access across the subka results difficult for land survey. A reconnaissance will be made in the initial state to determine the best and most economical method of obtaining the survey data required. Hydrographic survey may be required.

(ii) Geotechnical Investigation. This will include, but not be limited to: (i) boreholes of about 10 m to 20 m depth along the lines of the dikes; (ii) vane tests in clay to 5 m depth along and each side of the dikes; and (iii) boreholes at the pumping station. Access for drilling boreholes will be studied in a reconnaissance visit in the initial stage. It is probable that a drill mounted on a large soft tyred vehicle such as the Gemco will have to be used and small personnel-carrying hovercraft may be considered. No provision for any marine investigations is envisaged at this stage.

(iii) Laboratory Testing. Laboratory testing will be carried out on the site and at an approved laboratory to determine design parameters from the soil samples extracted.

3.3 Design

The Consultant will prepare designs for the dikes and pumping station using the results of the field investigations and the results of the work carried out during the construction of the Potash Project.

Viability of the scheme is dependent on future Dead Sea levels and projections of these levels will be updated from the studies carried out in the 1970's.

The capability of the fresh water system and power supplies will be assessed in relation to the power and water requirements for a new pumping station (should a new pumping station be required).

3.4 Cost Estimates

The Consultant will prepare detailed estimates of the capital and operating costs of the viable alternative.

B. CONSTRUCTION OF CARNALLITE PAN C-4

Design work previously done for this pan will be reviewed by the Consultant while referring to current conditions and updated as required. A field examination will be made by the Consultant to appraise the impact on the pan of erosion and salt deposition.

The Consultant will also study the possibility of enlarging the area of this pan. Estimates of the related construction costs will be provided.

C. CONVERSION OF PAN PC1 TO CARNALLITE PRODUCTION, CONSTRUCTION OF AN ADDITIONAL DIVERSION DIKE IN THE SALT PAN, AND RELOCATION OF THE EXISTING PC-1 FEED PUMP STATIONS

This study will provide detailed construction cost estimates for simple diversion dikes in pan PC-1 between approximate coordinates 61,600 N-193,800 E and 61,800 N - 196,000 E and in the salt pan between approximate coordinates 64,000 N- 193,600 E and 62,300 N - 200,000 E and the relocation of the existing brine transfer facilities to permit pumping brine from the salt pan to pan PC-2.

II. EVALUATION OF INFRASTRUCTURE EXPANSION CAPABILITIES

This study will be carried out by the Consultant to assess the potential for expanding support facilities with particular attention to water supply adequacy and long-term reliability; appraisals should include not only the present Safi and Mazar well fields and the Wadi Hudeira base flow but also the Wadi Hasa base flow, The Mujib Conveyor, and sources of Brackish water.

The electric power supply will be appraised for adequacy for the higher production level. The practicality of increasing power generation from the existing plant will also be evaluated.

The capability of the existing Safi - Aqaba road segment to sustain increased traffic from and to the plant will be evaluated.

The adequacy of the existing Aqaba potash terminal to support handling and shipping of increased output will be evaluated.

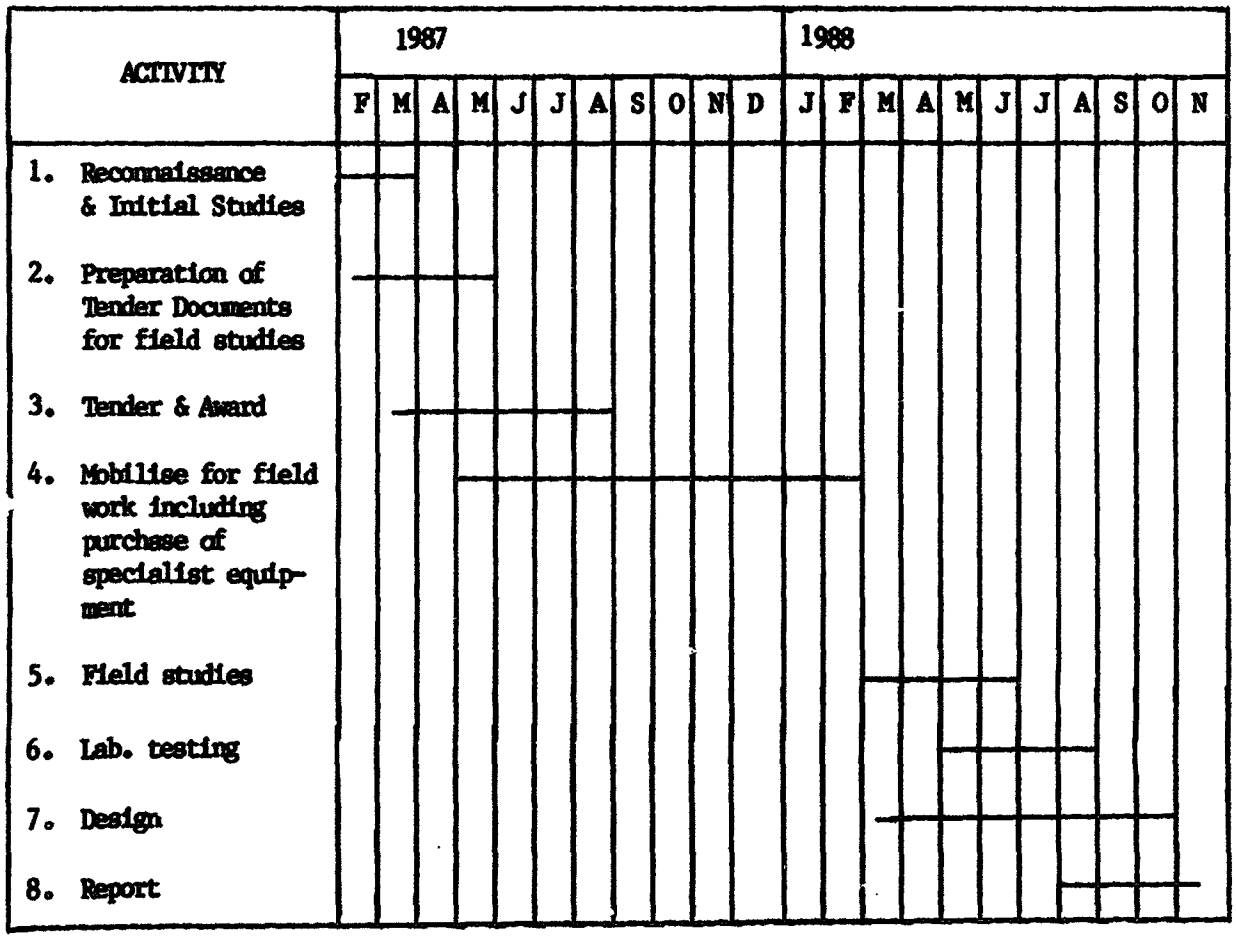
The Consultant will provide a preliminary estimate of investment and operating costs for expanding the above infrastructure/offsites, as required.

III. EXPANSION BEYOND 2 MILLION TPY KCl

This study will be carried out by the Consultant to identify the prospects for further expanding the APC production facilities beyond 2 million tpy KCl. It will include a review of all previously developed information regarding additional areas for solar pan construction with a view to preliminarily indicate potential for further expansion. In this context possible logistical limitations (feeding, harvesting, water, power supply, etc.) will also be identified.

Study Programme

To implement the above method of approach, it is expected that a 21-month programme will be required according to the following implementation schedule. This programme is estimated to require 65 man-months of consultants services to complete.



Reporting

Within seven weeks of the start date of the Agreement, the Consultant will prepare and submit to APC for review and approval detailed requirements for field studies. The scope of the required field work to be assigned to a specialized contractor will be defined in the tender documents.

Monthly Progress Reports. Throughout the period of the investigations the Consultant will submit to APC monthly reports describing the work undertaken both in the design office and in the field. The reports will include information on design progress, field investigations and evaluation thereof, physical and financial progress of the site investigations and surveys.

Study Report. Two months before the end of the study, the Consultant will submit to APC for review and approval a draft Final Report. This report will contain results of the design study, field investigations and laboratory results to hand at the time. It will identify the selected schemes, providing implementation schedule and detailed cost estimates for the proposed work.

All reports will be in English language.

JORDAN

ARAB POTASH COMPANY

TERMS OF REFERENCE TO ESTABLISH THE FEASIBILITY OF A COLD CRYSTALLIZATION PROCESS FOR REFINERY EXPANSION

Background

1. The Arab Potash Project was designed to produce 1.2 million tpy KCl by a conventional hot leach--crystallization process utilizing as feedstock carnallite obtained by solar evaporation of Dead Sea brine. The plant has been operational since October 1982 and is expected to achieve 1,150,000 tpy KCl production in 1987.

2. Modifications made during start-up and others now being implemented will bring the capacity of the potash refinery to 1,400,000 tpy production level by 1989/90. The Solar Pan System and the refinery will be in balance when the work underway is completed.

3. APC is now considering a further expansion of the refinery production capacity through cold crystallization of potash from carnallite, to reach a total of about 2 million tpy KCl. The potential for concurrent expansion of the solar evaporation system will also be studied, and is covered by separate terms of reference (Attachment 1). The cold crystallization process has been proved on a commercial scale; however, a technical development program based on pilot plant operations is necessary to determine design parameters in the specific APC conditions.

4. Cold crystallization of carnallite to produce potash is a lower cost process than the hot leach process, both in terms of capital and energy costs; therefore the economics of such expansion, if proved technically feasible, should result attractive.

Objectives

5. This study aims at assessing the feasibility of expanding potash production from 1.4 to about 2.0 million tpy KCl, utilizing a cold crystallization process. The exact expansion increment is dependent on the most economic increment of Solar Pan Area that is available as determined by a parallel study (Attachment 1) and on the results of the concurrent market/marketing study (Attachment 3).

6. Pilot plant work will determine the design parameters to beneficiate carnallite suitable for cold crystallization processing and establish design parameters for a commercial scale cold crystallization unit.

Scope of Work

7. To determine the prospects for establishing a viable cold crystallization process, APC will contract an experienced consulting firm (the Consultant). The work to be carried out by the Consultant will consist of the following main tasks.

(a) Design, procure and supervise the installation at Safi of a suitable pilot plant to:

(i) Determine design parameters of beneficiations process to provide approximately a 95% purity carnallite feed stock.

(ii) Determine design parameters for an industrial cold crystallization process to produce a 96% KCl purity product of suitable particle size.

(b) Provide technical supervision during the period of pilot plant operations through a complete harvest cycle of solar pans (carnallite particle size distribution is expected to vary during the year-long cycle due to (i) number of harvest passes; (ii) pan position of harvester; (iii) pan depth; (iv) temperature, etc.).

(c) Collect and evaluate the data, and prepare a report including final findings and recommendations on process feasibility and reliability. The report should also include the basic elements necessary for the preparation of the process basic design.

Schedule of Works

8. It is expected that the study, including pilot plant design, construction, operation, data evaluation and final report preparation will require 25 months to complete, according to the following implementation schedule:

PILOT TESTS	1986						1987												1988											
	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Contract Negotiat./ Award Signature																														
Procurement/Install.																														
Operation																														
Data Evaluation/Report																														

Reporting

9. After the starting of pilot plant operations, the Consultant will submit to APC quarterly reports on the progress of the tests, for review and discussion. One month before the completion of the study, the Consultant will submit to APC for review and approval a draft final report which will include all data and results of the pilot plant tests and laboratory investigations as well as the process optimal scheme and the necessary elements for the preparation of the cold crystallization process basic design.

10. All reports will be in English Language.

JORDAN

ARAB POTASH COMPANY

TERMS OF REFERENCE FOR MARKET AND MARKETING STUDY

1. This study will be carried out by the APC's Marketing Department with assistance of foreign consultants as required.

2. The study will be conducted concurrent with the Phase I studies to include the following:

(i) review all available information and conduct analysis of past consumption of potash fertilizers in the potential markets (including India and China) and identify increased export potentials for Jordan potash;

(ii) prepare and analyse potash demand and supply projection up to the year 2000, on a global and country-by-country basis;

(iii) prepare import/export matrices on international potash trade on a country-by-country basis and identify the importance of Jordan potash in future international trade markets;

(iv) review and analyse all available information on current and prospective potash prices, as well as production costs of and transportation costs from competitive sources of supply to prospective markets;

(v) assess likely landed prices of Jordan potash from the project to potential markets and compare them with projected import prices from competitive sources;

(vi) recommend, if needed, modified organizational arrangements for the handling, storage, transportation and distribution of potash to potential markets considering, inter alia, possible seasonal fluctuations of potash demand; and

(vii) recommend, if needed, variations in proportions of plant production capacities for each product quality (fine, standard, coarse, granular) according to projected demand trends for each quality.

3. The study will be carried out in two parts: an orientative investigations of points (i) and (ii) above will be carried out and complete by end of August 1986. A more detailed analysis of the same points plus the execution of the remaining points will be carried out towards the end of Phase I studies and is expected to be completed by end

October 1988. One month before the end of the market/marketing study, the APC Marketing Department will submit to APC Management a final report for review and approval. Interim reviews of the ongoing study are envisaged.

4. All reports will be in English language.

JORDAN

ARAB POTASH COMPANY

TECHNICO - ECONOMICAL EVALUATION OF PHASE I STUDIES

Introduction

1. The work under these terms of reference consists of a technico-economical evaluation of the prospects for expanding APC production based on the results of Phase I studies.

2. To this purpose APC will contract a reputable Engineering Firm (the Consultant) experienced in executing feasibility studies and engineering work in the potash field.

Scope of Work

3. The Technico-Economical Evaluation Study will include, but not be limited to, the following:

(i) Evaluation of the viability of different production sizes for the expansion project (such as 1.8 million tpy of KCl, 2 million tpy KCl, and 2.2 million tpy KCl) in order to determine the optimal expansion size which would maximize the economic benefits of the project.

(ii) Preliminary layout and limited engineering works as required to determine project capital and operation costs for plant, associated facilities and infrastructure, for each of the various alternatives considered. Accuracy of investment estimates will not exceed ± 25%.

(iii) Estimates for additional transport requirements from the plant site to the Aqaba port terminal as well as an estimate of the additional investments, if any, that might be needed at the terminal, for the various alternatives considered.

(iv) Analysis of the financial and economic impact of the various expansion alternatives considered, and in particular, preparation of financial projections, financial and economic rates of return, and sensitivity tests on the most important variables, as well as the assessment of major risks of expansion. Identification of the optimal option.

(v) Description of the main features of the optimal expansion project, including inter alia the selected capacity and the underlying assumptions, the adequacy of integrating the new cold crystallization process into the existing plant, the

construction methods and major design characteristics, to convey an adequate picture of the project and the extent to which main project parameters have been, or are still to be, determined; and

(vi) Preparation of a preliminary (PERT) time schedule showing suggested dates of the start and completion of crucial elements of the expansion project.

4. The study is expected to take six months to complete. Interim reviews of the work are envisaged. At the end of the fifth month, the Consultant will submit to APC for review an approval, a draft final report of Phase I work, including specific recommendations on the viability of expanding production.

5. All reports and documents will be in English language.

Attachment 5

JORDAN

ARAB POTASH COMPANY

TERMS OF REFERENCE FOR THE EXECUTION OF THE BASIC ENGINEERING FOR THE EXPANDED PLANT (PHASE II)

1. After satisfactory review and approval of the Phase I feasibility study, APC may contract an experienced Engineering Firm (the Consultant) to carry out the basic engineering of the expansion project.

2. The Consultant work will consist of the following:

(i) Develop all required basic engineering design data to enable potential Contractors to proceed with the detailed engineering and execution of the expansion project. Data in the process design engineering package should include material and energy balances, estimate of additional utilities, process flow diagrams showing major process lines and piping, line sizes, vessel sizes, instrumentation, reference drawings for each process unit with applicable standard drawings for individual process units, design specification for each piece of equipment (supported with dimensioned drawings where applicable) giving operating and design conditions, materials of construction and process conditions, plot plan layout, detailed specification of all additional offsites facilities including storage tanks and utility system, and process start-up and operating instructions.

(ii) Review the project investment cost estimate, with a degree of accuracy of ± 15%.

(iii) Review and finalize the items of work that the selected Contractor is expected to perform for APC.

(iv) Describe in detail the scope and responsibilities of the Contractor, including each item of work to be done and the time frame over which these are to be accomplished.

(v) Propose a list of bidders who are qualified to undertake the work.

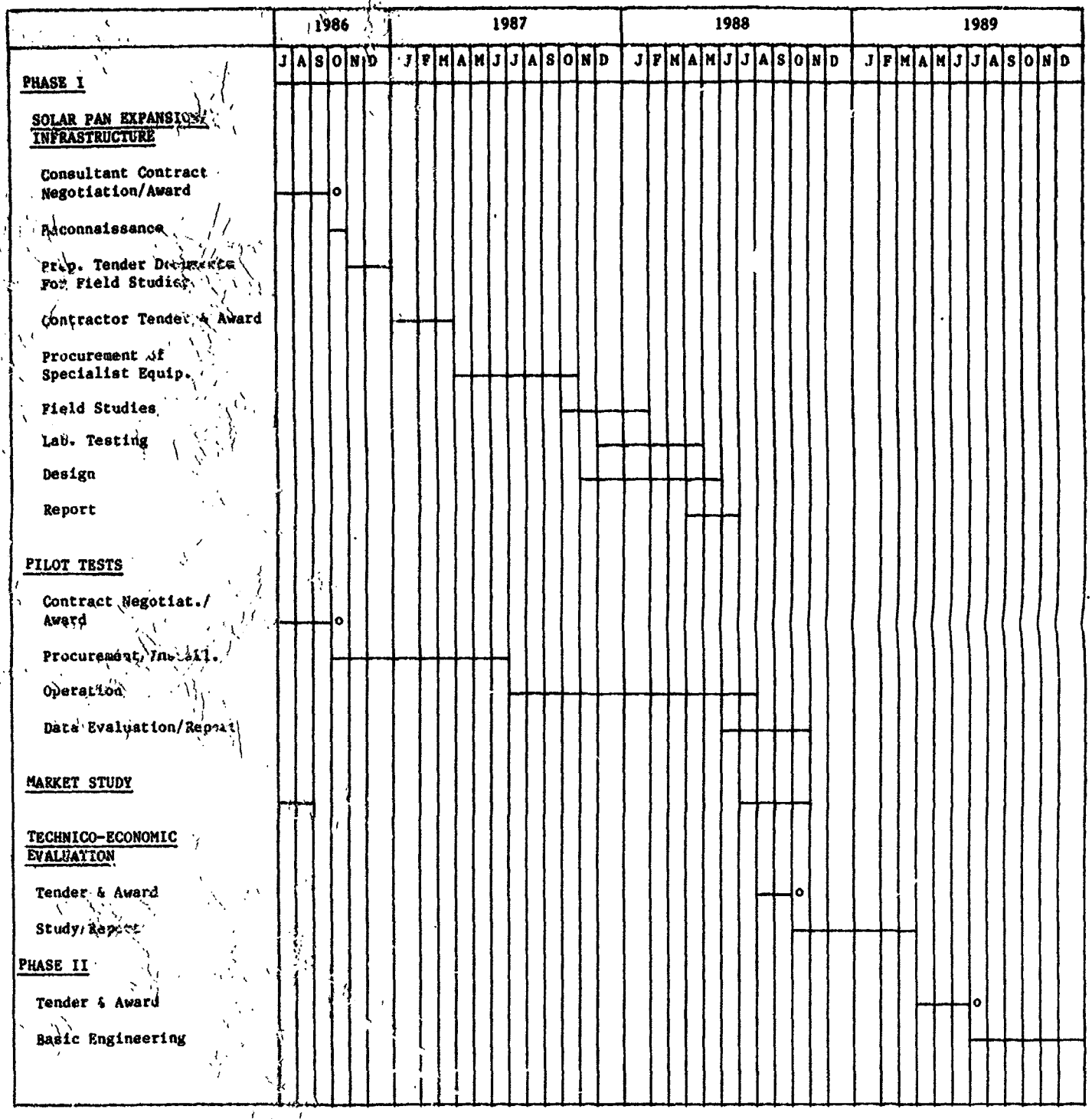
(vi) Prepare bidding documents for the general Contractor work.

3. The Consultant work is expected to take six months to complete. All documents, drawings, etc., will be in the English language.

Attachment 6

LONG TERM EXPANSION STUDIES (COMPONENT C)

IMPLEMENTATION SCHEDULE



Jordan - Second Arab Potash

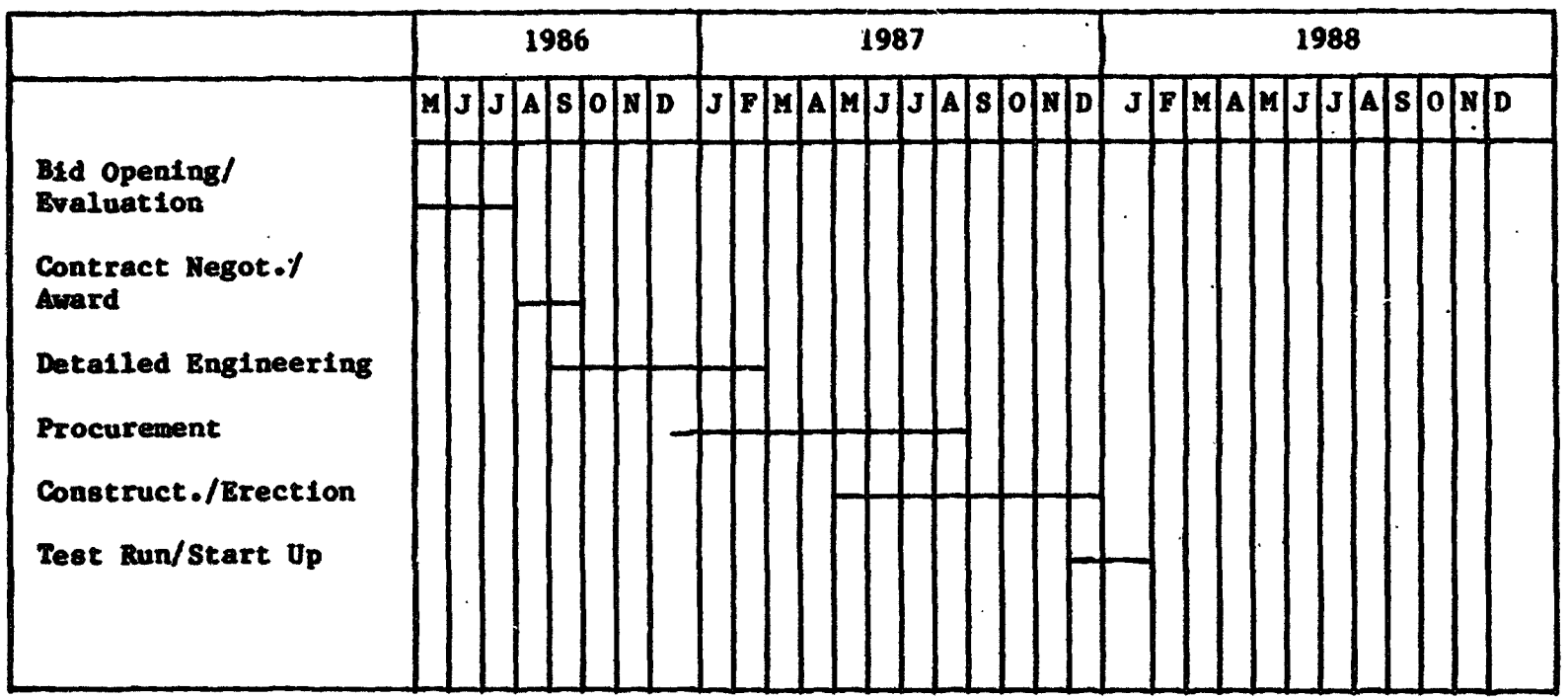
Preliminary Cost Estimate[a]/

	US$ million equivalent		
	Local	Foreign	Total
Component A			
Refinery Modifications [b]/	-	11.96	11.96
Component B			
Complementary Expansion	1.38	5.02	6.40
Component C			
Studies	0.29	2.61	2.90
Component D			
Training	0.08	0.33	0.41
Base Cost	1.75	19.92	21.67
Physical Contingencies	0.18	0.79	0.97
Price Contingencies	0.15	0.66	0.81
Total Installed Cost	2.08	21.37	23.45
Interest during Construction	-	3.23	3.23
Total Project Cost	2.08	24.60	26.68

a/ Detailes breakdown available in offered bid.
b/ Turn-key contract installed cost.

REFINERY MODIFICATIONS (COMPONENT A)

IMPLEMENTATION SCHEDULE



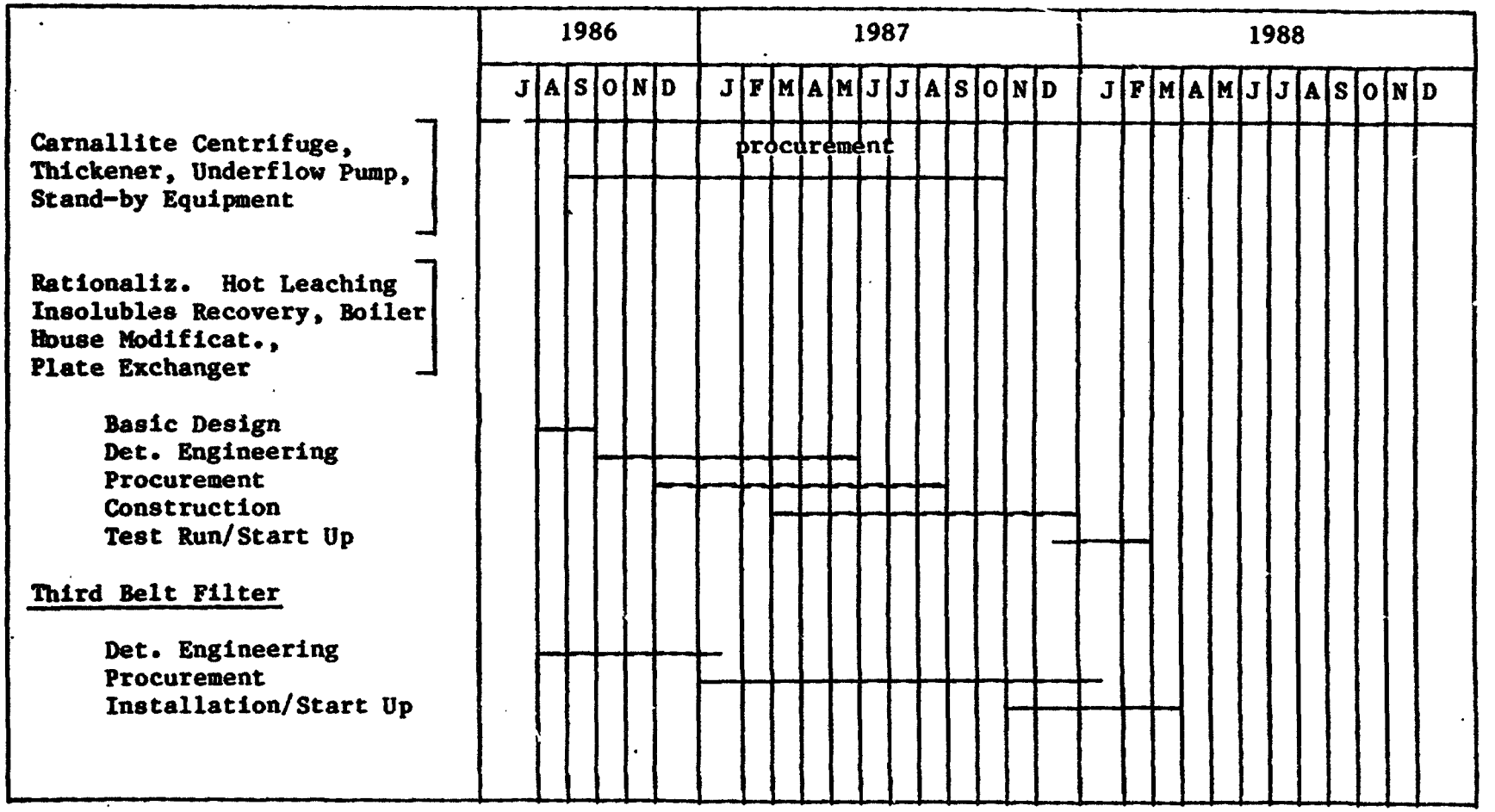
Complementary Expansion (Component B)

Preliminary Cost Estimate

		US$ million equiv.		
		Local	Foreign	Total
A. Solar Evaporation System				
(1)	Expansion of brine supply system and intake channel dredging	0.4	1.3	1.7
(2)	Supplementary harvester support equipment	-	0.3	0.3
(3)	Mobile equipment for solar pan dyke maintenance & construction	-	0.7	0.7
B. Power & Utility Section				
(1)	Increased water supply	0.3	0.3	0.6
(2)	Parallel operation of boilers	0.1	0.3	0.4
(3)	Increase plant air capacity	0.01	0.07	0.08
(4)	Process water reservoir modification	0.01	0.07	0.08
C. Refinery				
(1)	Carnallite centrifuge and rotating element	-	0.60	0.60
(2)	Hot leach modifications and capacity increase	0.10	0.30	0.40
(3)	Screening & Compaction plant capacity increase	0.20	0.30	0.50
(4)	Crystallizer agitator modification to improve operating factor	0.10	0.18	0.28
(5)	Additional number of potash haul trucks (10 units)	-	1.00	1.00
D. Engineering Assistance		0.30	0.10	0.40
Base Cost and Physical Contingency		1.52	5.52	7.04
Price Contingency		0.10	0.35	0.45
	Total Installed Cost	1.62	5.87	7.49

COMPLEMENTARY EXPANSION (COMPONENT B)

Implementation Schedule



Long Term Expansion Studies (Component C)

Preliminary Cost Estimate[a]/

	US$ million equiv.		
	Local	Foreign	Total
Phase I			
1. Solar Pan Expansion Plan and Logistic/Infrastructure Study			
Equipment	-	0.30	0.30
Technical Assistance	0.10	0.95	1.05
Sub-total 1	0.10	1.25	1.35
2. Pilot Tests			
Equipment + Spares	-	0.50	0.50
Transportation - Insurance	-	0.05	0.05
Civil Work - Erection	0.10	-	0.10
Technical Assistance	0.05	0.45	0.50
Sub-total 2	0.15	1.00	1.15
3. Market Study			
Technical Assistance	-	0.10	0.10
Sub-total 3	-	0.10	0.10
4. Tech. Economic Evaluation			
Technical Assistance	-	0.30	0.30
Sub-total 4	-	0.30	0.30
Total Phase I	0.25	2.65	2.90
Phase II			
Engineering	0.10	0.50	0.60
Total Component C	0.35	3.15	3.50

a/ Installed costs.

Long Term Expansion Studies (Component C)

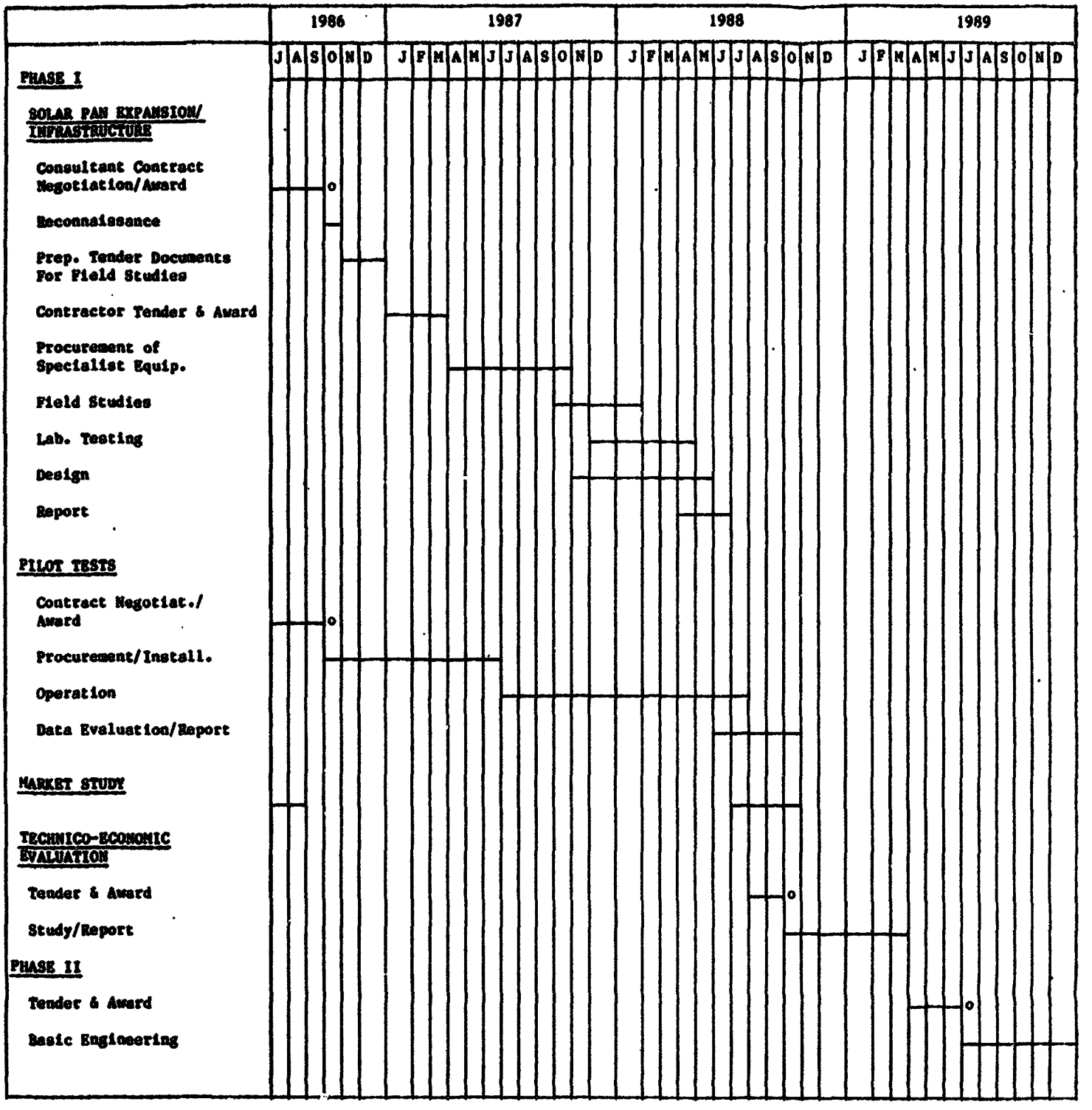
Disbursement Schedule[a]/
(US$ Million Equivalent)

Subcomponents/Years	1986	1987	1988	1989	Total
Solar Pan Expansion Infrastructure					
Local	-	0.05	0.05	-	0.10
Foreign	-	0.60	0.65	-	1.25
Total	-	0.65	0.70	-	1.35
Pilot Test					
Local	-	0.10	0.05	-	0.15
Foreign	0.10	0.65	0.25	-	1.00
Total	0.10	0.75	0.30	-	1.15
Market Study					
Local	-	-	-	-	-
Foreign	0.02	-	0.08	-	0.10
Total	0.02	-	0.08	-	0.10
Tech. Economic Eval./ Basic Engineering					
Local	-	-	-	0.10	0.10
Foreign	-	-	0.15	0.65	0.80
Total	-	-	0.15	0.75	0.90
Total Component C					
Local	-	0.15	0.10	0.10	0.35
Foreign	0.12	1.25	1.13	0.65	3.15
Total	0.12	1.40	1.23	0.75	3.50

a/ On the basis of installed costs.

LONG TERM EXPANSION STUDIES (COMPONENT C)

IMPLEMENTATION SCHEDULE



JORDAN - ARAB POTASH COMPANY

Optimization Program

Disbursement Schedule[a]/
(US$ million equiv.)

	1986	1987	1988	1989	Total
Component A					
Local	-	0.77	0.52	-	1.29
Foreign	-	6.41	4.26	-	10.67
Total A	-	7.18	4.78	-	11.96
Component B					
Local	-	1.16	0.46	-	1.62
Foreign	-	4.19	1.68	-	5.87
Total B	-	5.35	2.14	-	7.49
Component C					
Local	-	0.15	0.10	0.10	0.35
Foreign	0.12	1.25	1.13	0.65	3.15
Total C	0.12	1.40	1.23	0.75	3.50
Component D					
Local	-	0.05	0.05	-	0.10
Foreign	0.03	0.10	0.17	0.10	0.40
Total D	0.03	0.15	0.22	0.10	0.50
TOTAL					
Local	-	3.05	0.85	0.10	3.36
Foreign	-	10.05	3.25	0.75	20.09
TOTAL	0.15	14.08	8.37	0.85	23.45

a/ On the basis of installed costs.

Industry Department
December 1986

ANNEX 9

JORDAN - ARAB POTASH PROJECT

Estimated Disbursement Schedule for IBRD Loan
(US$ million)

Bank Fiscal Year	During Semester	Cumulative	Cumulative Disbursement as % of total
1987			
12/31/86	0.1	0.1	1.0
06/30/87	0.7	0.8	7.0
1988			
12/31/87	1.1	1.9	16.0
06/30/88	1.1	3.0	25.0
1989			
12/31/88	1.5	4.5	38.0
06/30/89	1.8	6.3	52.0
1990			
12/31/89	1.4	7.7	64.0
06/30/90	1.4	9.1	76.0
1991			
12/31/90	1.0	10.1	84.0
06/30/91	1.0	11.1	92.0
1992			
12/31/91	0.9	12.0	100.0
06/30/92	-	-	100.0

Industry Department
December 1986

JORDAN - SECOND ARAB POTASH PROJECT

ECONOMIC RATE OF RETURN

INCREMENTAL ANALYSIS
(in 1986 constant terms)

	Year	Total Production (in '000 tons)	Incremental Production (in '000 tons)	Capital Investment a/ (JD million)	Incremental Working Capital (JD million)	Incremental Operating Costs (JD million)	Incremental Revenues (JD million)	Net Cash Flow (JD million)
0	1986	1,050	-	1.05	-	-	-	(1.05)
1	1987	1,150	100	4.90	0.30	0.30	2.62	(2.88)
2	1988	1,250	200	1.30	0.30	0.50	5.13	2.93
3	1989	1,350	300	0.17	0.30	0.90	7.53	6.16
4	1990	1,400	350	0.09	0.15	1.05	8.60	7.31
5	1991	1,400	350	-	-	1.05	8.69	7.64
6	1992	1,400	350	0.07	-	1.05	8.79	7.67
7	1993	1,400	350	0.07	-	1.05	8.88	7.67
8	1994	1,400	350	0.07	-	1.05	8.98	7.86
9	1995	1,400	350	0.04	-	1.05	9.07	7.95
10	1996	1,400	350	-	-	1.05	9.17	8.12
11	1997	1,400	350	0.07	-	1.05	9.26	8.14
12	1998	1,400	350	0.07	-	1.05	9.45	8.33

NPV (12) = Net Present Value = JD 32.45 million
at 12% discount rate

IRR = 98%

a/ Conservatively calculated on the basis of 20% physical contingencies.

ARAB POTASH COMPANY

1986-90 CASH POSITION WITH AND WITHOUT PROPOSED INVESTMENT
(in 1,000 JD)

	Actual	With Proposed Investment					Without Investment				
	1985	1986	1987	1988	1989	1990	1986	1987	1988	1989	1990
Production ('000 tons)	908	1,050	1,150	1,250	1,350	1,400	1,050	1,150	1,150	1,150	1,150
Net Profit(Loss)	(6,525)	(6,176)	(2,897)	864	5,516	12,178	(5,975)	(2,369)	(724)	732	5,128
Cash Flow from Operations	13,208	13,072	16,179	19,627	23,204	25,554	13,072	16,020	17,111	17,805	18,476
Net Cash After Debt	(13,809)	(2,139)	(1,132)	1,158	1,895	3,756	(2,029)	(901)	(728)	(759)	1,206
Equity	34,546	36,212	33,315	34,179	39,695	51,873	36,413	34,044	33,320	34,052	39,120

Industry Department

ANNEX 11-2

JORDAN - ARAB POTASH COMPANY

PRODUCTION COSTS AT VARYING PRODUCTION LEVELS

(in 1986 constant terms) (JD '000)

	1986	1987	1988	1989	1990
Production ('000 tons)	1,050	1,150	1,250	1,350	1,400
Production Costs					
Salaries	3,787	3,787	3,787	3,787	3,787
OMT	225	225	25	225	225
Fuel	3,627	3,709	3,793	3,828	3,843
Power	1,482	1,600	1,725	1,800	1,800
Materials/Supplies	412	438	464	490	503
Maintenance Materials	1,431	1,456	1,481	1,506	1,519
Other	631	631	631	631	631
Production Costs at Plant	11,595	11,846	12,106	12,267	12,308
Trucking	1,851	1,951	2,051	2,151	2,201
Aqaba Office	463	473	483	493	498
Loading Charges (JD 1.05/ton)	1,085	1,208	1,313	1,418	1,470
Export Tax (JD 0.25/ton)	263	288	313	338	350
Amman Office	369	369	369	369	369
Marketing (Travel, Advertising)	166	186	206	226	236
Other Income	(180)	(180)	(180)	(180)	(180)
Sub-total	4,017	4,295	4,555	4,815	4,755
Operating Costs	15,612	16,141	16,661	17,082	17,063
Depreciation	7,974	8,286	8,313	8,324	8,440
Amortization	2,921	2,921	2,921	2,921	-
Total Production Costs	26,507	27,348	27,895	28,327	25,503

Analysis of Marginal Costs (JD '000)

	1987	1988	1989	1990
Incremental Production ('000 tons)	100	100	100	50
Fuel — Tons	(1,660)	(1,700)	(700)	(300)
Fuel — JD '000	82	84	35	15
Power — '000 kwh	(4,720)	(5,000)	(3,000)	(-)
Power — JD '000	118	125	75	-
Materials/Supplies				
- Anti-caking chemical	16	16	16	8
- Other direct materials	10	10	10	5
Maintenance materials	25	25	25	13
Other	0	0	0	0
Trucking (1 JD ton cash cost)	100	100	100	50
Aqaba	10	10	10	5
Loading charges	123	105	105	52
Export tax	25	25	25	12
Marketing	20	20	20	10
TOTAL	529	490	421	170
Marginal Cost JD/ton	5.29	4.80	4.65	3.400
(Average) Marginal Cost (JD/ton)			JD 4.6	

Industry Department

ANNEX 12-1

ARAB POTASH COMPANY

ACTUAL AND PROJECTED PROFIT AND LOSS ACCOUNTS

(After Debt Rescheduling)
(JD '000')

	Actual			Projected									
	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Production (tons)	279,851	486,868	908,560	1,050,000	1,150,000	1,250,000	1,350,000	1,400,000	1,400,000	1,400,000	1,400,000	1,400,000	1,400,000
Opening Inventory (tons)	8,926	77,566	106,833	82,665	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
Closing Inventory (tons)	77,566	106,833	82,665	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000
Sales Volume (tons)	211,211	449,608	932,728	1,032,665	1,150,000	1,250,000	1,350,000	1,400,000	1,400,000	1,400,000	1,400,000	1,400,000	1,400,000
Average Net Selling Price (JD per ton)	26.880	31.845	30.845	26.950	28.028	29.149	30.606	32.136	33.742	35.429	37.200	39.060	41.013
($per ton)	72.000	82.000	81.000	77.000	80.080	83.283	87.447	91.819	96.409	101.229	106.290	111.600	117.180
Sales Revenue (JD 000)	5,677	14,316	28,770	27,830	32,232	36,436	41,319	44,990	47,239	49,601	52,079	54,684	57,418
Other Revenue	363	314	345	180	193	206	221	236	251	270	289	309	331
Total Revenues	6,040	14,630	29,114	28,010	32,425	36,642	41,539	45,226	47,490	49,870	52,369	54,993	57,749
Manufacturing Costs													
Salaries	2,479	2,734	3,482	3,787	4,052	4,336	4,639	4,964	5,311	5,683	6,081	6,507	6,962
OMT	1,171	1,100	802	225	150								
Fuel	2,156	2,687	3,399	3,627	3,661	3,725	3,979	4,288	4,588	4,909	5,252	5,619	6,012
Power	1,839	1,242	1,432	1,482	1,505	1,528	1,659	1,787	1,912	2,045	2,188	2,341	2,504
Materials and Supplies	400	305	387	412	463	518	581	635	679	726	776	830	888
Maintenance	613	1,019	1,138	1,431	1,555	1,691	1,839	1,984	2,122	2,270	2,428	2,597	2,778
Other Costs	627	523	560	631	658	691	724	758	782	834	870	906	953
Total Production costs (SAFT)	9,285	9,610	11,200	11,595	12,044	12,489	13,421	14,416	15,394	16,467	17,595	18,800	20,097
Potash Inventory (Increase) Decrease	(2,019)	(1,277)	1,768	(187)	245	100	49	24	(77)	(83)	(82)	(89)	(96)
Trucking	277	568	1,294	1,304	1,474	1,662	1,864	2,048	2,191	2,344	2,508	2,683	2,870
Aqaba Office	58	199	316	428	492	590	641	707	756	808	864	924	988
Aqaba Loading Charges	100	583	646	1,085	1,207	1,312	1,417	1,470	1,470	1,470	1,470	1,470	1,470
Export Tax		112	233	263	287	313	337	350	350	350	350	350	350
Amman Office	807	653	303	284	304	325	348	372	398	426	456	488	522
Marketing			119	166	193	224	258	285	304	325	347	371	396
Sub-Total	8,508	10,448	15,879	14,938	16,246	17,015	18,335	19,672	20,786	22,107	23,508	24,997	26,597
Depreciation	1,873	3,228	7,815	7,974	8,285	8,313	8,324	8,440	8,575	8,660	8,867	8,903	8,945
Amortization	2,921	2,921	2,921	2,921	2,921	2,922	2,922						
Total Operating Cost of Sales	13,302	16,597	26,615	25,833	27,453	28,250	29,581	28,112	29,361	30,767	32,375	33,900	35,542
Operating Profit (Loss)	(7,262)	(1,967)	2,499	2,177	4,972	8,392	11,958	17,114	18,129	19,103	19,994	21,093	22,207
Interest	6,578	7,390	9,024	8,353	7,869	7,528	6,442	4,936	3,838	2,747	2,269	1,932	1,671
Income Before Tax	(13,840)	(9,357)	(6,525)	(6,176)	(2,897)	864	5,516	12,178	14,291	16,356	17,725	19,161	20,536
Tax											3,102	3,353	7,188
Net Income After Tax	(13,840)	(9,357)	(6,525)	(6,176)	(2,897)	864	5,516	12,178	14,291	16,356	14,623	15,808	13,349

Industry Department
December 1986

ACTUAL AND PROJECTED SOURCES AND APPLICATIONS OF FUNDS

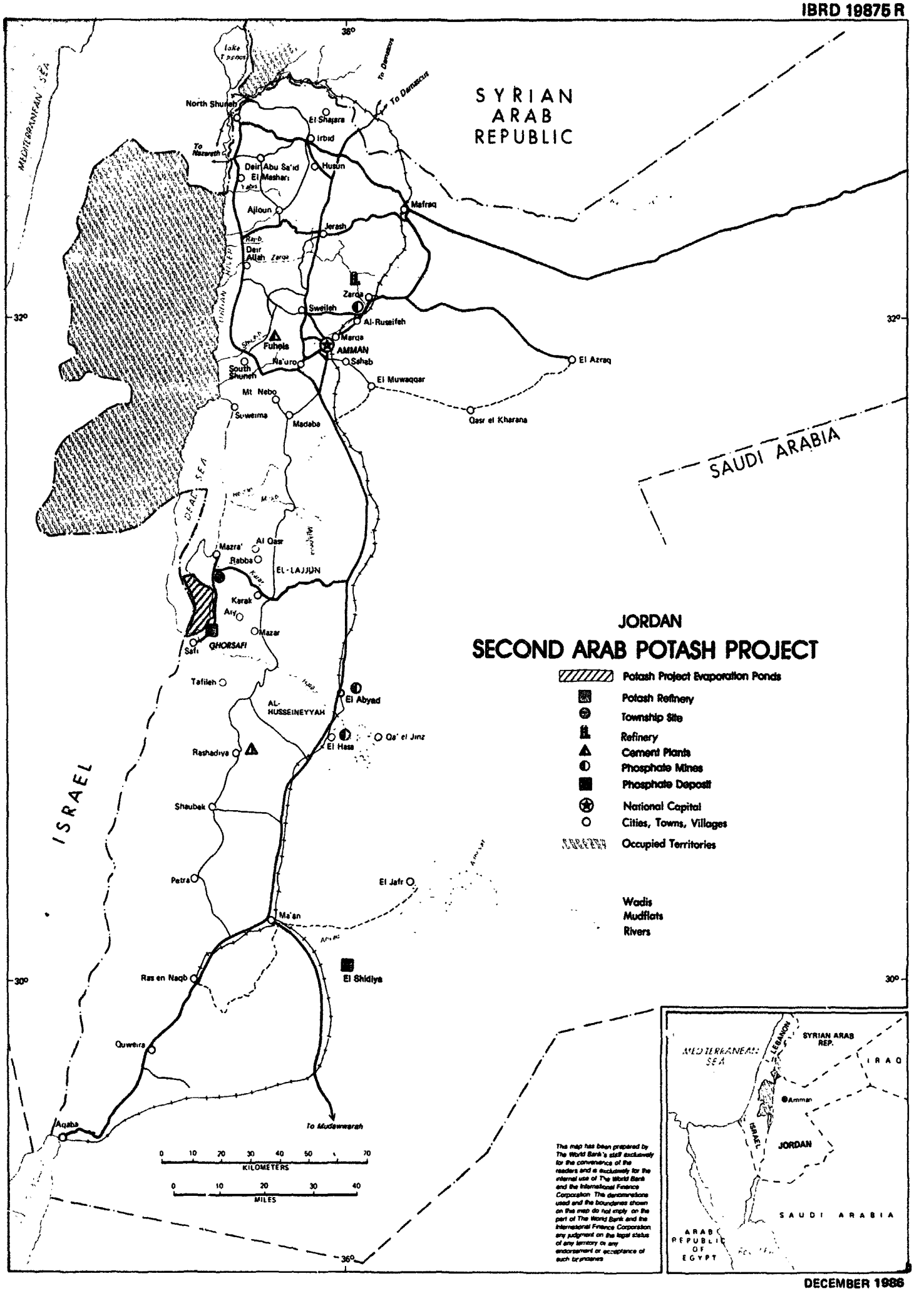
(After Debt Rescheduling)
(JD '000')

	Actual			Projected									
	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
SOURCES													
Cash Generation From Operations													
Net Income (Loss)	(13,840)	(9,716)	(6,525)	(6,176)	(2,897)	864	5,516	12,178	14,291	16,356	14,624	15,808	13,349
Depreciation	1,873	3,218	7,788	7,974	8,286	8,313	8,324	8,440	8,575	8,660	8,867	8,903	8,945
Amortization	2,921	3,218	2,921	2,921	2,921	2,922	2,922	-	-	-	-	-	-
Interest	6,578	2,921	9,024	8,353	7,869	7,528	6,442	4,936	3,838	2,747	2,269	1,932	1,671
Sub-Total	(2,468)	4,172	13,208	13,072	16,179	19,627	23,204	25,554	26,704	27,763	25,760	26,643	23,965
Capital Funds													
Equity	-	-	1,608	7,842	-	-	-	-	-	-	-	-	-
Quasi Equity	-	-	-	13,335	-	-	-	-	-	-	-	-	-
Grants	-	-	-	35	368	122	-	-	-	-	-	-	-
LT Loans Foreign	685	239	-	540	5,145	700	298	-	-	-	-	-	-
LT Loans Local	180	12,000	12,000	-	-	-	-	-	-	-	-	-	-
ST Loans Local	11,865		-	-	-	-	-	-	-	-	-	-	-
Deferred Interest	2,031	359	77	-	-	-	-	-	-	-	-	-	-
Staff Leaving Indemnity	(121)	2	105	120	250	250	250	250	250	250	250	250	250
Sub-Total	14,640	12,600	13,790	21,872	5,763	1,072	548	250	250	250	250	250	250
Total Sources	12,172	16,772	26,998	34,944	21,942	20,699	23,752	25,804	26,954	28,013	26,010	26,893	24,215
APPLICATIONS													
Cash Requirements													
Capital Expenditure	3,993	2,744	635	3,547	6,180	2,372	911	2,655	2,924	1,942	4,803	859	919
Working Capital	2,072	4,120	3,663	2,816	(1,917)	(264)	1,532	1,354	(1,483)	1,099	1,161	1,229	1,304
Feasibility Studies	50	32	5	35	368	122	-	-	-	-	-	-	-
Sub-Total	6,115	6,896	4,303	6,398	4,631	2,230	2,443	4,009	1,441	3,041	5,964	2,088	2,223
Debt Service													
Interest	6,578	7,749	9,024	8,353	7,869	7,528	6,442	4,936	3,838	2,747	2,269	1,932	1,671
Principal	84	6,407	17,993	6,858	9,442	10,941	14,867	16,859	19,511	8,736	4,925	3,228	3,228
Sub-Total Debt Service	6,662	14,156	27,017	15,211	17,311	18,469	21,309	21,795	23,349	11,483	7,194	5,160	4,899
Total Cash Requirements	12,777	21,052	31,320	21,609	21,942	20,699	23,752	25,804	24,790	14,524	13,158	7,248	7,122
Annual Net Cash Surplus (Requirement)	(605)	(4,280)	(4,322)	13,335	-	-	-	-	2,164	13,489	12,852	19,645	17,093
Cumulative Cash Surplus (Requirement)	(4,733)	(9,013)	(13,335)	-	-	-	-	-	2,164	15,653	28,505	48,150	65,243

ACTUAL AND PROJECTED BALANCE SHEETS

(After Debt Rescheduling)
(JD '000')

	Actual			Projected									
	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
ASSETS													
Current Assets													
Cash and Bank	72	2,155	5,704	5,803	3,093	1,879	2,302	2,563	40	40	40	40	40
Prepayments	343	495	641	933	998	1,068	1,143	1,223	1,309	1,400	1,498	1,603	1,715
Accounts Receivable	1,068	1,413	3,491	2,899	3,357	3,795	4,304	4,686	4,920	5,166	5,425	5,696	5,981
Inventory-Potash	2,254	3,531	1,763	1,950	1,705	1,605	1,556	1,580	1,657	1,740	1,822	1,911	2,007
Inventories	4,676	5,051	5,813	6,018	6,439	6,890	7,372	7,888	8,441	9,031	9,664	10,340	11,064
Total Current Assets	8,413	12,645	17,412	17,603	15,592	15,237	16,677	17,940	16,367	17,377	18,449	19,590	20,807
Cash-Excess									2,164	15,653	28,505	48,150	65,243
Investments/Feasibility Studies	767	799	804	839	1,207	1,329	1,329	1,329	1,329	1,329	1,329	1,329	1,329
Fixed Assets	125,355	128,099	128,735	132,282	138,462	140,834	141,745	144,400	147,324	149,266	154,069	154,928	155,847
Preproduction Costs	20,450	20,450	20,450	20,450	20,450	20,450	20,450	20,450	20,450	20,450	20,450	20,450	20,450
Total Gross Assets	145,805	148,549	149,185	152,732	158,912	161,284	162,195	164,850	167,774	169,716	174,519	175,378	176,297
Depreciation	5,639	8,857	16,645	24,619	32,905	41,218	49,542	57,982	66,557	75,217	84,084	92,987	101,932
Amortization	2,921	5,843	8,764	11,685	14,606	17,528	20,450	20,450	20,450	20,450	20,450	20,450	20,450
Net Assets	137,245	133,849	123,776	116,428	111,401	102,538	92,203	86,418	80,767	74,049	69,985	61,941	53,915
Total Assets	146,426	147,293	141,992	134,870	128,200	119,104	110,209	105,687	100,627	108,408	118,268	131,010	141,295
LIABILITIES													
Accounts Payable	414	316	278	107	114	123	131	140	150	161	172	184	197
Accruals and Sundry	3,904	4,113	5,255	2,801	2,700	2,600	2,500	2,400	2,300	2,200	2,100	2,000	1,900
Current Portion of LT Debt	16,881	17,469	7,170	9,443	10,941	12,867	12,859	12,176	8,736	4,925	3,228	3,227	2,655
Total Current Liabilities	21,199	21,898	12,703	12,351	13,755	15,590	15,490	14,716	11,186	7,286	5,500	5,411	4,752
Staff Indemnity	172	174	279	399	649	899	1,149	1,399	1,649	1,899	2,149	2,399	2,649
Grants				35	403	525	525	525	525	525	525	525	525
Cash-Shortage/Requirement	4,733	9,013	13,335										
Long.Term Debt	71,142	76,745	81,129	72,538	66,743	54,576	42,015	29,839	21,103	16,178	12,950	9,723	7,068
Subordinated Govt. debt - Quasi Equity				13,335	13,335	13,335	11,335	7,335					
Share Capital	63,000	63,000	64,608	72,450	72,450	72,450	72,450	72,450	72,450	72,450	72,450	72,450	72,450
Reserves	20	20	20	20	20	20	20	20	20	20	20	20	20
Retained Earnings (Loss)	(13,840)	(23,557)	(30,082)	(36,258)	(39,155)	(38,291)	(32,775)	(20,597)	(6,306)	10,050	24,674	40,482	53,831
Total Equity	49,180	39,463	34,546	36,212	33,315	34,179	39,695	51,873	66,164	82,520	97,144	112,952	126,301
Total Liabilities	146,426	147,293	141,992	134,870	128,200	119,104	110,209	105,687	100,627	108,408	118,268	131,010	141,295



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