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391-E-130

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D.C. 20523

COOLEY LOAN PAPER

Proposal and Recommendations
For the Review of the
Development Loan Committee

PAKISTAN: DAWOOD-HERCULES CHEMICALS LIMITED

Reference Center
Pakistan

AID-INC/P-651

NESA/CDP
OFFICIAL DOCUMENT
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ACTION MEMORANDUM

TO : AA/NESA, Mr. Maurice J. Williams DATE: December 8, 1967
FROM : NESA/CDF, Jack M. Adelman/Emerson Gardner
SUBJECT: Dawood-Hercules Chemicals, Limited - Application for a Cooley
Loan of Rs. 51,400,000 (\$10,800,000 equivalent)

On September 7, 1967, Hercules Incorporated submitted a Cooley loan application for Rs. 51,400,000 (\$10,800,000 equivalent) to help finance the local currency costs of a proposed urea fertilizer project in West Pakistan. Their project proposal has been analyzed in detail by AID, and the International Finance Corporation (IFC) and International Bank for Reconstruction and Development (IBRD) to whom Hercules also has applied for financing. The results of these analyses are favorable, and the IFC/IBRD expect to present the Hercules application to their Boards in early 1968.

We have prepared the attached Cooley loan paper with the assistance and collaboration of Steven I. Davis, who has been responsible for most of the negotiations with Hercules and the Dawoods. It is recommended that you approve a Cooley loan of Pakistani Rs. 51,400,000 to Dawood-Hercules Chemicals, Limited, subject to the terms and conditions set forth at the end of Section I, Summary and Recommendations.

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D.C. 20523

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AID-DLC/P-657
December 29, 1967

MEMORANDUM FOR THE DEVELOPMENT LOAN COMMITTEE

SUBJECT: Pakistan: Dawood-Hercules Chemicals Limited

Attached for your information are the recommendations for authorization of a loan pursuant to Section 104(e) of PL 480, as amended, in an amount not to exceed US\$10,800,000 equivalent to Dawood-Hercules Chemicals Limited to help finance the local currency costs of a proposed urea fertilizer project in West Pakistan.

This loan was authorized on December 29, 1967.

Rachel C. Rogers
Assistant Secretary
Development Loan Committee

Attachments:
Summary and Recommendations
Project Analysis
ANNEXES I-X

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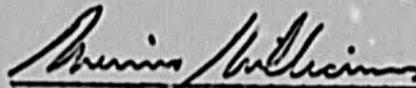
Loan No 391-E-130
(Ref: AID-DLC/P-657)

COOLEY LOAN AUTHORIZATION

Pakistan: Dawood-Hercules Chemicals Limited

Pursuant to the Agricultural Trade Development and Assistance Act of 1954, as amended, and delegations of authority issued thereunder, I hereby authorize a loan pursuant to Section 104(e) of such Act to Dawood-Hercules Chemicals Limited in the amount of Pakistan Rupees 51,400,000 subject to the following:

1. Such loan shall bear interest at the rate of 7 percent of the outstanding principal amount thereof per annum, payments being due semi-annually commencing six months after first disbursement under the Loan.
2. Such loan shall be repayable in fourteen (14) consecutive semi-annual installments, commencing forty-two (42) months after first interest payment. The amortization schedule shall provide for approximately equal semi-annual payments of principal and interest.
3. Conditions precedent to disbursement will include evidence that: (i) satisfactory arrangements have been made for gas supply, (ii) satisfactory management and organizational arrangements have been agreed upon by Hercules Incorporated and Dawood Industries Limited, and (iii) commitments by the International Finance Corporation and International Bank for Reconstruction and Development for financing are finalized.
4. Such other terms and conditions as A.I.D. may require.



Maurice J. Williams
Assistant Administrator
Bureau for Near East and South Asia

DEC 29 1967 ;

Date

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PAKISTAN - DAWOOD-HERCULES CHEMICALS LIMITED

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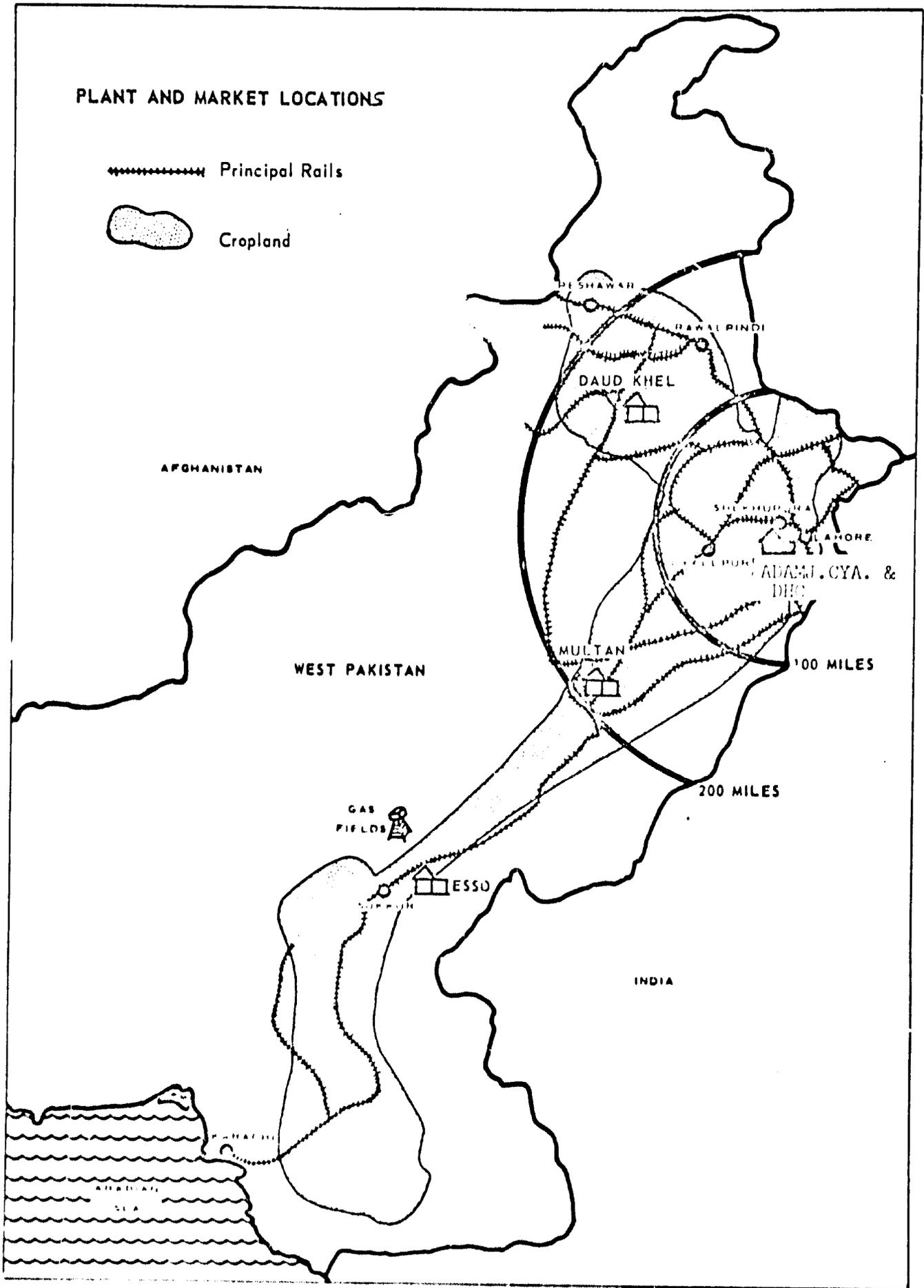
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PLANT AND MARKET LOCATIONS

Principal Rails

Cropland



I. SUMMARY AND RECOMMENDATIONS

Hercules Incorporated of Wilmington, Delaware, and Dawood Industries Ltd. of Karachi, Pakistan, propose to form a new company, Dawood-Hercules Chemicals, Limited (DHC) to produce urea in West Pakistan. The Dawoods were one of three family groups licensed by the GOP in 1966 to put together ammonia-urea projects with capacity in the order of 1,000 metric tons of urea per day for West Pakistan. The other two groups were the Adamjees, who are collaborating with American Cyanamid International, and the Hyesons, who are collaborating with Kaiser Aluminum and Chemical Corporation. All three project proposals are under active consideration by the Government of Pakistan (GOP), although there are indications that no more than two plants will be authorized to proceed at this time. In September 1967, AID received a Cooley loan application for \$10.8 million equivalent to partially finance the DHC project.

The DHC plant will be located near Lahore. Production start-up is scheduled for early 1971, increasing to full capacity production of 345,000 M.T. per year of urea within two to four years. The plant will be based on natural gas from the Sui gas fields transported and supplied by the Sui Northern Gas Pipeline Company.

Estimated costs of the project are fixed plant investment \$66.8 million, pre-operating expense \$3.7 million, interest during construction \$2.7 million and working capital \$3.9 million, or a total of \$77.1 million.* Proposed sources of financing are: (1) equity - Hercules (FREX) and Dawoods (Rs.) each \$11.7 million or 40% equity interest, and International Finance Corporation (FREX) and Pakistan public (Rs.) each \$2.9 million or 10% equity interest; (2) loans - International Bank for Reconstruction and Development (IBRD) \$30.0 million, AID Cooley \$10.8 million, Pakistani overdrafts \$4.2 million and Government of Pakistan (GOP) customs debentures \$2.9 million. Total foreign exchange requirements would be \$44.6 million, local currency requirements \$32.5 million. The debt-equity ratio of the above capitalization plan would be 62:38, or well within NESAs' outside limits for this type of project.

The return on investment to Hercules is not particularly attractive (9 to 10%) according to the assumptions we have used in projecting the financials. In Hercules' own analysis, however, it has assumed a relatively rapid production build-up, approval by the GOP of DHC as a public company for tax purposes, agreement by the GOP to repatriation of "15BB" reserves after the tax holiday, and other matters which would improve Hercules' return. If Hercules receives adverse rulings from the GOP on these tax matters, it will undertake a reappraisal of the project before final recommendations are made to its Board. Based on current negotiations with the GOP, however, Hercules is prepared to proceed and is anxious to complete financing arrangements as quickly as possible. National economic return of the project, according to our calculations, would be 20% without shadow pricing foreign exchange, or 26% based on shadow pricing.

Hercules, according to present draft agreements, is responsible for organizing and promoting the project, designing and building the plant,

* The rate of Rs. 4.8 to U.S. \$1.00 has been used throughout this presentation.

supervising start-up, managing during the initial years of plant operation and technical sales service. Hercules will appoint a Technical Director (or General Manager) to be responsible for matters having to do with plant management and operation. The Dawoods will be responsible for obtaining necessary Government permits and sanctions, underwriting the public issue if necessary, serving as Managing Agent of the Company and handling commercial sales. A new company, Dawood Corporation Ltd. (DCL), will be set up to sell the plant's output through approximately 300 to 500 distributors.

Extensive analysis and feasibility study has been undertaken by Hercules and its consultants (Bechtel Corporation, Chemical Consultants Ltd., and Fluor Corporation) in preparing this project and justifying its soundness. Numerous discussions have been held with AID, the IFC and the IBRD, during which time three issues became apparent:

(1) Adequacy of arrangements for gas supply

Additions to the Sui Northern Gas Pipeline Company Ltd. facilities will be necessary to supply gas for any new fertilizer plants in the Lahore area. There is also a need to clarify priorities among customers if competing demands either at the gas field or along the pipeline exceed supply.

Meetings are being arranged by the IFC between all parties interested in gas supply to the fertilizer plants to reach agreement on the additional facilities necessary, arrangements for financing these facilities and an order of priority for supply. The IBRD already has indicated its interest in financing the foreign exchange costs of additional pipeline facilities.

(2) Adequacy of market for two new plants

Hercules initially stated that one of its conditions for proceeding with the project was assurance from its lenders and the GOP that it would have an eighteen month to two year lead over a second plant (of the three licensed in 1966). It claimed that market development was too uncertain and supply-demand margins too close to permit reasonable assurance that two plants could start production in 1971 and sell their full output. AID (and the IFC's) position has been that the financing institutions would look at each project on its merits as it was presented. Our analysis indicates there will be room for two plants coming on stream in 1971 and building up to full production over a period of four years, however, a third plant will not be needed until several years later.

Hercules apparently has withdrawn from its original position that it will not proceed without assurance of delaying a second plant. Its current plan is to complete arrangements for financing as

quickly as possible so that procurement and construction can begin, thereby beating its competitors into the market by a year or more. It has already taken certain steps in negotiating contracts and proceeding with the engineering and procurement stage of the project, which in original plans was to occur only after financial arrangements were completed.

(3) Inadequate management and organizational arrangements

After detailed review of the several draft agreements between Hercules and the Dawoods, it appeared that Hercules, while providing know-how and the services of qualified personnel, was disclaiming direct responsibility for construction and performance of the plant. It was also apparent that two overlapping chains of command - that of the Dawood Managing Agency and the Hercules Technical Director - existed and that the conflicts which might therefore arise could only be settled at the Board level, where a stalemate could occur because of the veto power exercised by each group. With the exception of plant operation, there was no clear cut allocation of responsibility for management decisions.

This issue has been discussed at length with Hercules, and modifications of the draft agreements have been suggested which would (1) ensure Hercules' direct responsibility for engineering, construction and initial operation of the plant and (2) designate a Hercules appointee as General Manager with broad authority over all business of the Company. Hercules has discussed these changes with the Dawoods, and both partners have indicated general acceptance of these modifications. No problem is anticipated in reaching satisfactory resolution of this issue with Hercules during the course of negotiations on the loan agreement.

Thus the major issues which have been identified either have been resolved or are anticipated to be resolved during the normal course of loan negotiation. The project has highest priority in GOP plans to achieve self-sufficiency in agriculture and simultaneously hold requirements for imports of agricultural inputs to a minimum. It is well conceived, extensive feasibility study and analysis have been completed and design and detailed engineering are poised to proceed once financial arrangements are assured. The IFC/IBRD is now engaged in intensive review of DHC's application and expects to authorize the equity and loan participation in early 1968.

We recommend that this application be approved and a loan authorized to Dawood-Hercules Chemicals Limited of an amount not to exceed Rs. 51,400,000 (\$10.8 million equivalent) for the project described above, subject to the following conditions:

- (1) The loan shall be repayable in 14 consecutive approximately equal semi-annual installments, commencing 42 months after first interest payment.
- (2) The loan shall bear the annual interest rate of 7% of the outstanding principal amount thereof.
- (3) Conditions precedent to disbursement will include evidence that
 - (i) satisfactory arrangements have been made for gas supply and
 - (ii) satisfactory management and organizational arrangements have been agreed upon by Hercules and the Dawoods.
- (4) Such other terms and conditions as AID may require.

II. APPLICANT

The application was submitted by Hercules Incorporated on behalf of the new company Dawood-Hercules Chemicals, Ltd. (DHC). It is expected that legal formation of the new public corporation will occur in early 1968.

Hercules Inc. and Dawood Industries Ltd. will each own 40% of DHC's equity, and the International Finance Corporation and the Pakistani public will equally share the remaining 20%. Each will hold shares of common stock and have voting rights commensurate with its share of equity participation. There is no affiliation between shareholders other than through ownership of the applicant. Hercules Inc. is a U.S. public corporation, a majority of whose voting shares is owned beneficially by United States citizens.

The Dawoods are one of the three or four leading family industrial groups in Pakistan. They have acquired and/or manage a number of textile mills in both East and West Pakistan and also have interests in the Karnafuli Paper Mill, Dawood Mines Ltd., and the Central Insurance Company Ltd. A more complete description of their organization and holdings is set forth in Annex II.1.

Hercules is a major world-wide chemical company with a broad range of products. Among the more important product groups are: cellulose and rosin derivatives, synthetic resins, fibers, films, explosives, pigments, specialty plastics, and a large group of products developed for specific customer requirements. The Company presently operates a total of 53 plants and a Research Center and, in addition, either owns or has a substantial equity interest in 33 plants in 15 foreign countries. For the year ending December 31, 1966, consolidated assets of Hercules were \$530 million, retained earnings \$256 million, net sales \$610 million, and net income \$52 million.

Hercules has been operating ammonia plants since 1939. In 1960, the first of two urea plants went on stream at Hercules, California. Currently, Hercules operates ammonia facilities at Ketona, Alabama; Louisiana, Missouri; and Hercules, California. The latter two locations have an annual capacity of 60,000 tons of ammonia each. Both the Louisiana and Hercules plants are large chemical complexes based on natural gas. Both make urea (40,000 tons per year at Louisiana, Missouri and 20,000 tons at Hercules, California) and urea capacity at each plant is presently being expanded (Louisiana, Missouri to 100,000 tons and Hercules, California to 40,000 tons). Hercules claims it has over 300 qualified employees with ammonia and related experience from which to draw upon for assistance in this project. By "qualified", it refers to men with 3 to 25 years experience in design, construction, and management of ammonia and related operations.

Despite this experience and expertise in ammonia and urea, it should be noted that the ammonia-urea plant to be built in Pakistan is several times larger than Hercules' plants currently operated or planned in the United States. The planned capacity of the Pakistani plant is 345,000 M.T. of urea annually, as compared to 100,000 M.T. at the expanded Louisiana, Missouri plant. Furthermore, Hercules has not built or operated any ammonia-urea plants overseas. One of the main differences in technology in scaling up to 600 ton-a-day ammonia plants is utilization of centrifugal compressors (in lieu of reciprocal compressors used in smaller plants). While Hercules has no experience with centrifugal compressors in ammonia plants, centrifugal compressors of comparable size are used in other plants in its chemical complexes, and it anticipates no problems in utilizing this experience with ammonia. In addition, it will have the assistance of the Fluor Corporation, Kellogg and supplier personnel during construction, installation and start-up. The IFC and IBRD are satisfied with Hercules' capability to build and operate the facilities planned in Pakistan and AID accepts this judgement.

III. MANAGEMENT AND OTHER ARRANGEMENTS

In general terms, Hercules has responsibility for organizing and promoting the project, designing and building the plant, supervising start-up, managing plant operation during the initial years and providing for technical sales service and commercial sales activities not assigned to the Dawood sales organization. For providing know-how during the design, procurement and construction stages Hercules is to receive a fee of \$1,500,000 payable in five annual installments beginning one year after DHC commences production of ammonia and urea. This fee, which amounts to 2.3% of fixed capital costs or 1.9% of total project costs, appears reasonable in light of other fertilizer plant estimates in Pakistan.* In early 1968, Hercules will designate a Director from among its appointees to the DHC Board who will be a full time Technical Director (this title probably will be changed to General Manager in accordance with subsequent discussions with AID to better reflect his actual responsibilities). Hercules will supply a start-up team and the services of other key management and technical personnel for periods of up to six years from the end of construction through initial operation. Hercules, through the Technical Director, also will be responsible for development and implementation of a program for providing technical services to farmers in the form of field demonstrations and technical advice and assistance concerning the use of fertilizer and creation of demonstration and test farms. The personnel assigned by Hercules will be responsible to the Technical Director. A list of the positions to be filled by expatriate personnel and their approximate periods of assignment is shown in Annex III.1.

Dawood Industries Limited will be Managing Agent of the Company for a period of ten years commencing from the date the shares of the Company are offered for subscription to the public. The Managing Agent will be responsible for such matters as: (1) acquisition of property, (2) sale or disposal of property, (3) procurement of supplies required for the Company subject to approval of the Technical Director, (4) appointment of attorneys, (5) financial arrangements with banks, (6) negotiation of checks, bills, promissory notes, etc., on behalf of the Company, and

* Estimated know-how fees:

	Amount	% of Fixed Capital	% of Total Projected Cost
Adamjee-Cyanamid	\$1,500,000	2.8%	2.3%
Hysesons-Kaiser	1,000,000	1.7%	1.4%

(7) other administrative matters. For its services, Dawood Industries Ltd. will receive a fixed office allowance, reimbursement of actual expenses, and a commission of five percent of net profits before taxes (but not to exceed \$420,000 annually). The Managing Agent's commission works out to be about 3.6% of pre-tax profits when full production is reached and production costs stabilized. The Dawoods also will establish a new company, wholly owned by Dawood Corporation Ltd. (DCL), which will be appointed sales agent for DHC. DCL will be responsible for forming an organization capable of effectively marketing and promoting the sale of urea, including appointment of reliable distributors and retailers in sufficient number to provide good coverage of the market. For this service, DCL will receive a commission of two percent of ex-factory price (\$91.50) or a commission of \$1.83 per M.T.

The DHC Board of Directors will be composed of eight, ten or twelve members, with Dawood and Hercules each electing three, four or five members, respectively. The first Directors of the Company will be: (1) from the Dawoods - Ahmed Dawood (Chairman), Suleiman Dawood, Siddique Dawood and M.H. Gani, and (2) from Hercules - Dr. Harvey J. Taufen, Mr. Henry Reeves, and two members not yet selected. Before passage of any resolution by the Board, the vote of a majority plus one is required. At the shareholder level, a vote of not less than two-thirds of the total issued capital is required for passage of a resolution. Thus both the Dawoods and Hercules have veto power at the Board of Director and shareholder levels. Certain authorities are reserved to the Board, such as execution of contracts requiring more than twelve months to perform, execution of sales or purchase contracts involving more than \$210,000, any capital expenditure for fixed investment in excess of \$65,000, and legal or financial matters outside the normal course of business.

The above arrangements between Hercules and the Dawoods are spelled out in a series of agreements (a summary is set forth in Annex III.2). AID's review of those agreements raised questions with respect to two areas. First, in the decision-making area where Hercules intends to assume responsibility, there seems to exist no clear lines of authority and responsibility from Hercules through the DH corporate structure. Although Hercules clearly has an interest in effective implementation of the project, the presence of frequent disclaimers of the actions of individuals and of Hercules in the agreements gives a quite different impression. The agreements should contain clear statements to the effect that overall responsibility to provide design and construction know-how, start-up and operating personnel, etc. lies with Hercules. Also, it is not enough for Hercules simply to provide services and know-how to DH Chemicals; the agreements should also ensure that, subject to Board approval, these inputs are translated into action by the Company. Second, the agreements do not adequately provide for effective resolution of conflicts between the Technical Director and his staff and the Managing Agent. The Board has essentially delegated to the Managing Agent full

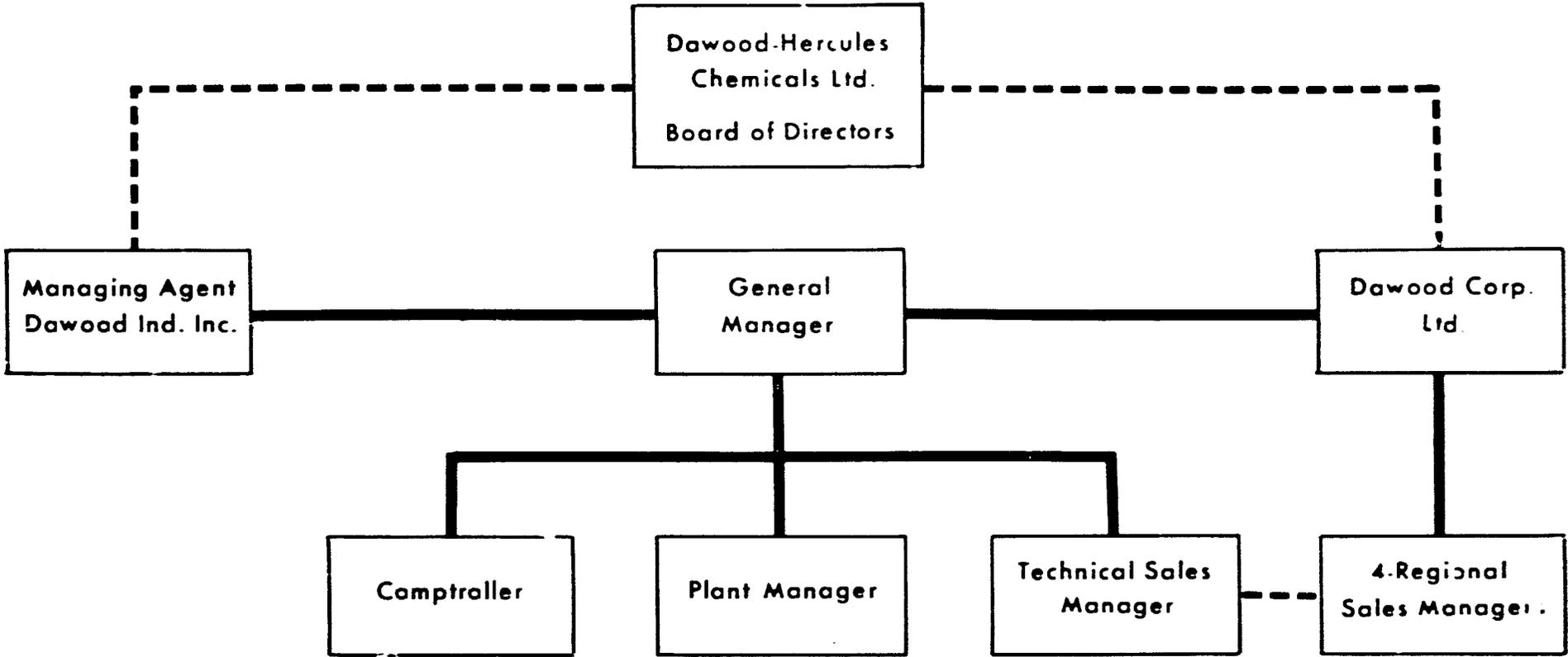
responsibility to operate the company, while the Managing Agent has in turn agreed to delegate to the Technical Director responsibility for all activities related to plant operation (and, we understand, marketing). With this type of management structure, disagreements could arise both as to scopes of responsibility (since production and marketing considerations are present in most corporate decisions) and the substance of a decision within a given management area.

Following AID's discussion of these problems with Hercules and Hercules' subsequent discussion with the Dawoods, Hercules now reports that designation of the Technical Director as General Manager over Company affairs is acceptable to both stockholders; his authority would include the right to approve decisions of the Managing Agent in any area of management prior to implementation of the decision. The Managing Agent would have the right to appeal such decisions to the Board, which, however, would be deadlocked and thus not overrule the Technical Director if Hercules' directors supported his decision. Hercules also reports that it is prepared to remove most of the "disclaimer" clauses with respect to its responsibility to the project and become directly responsible for ensuring that the plant achieves its stated production objectives. These assurances are satisfactory, we believe, at this stage as a basis for proceeding with loan authorization. These matters will be discussed further during the course of loan agreement negotiation, however, and evidence of satisfactory arrangements will be made a Condition Precedent to Disbursement of the loan.

The organization of the Company, once the above changes are effected, is illustrated by the chart on the next page.

9a

PRELIMINARY ORGANIZATION CHART
DAWOOD-HERCULES CHEMICALS LTD.



IV. PROJECT

A. Facilities and Process

The project involves the construction and operation of a 345,000 metric ton (M.T.) per year urea plant near Lahore and the establishment of a private marketing/distribution organization to handle the plant's entire output.

Manufacturing facilities will consist of a 613 M.T./day (202,000 M.T./year) ammonia plant and a 1,047 M.T./day (345,000 M.T./year) urea plant. The ammonia plant is planned on the basis of a Kellogg single train unit. The urea plant will be based on the Toyo Koatsu complete recycle process. Two lines are used for synthesis, purification and recovery, although we understand that Hercules is considering modification to a single train plant which would reduce plant costs by more than \$1 million. Finishing is accomplished in a single evaporator and a prilling tower. Prilled urea is conveyed to two storage buildings with a combined capacity of two months' production. A bagging plant is provided to handle full daily production in one shift of eight working hours. Bagged urea can be loaded into railcars or trucks or stored. Provisions are made for two weeks' production of bagged product storage.

Supporting facilities will include a power generating plant supplying 18,000 KW; steam, cooling water, fire water and potable water systems drawing from tubewells to be drilled on the site; telephone communication system; fully equipped maintenance shops; plant office; warehouse for spare parts and supplies; and a substantial housing colony for approximately 75 key employees and their families, school, medical and recreational needs.

B. Site

The initial site considered was Daharki, near the Mari gas field, which had the distinct advantage of a low gas cost of 15¢ per million BTU. This site was recommended by Bechtel in its report of December 1966*. DHC, however, concluded that there were

* Bechtel Corporation, Project Economic and Engineering Report, D-H Chemicals, Ltd. Urea Plant, West Pakistan, December 1966.

two very important disadvantages related to this site - unreliable transportation of product and extremely primitive living conditions. The Bechtel Report did not attempt to evaluate the relative economies of locating this plant at a greater distance from the gas field with the consequently lesser distance from the principal domestic market, about 200 to 450 miles north from the Daharki site. Bechtel also did not examine possible Sui gas costs along the pipeline at northern locations.

In March 1967, DHC requested Chemical Consultants (Pakistan) Ltd. to consider all possible sites between Sukkur and Lahore and tabulate all relevant data. This was presented in a report dated May 1967*. Hercules' engineers inspected the seven most advantageous sites based on information in the report and selected Chichoki Mallian, about sixteen miles west of Lahore. Considering costs of gas, water, wage differentials, fringe benefits and transportation, this site offers according to the Chemical Consultants survey the lowest aggregate costs. Its main economic advantage is proximity to market, which is worth about \$3 per ton of urea transport in comparison with the Daharki location. The site is near the Sui Northern Gas Pipeline; abundant supplies of good water are available underground; the soil is flat, clear and will support adequate foundation loads; land cost is reasonable at about \$500 per acre; rail, road, telephone, telegraph and mail facilities are good compared to other locations; and the site is near an important industrial center (Lahore) where skilled labor, schools, hospitals, etc. are available.

DHC has received approval from the Government of Pakistan for its site selection, and negotiations for acquisition of 800 acres have begun. (DHC has requested assurances that the Government will requisition the land if it encounters difficulties.)

* Chemical Consultants (Pakistan) Ltd. Site Survey for Dawood-Hercules Chemicals, May 1967.

Initially 200 acres will be developed to include plant facilities, an experimental farm test area, and housing colony, recreational facilities and dispensary. The additional 600 acres acquired will be available for future expansion.

At the time the site was selected, it was unclear where the other two new licensed urea projects might choose to locate. Adamjee-Cyanamid now has selected the Lahore area also, and expect to locate an almost identical plant within several miles of DHC. (Kaiser-Hyesons has selected the Daharki location.) If these two plants proceed apace, this obviously will have significant impact on the demand for transportation facilities, availability of labor, development of ancillary support facilities, competition for the market, and like matters.

Neither Hercules nor American Cyanamid seem overly concerned about this matter. Hercules believes it is farthest along in developing its project and expects to be first in the Lahore area with the consequent advantages of having prior access to labor, trucking companies, market development and the like. The Lahore Division of the Pakistan Western Railway (PWR) is a net exporter of empty wagons, and wagon availability is better than in any other Division of the Railway. The main switchyard facilities near Lahore are overcrowded and inefficient, but if two new fertilizer plants are scheduled to come on stream in 1971, this may provide the impetus for the PWR to undertake substantial improvement of its switching and loading facilities. It is expected that trucking companies will be attracted to the area to provide transportation for the new plants, and again, with two plants in the offing, the incentive to truckers and ancillary repair shops, machine shops, etc. to locate in Lahore will be that much greater. Skilled labor is expected to migrate, and unskilled labor should be in abundant supply. The effect of two plants on gas supply and market competition is discussed in separate sections of this paper, but neither factor should be a major obstacle to locating in Lahore. Lahore is the second largest industrial area in West Pakistan and thus is better prepared to absorb and adjust to two new plants than most other locations. While either company would prefer to be the sole producer of fertilizer in the Lahore area, both were attracted by its substantial advantages, and both are prepared to proceed knowing the other will be located nearby.

C. Gas Supply

Gas will be supplied from the Sui gas fields, approximately 65 miles north of Sukkur and 400 pipeline miles from Lahore. The gas will be transported from the gas fields to the DHC site by the Sui Northern Gas Pipeline Company Ltd. (SNGP), a government undertaking. The SNGP now has an allocation of 2.0×10^{12} cft. of the gas reserves of the Sui gas field. It has requested an additional allocation of 1.2×10^{12} cft. to meet normal growth requirements on its system through the early 1970's. In addition, if one or two new fertilizer plants draw gas from its system, each will require an allocation on the order of 0.4×10^{12} cft. of Sui gas reserves to have an assured gas supply during the life of the plant. Thus, with two fertilizer plants expected to come on line in the early 1970's, the SNGP would require a total allocation of about 4.0×10^{12} cft. to meet all demands. This is well within the capacity of estimated reserves of 5.7 to 6.3×10^{12} cft. in the Sui field, including 1.2×10^{12} already committed to Indus Gas and the Karachi Gas Transmission Company. However, it leaves little margin for further allocations to other demands, e.g. for the West Pakistan Water and Power Development Authority for power requirements (a large gas-based power station is planned in the Sukkur region) or for a new line serving Daudkhel and Peshawar.

The present production capacity of the Sui gas field is about 320×10^6 cft./day. Installed capacity of the purification plant is 200×10^6 cft./day, and average present through-put is in the order of 150 - 160×10^6 cft./day. This allows sufficient capacity at the present time to handle the 35×10^6 cft./day requirements of a single new large fertilizer plant. However, if growth in normal demand of the SNGP or a second fertilizer plant is taken into consideration, purification facilities will have to be expanded. The free flow capacity of the SNGP system is 90×10^6 cft./day, which is now fully utilized. In order to meet normal demand growth up to 1970, the SNCP is installing four compressor stations between Sui and Multan (where more than half the load is consumed), which will raise the capacity of the line to 160 - 170×10^6 cft./day. The Mission reports that this capacity will be fully absorbed through normal growth by 1970 (representing an annual compound growth rate of 17 percent between 1966-1970). Additional pipeline facilities will be needed for any new fertilizer plants and to meet other demands from 1970 onward.

The SNGP proposes to loop the line from Sui to Multan, and install additional compressor stations. Depending on whether

one or two new fertilizer plants come on stream about the same time, SNGP estimates total investment in new transmission capacity will be between \$18 and \$32 million. Approximately two to three years' lead time from the date financing is arranged will be required to complete the new transmission line facilities. The GOP has had preliminary discussions with the IFC/IBRD concerning plans for such additional facilities and foreign exchange financing. A meeting is being convened by the IFC in Pakistan in December or January among all parties concerned with gas supply to ensure plans are firmed up and necessary arrangements made for financing. The IBRD already has indicated its interest in financing the foreign exchange costs of additional SNGP facilities. It is expected that expanded purification facilities and new wells for the Sui Gas Transmission Company will be financed from GOP free foreign exchange.

DHC executed a contract on October 6, 1967 with the SNGP providing for gas supply. DHC reports that the quality of the gas is good (methane content 94.9%; total sulphur two grains per 1,000 SCF maximum; heat value between 885 BTU and 950 BTU per thousand cft.). The contract has fixed and variable price elements, which DHC calculates will total on the average about 35¢ per thousand cft. at full production capacity. The contract is for fifteen (15) years from the date of start-up, renewable unilaterally by DHC for five (5) additional years, and mutually thereafter for five (5) year periods. The contract is subject to (a) approval of the GOP to the proposed DHC plant and provision of gas supplies, (b) SNGP securing Government approval of its proposed expansion and obtaining the required financing, and (c) necessary arrangements for the purification of additional gas to meet DHC's requirements.

To ensure that DHC will have an adequate gas supply, AID will require as a condition precedent to disbursement under the loan (1) that satisfactory arrangements have been made for financing and completing necessary gas facilities by the time the DHC plant is scheduled for start-up, and (2) that the conditions of the gas contract, and such other modifications as AID may require, are met.

D. Other Inputs

Major material inputs other than gas are bags, catalysts and chemicals, power, water and air.

DHC contemplates the use of burlap bags with imported polyethylene inner liners. Around 7 million bags are needed per year. Costs are estimated to be \$1.8 million of which \$100,000 represents the cost of importing 250 metric tons of bulk polyethylene, probably from Japan. Government approval is presently being sought for the import of polyethylene and DHC plans to arrange for a supply of burlap from local sources.

Catalysts will be imported, though most other chemicals are available locally. Total annual cost of catalysts is estimated to be \$275,000.

Power will be generated on site by three 6,000 KW base load capacity alternators. Two of the alternators will be driven by gas turbines (accounting for one-third of the daily DHC gas requirement) and the third by steam. Ample quantities of sub-soil water of under 500 ppm salinity are available which will be pumped via tubewells, according to Chemical Consultants site survey report.

E. Labor

The total planned number of employees is as follows:

<u>Function</u>	<u>Number</u>
Management	13
Supervision	59
Skilled Labor	270
Unskilled Labor	<u>225</u>
TOTAL	567

This is approximately 50% more than would be required in a U. S. plant due primarily to extra personnel employed for supporting facilities (e.g. maintenance and repair shops and housing colony) and end product handling. Operating facilities, the power plant and the control laboratory will work three shifts, 24 hours per day, 7 days per week.

Hercules will provide up to eighteen men for periods ranging from two to five years plus a start-up team of ten men for up to one year. Hercules expects that some of the expatriate staff may

be recruited in Europe or Japan. The number of people, functional responsibilities and duration of service of personnel to be provided by Hercules appear reasonable, Although it would be desirable to establish in a loan agreement covenant AID's right to be consulted first if Hercules desires to withdraw its personnel from certain senior positions (such as Resident Technical Director and Plant Manager) prior to full payment of the Cooley loan.

Other than the Hercules expatriate staff, DHC expects to recruit all employees locally and Pakistanize the entire plant within five years from start-up. DHC plans to use a variety of training media designed to fit the qualifications of the Pakistani employees hired. Key supervisory personnel will be trained in Hercules' plants for three to six months. Additionally, training programs will be incorporated into the suppliers' bid specifications (such as the Toyo Engineering's formal program conducted in its facilities in Japan). Trained employees will join expatriate staff about three months prior to commissioning and together conduct on-the-job training for the operating and maintenance people. The training program will be under the direct supervision of a specialist from one of Hercules' plants in the USA, who will be assigned to the project, if the planned schedule is maintained, in the first half of 1968.

DHC does not anticipate significant problems in finding sufficient numbers of skilled and semi-skilled technicians in the Lahore area. One of the major advantages of the Chichoki Mallian site is the relative availability of skilled and semi-skilled workers and graduates at the Intermediate and Degree level which can be trained.

V. PROJECT COST AND FINANCING

A. Project Costs

Project costs as estimated by Hercules are summarized as follows:

(Amounts in \$ millions)

	<u>FREX</u>	<u>L.C.</u>	<u>Total</u>
1. Plant	29.3	9.5	38.8
2. Spare Parts & Catalysts	3.4	0.2	3.6
3. Site & Housing	0.5	4.3	4.8
4. Import Duties	-	7.2	7.2
5. Fees	4.0	-	4.0
6. Engineering & Start-up	6.6	1.4	8.0
7. Additional Contingency	-	0.4	0.4
Sub-total (Fixed Capital Costs)	43.8	23.0	66.8*
8. Pre-operating Expense	0.8	2.9	3.7
9. Interest During Construction	-	2.7	2.7
10. Working Capital	-	3.9	3.9
Total	<u>44.6</u> 45.6	32.5	77.1

* Includes \$8.8 million "Contingency and Escalation".

Estimates of plant, spare parts and catalysts, fees and engineering and start-up costs are based on the Specifications and Order of Magnitude Estimate, dated June 1967, prepared for Hercules by Fluor Corporation, Ltd. A detailed breakdown is given on the next page. Costs assume world-wide procurement; self generation of all power needs; conservative design of process and utility facilities; a two-year supply of imported chemicals, spare parts, oils, lubricants and warehouse inventories; and initial and spare catalyst charges. Land cost is estimated at \$500 per acre based on the Chemical Consultants' Site Survey Report. A housing colony with 198 units and supporting facilities such as recreation buildings, school and dispensary will be provided.

"Engineering Not in Field" includes \$1,355,000 for Hercules engineering costs, \$500,000 for Fluor's engineering costs to be incurred through May 1968 (Phase II of their contract) and engineering performed by Fluor and other contractors during Phase III of the project.

DANWOOD-HERCULES FERTILIZER PROJECT
Capital Costs
(Thousands of Dollars)

PAGE 17-A

Item	Imported Material Fas Port (A)	Ocean Freight (B)	Import Duty (C)	Inland Freight (D)	Field Costs (E)	Escalation and Contingency (F)	Foreign Exchange (G)	Local Currency (H)	Total (I)
1. Ammonia Plant	6,500	800	2,200	250	2,500	1,790	9,810	4,230	14,040
2. Urea Plant	4,100	500	1,400	160	2,640	1,285	7,105	2,980	10,085
3. Ammonia Storage	650	30	200	25	195	160	915	345	1,260
4. Auxiliary CO ₂ Equipment	1,350	70	450	50	380	335	1,950	685	2,635
5. Urea Storage & Shipping	670	30	225	25	3,527	655	1,810	3,322	5,132
6. Electric Power Generation	2,086	30	650	90	774	540	2,200	1,460	4,220
7. Electric Services	65	5	13	3	287	57	167	268	435
8. Auxiliary Boiler Plant	500	20	150	20	160	125	690	285	975
9. Steam Services	10	1	2	1	26	5	30	15	45
10. Water Supply & Treatment	375	48	127	17	275	120	625	337	962
11. Cooling Towers	500	80	200	20	150	140	745	345	1,090
12. Water Distribution	37	4	11	2	142	30	130	96	226
13. Fire Protection	83	9	28	3	37	25	130	55	185
14. Comp. Air System	46	4	10	1	21	10	70	22	92
15. Effluent Treatment	-	-	-	-	50	7	10	47	57
16. Mobile Equipment	985	100	328	32	55	219	1,286	433	1,719
17. Other Non-Process Equip.	199	68	52	5	6	50	310	70	380
18. Buildings & Furniture	300	37	102	10	713	171	732	601	1,333
19. Spare Parts	2,000	140	640	80	-	420	2,450	830	3,280
20. Catalysts & Chemicals	760	46	242	10	-	159	926	291	1,217
21. Sub-Total 1-20	21,216	2,072	7,035	804	11,938	6,303	32,651	16,717	49,368

(Continued)

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Item	Imported Material Fas Fort (A)	Ocean Freight (B)	Import Duty (C)	Inland Freight (D)	Field Costs (E)	Escalation and Contingency (F)	Foreign Exchange (G)	Local Currency (H)	Total (I)
22. Land	-	-	-	-	400	-	-	400	400
23. Site Investigations	-	-	-	-	50	7	35	22	57
24. Site Improvements	60	10	20	10	655	110	60	805	865
25. Housing	340	40	115	11	2,674	477	437	3,220	3,657
26. Sub-Total 22-25	400	50	135	21	3,779	594	532	4,447	4,979
27. Engineering Not in Field	6,708	-	-	-	-	980	6,329	1,359	7,688
28. License Fees - Ammonia	103	-	-	-	-	-	103	-	103
29. Urea	976	-	-	-	-	51	1,027	-	1,021
30. Fees - Know How	14	-	-	-	-	2	16	-	16
31. Tech. Collaboration	29	-	-	-	-	5	34	-	34
32. Management	2,435	-	-	-	-	430	2,865	-	2,865
33. Sub-Total 28-32	3,557	-	-	-	-	488	4,045	-	4,045
34. Start-Up Costs	293	-	-	-	-	52	235	60	345
35. Additional Contingency	-	-	-	-	-	400	-	400	400
36. Total Fixed Capital	32,174	2,122	7,170	825	15,717	8,817	43,842	22,983	66,825

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"License fees" are based on the Kellogg ammonia process (considered relatively firm cost) and the Toyo Koatsu complete recycle urea process (5% contingency included). "Know-How" and "Technical Collaboration" fees are for start-up assistance by suppliers on critical items of equipment. The "Management Fee" is for the functions to be performed by Fluor or another firm to serve as Managing Contractor during construction (see Section VI Project Implementation). Total "Management Fee" and "Engineering Not in Field" costs are estimated at \$10.6 million, or 16% of total Fixed Capital Costs. This magnitude of engineering costs, according to the IFC, is within the normal range for this type of project.

The GOP has indicated to Hercules that duties on items which can be classified as production facilities will be 25%. To cover for duties on non-production items, for surcharges and other hidden taxes, Hercules uses an overall gross rate of 30% in calculating import duties.

A 10% escalation factor and 5% contingency factor have been included for fixed capital items with the following exceptions: "Land" - no allowance; "Engineering Not in Field" - no allowance on direct Hercules costs; and "License Fees" - 5% contingency only on urea process. Since Fluor's Specifications and Order of Magnitude Estimates were submitted as recently as June 1967 and bid awards are expected to be made by July 1968, the escalation factor appears reasonable. The project cost estimates have been prepared on the basis of extensive and multiple analysis (i.e. Bechtel, Fluor and Hercules' own review). While the 5% contingency may not be adequate as a contingency allowance per se, the total allowance of 15% should be adequate to cover possible increases over estimated capital costs due both to escalation and unexpected overruns.

Details of pre-operating and interest during construction costs are set forth in Annex V.1. Hercules expects to be able to capitalize all pre-operating expenses except "Technical Sales Service" amounting to \$350,000 net after deducting seeding program revenues. Interest during construction is calculated at 7% on both dollar and rupee loans. Terms of loans are amplified further in Section V.B. Working capital needs are estimated to be \$4,242,000 for inventories (two months finished goods) and accounts receivable (six weeks) through 1971, the first year of operation, increasing to \$7,005,000 by 1976, when sales and operating expenses are projected to level off (See Annex VIII.8). By December 31, 1970, DHC shows a cash balance of \$3,880,000, which along with cash generated by operations in 1971 is expected to provide the necessary working capital funds.

On a per-ton basis, the investment costs per metric ton of capacity at the DHC plant would be as follows:

(In Dollars)
Total Costs Per MT of Capacity

	<u>Urea</u>	<u>N</u>
1. Fixed Capital Costs	\$192.5	\$417.6
2. #1 plus Pre-operating Expenses and Interest During Construction	212.2	460.4
3. #1 and #2 plus Working Capital	223.5	484.9

While these cost estimates are somewhat higher than other comparable urea plants being planned in Pakistan and India (see Annex V.2) they are within reasonable range of such costs and may largely be the result of more thorough and realistic analysis and planning. The range of total estimated costs (fixed capital, pre-operating expenses, capitalized interest and working capital) per metric ton of urea capacity is \$208 to \$224 for the three Pakistan plants; similar costs for the Armour-Goa plant in India are \$185 per M.T. based on 1966 U.K. prices.

B. Project Funding

Planned project funding is as follows:

		(Millions of Dollars)		
		<u>FREX</u>	<u>L.C.</u>	<u>Total</u>
	IBRD	30.0	----	30.0
	AID Cooley	----	10.8	10.8
	Pak Bank Overdrafts	----	4.2	4.2
	GOP Debentures (import duties)	----	2.9	2.9
	Sub-total	<u>30.0</u>	<u>17.9</u>	<u>47.9</u>
<u>Equity</u>				
	Hercules	11.7	----	11.7
	Dawood	----	11.7	11.7
	IFC	2.9	----	2.9
	Public	----	2.9	2.9
	Sub-total	<u>14.6</u>	<u>14.6</u>	<u>29.2</u>
		<u>100</u>		
	Total Loans & Equity	44.6	32.5	77.1

The IBRD loan and IFC equity investment are actively under consideration and are expected to be submitted for Board action during the first quarter of 1968. The anticipated terms of the IBRD loan are 6% interest with a commitment fee of 3/8 percent on amounts not drawn down; three and one-half to four year grace period from first drawdown date, ten year payback after grace period; and a Government of Pakistan guarantee at a cost of 1/4 - 3/8 percent. In our financial statements, we have shown the IBRD initial drawdown occurring the second half of 1969, and first repayment on June 30, 1973. Overall interest cost has been calculated at 7 percent.

A Cooley loan of \$10,800,000 equivalent is requested to cover all local currency costs, including seeding program losses but excluding working capital, not funded by rupee equity or GOP import duty debentures. Projected conditions are 7% interest, three and one-half to four year grace after initial disbursement and seven year repayment after grace. The Cooley loan will not be subordinated to any other long-term debt without AID prior approval. The IFC has advised us that the IBRD will require an equitable mortgage on the fixed assets of the company in addition to the GOP guarantee. Reportedly, such a mortgage can be granted without payment of a registration fee because the IBRD is an international organization; if AID is a party to the mortgage, a fee in the order of \$600,000 to \$700,000 would have to be paid. This matter will be discussed further during the course of loan agreement negotiations. Hercules' Appropriation Request to its Board projected the Cooley loan being completely repaid over three years between 1971 and 1973. To permit better debt coverage during the first two years of operation, our financials re-cast Cooley repayments over a seven year period, commencing on June 30, 1973, the same date as first repayment of the IBRD loan. It is DHC's intention to pre-pay the Cooley loan to the extent surplus cash is generated above working capital and reinvestment needs.

DHC has explored the availability of short-term loans and believes up to \$8.0 million equivalent in short term lines of credit could be made available from American Express, First National City Bank, Habib Bank and National Bank of Pakistan at interest rates of 7-7½ percent. Such amounts would require tangible asset collateral in the form of inventory or fixed assets. As in the case of the Cooley loan, DHC expects to eliminate the need for overdraft facilities by 1973 through surplus cash generation from operations.

The project will be allowed delayed payment of import duties to the extent of 40% of total duties. This payment will take the form of GOP debentures bearing interest at 6% with a five year payback including two years of grace. In our financials, we have shown debentures in the amount of \$2.9 million equivalent being issued in 1970 and paid back in 1972. If cash requirements dictate, repayment could be rescheduled over the period 1973-1975.

Equity investment by Hercules Inc., Dawood Industries, Ltd., International Finance Corporation and the Pakistani public will all be 100% cash contributions. According to the Basic Agreement (unsigned) between Hercules and Dawood Industries Ltd., Dawood is to either act as underwriter or to secure the services of a bank or other suitable party to act as underwriter for the ten percent public issue (1,399,000 shares at Rs. 10 each, or total issue of Rs. 13,900,000). The commission for the underwriter would be a maximum of 2 $\frac{1}{2}$ % and Dawood would guarantee that DHC, within 180 days after the issue of the prospectus, would receive at least Rs. 9.75 per share for unsubscribed shares. We have raised the issue with Hercules of whether an independent underwriting consortium (perhaps led by the Investment Corporation of Pakistan) could handle the underwriting to ensure maximum opportunity for public participation. This matter will be explored further and suitable conditions written into the loan agreement.

The promoters originally proposed that both the IBRD and AID loans be drawn down in proportion with equity pay-in. We agreed, however, in talks with the IFC that a substantial proportion of equity should be paid-in prior to any loan disbursement. One apparently acceptable solution would be a formula whereby Hercules, the Dawoods and the IFC would each pay in 25% of their equity shares at the time of the IFC/IBRD commitment. Each of these parties would pay in remaining equity in four 18.75% installments at six month intervals. Such a formula is acceptable to AID provided the promoters guarantee the disbursed portion of the Cooley loan until all equity is fully paid-in.

In our financial statements we have assumed the first equity pay-in will occur by June 30, 1968. Subscriptions of the three equity principals would be fully paid-in by June 30, 1970. We also assume that the 10% public issue is not paid-in and GOP debentures and bank overdraft are not available until 1970. Based on these assumptions and Hercules' projected schedule of funds requirements, the IBRD and AID loan drawdowns would commence in the second half of 1969. Scheduled drawdown of rupee and foreign exchange funds are set forth in Annex VIII.1.

The debt-equity ratio at the time of project start-up would be 1.64: to 1.00 or 62:38. This ratio is more conservative than the 70:30 considered by NESAs as the maximum permissible for fertilizer projects.

VI. PROJECT IMPLEMENTATION

A. Design, Engineering and Construction

Hercules has primary responsibility for putting together this project in all its technical and overall management phases including technical sales service. To manage this effort, it has established a task team under the leadership of its International Department which is scheduled to devote upwards of twenty man years to the project prior to start-up date. Hercules will be responsible for the design, procurement and construction of plant facilities. These responsibilities include, among other things, preparing, assembling or having prepared design criteria, specifications and drawings; advising on plant layout; advising on the selection of a construction contractor; assisting in the procurement of materials and equipment; providing surveillance standards to determine whether the plant is being properly constructed; and similar matters. In fulfillment of these responsibilities, Hercules has assigned various numbers of its engineering staff to the project and expects to utilize 38 engineering man years prior to start-up.

In 1967, Hercules signed a contract with Fluor Corporation to undertake work in three phases (with Hercules' approval before commencing each phase):

I. Preparation of Specifications and Order of Magnitude Estimate.

This was completed and submitted in June 1967;

II. Preparation of process design, mechanical specifications and definitive estimate; and

III. Detailed design, procurement and construction of facilities.

Agreement to proceed with Phase II of the contract is conditioned upon arrangements for financing being finalized with the IFC and IBRD. It is expected that project construction will be administered through a Managing Contractor under the supervision of the Hercules Engineering Department. Hercules favors selecting Fluor as the Managing Contractor on the basis of their experience in foreign countries (e.g. they have recently completed two fertilizer plants in Korea) and their current responsibility for building the Esso plant in Pakistan. Fluor is also a licensee of the Toyo Koatsu urea process which Hercules plans to utilize. Fluor should be able to phase out its work with Esso (scheduled completion late 1968) with commencement of intensive work on the DHC plant, thus making experienced personnel available and minimizing costs.

Under Hercules' supervision, the Managing Contractor (Fluor) will prepare process design and mechanical specifications, issue instructions to bidders, solicit bids and provide definitive overall engineering and construction cost estimates. According to the implementation plan, engineering and procurement for the two process units - ammonia and urea - will be done competitively by process contractors. Because of Hercules' preference for certain of the various available ammonia and urea manufacturing processes, the number of bidders will be restricted. Pre-selection of bidders is to start shortly after Fluor receives authority to proceed with Phase II. Bid negotiations and award of contracts are scheduled for late spring 1968.

Procurement and construction will be supervised by the Managing Contractor. The Managing Contractor will be responsible for performing inspections during manufacture of equipment and accepting or rejecting items for shipment to the construction site.

Start-up will be accomplished by bringing a team of about ten expatriate personnel to West Pakistan during the second half of 1970 for periods averaging six months. Maximum expatriate personnel at site are expected to be 29 people during commissioning and start-up. These personnel would be phased out in 1972 and 1973, with the exception of the Plant Engineer who would leave in 1974 and the Plant Manager who would leave in 1975.

B. Project Schedule

The chart on the following page shows the basic timetable for design, engineering and construction phases of the project. Hercules as well as Fluor customarily use Critical Path Method (CPM) to program work. A CPM schedule was used on the initial portions of the project that led up to the Appropriation Request for Hercules' Board approval, and further CPM schedules will be prepared when Fluor starts the next phase of the project.

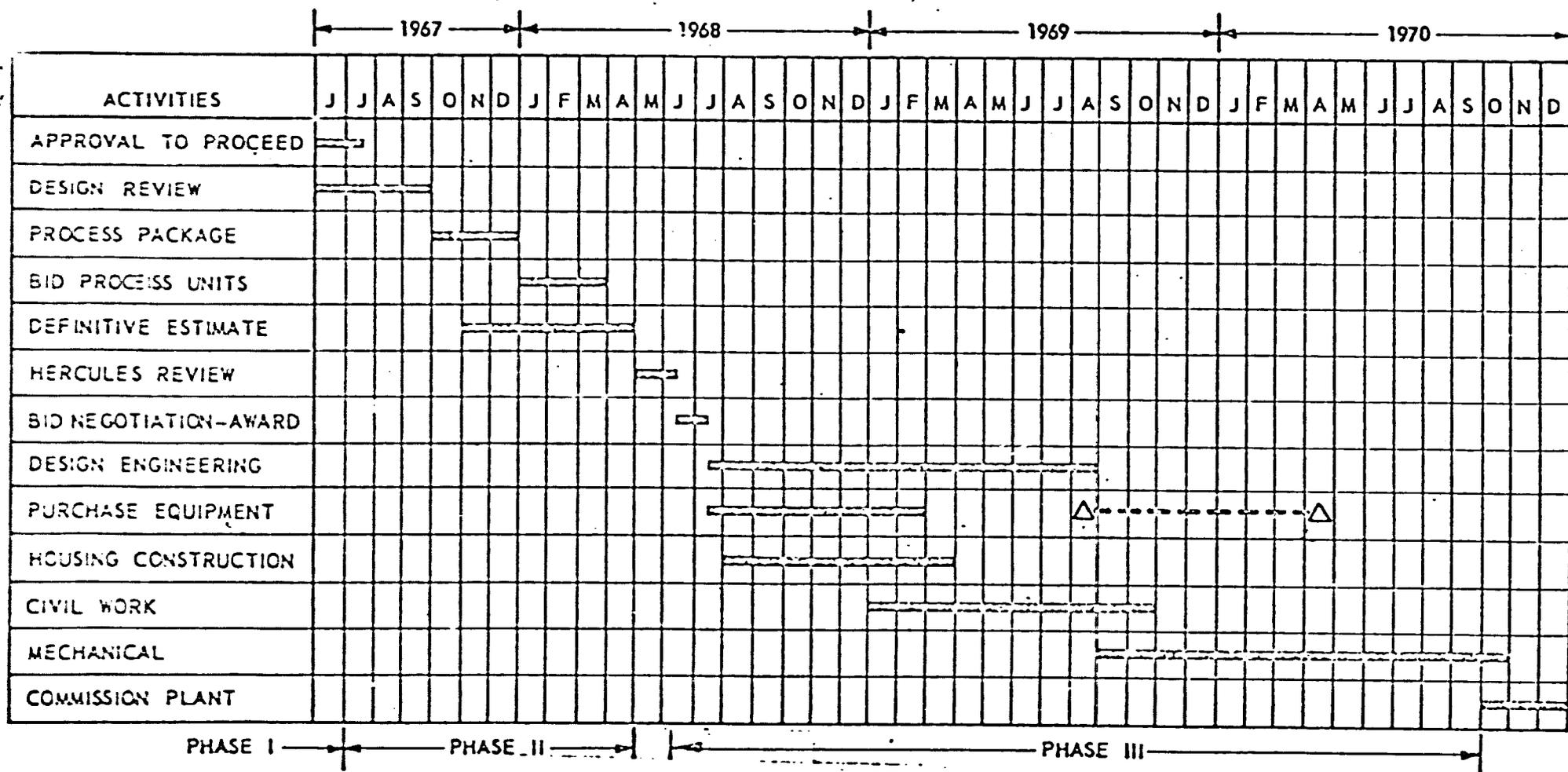
The project is already about five months behind schedule as a result of delays in obtaining foreign exchange financing. A total of forty-two months are projected to elapse between commencement of Phase II and commissioning. Hercules believes it can regain much of the lost time if notice to proceed is given in the next month or two. Start-up of commercial operation is planned for January 1971, with production reaching 50 percent of capacity in 1971, 90 percent in 1972, and 100 percent thereafter. Disbursements are expected to occur as indicated in Annex VI.1.

PAKISTAN FERTILIZER PROJECT
CONSTRUCTION SCHEDULE

LEGEND

△ JOBSITE DELIVERY

▬ WORK PERIOD



Source: Hercules Appropriation Request

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FERTILIZER DEMAND IN WEST PAKISTAN
(In Thousands of Metric Tons of N)

	<u>1966/67</u>	<u>1967/68</u>	<u>1968/69</u>	<u>1969/70</u>	<u>1970/71</u>	<u>1971/72</u>	<u>1972/73</u>	<u>1973/74</u>	<u>1974/75</u>
1. IBRD Group	132	168	214	271	301	336	373	416	453
2. Dawood-Hercules	115	150	200	250	299	350	391	451	506
3. USAID	<u>115</u>	<u>203</u>	<u>259</u>	<u>294</u>	<u>356</u>	<u>417</u>	478	539	600
4. Chemical Consultants	-	-	-	370	(405)	(443)	(485)	(531)	587
5. Kaiser	145	(187)	(241)	(311)	408	(461)	(521)	(589)	667
6. Fisons	195	378	455	503	551	601	630	660	680
7. Adamjee-Cyanamid	100	224	353	457	557	640	720	(800)	880

- Note: 1. Past consumption based on Chemical Consultants Report (see item 4 below) has been as follows:
1961/62 - 42,000; 1962/63 - 34,000; 1963/64 - 69,000; 1964/65 - 79,000; 1965/66 - 97,000
2. Figures in parentheses are extrapolated on compounded basis from projected estimates in other years.

- Sources: 1. IBRD Group based on draft report dated February 23, 1967.
2. Dawood-Hercules based on Cooley loan application dated September 6, 1967.
3. AID projected requirements from TOAID A-504 dated September 29, 1967.
4. Chemical Consultants Study on Agricultural Conditions and Fertilizer Demands and Production dated September 1966.
5. Kaiser Aluminum and Chemical Pakistan Fertilizer Project, undated.
6. Fison's Fertilizer Project Feasibility Study dated September 1966.
7. Adamjee-Cyanamid Prospectus dated September 1967.

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by taking acreage under cultivation for different crops, multiplying these figures by recommended dosages, and allowing for an estimated shortfall to arrive at consumption figures. A detailed breakdown of Hercules' assumptions with respect to acreage, recommended dosage (application) and coverage (percent of acreage under recommended dosage) is given in Annex VII.1. The major crop affecting consumption of fertilizer in both 1970/71 and 1974/75 is Mexi-Pak, a new strain of dwarf wheat developed with Pakistan germ plasm in Mexico by hybridization. It was tested in Pakistan on a large scale in 1965, and results obtained to date indicate that wheat yields can be tripled and quadrupled using the new variety. The actual acreage planted to Mexi-Pak was 9,400 acres in 1965/66 and 200,000 acres in 1966/67. In the fall of 1968 there will be adequate Mexi-Pak seed to sow 6,000,000 of the 8,000,000 irrigated acres in wheat in West Pakistan according to one study; according to Chemical Consultants' report on fertilizer demand and production,* this condition is likely to be reached only in 1969/70 or 1970/71. In Hercules' table, this acreage level is assumed to be reached in 1970/71. On the basis of the limited fertilizer tests conducted thus far, the Mexican specialist in charge of the Mexi-Pak project estimates the optimum fertilizer dosage on Mexi-Pak is 120 lbs. N per acre and the recommended dosage 80 lbs. N per acre. According to this specialist, it is probable that the average application by 1970 on Mexi-Pak wheat will be three bags of N per acre, or 68 lbs. Hercules assumes a dosage of 69 lbs. per acre in 1970/71. In sum, Hercules' estimates of nitrogen usage on Mexi-Pak, which accounts for more than 50% of the projected nitrogen consumption, appear reasonable. For other crops, Chemical Consultants has gone through a similar analysis of acreage and application per acre to arrive at consumption figures. As can be seen from the table on the prior page, Hercules' final estimates are considerably more conservative than Chemical Consultants'.

There are a number of constraints which may limit the growth in fertilizer consumption, such as lack of adequate water supplies, bottlenecks in transportation (particularly the availability of rail cars), shortages of farmer credit, insufficient attention to farmer education, and many more. These are difficult to quantify in terms of fertilizer demand, but Hercules has recognized a discount factor in its "percent coverage" calculations. It will also take direct steps as a company to overcome some of these constraints, such as providing its own Technical Sales Service staff and facilities, providing substantial credit through DHC and the Dawood Corporation Ltd. (the Dawood sales organization), investigating transportation facilities, etc. These actions should reduce the impact of these constraints upon consumption.

* Chemical Consultants (Pak) Ltd., Study on Agricultural Condition and Fertilizer Demands and Production, Lahore, September 1966

In sum, we believe Hercules has made reasonable assumptions in projecting nitrogenous fertilizer demand in West Pakistan. They readily admit that these projections start from a small base of experience and that the dramatic growth projected has limited reliability. Their findings, however, are reinforced by the other consultants, experts, and agencies which have analyzed fertilizer needs, and are on the conservative side of other projections.

B. Production Capability

Fertilizer in West Pakistan is now produced solely by public sector plants of the West Pakistan Industrial Development Corporation (WPIDC) at Lyallpur, Daudkel and Multan. The plant at Lyallpur has an annual capacity of about 18,000 MT of super-phosphate, which is being expanded to 42,400 MT by 1968. Daudkel has an annual capacity of 50,000 MT of ammonium sulphate, which is being expanded to 90,000 MT this year. The largest WPIDC plant is at Multan, whose capacity is 110,600 MT of ammonium nitrate and 57,600 MT of urea. Total capacities will be expanded to 140,300 MT of ammonium nitrate and 74,100 MT of urea by 1968. In addition, ESSO is constructing an urea plant in the Mari gas fields about 60 miles northeast of Sukkur. This plant, which will be the first private fertilizer plant in West Pakistan, is scheduled to come on stream by the end of 1968 and will produce 173,000 MT of urea at full capacity.

In our consideration of new plants, we have allowed for only two of the 1,000 MT-a-day urea plants already licensed - namely the DHC and Adamjee-Cyanamid plants. In August, 1967, these projects were given a clear sanction by the National Economic Council (NEC) to proceed (each has subsequently received a sanction letter) and both are now seeking firm commitments for financing. The third licensee - Hyesons - has yet to obtain an unqualified sanction from the NEC, we understand and information available to AID to date indicates its capitalization plan, heavily dependent on supplier credits, is based on an unsatisfactory debt-equity ratio and the availability of a substantial amount of equity financing which might not be available under current market conditions. The National Economic Council has also sanctioned a large ammonium sulphate nitrate plant (600 MT ammonia per day) to be built by WPIDC at Daudkel. However, GOP officials have indicated this plant will be delayed if two of the private urea plants proceed as scheduled. Other small expansions may be made to the present plants at Lyallpur, Multan and Daudkel, but these will not significantly affect total fertilizer availabilities. A triple super-phosphate plant of 150,000 MT capacity to be built in Karachi by the Jaffer Brothers with Kuwaiti financing also has been sanctioned, but its current status is unknown. More detailed information on capacities and production of these plants is given in Annex VII.2.

Comparison of the several demand projections (listed on page 24-A) and production is illustrated in the chart on the following page. In projecting production to be expected from the new plants, one method is to accept the start-up date and phased levels of production during initial years as set forth by the promoters in their project reports. DHC expects to commence production in January 1971, achieving 50% of capacity the first year (1971), 90% the second, and 100% thereafter. Adamjee-Cyanamid expects to begin production by February 1971, achieving 54% of capacity through 1971, 79% the second year, 88% the third, 94% the fourth, and 100% thereafter. On these assumptions, the production-demand balance would be as follows:

(Metric Tons of N)

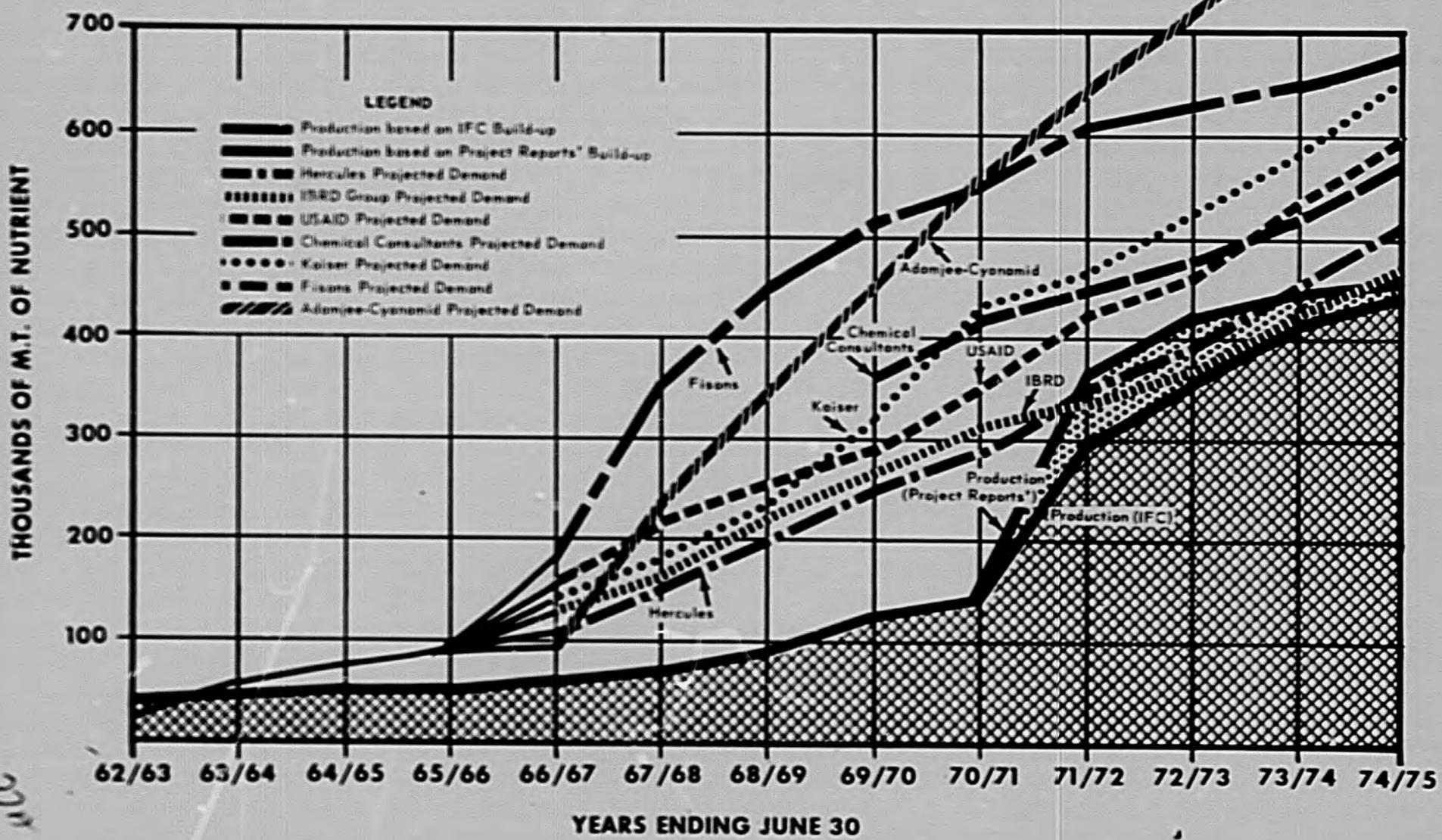
Year Ending <u>6/30</u>	Production Assuming Schedules in Project Reports *	Hercules Estimated Demand	Production Surplus (Deficit)	USAID Estimated Demand	Production Surplus (Deficit)
1971/72	375,000	350,000	25,000	417,000	(42,000)
1972/73	421,000	391,000	30,000	471,000	(50,000)
1973/74	444,000	451,000	(7,000)	532,000	(88,000)
1974/75	453,000	506,000	(53,000)	600,000	(147,000)

* Assumes present plants plus ESSO, DHC and Adamjee-Cyanamid plants.

The significance of these figures is that both Hercules and USAID estimated requirements (or demand) indicate production could be fully absorbed. The slight surpluses for 1971/72 and 1972/73 shown in Hercules' projections would amount to only 7% of production and could easily be assimilated in increased stock levels. USAID's projected requirements show an increasing deficit which must be met each year by imports or other plant expansions. These forecasts also show that a third 1000 MT-per-day urea plant (first year production estimated 75,000 MT of N) could not be fully absorbed if it were to come on-stream prior to 1973/74 based on USAID projected requirements, or after 1974/75 based on Hercules projected requirements.

A second method of projecting production, and the one utilized by the IPC in its analysis, is to assume a more conservative rate of build-up to full production based on experience with other fertilizer plants and apply this build-up uniformly to the new projects. The IPC schedule assumes production at 50% of capacity the first year, 70% the second, 85% the third, 95% the fourth and 100% thereafter. This approximates the build-up projected by Adamjee-Cyanamid for its plant. Utilizing these percentages and assuming both new plants commence production only in July 1971 (allowing for delays in firming up foreign exchange financing commitments), the production-demand balance would be as follows:

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(Metric Tons of N)

Year	Production Assuming IFC		Production (Deficit)	USAID	
	Scheduled Build-up	Hercules Estimated Demand		Estimated Demand	Production (Deficit)
1971/72	300,000	350,000	(50,000)	417,000	(117,000)
1972/73	367,000	391,000	(24,000)	471,000	(104,000)
1973/74	412,000	451,000	(39,000)	532,000	(120,000)
1974/75	442,000	506,000	(64,000)	600,000	(158,000)

These figures indicate a deficit each year in production available to meet requirements. Considering Hercules projected requirements, there still is not room for a third new urea plant until after 1974/75; USAID projected requirements would allow a third plant to commence production in 1971/72, but production would slightly exceed requirements in 1972/73 and 1973/74.

In summary, it is reasonable to assume there will be sufficient demand to fully absorb the production of two new urea plants in 1971/72 even if the most optimistic production schedule (Hercules') and conservative projected requirements (also Hercules') are realized. If either the IFC production schedule or USAID projected requirements are more accurate, the deficit between production and requirements becomes larger. Only if USAID's more optimistic projected requirements and the IFC's more conservative production schedule are compared would there be room for three plants initially and margins between production and demand would be minimal. This analysis supports our conclusion (and the IFC's) that only two new urea plants should proceed at this time.

C. Market Area and Competition

There is on the east-central corner of the predominant market area which roughly forms a half moon with Multan in the southwest, Lahore in the east and Daudkel in the northwest, as indicated in the map in the first part of this paper. The main marketing effort will be concentrated within a 200-mile radius from the plant.

It is expected that production in the predominant market area (from the Daudkel, Multan, Adamjee-Cyanamid and DHC plants) will approximate consumption through 1974/75, after which increased capacity will be required (see analysis in Annex VII.3). If DHC reaches capacity production at a faster rate than projected by the IFC, availabilities in this market area will exceed requirements and plants will be forced to sell farther afield to dispose of their product.

In addition to the northern plants, however, the Esso urea plant, which will be some 200 miles south of Multan, plans to ship some product into the northern market area. Esso will have about a three year lead in coming into production, but this may be largely offset by the seeding program planned by Dawood-Hercules to begin this year. Adamjee-Cyanamid does not plan to begin its seeding program until 1969 and even then plans to sell only 60,000 M.T. of urea prior to plant start-up.

The most economic allocation of nitrogenous fertilizer production would involve Esso and Multan plants serving the south-central areas with an overlap around Multan. Such a clear demarcation is not likely. The most probable result will be a highly competitive market from Multan northward, with northern manufacturers being forced to ship part of their outputs beyond a 200 mile range. This will add to transportation and other selling costs (which is discussed more fully under Section VII.E. Costs, Selling Prices and Margins).

D. Distribution and Sales

The GOWP has decided to permit the new private fertilizer producers - Esso and the others now in the planning stage - to establish private organizations for distribution and sales of their product. Distribution and sales of imported fertilizer now are handled by the public sector Agricultural Development Corporation (ADC), which sells directly from its sales depots or appoints private parties as retail sales agents. Fertilizer from the WPIDC plants is sold through the Rural Supply Cooperative Corporation (RSCC). It is expected that with the ensuing competition between the private sector, cooperatives and the ADC-operated agent network, distribution effectiveness should improve considerably in the future.*

* In the past, distribution has been solely through government channels. "From 1954 to 1962 the distribution of fertilizers in West Pakistan was handled exclusively by the Provincial Agriculture Department through the departmental staff who arranged transportation and storage and supervised sales made through their appointed agents. Primarily due to the basic incompatibility of business operations through government channels the distribution and marketing was not done successfully and was later entrusted to the co-operative sector.

"The Service Cooperative Societies which started functioning in 1961/1962 as retail agents to WPADC also proved inefficient for precisely the same reasons; the functions of Agriculture Department were taken over by the Cooperative Department with the same inherent weaknesses.

(Continued on next page.)

Dawood-Hercules will promote and distribute its urea through two marketing groups - a technical sales service group which will be part of DHC and under the management of Hercules personnel, and a commercial sales organization owned and managed by Dawood Industries. Esso and Adamjee-Cyanamid are planning their distribution systems on more or less similar lines, except that their technical and commercial sales are handled together through a Marketing Division. Plans for these Dawood-Hercules organizations are somewhat tentative pending further analysis by a Hercules team which visited Pakistan in November 1967 and commencement of a seeding program. However, current thinking is as follows.

Primary responsibility of the technical sales force will be to determine the demand for DHC brand urea among the farmers and to instruct them in the proper use of fertilizer and other progressive farming methods. This will be done principally through direct counseling, field demonstrations and village meetings. The technical sales staff will also work with the Government's agricultural extension service to enlist its support and cooperation. The technical sales group will be headed by a technical manager, who initially at least will be an expatriate Hercules employee, and four senior agronomists, one for each of the four proposed sales districts. In addition to the senior agronomists there will be 25 field agronomists located throughout the marketing area. The headquarters for the sales districts will be located at Lahore, Sargodha, Peshawar and Multan. To support the work of the technical sales force, DHC will have a soil testing laboratory. The cost of technical sales service is estimated at \$700,000 during the pre-operating period and \$500,000 per annum after start-up.

The principal responsibility of the commercial sales company will be to set up an effective distribution system to serve the marketing area. The company will guarantee off-take of 80% of plant production each month with payment 45 days after shipment. It will maintain four main depots with capacities of 10,000 to 20,000 M T. each and about 27 satellite depots with capacities in the order of 4 to 500 M.T. each to stock inventory and supplement stocks carried by distributors. The sales company, under the management of a marketing director, will establish four regional sales offices, each of which will be staffed by a branch

* (Continued from previous page.)

"In 1964 the distribution passed on to WPIDC who appointed their own agents. This was discontinued in 1966 as large scale black marketing was allegedly done by WPIDC Agents during the two year period.

"Since 1966 the distribution is partly handled by WPADC through its own sales depots and through retail agents, and partly done by the cooperatives." From letter from Hercules to IFC, dated September 22, 1967.

manager, a sales and distribution manager, office management and accounting personnel, and a number of sales representatives. Approximately 300-500 distributors will be selected (primarily in Mandi, or market, towns), who, along with their sub-agents, will provide upwards of 1,000 retail agents. The Dawoods already have approximately 500 distributors or agents who handle the purchase of cotton for their ginning and weaving operations and sell finished products. It is expected these agents will form the nucleus of the fertilizer distribution organization. (Note: Hercules recently reported that the Dawoods already have appointed 30 fertilizer distributors, and are seeking 70 more.)

To develop these organizations and build a market for its product, Dawood-Hercules plans to undertake an intensive seeding program prior to plant start-up. The ADC has agreed, in a contract executed October 5, 1967, to appoint Messrs. Dawood Corporation Ltd. as distributors of fertilizer on behalf of the ADC, and to allocate 92,000 M.T. of fertilizer (in terms of urea) to this company each year for the years 1967/68, 1968/69 and 1969/70. D-H is satisfied with this quantity for the current year but has requested the following total allocations in terms of urea tons for subsequent years:

1968/69	135,000 M.T. of any type of fertilizer
1969/70	165,000 M.T. of any type of fertilizer
1970/71	100,000 M.T. of urea

They will negotiate for these incremental amounts in due course. Reportedly the Dawoods have received or are about to receive their first shipments of fertilizer and will undertake to sell the full 1967/68 allocation by June 30, 1968.

Concurrently with the development of commercial sales, Hercules plans to staff the DHC technical sales force, starting with 15 agronomists (including one to three expatriates) and increasing to full strength of about 30 by one year prior to plant start-up.

The seeding program appears sound at this stage of project implementation; and, with three years experience prior to plant operation, it should permit the company to develop its market position and effectively establish its organizations for technical sales service and commercial sales. The ability of the new Company to establish its privately-owned selling organization and gain several years experience in promoting and distributing fertilizer is critical in Hercules' view to the success of the project. Their recent observations in Pakistan are that fertilizer is being held back from the farmers and growth of demand stunted by the Government-managed distribution organizations and their agents. Thus a true picture of fertilizer demand and credit needs will not emerge until private distributors have an opportunity to operate and fertilizer becomes readily available.

E. Costs, Selling Prices and Margins

Costs, selling prices and margins are analyzed for two periods:
 (1) pre-operation seeding period (1967/68-1970/71) and (2) post-start-up
 (1971/72 onwards).

1. Seeding Program. The Dawood contract with the ADC provides for
 the following Freight-On-Rail (FOR) Karachi costs and fixed selling prices:

(All Data in \$ per M.T.)

<u>Type Fertilizer</u>	<u>FOR Karachi</u>	<u>Selling Price In Mandi Towns*</u>	<u>Margin</u>
Urea	88.41	105.00	16.59
TSP	64.47	79.80	15.33
A/S/N	44.94	58.80	13.86
A/S	32.34	46.20	10.86

* Additional charges allowed for sales beyond Mandi towns are: Urea and TSP \$4.20; A/S and A/S/N \$2.10.

On a per ton of urea basis, Hercules estimates of distribution-technical sales service costs are:

	<u>\$ per M.T.</u>
Number of tons urea sold during seeding program - 500,000 M.T.	
(a) Cost of urea FOR Karachi	\$ 88.41
(b) Costs to be met from margin:	
Dawood Agents Commission (2% of FOR)	1.77
Rail Freight	5.78 to 10.00*
Unloading, Storage & Outloading	1.00
Dealer Commissions	5.00
Technical Sales Service	1.75
Sub-Total	\$ 15.31 - \$19.52
(c) Total Costs	\$103.71 - \$107.93

* The ADC-Dawood contract includes an average freight cost of \$5.78 per M.T. and allows for adjustment of margins if costs are higher or lower. According to Chemical Consultants' site survey, the freight cost per ton of fertilizer in a 20 M.T. wagon would be about \$6.80 from Karachi to Lahore. Hercules

(Continued on next page.)

With the selling price of urea fixed at \$105 per M.T., Dawood-Hercules should come close to breakeven on distribution and technical sales services costs. If other types of fertilizer are sold (as undoubtedly they will be) which have smaller margins, it is less likely that D-H will breakeven on its seeding program. If experience indicates this program will result in losses, Hercules plans to negotiate wider margins - although Esso's experience would indicate there is little leeway for adjustment of margins already granted in the contract.

2. Post Start-Up. Dawood Hercules proposed selling price is calculated as follows:

	<u>\$ per M.T. Urea</u>
Ex-factory gate	91.50
Dawood Agents' Commission (2% of ex-factory)	1.83
Estimated Average Transportation Cost	3.00
Unloading, Storage & Outloading	1.00
Dealer Commission	5.00
Technical Sales Service	1.50
Residual for Contingency	1.17
	<u>105.00</u>

The major factor of uncertainty in these cost estimates is transportation. The \$3.00 per M.T. cost assumes that about 50% of the urea is moved by rail within a 200 mile radius and 50% by truck up to 50 to 100 miles. As pointed out in Section VII.C., transportation distances are likely to be greater due to competition in the northern marketing area between DHC, Adamjee-Cyanamid and the enlarged Government plants. The mix of transportation * and market served will not be set until experience is gained in the early years of operation, and transportation costs are likely to vary from present estimates. It might be noted that the "Residual for Contingency" would cover a one-third overrun in transportation cost estimates.

For purposes of preparing project financials and estimating profitability, Dawood-Hercules has assumed a retail selling price to the farmer of \$105 per metric ton. Hercules reasons as follows (per the Cooley loan application):

(continued from previous page) has calculated a cost of about \$10.00 per ton to ship urea from Lahore to Karachi. Actual freight will vary according to destination - i.e. fertilizer will be shipped directly from Karachi to depots throughout the marketing area.

* For example, with two large plants competing for transportation facilities in the Lahore area, truck transportation facilities are likely to expand more rapidly than rail, and thus a heavier utilization may be made of trucks. Chemical Consultants concludes that trucks should probably be used for all southbound traffic for distances between 150 to 200 miles and for northbound traffic for distances between 75 to 200 miles.

"This compares with the present subsidized CIF Karachi prices of urea officially fixed at \$102-\$105 per ton depending on whether it is locally produced or imported. By the time our plant comes into being the subsidy program will have been discontinued. We have been assured that a free pricing system will be instituted by the government. Nonetheless, it is doubtful that significant revisions in price will take place. We believe that price will remain firm for the following reasons: (a) the use of fertilizer is highly profitable for the farmers who in the past have actually paid much higher prices; (b) there will not be any significant surplus in domestic production and since the bulk of the production capacity will be privately owned, there will be general interest in maintaining prices at a competitive but profitable level; (c) the small government plants have high production costs and will not be in a position to lead any downward trend; (d) Pakistan will continue to face a serious foreign exchange shortage necessitating severe import restrictions so that imports will only be authorized to the extent that there is a shortage of local production and; (e) the government considers this price level satisfactory as manifested by the fact that it has authorized this price to Esso under a formal agreement."

Adamjee-Cyanamid also has used \$105 per M.T. as the soundest basis for projections. If costs turn out to be higher than anticipated, it is reasonable to assume that DHC and Adamjee-Cyanamid will be able to make adjustments in their selling prices for the reasons stated in the quotation above.

The competitive world market price of urea, c.i.f. to Asian subcontinent, appears to be in the order of \$85-\$90 per metric ton. (See analysis in Section IX-B.) If \$10 is added for handling and storage in Karachi and transporting to the northern market area, the comparative price for imported urea would be \$95-\$100, which is higher than the \$91.50 ex-factory price to be charged by DHC. This comparison does not shadow price the cost of foreign exchange, which would heavily favor indigenous production. Thus, DHC's ex-factory price is and should continue to be advantageous competitively with imports, even if world market prices drop substantially.

F. Credit

In analyzing credit needs of the new venture, three levels are considered: (1) credit supplied by DHC to Dawood Corporation Ltd. (DCL); (2) credit extended to distributors and retailers by DCL; and (3) credit made available to the farmers. Credit requirements are accentuated by two factors - the seasonal pattern of sales to farmers (three-fourths of sales occur during six months of the year) and the fact that most farmers will not be able to pay for part of their fertilizer until they market their crops. In the application, DHC has assumed certain inventory capacities at both the plant and selling company levels and stated that each will offer up to six weeks' payments on shipments; it is assumed that distributors and dealers, along with credit institutions, will supply the remainder. Based on an analysis presented in Annex VII.4., the maximum inventory and receivables to be

financed by DHC would be in the range of \$7.0 to \$7.6 million during the months April-June and October-November. These periods occur when sales are highest by DHC in order to build DCL and distributor/dealer stocks for the heavy sales in each planting season. This level of inventories and receivables approximates that shown in DHC financials and should cause no difficulty.

Maximum credit requirements of DCL would be on the order of \$5.6 to \$6.2 million, the major portion of which would be required for inventories. The Dawoods have stated that a line of credit of from \$6 to \$8 million would be available from local banks (probably Habib) against hypothecation of inventory; in addition the resources of the Dawood Group would be available to back up financing requirements. DCL should therefore have an adequate supply of credit.

Despite optimal conditions being assumed for distributor/dealers (e.g. only one month's inventory in terms of sales, 60% cash payments including funds from institutional credit), peak requirements reach \$8.1 to \$8.4 million during the months of April and May because of the lag in collections and the need for sizeable inventories in May to supply June sales. If there are approximately 400 distributors, each would need resources of about \$20,000, or Rs. 100,000. This may not be unreasonable for many distributors, but it is probable DCL will have to extend additional financing to others. Since DCL will have a bank line of credit available against inventories, which are high during the same months of distributor/dealer maximum need, DCL may have to extend longer payment terms or discount retailer receivables during peak months of the year (e.g. February - April). AID will require in the form of an overrun commitment that DCL undertake to supply or make available such distributor/dealer credit as may be required to dispose of 80 percent of plant production (the amount DCL is required to procure).

The above analysis assumes that 20% of sales will be financed by institutional credit. Such credit would amount to a maximum of about \$3 to \$4 million at any one time. Institutional credit is available through the Agricultural Development Bank of Pakistan (in 1966/67, the ADBP disbursed \$30 million in loans), Cooperative Credit and Farming Societies, and Government taccavi loans. Money lenders also are a primary source of loans to farmers. It is generally recognized that existing short-term agricultural credit facilities are inadequate and poorly administered. Hercules, after a recent team visit to Pakistan, reported that credit was not readily available to the farmers, because among other reasons, many farmers had not repaid prior year loans and, consequently, most sales are now for cash. The credit problem is under study at the highest levels of the Government, and a much expanded and improved farm credit program will have to evolve if sales of fertilizer three or four times present levels are to be financed. It is reasonable to forecast, however, that expanded farmer credit will become available to serve the relatively modest requirements of this project.

It should be noted that the preceeding analysis is only one calculation based on what we consider a reasonable set of assumptions. If variations occur in percent cash sales, institutional credit available, inventory levels, etc., credit needs may change substantially. This sensitivity underlines the need for DCL to assure adequate credit will be made available for DCL, distributor and retail sales.

VIII. FINANCIAL ANALYSIS

A. Financial Assumptions During Construction Period

Annex VIII-1, the Scheduled Draw-Down of Rupees and Foreign Exchange, provides a schedule of semiannual equity and loan drawdowns conforming to a tentative agreement between Hercules and IFC/IBRD that 25% of the promoter's and IFC's equity will be paid-in upon commitment of the IBRD loan with the remaining 75% of the equity to be "called" over the following two years (18-3/4% every six months). It is assumed that the IBRD loan is committed by June 1968. Under this formula, and the annual rupee and foreign exchange requirements supplied by Hercules, neither the AID nor the IBRD loans will be required until the second half of 1969.

The Projected Source and Application of Funds Statement, Annex VIII-5, also reflects this timing as well as Hercules' projections of the timing of expenditures for fixed assets (including customs) and pre-operating expenses during the three-year construction period (1968-1970). Expenses which Hercules projected for 1967 are consolidated into 1968, due to delays in beginning the project. All cash requirements during the construction period are supplied from equity and the term loans.

B. Profit and Loss Statements

Projected Profit and Loss Statements for the years 1971-1982 are provided in Annex VIII-2. These projections are based on an ex-plant sales price of \$93 per metric ton during the operating years.

Owing to normal problems encountered during start-up as well as the constraints imposed by establishing distribution credit and farmer education, DHC's production build-up was projected by Hercules to reach 50% of capacity in 1971, 90% in 1972 and 100% in 1973. Although no historical basis for production build-up of a plant such as this one is available for the subcontinent, IFC/IBRD and AID agreed that, to be conservative, projected production should be adjusted downward to 50% of capacity in 1971, 70% in 1972, 85% in 1973, 95% in 1974 and 100% from 1975 onward. This build-up, we believe, may also more realistically reflect lower sales which may be achieved during early years due to prospective market constraints and deficiencies. •

Plant production costs are composed primarily of natural gas purchases (about 25% of unit costs), bagging costs (about 28% of unit costs), power, operating and repair labor, maintenance materials, and plant overhead. Built into labor and overhead costs is a 10% annual

escalation factor during the years 1971-1976. Gas costs are based on a contract calling for \$1.16 million annual fixed charge plus 25.2¢ per 1,000 cubic feet. Bagging costs of \$10.00 per M.T. are based on importing polyethylene inner lines (\$100,000 per year) and processing burlap bags locally. As production increases, the per-unit plant cost decreases from a high of \$47.19/M.T. in 1971 (50% of capacity) to \$33.93/M.T. and \$35.48/M.T. in 1975 and 1976, respectively.* Conversely, gross profit before depreciation increases from 49.3% of net sales in 1971 to 63.5% and 61.8% in 1975 and 1976, respectively. Although production remains the same, plant costs increase during 1976 due to escalation but remain constant in absolute terms and in proportion to net sales from that year onward. Hercules believes that projection of an escalation factor more than ten years from now (i.e. beyond 1976) is too uncertain and thus includes no factor beyond this date (it could be assumed further escalation would be offset by selling price changes or improvements in efficiency).

Indirect costs include Hercules' and Dawood's office expenditures (the bulk of these expenses occur prior to start-up and are amortized over the life of the Project), the Managing Agent's fee, Hercules' know-how fee, DHC home office expenses and technical sales service costs. These fees have been described in an earlier section. In total, indirect costs amount to \$1,226,000, or 3.8% of net sales in 1976, the year when plant costs level off.

The data in Hercules' presentation assumed depreciation computed on a straight-line basis. GOP tax law requires, however, that for companies that wish to take advantage of the six-year tax holiday, taxable income must be calculated using the declining balance method of depreciation.** Annex VIII-3 is the detailed computation of the declining balance method compared to straight-line depreciation and Annex VIII-4 adjusts net income, income taxes, the "15 BB Reserve" and the maximum dividend allowed using the declining balance method.***

* The \$35.48/M.T. production cost is comparable to the proposed Adamjee/Cyanamid project's costs of \$34.17/M.T.

**Tax in Pakistan, A Brief Outline, Central Board of Revenue, Karachi, Pakistan, p.13.

***During the six-year tax holiday, 1971-1976, the company can pay annual dividends up to 60% of accumulated retained earnings. The remaining 40% known as the "15 BB Reserve" must remain in the company to be used only for re-investment (including debt retirement), issuance of bonus shares, or investment in a scheduled list of approved industries. For purposes of our projections, it is assumed that maximum allowable cash dividends will be paid, i.e., 60% of accumulated earnings for years 1971-1976 and 100% thereafter. It is noted, however, that the company has applied to the GOP to pay cash dividends of the "15 BB Reserve" in 1977.

During the first year of production, the company has a projected gross profit after depreciation of 6.7% due primarily to operation at only 50% of capacity. Gross profit increases dramatically to 30% in the second year of production when the company is scheduled to operate at 70% of capacity. Gross profit in 1975, the first year of full capacity production, is approximately 50%, dipping in 1977 through 1979 because of "extra-shift" depreciation.* By 1980, gross profit exceeds 50%.

Operating profit (profit after indirect costs but before interest expenses and income taxes) follows a similar pattern as that of gross profit, although it is influenced by the higher indirect expenses caused by employing expatriate personnel and organizing administrative and selling efforts during the initial years.

Heavy interest payments during the first year of operations when added to the effect of one-half of capacity production and relatively high indirect expenses cause a net loss of \$3,406,000 in 1971. This pattern, however, is reversed the following year to a net income before taxes of \$2,234,000 or almost 10% of net sales.

Due to the six-year tax holiday, net profits after taxes are the same as net income until 1977 when the first income tax payments, representing 45% of taxable income, are made.**

* "Extra shift" depreciation at the rate of 100% of the normal allowance allowed for triple shift operations. See Annex VIII-3.

** Hercules utilized a tax rate of 40% in its financials. However, the Finance Act of 1967 provides for the following company taxes:

1. Income tax	30%
2. Super tax	30%
a. Rebate for firm declaring dividends in Pakistan and withholding tax on dividends.	15%
b. Rebate for "public company"	10%

DHC should qualify for the dividend rebate, but does not appear to qualify as a public company (defined as 50% or more of equity held by the public). We have therefore assumed a net tax rate of 45% in our projections.

C. Source and Application of Funds

In 1971 and 1972, cash needed to finance initial inventory and receivables is met from overdraft facilities, depreciation and profits (1972 only). In 1973, working capital requirements, for the most part, level off and from that year through 1980, the major cash outlays are for income taxes (which begin in 1977), debt retirement, both financed from profits and depreciation, and dividends financed from profits.

The statements indicate no provision for fixed asset expenditures after completion of the plant in 1970; however, annual maintenance costs included in the P and L, which increase from \$833,000 in 1971 to \$1,031,000 in 1975, are meant to finance minor additions to the plant. As pointed out below, considerable amounts of retained earnings accumulated during the tax holiday and cash from depreciation will be available for re-investment in the company if this should be necessary.

In Annex VIII-6 (Amortization of Term Debt and Overdraft), debt retirement is computed on the following terms: (a) ten-year amortization for the IBRD loan following a 42-month grace period after disbursement, (b) seven-year amortization for the AID Cooley loan following a 42-month grace period after disbursement, and (c) GOP debentures retired in one payment in 1972 after a two and one-half-year grace period. Amortization of the overdraft, although technically an obligation payable on demand, is projected for seven years.

Dividend payments are restricted to 60% of cumulative earnings per year during the six-year tax holiday. (See Annex VIII-8 - Projected Balance Sheets.)

Annex VIII-7 provides a summary of debt-coverage. Including cash carry-over, debt coverage during operations is at its lowest (2.1) in 1971 and 1972 but increases gradually during the following years. By 1976, coverage has increased to over 5 and is doubled within four years (1980). Excluding cash carry-over, the debt coverage is marginal in 1972 at 1.6 but gradually improves to 2.6 by 1976, the improvement being due primarily to the tax holiday. However, once tax payments begin, coverage falls to 2.1 (1977) but again improves as interest decreases and the overdraft and AID loan are retired in 1978 and 1979, respectively.

D. Pro-Forma Balance Sheets

Pro-forma balance sheets are set forth in Annex VIII-8.

1. Cash

In 1972 DHC begins to generate increasing amounts of cash due primarily to heavy depreciation charges and the "15 BB Reserve". During the tax holiday, the company proposes to invest in short-term investments, such as Government of Pakistan bonds, and/or prepay the Cooley loan. In view of the anticipated build-up of cash, we intend to incorporate in the loan agreement a requirement that the Borrower prepay the Cooley loan based on a "cash available after dividend payment" formula. Hercules has no objection to this prepayment requirement and, in fact, intends to prepay the Cooley loan (assuming there is, in fact, a cash surplus); the original Cooley application called for a three-year Cooley repayment period beginning in 1971.

2. Current Position

Hercules' calculations of working capital assume two months' product inventory and two weeks' bag inventory at cost plus one and one-half months of receivables at ex-factory price (\$93). The following tables summarize inventory and receivable requirements for the first six years of production after which requirements are assumed to level off at \$7.0 million; and the company's working capital position and significant ratios for the same period:

	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>
<u>Inventories</u>						
a) Urea inventory of 2 months at plant cost						
Tons	28,750	40,250	48,875	54,625	57,500	57,500
Mill Cost	\$75.29	\$59.62	\$52.30	\$48.90	\$48.02	\$49.57
Urea Inventory ^(a) (\$000)	2,165	2,400	2,556	2,671	2,761	2,850
b) Empty bags inventory of 2 weeks supply at \$10/ton urea	<u>72</u>	<u>101</u>	<u>122</u>	<u>137</u>	<u>144</u>	<u>144</u>
Total Inventories (\$000)	\$2,237	\$2,501	\$2,678	\$2,808	\$2,905	\$2,994
<u>Receivables</u>						
1.5 months urea production - tons	21,563	30,188	36,656	40,969	43,125	43,125
Billings at \$93 per ton (\$000) ^(b)	2,005	2,901	3,409	3,810	4,011	4,011
Total Inventory & Receivables (\$000)	\$4,242	\$5,402	\$6,087	\$6,618	\$6,916	\$7,005

- (a) While these inventory data are consistent with the seasonal peak requirements shown in Annex VII-4, they do not correspond to the year-end requirements given in that table
- (b) Annex VII-4 indicates a peak seasonal receivables requirement of \$6.2 million, although the maximum coincidental inventory and receivable peak is only \$7.6 million at capacity.

(In thousands of dollars)

	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>
Inventory & Receivables	4242	5402	6087	6618	6916	7005
Cash	<u>3673</u>	<u>7706</u>	<u>10882</u>	<u>14256</u>	<u>18140</u>	<u>22010</u>
Current Assets	8005	13107	16969	20874	25056	29015
Less: Current Liabilities	<u>7521</u>	<u>8760</u>	<u>8209</u>	<u>7597</u>	<u>6985</u>	<u>6373</u>
Net Working Capital	484	4347	8760	13277	18071	22642
Current Ratio	1.06	1.50	2.07	2.75	3.59	4.55
Quick Ratio	.77	1.21	1.74	2.38	3.17	4.08

Current liabilities are trade payables (\$659,000 at peak sales), outstanding overdrafts and that amount of term debt to be repaid within twelve months. The current ratio improves substantially during the period, reaching an acceptable 2.07 by the third year of production. The quick ratio follows a similar pattern but takes about an additional six months (mid 1974) before reaching a ratio of 2:1. As pointed out in an earlier section, if the current cash position is tight, it is possible to stretch the repayment of the GOP debentures over the period 1972-75 rather than repaying them fully in 1972. After the initial years, however, if cash surplus is sufficient, it would be possible to prepay debt which would have a favorable effect on these ratios. As a covenant to the Cooley loan we will require the maintenance of a satisfactory current ratio or, as may be recommended by IFC/IBRD, a satisfactory quick ratio.

3. Fixed Assets

Gross fixed assets include fixed capital assets (\$54.5 million); engineering and start-up costs (\$12.0 million); pre-operating expenses excluding seeding program losses (\$3.4 million); interest during construction (\$2.7 million); and additional contingencies (\$400,000) for a total of \$72.9 million. Of this total, \$8.8 million represent anticipated contingencies and escalation of the capital assets and fees, engineering and start-up costs.

Depreciation is based on the total project cost of \$72.9 million less non-depreciable assets of:

a) Site and improvements	\$1,350,000
b) Escalation and contingencies applicable to site	200,000
c) Prorated share of operating fee	<u>50,000</u>
Total	\$1,600,000

Thus, assets amounting to \$71.3 million are depreciated; the depreciation calculations, basically on a 10% annual declining balance method, are presented in Annex VIII-3.

4. Term Debt

The terms of the IBRD and AID loans and the GOP debentures are included in Section V-B. Details of amortization are set forth in Annex VIII-6. The loan agreement will contain a covenant prohibiting further term debt without AID's prior concurrence.

E. Return on Total Capital Employed and on Hercules' Investment

Annex VIII-9, Return on Total Capital Employed, concludes that, on a conservative basis, the project would generate a return of over 13% on total investment (including working capital) using the discounted, or time-adjusted method of computation. Compared to the estimated current opportunity cost of money in Pakistan in the order of 12 to 15%, this return appears satisfactory.

Annex VIII-10 calculates the time-adjusted return on Hercules' investment. Hercules' earnings will consist of "know-how" fees of \$1.5 million, received in equal installments during the first five years of operation; and dividends after Pakistan income taxes of 20%. * During the first twelve years of operations, Hercules will have a time-adjusted return, before U.S. income taxes, of approximately 9% on its \$11,676,000 investment. ** The 9% return does not include dividends that could result from interest earned on surplus cash invested. These additional dividend earnings would raise Hercules' time-adjusted return to approximately 10% (see Annex VIII-10). It is not clear, however, whether the ICP would allow Hercules to remit dividends resulting from earnings of rupee investments.

Since the Dawood investment will also be a corporate investment and thus will pay only 20% income tax on dividends, Dawood's return will be approximately the same as Hercules. Individual Pakistani investors are required to pay income taxes on dividends at a higher rate than the 20% paid by corporations. *** Thus it can be assumed that the return on investment to individual Pakistani investors would be lower than that received by the corporate investors, Hercules and Dawood. This coupled with the generally sluggish Pakistani equity market underlines the need for an adequate underwriting arrangement either with the Dawoods or a syndicate, preferably arranged by the ICP.

* Under Pakistan tax law, dividend earnings received by a corporation from a non-public corporation are taxed at a 20% rate, while those received from a public company are taxed at a 15% rate.

** U.S. tax payments by Hercules on dividends earned from this company will be affected by a series of factors, including dividends and other earnings from other investments.

*** Since personal income taxes are on a graduated scale, the total taxable income of any one individual investor determines the tax rate that would be paid.

F. Breakeven and Other Sensitivity Analyses

1. Breakeven analysis

Using cost details supplied by Hercules, we estimated, for the years 1976-1980, (1) the production capacity the company must attain in order to meet all cash costs; and (2) alternatively, the price that must be charged per ton in order to meet all costs assuming full production.

In 1976 and 1977, the company would have to produce at approximately one-half of capacity in order to meet all fixed and variable costs. The required production reduces to 48% of capacity the following year due to the lower debt repayments. During the next two years, decreases in debt repayment further reduce the breakeven capacity to just about 37% by 1980. Over the five-year period, the company would have to produce at 46% to breakeven.

Assuming full capacity production of 345,000 M.T. per year, the company could reduce its price to approximately \$43 per M.T. (average over the first five years of 100% capacity production) and still meet all cash outlays. This price would allow the company to continue to be competitive even if the current world price of urea delivered to the "up country market" fell by 55% (i.e. from \$95 to \$43 per M.T.)*.

2. Other Sensitivity Analyses

Assuming adverse changes in price or costs, the effect upon projected net profit and total debt coverage was analyzed for the years 1976 and 1977. (These years were chosen because 1976 is the last year of the tax holiday and in 1977, profits begin to be affected by the increased depreciation allowance for triple-shift operations). The following summarizes the results of applying these assumed changes:

* A conservative "up-country" delivered price is assumed to be \$85 per M.T., CIF, Karachi plus \$3 and \$7 per M.T. for unloading and inland transportation, respectively. (See footnote, page 48.)

<u>Changes</u>	<u>1976</u>		<u>1977</u>	
	<u>Reduces Net Profit by</u>	<u>Reduces Debt Coverage (2.6) by</u>	<u>Reduces Net Profit by</u>	<u>Reduces Debt Coverage (2.1) by</u>
(a) Production reduced 10%	19%	13.2%	25%	9.3%
(b) Price reduced 10%	25%	17.3%	32%	12.1%
(c) Direct Production Costs Increase 10%	10%	6.6%	12%	4.7%
(d) Capital Cost Overrun of 10% (\$7.0 million)	10%	4.5%* 12.2%**	16%	1.0%* 9.3%**

* Overrun debt repayment subordinated to all other borrowed debt.

** Overrun debt repayment pari passu with all other borrowed debt.

IX. ECONOMIC BENEFITS

A. Foreign Exchange Savings

The foreign exchange costs of the project are the dollar outlays for (a) production costs, (b) repayment (including interest), (c) the fee to Hercules (d) dividend payments to Hercules, net of G.O.P. income taxes, and IFC and (e) the salaries to expatriate advisors. The gross savings are represented by the cost to Pakistan of importing a comparable amount of fertilizer.

Annex IX-1 details these foreign exchange outlays and gross savings during the life of the project. By deducting all foreign exchange costs of the project from the alternative of importing the plant's production, a net saving of over \$226 million will be realized over the first twelve years of operations. This amounts to an average of almost \$19 million per year.

B. National Economic Rate of Return

In analyzing the national economic rate of return of the project, the discounted cash flow method is used. Cash outflows are capital and operating costs excluding depreciation, duties, debt service and taxes. Benefits are calculated as the alternative cost of importing and transporting up-country the amounts of urea to be produced by DHC. The cost of importing fertilizer is assumed to be \$85 CIF Karachi, a figure based on recent prices of urea tenders to the Asian sub-continent.* The life of the project is conservatively assumed to be fifteen years (the basic term of the gas contract), although it can probably be operated economically for an additional five or ten years.

* The IFC reports its "most reliable" figure for urea imports CIF Karachi from Japan is \$85 per M.T. The West Pakistan ADC has contracted with the Dawoods to supply urea FOB Karachi at \$88.41 per M.T. Recent quotations for delivery of urea to India from Italy, Norway, Holland, Japan and Taiwan under barter arrangements financed from AID program loans, assuming foreign flags, were in the range of \$89 to \$91, C&F India. A recent non-barter quote for urea FOB Western European countries was \$74.75, which would result in about \$85 C&F Asian sub-continent allowing \$10 for foreign flags. Hercules, in the Cooley loan application, used as its "best figure" a competitive world price of urea of \$80 per M.T. FOB, and \$102 per M.T. CIF Karachi. However, the cost for shipping appears high, unless shipping is assumed to be from the U.S. on U.S. flags.

The internal rate of return is calculated on two bases: (1) assuming no shadow pricing of foreign exchange costs and (2) assuming a shadow price for foreign exchange costs. In the latter analysis the foreign exchange cost of all cost outlays as well as CIF value of imported fertilizer is doubled; i.e. an effective foreign exchange rate of Rs. 9.6 to \$1.00.* On these bases, the internal rates of return of the project are approximately as follows:

- (1) Without shadow pricing foreign exchange costs - 20%
- (2) Shadow pricing foreign exchange costs - 26%

Both of these calculations indicate a substantial benefit to Pakistan from the project which would result from indigenous production in lieu of importing comparable amounts of fertilizer. Considered against an assumed return of 12 to 15 percent on alternative uses of capital in Pakistan, this project is very attractive in national economic terms.

C. Other Benefits

Other benefits that would accrue, directly and indirectly, to Pakistan as a result of the project are:

a. Increases in wheat, rice and cotton production. Hercules estimates that the project would provide sufficient fertilizer to displace 650,000 tons of wheat imports alone, amounting to an annual foreign exchange outlay of about \$47 million.

b. Provide employment opportunities for over 1,000 locals as well as train these nationals in technical sales and marketing fields.

c. Utilize Pakistan's abundant supply of natural gas.

d. Build up ancillary facilities in transportation, light industry and the like in and around the project's location.

In sum, the project will increase agricultural production through the use of fertilizers and result in major economical, technological and social benefits to Pakistan.

* The 100% premium is the conclusion drawn by a group of the World Bank staff in a report to the President of the IBRD as Administrator of the Indus Basin Development Fund. Study of the Water and Power Resources of West Pakistan, Economic Annex, Appendix 1, pp 18-24.

X. CONCLUSIONS

The proposed project is sound from a technical, financial and economic point of view. The major issues which have been identified either have been resolved or are anticipated to be resolved during the normal course of loan negotiation. The IFC/IBRD is now engaged in intensive review of DHC's application and expects to authorize equity and loan participation in early 1968.

We recommend that this application be approved and a loan authorized to Dawood-Hercules Chemicals Limited of an amount not to exceed Rs. 51,400,000 (\$10.8 million equivalent) for the project described above, subject to the following conditions:

- (1) The loan shall be repayable in 14 consecutive approximately equal semiannual installments, commencing 42 months after first interest payment.
- (2) The loan shall bear the annual interest rate of 7% of the outstanding principal amount thereof.
- (3) Conditions precedent to disbursement will include evidence that (i) satisfactory arrangements have been made for gas supply and (ii) satisfactory management and organizational arrangements have been agreed upon by Hercules and the Dawoods.
- (4) Such other terms and conditions as AID may require. A summary of the terms and conditions AID expects to negotiate is set forth in Annex X-1.

THE DAWOOD GROUP OF COMPANIES

A leading New York Bank analysis of the Dawood Group of Companies contained the following comments:

"This is a Private Limited Company incorporated on May 5, 1949 with an authorized capital of Rs. 10 million. Its existing paid-up capital is Rs. 5 million. The functions of the company are to plan, promote, implement and manage the industrial enterprises of Dawood Group of industries as Managing Agents. The Company has been striving to keep abreast of modern management techniques and ensure a steady supply of qualified personnel to meet the growing needs of the Group.

"The following Limited Companies promoted and/or acquired by the Group are being managed by the Company:

- a.) Dawood Cotton Mills, Karachi, West Pakistan.
- b.) Burewala Textile Mills Limited, Dawoodabad, Multan, West Pakistan.
- c.) Karnaphuli Paper Mills Limited, Chandragona, East Pakistan.
- d.) Lawrencepur Woollen & Textile Mills Limited, Dawoodpur, District Campbellpur, West Pakistan.
- e.) Karnaphuli Rayon & Chemicals Limited, Chandragona, East Pakistan.

"The following Private Limited Companies are also owned by the Dawoods:

- a.) Dawood Corporation Limited, Karachi
- b.) Dawood (England) Limited, Manchester
- c.) Dawood Mines Limited

"The Group also has controlling interest in the Central Insurance Company Limited. Assets owned by this company are estimated at Rs. 12.92 million. Controlling interest is also held by the Group in the Memon Co-operative Bank Limited which has deposits amounting to Rs. 50 million.

"In 1960, the Group established a philanthropic institution known as "Dawood Foundations". The institution has created an endowment of Rs. 25.5 million which is used for providing educational grants to Pakistanis studying at home and abroad. The Dawood Foundation has sponsored a College of Engineering and Technology which is affiliated with the University of Karachi.

"Dawoods are a reputable and well established group of industrialists of Pakistan. They have been managing a number of industrial concerns satisfactorily and are known to possess large resources."

EXPATRIATE PERSONNEL

CODE

1 - APPOINTED 2 - TRANSFERRED TO PAKISTAN 3 - REPATRIATED

FUNCTION	DURATION															
	67	68	69	70	71	72	73	74	75							
1. RESIDENT DIRECTOR	1	2														
2. PLANT MANAGER	1	2							3							
3. COMPTROLLER	1	2					3									
4. TECHNICAL SERVICE MANAGER	1	2					3									
5. ASSISTANT PLANT MANAGER			1	2				3								
6. ASSISTANT TECH. SERVICE MANAGER			1	2			3									
7. PRODUCTION SUPERINTENDENT				2				3								
8. ASSISTANT PRODUCTION SUPT.				1	2		3									
9. TECHNICAL SUPERINTENDENT				1	2		3									
10. PLANT ENGINEER	1	2						3								
11. ASSISTANT PLANT ENGINEER			1	2			3									
12. OFFICE SUPERINTENDENT			1	2			3									
13. PERSONNEL & SAFETY SUPT.		1	2				3									
14.* AMMONIA SUPERVISOR					1	2		3								
15.* UREA SUPERVISOR					1	2		3								
16.* CRAFTS SUPERVISOR					1	2		3								
17.* UTILITIES SUPERVISOR					1	2		3								
18.* TECHNICAL SUPERVISOR					1	2		3								
19. CHIEF INDUSTRIAL ENGINEER					1	2		3								
20. START UP TEAM (10)						2	3									
TOTAL ASSIGNED TO PRESENT	5	6	10	11	13	19	29	19	18	9	6	3	2	2	1	1

START UP

Source: Hercules Incorporated Appropriation Request.

* - MAY BE AVAILABLE IN PAKISTAN BUT PRICED IN PROJECT AS EXPATRIATED

PROJECT FORMULATION AGREEMENTS

1. Basic Agreement - between Hercules and Dawood Industries Ltd. wherein the basic principal of the joint venture, its capitalization, and the conditions for investment are set out. It contains lists of various matters on which there must be agreement prior to submission thereof to the Board of Directors of D.H.C., purchase provisions regarding the shares in D.H.C. and the conditions precedent.
2. Investment Agreement - between Hercules and Dawood Industries Ltd. relative to the changes and fiscal policy to be implemented by D.H.C. and commitments on the part of Dawood Industries to obtain the necessary permits and foreign exchange for the remittance of dividends, and repatriation of capitalization.
3. Start-Up and Operational Assistance Agreement - between Hercules and D.H.C. whereby Hercules agrees to provide D.H.C. with the assistance of personnel in starting to operate the plant. Hercules will furthermore provide for plant supervision up to eighteen men for periods ranging from two to five years plus a start-up team of ten men for up to one year.
4. Consulting Services Agreement - between Hercules and D.H.C., wherein Hercules will act as consultant to D.H.C. in respect to the design, procurement, and construction of the plant for a total fee of \$1,500,000 payable in equal installments over a five-year period.
5. Sales Agreement - between D.H.C. and Dawood Corporation Ltd. wherein D.H.C. constitutes Dawood Corporation its sales agent for fertilizer in Pakistan. Dawood Corporation's commission is 2 percent of ex-factory price.
6. Managing Agency Agreement - between D.H.C. and Dawood Industries, Ltd. wherein Dawood Industries is made Managing Agent of D.H.C.
7. Technical Management Agreement - between Hercules and Dawood Industries Ltd. wherein Dawood Industries, as Managing Agent, confirms that certain specific powers belong to a Hercules nominee for the purpose of the technical operation of the plant. The Hercules designee, who will be Hercules' Resident Director in Pakistan, will be responsible for the technical supervision of the company, including engineering, plant operation and technical sales service.
8. Letter Agreement - between Dawood and Hercules setting out responsibilities for incurring preorganizational expenses.

10. Articles of Association - the new company is organized in such a manner that both Dawoods and Hercules will have a negative control at all times. The Board of Directors is composed of either 8, 10, or 12 directors and before passage of any resolution the vote of a majority plus one is required. The articles of the company provide that as long as Hercules, and likewise Dawoods, holds 40 percent of the issued capital, each will be entitled to 3, 4 or 5 directors if the board is composed of 8, 10 or 12 respectively. At the shareholder level a vote of not less than two-thirds of the total issued capital is required for passage of a resolution. For a quorum two-thirds of the issued capital must be represented. In addition to these restrictions, specific restriction of the directors' and managing agent's powers have been incorporated in the articles.

PRE-OPERATING EXPENSES

(Thousands of Dollars)

	<u>1968*</u>	<u>1969</u>	<u>1970</u>	<u>TOTAL</u>
A. <u>Hercules</u>				
International Department Salaries at \$3,000/month, including overhead and travel	538	137	98	773
B. <u>Dawood</u>	240	130	100	470
C. <u>D.H.C.</u>				
Karachi Office	69	127	139	335
Technical Sales Services **	60	120	170	350
Plant Costs				
Operating Labor			250	250
Maintenance Labor			225	225
Chemical Controls			35	35
Direct Superintendence			90	90
Plant Overhead		25	125	150
Training		24	76	100
Expatriates	<u>72</u>	<u>261</u>	<u>588</u>	<u>921</u>
Sub Total D.H.	201	557	1,698	2,456
TOTAL	979	824	1,896	3,699

* 1967 projected expenditures combined with 1968 due to project delays.

** Actual estimated expenses of \$700,000 less \$350,000 revenue expected from the Seeding program.

INTEREST DURING CONSTRUCTION

(Thousands of Dollars)

	<u>1969</u>	<u>1970</u>	<u>Total</u>
IBRD Loan @ 7 percent	222	1,687	1,909
Cooley Loan @ 7 percent	23	589	612
GOP Debentures @ 6 percent	-	131	131
Pakistan Bank Overdrafts @ 7 percent	-	<u>75</u>	<u>75</u>
Total Interest	245	2,482	2,727

COMPARATIVE ANALYSIS OF UREA PROJECT COST ESTIMATES
(Costs in Dollars)

Project	Annual Production Capacity of Urea (M.T.)	Fixed Capital Costs (000)	Pre-Operating Expenses & Interest During Construction (000)	Working Capital (000)	Costs per Metric Ton of Urea Capacity		
					Fixed Capital Costs (2) ÷ (1)	Fixed Capital Costs plus Pre-Oper + Int. (2+3) ÷ (1)	Fixed Capital Costs Plus Pre- Oper. Int.+Wk.Cap. (2+3+4) ÷ (1)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1. Dowood-Hercules	345,000	66,800	6,400	3,900	194	212	224
2. Alunjee-Cyanamid	318,000	97,500	8,500	3,100	181	208	217
3. Brown-Kaiser	340,000	61,800	4,700	4,000	181	196	208
4. Armour-Sia	340,000	53,000	6,545	3,465	156	175	185

Source: Individual Project Reports

Best Available Document

CUMULATIVE FUND REQUIREMENT SCHEDULE

CONSTRUCTION, INTEREST, PRE-OPERATING EXPENSE AND WORKING CAPITAL
 (Expressed in thousands of dollars)

	<u>% Rupees</u>	<u>% \$</u>	<u>Rupees</u>	<u>\$</u>
June 30, 1968	2	3	567	1,338
Sept. 30, 1968	3	5	1,135	2,230
Dec. 30, 1968	7	7	2,270	3,122
March 30, 1969	18	11	5,958	4,905
June 30, 1969	19	19	6,241	8,473
Sept. 30, 1969	22	32	7,093	14,270
Dec. 30, 1969	33	55	10,680	24,527
March 30, 1970	67	82	21,845	36,568
June 30, 1970	79	93	25,817	41,473
Sept. 30, 1970	83	97	26,952	43,257
Dec. 30, 1970	100	100	32,525	44,595

TOTAL BOTH CURRENCIES - \$77,120,000

Hercules' Market Assumptions
By Type of Crop

CROP	ACREAGE		RECOMMENDED DOSAGE		COVERAGE		CONSUMPTION		PERCENT OF TOTAL	
	(in million)		Lbs. N		%		THOUSANDS OF TONS N			
	'71	'75	'71	'75	'71	'75	'71	'75	'71	'75
Wheat										
Irr. Mexican	6	8	69	92	80	75	150	250		
" Traditional	2	-	46	-	50	-	21	-		
Rainfed Trad. & Mexican	5	5	23	25	20	35	10	20		
Total Wheat							181	270	58	54
Cotton	3.8	3.8	46	69	40	60	32	71	10	14
Sugarcane	1.2	1.2	69	69	80	80	30	30	10	6
Rice										
IRRI Varieties	0.5	2	69	92	70	80	11	67		
Traditional Varieties	3.0	1.5	46	46	40	50	25	16		
Total Rice							36	83	12	17
Maize										
Synthetic Variety	0.5	1.0	92	69	85	75	18	23	6	5
Vegetables							2	6	1	1
Fruits							2	3	1	1
Oil Seeds, Tobacco, Pulses, Etc.							6	10	2	2
GRAND TOTAL							307	496	100	100

Source: Letter From G.C. Smith, Hercules to AID, dated October 5, 1967

PRODUCTION OF FERTILISERS IN WEST BANGALORE

I. Existing Plants	Type Fertilizer	Completion Year	Annual Rated Capacity		Production In District Metric Tons											
			Fertilizer (M.T.)	Nitrate (M.T.)	1947/48	1948/49	1949/50	1950/51	1951/52	1952/53	1953/54	1954/55	1955/56	1956/57	1957/58	
Ballari	Super Phosphate	1957	18000	3600	1500	1500	3100	3100	3100	3100	3100	3100	3100	3100	3100	3100
Dandakhal	Ammon. Sulphate	1958	50000	10500	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
Mulran	Ammon. Nitrate	1961	110600	29400	18400	18400	25000	25000	25000	25000	25000	25000	25000	25000	25000	25000
	Urea	1961	57600	2-500	20400	20400	20600	20600	20600	20600	20600	20600	20600	20600	20600	20600
II. Plants Under Construction																
Dandakhal Expansion	Ammon. Sulphate	1967	40000	8400	-	-	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100
Ballari Expansion	Super Phosphate	1968	24400	4400	-	-	-	1100	1100	1100	1100	1100	1100	1100	1100	1100
Mulran Expansion	Ammon. Nitrate	1968	29700	8000	-	-	-	600	600	600	600	600	600	600	600	600
-----	Urea	1968	16500	7600	-	-	-	500	500	500	500	500	500	500	500	500
-----	Urea	1968	173000	79500	-	-	-	-	20000	40000	40000	40000	40000	40000	40000	40000
III. New Plants*																
Dewood-Herrules	Urea	Est. mid-1971	345000	158000	-	-	-	-	-	-	-	18000	110000	124000	110000	110000
Manjee-Narasim	Urea	Est. mid-1971	314000	143000	-	-	-	-	-	-	-	17000	100000	110000	110000	110000
Totals I, II & III																
rounded to nearest thousand																
	Urea		910000	415000	20000	20000	23000	23000	49000	17000	4000	150000	80000	345000	190000	410000
	Ammon. Sulphate		90000	19000	5000	5000	11000	11000	14000	14000	14000	14000	14000	14000	14000	14000
	Ammon. Nitrate		140000	37000	18000	18000	25000	25000	25000	25000	25000	25000	25000	25000	25000	25000
	Total N		1140000	471000	47000	47000	59000	59000	97000	125000	124000	124000	124000	124000	124000	124000
	Super Phosphate		42400	8000	2000	2000	3000	3000	4000	7000	7000	7000	7000	7000	7000	7000

*Production build-up based on following percentages: 50% capacity first year, 70 percent capacity second year, 85 percent capacity third year, 95 percent capacity fourth year and 100 percent thereafter.

Sources: 1. Technical Consultants Study On Agricultural Conditions & Fertilizer Demands and Production
 2. AIC Program Memorandum

Best Available Document

Analysis of Nitrogen Demand and
Production In Northern Market Area

The following is a breakdown of acreage for the five major crops in the primary and secondary northern market areas.

Cultivated Acreage in Plant Area
(percent of West Pakistan total)

<u>Crops</u>	<u>Primary Market 100 mile radius of Lahore %</u>	<u>Secondary Market 100-200 mile radius of Lahore %</u>	<u>Total 200 mile of Lahore %</u>
Wheat	27	29	56
Rice	39	5	44
Maize	26	67	93
Cotton	27	36	63
Sugar Cane	<u>44</u>	<u>33</u>	<u>77</u>
Total Cropped Acreage	26	28	54

Source: Cyanamid International, Adamjee-Cyanamid Urea Fertilizer Project, September, 1967.

The nitrogen market is somewhat higher in these two areas than would be indicated by the percent of the cropped acreage, since many of the crops grown in other areas of Pakistan require less fertilizer. It is estimated by Adamjee-Cyanamid that the nitrogen market in the primary area around Lahore is 31% of the total in West Pakistan, and in the primary and secondary area combined 74%. If these percentages are applied to Hercules' projection of nitrogenous demand in West Pakistan, demand within the market area would be as follows:

Projected Nitrogenous Demand in West Pakistan
(Thousands of Metric Tons of N)

<u>Distance from Lahore</u>	<u>1971/72</u>	<u>1972/73</u>	<u>1973/74</u>	<u>1974/75</u>
0 - 100 miles (31%)	109	121	140	157
100-200 miles (43%)	<u>151</u>	<u>168</u>	<u>194</u>	<u>218</u>
Total: 0 - 200 miles (74%)	260	289	334	375

Production of nitrogenous fertilizer within this marketing area, based on the IFC production build-up schedule, is expected to be as follows (data from Annex VII. 2).

Projected Fertilizer Production Within 200 Mile Radius of Lahore
(In 1,000 M.T. of N)

<u>Plant</u>	<u>1971/72</u>	<u>1972/73</u>	<u>1973/74</u>	<u>1974/75</u>
DHC	79	110	134	150
Adamjee-Cyanamid	72	100	122	136
Daudhkel & Multan	<u>77</u>	<u>77</u>	<u>77</u>	<u>77</u>
Total	228	287	333	363

Thus demand and production within a 200 mile radius of Lahore is expected to be in balance.

CREDIT ANALYSIS

Hercules provided AID with an analysis of the capital requirements to finance retail sales of DHC production based on certain assumptions. We have expanded this analysis to present a possible quantification of potential credit demands by month at three different levels (DHC, DCL and distributor/retailer), based on the following assumptions:

1. Production of 340,000 MT of fertilizer (5,000 MT is assumed lost) occurs evenly over the 12-month year.
2. DHC inventories will be at least one month's production but not exceed two months' production; the month-end inventory of DCL will always be sufficient to cover the next month's sales by DCL, and distributor/dealer month-end inventories will equal the next month's distributor/dealer sales. The inventory cushion between DHC's production and DCL sales caused by seasonal fluctuations in demand will be met first by DHC providing up to two months' inventory with any excess inventory being assumed by DCL.
3. Both DHC and DCL will provide six weeks' payment terms on sales.
4. Timing of sales to farmers is based on a Hercules' study of cropping patterns and timing of harvests which assumes an end use pattern for urea for 50% wheat, 18% cotton, 12% rice, 5% maize, 9% sugar cane and 6% miscellaneous.
5. Collection of farmers' receivables by distributor/retailers is based on the following assumptions made by Hercules:
 - a. In the early 70's the payment pattern for fertilizer by the farmers will be 40% cash, 20% financing through institutional credit and 40% financed through dealer credit (for purposes of distributor/retailer sales, institutional credit is considered the equivalent of cash).

- b. The 60% portion of fertilizer requirements financed by credit will take the form of crop term credit - i.e. payment will be made when the produce is marketed. Hercules assumes that the marketing and therefore repayment timetable will be 15% in May, 35% in June, 10% in July, 14% in October, 18% in November, and 8% in December. As a result, the monthly collections by the dealer/distributor will equal 60% of the current months' sales plus the above monthly percentage times 40% of the annual retail sales volume of \$35.7 million.

The analysis is presented on the following page. In effect, DHC and DCL between them are assumed to carry all inventory and receivables required to provide the distributor/retailer each month with sufficient product to meet the latter's sales projected for the subsequent month.

CAPITAL REQUIRED TO FINANCE SALES
(Thousands of Dollars)

	January	February	March	April	May	June	July	August	September	October	November	December
1. Duwood-Hercules Chemicals												
Inventory: (@ \$47.13/M.T.)												
Prior Balance	1,700	2,200	2,800	2,700	2,700	2,500	2,200	2,700	2,600	2,500	2,200	1,700
Production	1,400	1,300	1,300	1,400	1,300	1,300	1,400	1,300	1,300	1,400	1,300	1,300
Sales	900	700	1,400	1,400	1,500	1,600	900	1,400	1,400	1,700	2,100	1,900
Balance	2,200	2,800	2,700	2,700	2,500	2,200	2,700	2,600	2,500	2,200	1,400	1,700
Accounts Receivable (@ \$93/M.T.)												
Prior Balance	4,200	2,800	2,400	3,600	4,200	4,600	4,800	3,400	3,800	4,200	3,000	4,800
Sales	1,800	1,400	2,800	2,800	3,200	3,200	1,800	2,800	2,800	3,600	4,400	2,200
Collections	3,200	1,800	1,600	2,200	2,800	3,000	3,200	2,400	2,400	2,900	3,200	4,000
Balance	2,800	2,400	3,600	4,200	4,600	4,800	3,400	3,800	4,200	5,000	4,200	4,200
Total Capital	5,000	5,200	6,400	7,000	7,100	7,100	6,100	6,500	6,900	7,200	7,200	5,900
2. Duwood Corporation Ltd (@ \$98/M.T.)												
Inventory												
Prior Balance	2,100	1,800	2,600	5,100	5,300	5,200	3,800	2,500	4,300	6,200	3,500	4,600
Receipts	1,800	1,500	2,800	2,800	3,300	3,200	1,900	2,800	2,800	3,700	4,600	2,200
Sales	2,100	700	300	2,600	3,400	4,600	3,200	500	1,400	4,400	3,500	4,600
Balance	1,800	2,600	5,100	5,300	5,200	3,800	2,500	4,300	6,200	5,500	4,600	2,200
Accounts Receivable (@ \$100/M.T.)												
Prior Balance	7,400	4,400	1,700	600	2,800	4,800	6,400	5,600	2,100	1,600	3,100	7,300
Sales	2,100	700	300	2,700	3,500	4,700	3,300	500	1,400	4,800	5,600	4,700
Collections	5,100	3,400	1,400	500	1,500	3,100	4,100	4,000	1,900	1,000	2,900	3,200
Balance	4,400	1,700	600	2,800	4,800	6,400	5,600	2,100	1,600	5,100	7,500	7,300
Total Capital	6,200	4,300	5,700	8,100	10,000	10,200	8,100	6,900	7,500	10,600	12,400	12,200
Less: AR's Carried by DMC	2,800	2,400	3,600	4,200	4,600	4,800	3,400	3,800	4,200	5,000	6,200	6,200
Net Capital Required	3,400	1,900	2,100	3,900	5,400	5,400	4,700	3,100	3,600	5,600	6,200	6,000
3. Distributors/Retailers												
Inventory (@ \$100/M.T.)												
Prior Balance	4,700	2,100	700	300	2,700	3,500	4,700	3,300	500	1,400	4,500	3,600
Receipts	2,100	700	300	2,700	3,500	4,700	3,300	500	1,400	4,500	3,600	3,600
Sales	4,700	2,100	700	300	2,700	3,500	4,700	3,300	500	1,400	4,500	3,600
Balance	2,100	700	300	2,700	3,500	4,700	3,300	500	1,400	4,500	3,600	3,600
Accounts Receivable (@ \$105/M.T.)												
Prior Balance	5,292	7,266	8,148	8,442	8,568	7,560	4,072	4,578	5,964	6,174	4,776	4,776
Sales	4,935	2,205	735	315	2,835	3,675	4,935	3,465	525	1,875	2,205	2,205
Collections	2,961	1,323	441	189	3,883	7,203	4,339	2,079	315	1,387	2,205	2,205
Balance	7,266	8,148	8,442	8,568	7,560	4,032	4,578	5,964	6,174	4,776	4,776	4,776
Sub-Total Capital Required	9,366	8,848	8,742	11,268	11,060	8,732	7,818	6,464	7,547	9,254	9,424	9,424
Less: AR's Carried by DCL	4,400	1,700	600	2,800	4,800	6,400	5,600	2,100	1,600	5,100	7,500	7,300
Net Capital Required	4,966	7,148	8,142	8,468	6,260	2,332	2,278	4,364	5,947	4,154	1,924	2,124

SCHEDULED DRAW-DOWN OF LOANS AND EQUITY

Semiannually 6-30-68 through 12-31-70
(In Thousands of Dollars)

	Rs. Equity	Rs. Loans			Total Rs.	\$ Equity	IBRD \$ Loan	Total \$	Grand Total
		AID	Overdraft	GOP Deb.					
I. Year-By-Year									
6-30-68	2,919	-	-	-	2,919	3,649	-	3,649	6,568
12-31-68	2,189	-	-	-	2,189	2,736	-	2,736	4,925
6-30-69	2,189	-	-	-	2,189	2,737	-	2,737	4,926
12-31-69	2,189	1,294	-	-	3,483	2,736	12,669	15,405	18,888
6-30-70	2,556	9,506	-	2,900	14,962	2,737	14,209	16,946	31,908
12-31-70	2,556	-	4,230	-	6,783	-	3,122	3,122	9,905
	14,595	10,800	4,230	2,900	32,525	14,595	30,000	44,595	77,120
II. Cumulative									
6-30-68	2,919				2,919	3,649	-	3,649	6,568
12-31-68	5,108				5,108	6,385	-	6,385	11,493
6-30-69	7,297				7,297	9,122	-	9,122	16,419
12-31-69	9,486	1,294			10,780	11,858	12,669	24,527	35,307
6-30-70	12,042	10,800		2,900	25,742	14,595	26,878	41,473	67,215
12-31-70	14,595	10,800	4,230	2,900	32,525	14,595	30,000	44,595	77,120

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PROPOSED PROFIT AND LOSS STATEMENTS
1971 - 1982

(all figures in thousands of dollars unless otherwise noted)

Year	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Capacity	52%	70%	85%	95%	100%	100%	100%	100%	100%	100%	100%	100%
Merita Ton Production (000's)	175	242	293	328	345	345	345	345	345	345	345	345
Net Sales	16089	22506	27249	30504	32085	32085	32085	32085	32085	32085	32085	32085
Plant Costs	8164	9572	10461	11174	11706	12241	12241	12241	12241	12241	12241	12241
Depreciation	6851	6173	5562	5013	4518	4073	3262	5824	4674	3752	3016	2124
Gross Profit	1174	6761	11226	14317	15861	15771	12557	14000	15170	16092	16808	17420
Indirect Expenses	1151	1208	1459	1535	1510	1226	1226	1206	1206	1206	1206	1206
Operating Profit	(76)	5553	9767	12782	14351	14545	11336	12794	13964	14886	15602	16214
Less: Interest	333	312	302	262	231	190	159	127	88	58	37	18
Net Income	(3406)	2234	6744	10120	12050	12605	9777	11577	13076	14288	15265	16096
Income Taxes 34-51	-	-	-	-	-	-	4400	5210	5884	6430	6856	7226
Net Profit after Taxes	(3406)	2234	6744	10120	12050	12605	5377	6367	7190	7858	8409	8870
Percentage Return on Net Sales												
Gross Profit Before Depreciation	49.3	37.3	61.6	63.4	63.5	61.8	61.8	61.8	61.8	61.8	61.8	61.8
Gross Profit After Depreciation	6.7	30.0	41.2	46.9	49.4	49.2	39.2	43.7	47.3	50.2	52.4	54.3
Operating Profit	(4.5)	24.7	35.8	41.9	44.7	45.3	35.4	39.9	42.5	46.3	48.6	50.5
Net Income	(21.2)	9.9	24.7	33.2	37.6	39.3	30.3	36.1	40.8	44.5	47.5	50.0
Net Profit After Taxes	(21.2)	9.9	24.7	33.2	37.6	39.3	16.8	19.8	22.4	24.5	26.7	27.5

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DECLINING BALANCE DEPRECIATION COMPUTATION
(in thousands of dollars)

Year	End of Construction Period	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Housing:													
Year End Book Value	3800	3705	3612	3522	3434	3348	3264	3182	3102	3024	2948	2874	2802
Depreciation @ 2.5%		95	93	90	88	86	84	82	80	78	76	74	72
Plant & Equipment:													
Year End Book Value	67556	60800	54720	49248	44323	39891	35902	28722	22978	18382	14706	11764	9412
Annual Depreciation @ 10%		6756	6080	5472	4925	4432	3989	3590	2872	2298	1838	1471	1176
Extra Shifts @ 10%		--	--	--	--	--	--	3590	2872	2298	1838	1471	1176
Total Annual Depreciation		6756	6080	5472	4925	4432	3989	7180	5744	4596	3676	2942	2352
Grand Total - Annual Depreciation		6851	6173	5562	5013	4518	4073	7262	5824	4674	3752	3016	2424

ALERT 711.4

NET INCOME, TAX, DIVIDEND AND RESERVE CALCULATION
(in thousands of dollars)

	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Net Income before Taxes & Interest (per Hercules)	(361)	4590	8193	10659	11733	11482	11482	11482	11482	11482	18618	18618
Less: Interest (per AID)	<u>3330</u>	<u>3319</u>	<u>3023</u>	<u>2662</u>	<u>2301</u>	<u>1940</u>	<u>1579</u>	<u>1217</u>	<u>868</u>	<u>578</u>	<u>367</u>	<u>158</u>
Net Income (S.L. Depr)	(3695)	1271	5170	7997	9432	9542	9903	10265	10614	10904	18251	18460
Add: Straight-Line Depreciation	<u>7136</u>	--	--									
Total	3445	8407	12306	15133	16568	16678	17039	17401	17750	18040	18251	18460
Less: Declining Balance Depreciation	<u>6851</u>	<u>6173</u>	<u>5562</u>	<u>5013</u>	<u>4518</u>	<u>4073</u>	<u>3762</u>	<u>3824</u>	<u>4674</u>	<u>3752</u>	<u>3016</u>	<u>2424</u>
Net Income (D.B. Depr)	(3406)	2234	6744	10120	12050	12605	9777	11577	13076	14288	15235	16036
Income Taxes												
	<u>T</u>	<u>A</u>	<u>X</u>	<u>H</u>	<u>O</u>	<u>L</u>	<u>I</u>	<u>D</u>	<u>A</u>	<u>Y</u>		
15% Reserve	--	--	2232	4048	4820	5042	--	--	--	--	--	--
Maximum Dividends	--	--	3349	6072	7230	7563	5377	6367	7192	7450	8379	8820

Projected Source and Use of Funds
1968-1982
(in Thousands of Dollars)

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Source of Funds															
Net Income (a)	-	-	400	(3,406)	2,234	6,744	10,120	12,050	12,605	9,777	11,577	13,076	14,288	15,235	16,036
Interest (a)	-	245	2,482	3,330	3,319	3,023	2,662	2,301	1,940	1,579	1,217	868	578	367	158
Depreciation (b)	-	-	-	6,851	6,173	5,562	5,013	4,518	4,073	7,262	5,824	4,674	3,752	3,016	2,424
Share Capital - \$ (c)	6,385	5,473	2,737	-	-	-	-	-	-	-	-	-	-	-	-
Share Capital - Rs. (c)	5,108	4,378	5,109	-	-	-	-	-	-	-	-	-	-	-	-
IBRD Loan - \$ (c)	-	12,669	17,331	-	-	-	-	-	-	-	-	-	-	-	-
AID Loan - Rs. (c)	-	1,294	9,506	-	-	-	-	-	-	-	-	-	-	-	-
GOP Debentures - Rs. (c)	-	-	2,900	-	-	-	-	-	-	-	-	-	-	-	-
Overdraft - Rs. (c)	-	-	4,230	-	-	-	-	-	-	-	-	-	-	-	-
Accounts Payable	-	-	-	391	207	61	-	-	-	-	-	-	-	-	-
Total Sources	11,493	24,059	44,695	7,166	11,933	15,377	17,795	18,869	18,618						
Use of Funds															
Pre-Operating Expenses (d)	979	1,169	4,378	-	-	-	-	-	-	-	-	-	-	-	-
Capital Expenditures (e)	4,000	29,000	33,825	-	-	-	-	-	-	-	-	-	-	-	-
Accounts Receivable	-	-	-	2,005	896	508	401	201	-	-	-	-	-	-	-
Inventories	-	-	-	2,237	264	177	130	97	89	-	-	-	-	-	-
Income Taxes	-	-	-	-	-	-	-	-	-	4,400	5,210	5,884	6,430	6,856	7,216
Debt Service (P&I) (g)	-	245	2,482	3,330	6,831	8,179	7,818	7,457	7,096	6,735	6,319	5,404	3,578	3,367	3,158
Maximum Dividends (f)	-	-	-	-	-	3,349	6,072	7,230	7,563	5,377	6,367	7,192	7,858	8,379	8,820
Total Uses	4,979	30,414	40,685	7,572	7,991	12,213	14,421	14,985	14,748	16,512	17,896	18,480	17,866	18,602	19,196
Cash Balance	6,514	(6,355)	4,010	(406)	3,942	3,177	3,374	3,884	3,870	2,106	722	138	752	16	(576)
Beginning Cash	-	6,514	159	4,169	3,763	7,705	10,882	14,256	18,140	22,010	24,116	24,838	24,976	25,728	25,744
Cash Carried Forward	6,514	159	4,169	3,763	7,705	10,882	14,256	18,140	22,010	24,116	24,838	24,976	25,728	25,744	25,168

- (a) Annex VIII-2 Projected P&L Statement
 (b) Annex VIII-3 Depreciation Computation
 (c) Annex VIII-1 Scheduled Drawdowns
 (d) Annex V-2 Preoperating Expenses and Interest During Construction
 (e) Annex V-1 Capital Costs
 (f) Annex VIII-4 Tax and Dividend Calculations
 (g) Annex VIII-6 Amortization of Debt

ANNEX III.7

DEBT COVERAGE
1968 - 1987

(all figures in thousands of dollars except coverage)

Year	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Debt Service	-	245	2482	3330	6831	8179	7828	7457	7096	6735	6319	5414	3578	3367	3158
Cash Available:															
Incl. Beginning Cash	6514	404	6651	7093	14536	22410	28116	32827	36669	36228	37524	37572	37164	37490	37146
Excl. Beginning Cash	6514	404	6651	7093	10773	14705	17264	18571	18529	14218	13408	12734	12188	11762	11402
Coverage:															
Incl. Beginning Cash	-	1.6	2.7	2.1	2.1	2.7	3.6	4.4	5.2	5.4	5.9	6.9	10.4	11.1	11.3
Excl. Beginning Cash	-	1.6	2.7	2.1	1.6	1.8	2.2	2.5	2.6	2.1	2.1	2.4	3.4	3.5	3.6

FIG. FORM BALANCE SHEET
Year end, 1965 - 1967

(All figures except ratios in thousands of dollars)

Year	1965	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Cash	6,514	159	4,169	3,763	7,705	10,882	14,256	18,140	22,010	24,711	4,838	24,976	25,728	25,744	25,168
Accounts Receivable	-	-	-	2,005	2,901	3,409	3,810	4,011	4,011	4,011	4,011	4,011	4,011	4,011	4,011
Inventories	-	-	-	2,237	2,501	2,678	2,808	2,905	2,964	2,964	2,964	2,964	2,964	2,964	2,964
Total Current Assets	6,514	159	4,169	8,005	13,107	16,969	20,874	25,056	29,015	31,686	31,793	31,961	32,713	32,749	32,143
Accounts Payable	-	-	-	391	598	659	659	659	659	659	659	659	659	659	659
Overdraft	-	-	4,230	4,230	3,618	3,006	394	1,782	1,170	585	-	-	-	-	-
IBRD (Current)	-	-	-	-	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	-
AID (Current)	-	-	-	-	1,544	1,544	1,544	1,544	1,544	1,544	1,544	-	-	-	-
YOB (Current)	-	-	-	2,900	-	-	-	-	-	-	-	-	-	-	-
Total Current Liabilities	-	-	4,230	7,981	8,160	8,209	7,597	6,995	6,333	5,844	5,198	5,198	5,198	5,198	5,198
Net Working Capital	6,514	159	(61)	484	4,947	8,760	13,277	18,071	22,682	25,842	26,645	26,763	27,515	27,551	26,945
Gross Fixed Assets	5,003	35,584	72,960	72,960	72,960	72,960	72,960	72,960	72,960	72,960	72,960	72,960	72,960	72,960	72,960
Less: Depreciation	-	-	-	6,651	11,024	18,526	21,599	25,117	32,190	39,452	45,276	49,268	51,022	50,718	50,142
Net Fixed Assets	5,003	35,584	72,960	66,309	61,936	54,434	49,361	44,843	40,770	33,508	27,684	23,692	21,938	22,242	22,818
Total Assets	11,517	35,743	72,899	66,593	64,283	63,134	62,638	62,914	63,417	58,368	54,330	51,330	49,330	49,330	49,730
Represented by:															
IBRD	-	12,669	30,000	30,000	27,000	24,000	21,000	18,000	15,000	12,000	9,000	6,000	3,000	-	-
AID	-	1,294	10,800	10,800	9,256	7,717	6,168	4,624	3,050	1,336	-	-	-	-	-
YOB	-	-	2,900	-	-	-	-	-	-	-	-	-	-	-	-
Total Debt	-	13,963	43,700	40,800	36,256	31,717	27,168	22,624	18,050	13,336	9,000	6,000	3,000	-	-
Capital	11,493	21,780	29,199	29,199	29,199	29,199	29,199	29,199	29,199	29,199	29,199	29,199	29,199	29,199	29,199
15 25 Percent	-	-	-	-	-	2,237	6,280	11,100	16,140	16,140	16,140	16,140	16,140	16,140	16,140
Retained Earnings	14	896	9	(3,327)	(1,163)	-	-	-	-	-	-	-	-	-	-
Total Net Worth	11,517	21,780	29,199	29,199	29,199	31,436	35,479	40,349	45,149	45,159	43,199	43,199	43,199	43,199	43,199
Total Debt & Net Worth	11,517	35,743	72,899	66,593	64,283	63,134	62,638	62,914	63,417	58,368	54,330	51,330	49,330	49,330	49,730
Current Ratio	-	-	$\frac{6,514}{4,169}$	1.06	1.50	2.07	2.75	3.59	4.55	5.40	6.13	6.14	6.64	6.6	6.51
Debt/Net Worth	-	$\frac{13,963}{21,780}$	$\frac{43,700}{29,199}$	1.37	1.41	1.27	1.0	1.13	1.4	1.41	1.31	1.21	1.15	1.1	1.07

RETURN ON TOTAL CAPITAL EMPLOYED
(in thousands of dollars)

	Investment ^{1/} -	Income ^{2/} +	Net	13% Discount Factor	Present Value
1968	11,493	-	(11,493)	1.000	(11,493)
1969	23,569	-	(23,569)	.885	(20,582)
1970	39,329	-	(39,329)	.783	(30,795)
1971	-	6,775	6,775	.693	4,695
1972	-	11,726	11,726	.613	7,188
1973	-	15,329	15,329	.543	8,324
1974	-	17,795	17,795	.480	8,542
1975	-	18,869	18,869	.425	8,019
1976	-	18,618	18,618	.376	7,000
1977	-	14,218	14,218	.333	4,735
1978	-	13,408	13,408	.295	3,955
1979	-	12,734	12,734	.261	3,324
1980	-	12,188	12,188	.231	2,815
1981	-	11,762	11,762	.204	2,399
1982	(7,685) ^{3/}	11,402	19,087	.181	3,455
					<u>1,581</u>

^{1/} Total investment (excluding interest) and working capital invested pursuant to the IBRD/IFC formula.

^{2/} After tax profit plus depreciation and interest expense

^{3/} Assumes company is liquidated at 25% of 1982 book value of fixed assets (\$3,455,000) plus original investment for working capital (\$4,230,000)

RETURN ON HERCULES' INVESTMENT
(in thousands of dollars)

	Investment ^{1/}	Operations Only			Including Earning from Investments		
		Earnings	9% Discount Factor	Present Value	Earnings	10% Discount Factor	Present Value
1968	5,108	-	1.000	(5,108)	-	1.000	(5,108)
1969	4,378	-	.917	(4,015)	-	.909	(3,980)
1970	2,190	-	.842	(1,844)	-	.826	(1,801)
1971	-	300	.772	232	300	.751	225
1972	-	300	.708	212	300	.683	205
1973	-	1,372	.650	892	1,791	.621	1,112
1974	-	2,243	.596	1,337	2,370	.564	1,337
1975	-	2,614	.547	1,430	2,781	.513	1,427
1976	-	2,420	.502	1,215	2,634	.467	1,230
1977	-	1,721	.460	792	1,948	.424	826
1978	-	2,031	.422	860	2,279	.386	880
1979	-	2,301	.388	893	2,547	.350	891
1980	-	2,515	.356	895	2,724	.319	869
1981	-	2,681	.326	874	2,931	.290	850
1982	(3,074) ^{2/}	2,822	.299	<u>1,763</u>	3,074	.263	<u>1,616</u>
				428			369

^{1/} Paid-in pursuant to IBRD/IFC formula - 25% upon IBRD loan commitment and 18-3/4% at the end of the four six-month period thereafter.

^{2/} Assumes company is liquidated at 25% of 1982 book value of fixed assets (\$3,455,000) plus original investment for working capital (\$4,230,000); Hercules receiving its 40% proportionate share.

COMPUTATION OF NET FOREIGN EXCHANGE SAVINGS
(in thousands of dollars)

	<u>Imports</u> ^{1/}	<u>Fx Production Costs</u>	<u>Fx Debt Repayment</u> ^{2/}	<u>Fx Fee</u> ^{3/}	<u>Fx Salaries</u> ^{4/}	<u>Fx Dividends</u> ^{5/}	<u>Net Fx Savings</u> ^{6/}
1971	14663	1995	2100	300	340	-	9928
1972	20528	2131	2100	300	334	-	15663
1973	24926	1938	5048	300	331	1407	15902
1974	27859	1969	4838	300	62	2550	18140
1975	29325	2015	4627	300	27	3037	19319
1976	29325	1645	4418	-	-	3176	20086
1977	29325	1616	4207	-	-	2053	21449
1978	29325	1616	3998	-	-	2431	21282
1979	29325	1616	3787	-	-	2746	21176
1980	29325	1616	3578	-	-	2956	21175
1981	29325	1616	3367	-	-	3199	21143
1982	29325	1616	3158	-	-	3367	21184
					Total		226476
					Yearly Average		18871

1/ C. I. F. urea (\$85 per M.T.) times production of plant per respective years.

2/ See Annex VIII.6 Amortization of Debt.

3/ Operating Fee of \$1.5 million to Hercules.

4/ Assumes 50% of expatriate salaries will be in dollars.

5/ Projected dividend payments to Hercules less 20% Pakistan income taxes and to I. F. C. (IFC is exempt from tax payments).

6/ If surplus cash is invested, dividends to Hercules (net of taxes) and IFC will increase by \$4,807,000 over the twelve year period. Thus total foreign exchange savings would be reduced to \$221,640,000 or an average of \$18,470,000 per year.

LOAN CONDITIONS AND COVENANTS

The following is a list of particular conditions and covenants, in addition to those set forth in Section X, which have been identified throughout the loan paper. These will be negotiated prior to execution of the loan agreement, and do not represent a firm AID position at this time.

1. Hercules and the Dawoods will provide a full overrun commitment to meet any overruns of construction costs. Such funds as they may provide or cause to be provided will be subordinate to the AID and IBRD loans, both with respect to debt service and in case of liquidation.
2. The Dawoods will provide a commitment to provide or cause to be provided such credit to its distributors as may be necessary to sell the 80% of DHC production which Dawood Corporation Limited is committed to procure.
3. The Borrower will covenant to maintain a satisfactory current or quick ratio.
4. The Borrower will covenant not to incur further long term debt without AID's prior concurrence.
5. The Borrower will not permit any lien against fixed assets unless AID is pari-passu, without prior AID approval.
6. The Borrower will make satisfactory arrangements for overdraft facilities.

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