GARY REDMAN

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

PROJECT PAPER

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Egypt: Quattamiya Cement (East of Maadi)

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AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT PAPER FACESHEET

1. TRANSACTION CODE: A (A = ADD, C = CHANGE, D = DELETE)

PP

2. DOCUMENT CODE: 3

3. COUNTRY/ENTITY: Egypt

4. DOCUMENT REVISION NUMBER:

5. PROJECT NUMBER (7 digits): 263-0052

6. BUREAU/OFFICE: A. SYMBOL: NE; B. CODE: 03

7. PROJECT TITLE (Maximum 40 characters): Quattamia Cement

8. ESTIMATED FY OF PROJECT COMPLETION: FY 83

9. ESTIMATED DATE OF OBLIGATION: A. INITIAL FY 78; B. QUARTER 4 (Enter 1, 2, 3, or 4); C. FINAL FY 78

10. ESTIMATED COSTS ($000 OR EQUIVALENT $1 -)

A. FUNDING SOURCE	FIRST FY 78 B. FX	C. L/C	D. TOTAL	LIFE OF PROJECT E. FX	F. L/C	G. TOTAL
AID APPROPRIATED TOTAL	95,000		95,000	95,000		95,000
GRANT)	( )	( )	( )	( )	( )	( )
LOAN)	(95,000)	( )	(95,000)	(95,000)	( )	(95,000)
OTHER U.S. 1.						
OTHER U.S. 2.						
HOST COUNTRY		66,400	66,400		66,400	66,400
OTHER DONOR(S)	35,100		35,100	35,100		35,100
TOTALS	130,100	66,400	196,500	130,100	66,400	196,500

11. PROPOSED BUDGET APPROPRIATED FUNDS ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE C. GRANT	D. LOAN	E. 1ST FY 78 F. GRANT	G. LOAN	IND FY ___ I. GRANT	J. LOAN	K. 3RD FY ___ L. GRANT	M. LOAN
(1) SA	700		839		95,000				
(2)									
(3)									
(4)									
			TOTALS		95,000				

A. APPROPRIATION	N. 4TH FY ___ O. GRANT	P. LOAN	Q. 5TH FY ___ R. GRANT	S. LOAN	LIFE OF PROJECT T. GRANT	U. LOAN
(1) SA						95,000
(2)						
(3)						
(4)						
TOTALS						95,000

12. IN-DEPTH EVALUATION SCHEDULED: MM YY 10 79

13. DATA CHANGE INDICATOR. WERE CHANGES MADE IN THE PID FACESHEET DATA, BLOCKS 12, 13, 14, OR 18 OR IN PRP FACESHEET DATA, BLOCK 12? IF YES, ATTACH CHANGED PID FACESHEET.

1 (1 = NO, 2 = YES)

14. ORIGINATING OFFICE CLEARANCE

SIGNATURE:

TITLE: Donald S. Brown
Director

DATE SIGNED: MM 09 DD 17 YY 78

15. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION: MM DD YY

AID 1330-4 (3-76)

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METRIC AND CURRENCY CONVERSIONS

CURRENCY EQUIVALENTS

U.S. $1.00 = LE 0.70
LE 1.00 = $1.43

WEIGHTS AND MEASURES

1 Metric Ton (M/T)	= 1,000 Kilograms (kg)
1 Metric ton	= 2,205 Pounds (lbs)
1 Kilometer (km)	= 0.62 Miles
1 Meter (m)	= 39.3 Inches

ABBREVIATIONS USED

ARE	Arab Republic of Egypt
GOE	Government of Egypt
SCC	Suez Cement Company
QCC	Quattamia Cement Company
GOFI	General Organization for Industrialization
ECO	Egyptian Cement Office
ASEC	Arab-Swiss Engineering Company
IBRD	International Bank for Reconstruction and Development
MOH	Ministry of Housing
EEA	Egyptian Electricity Authority
HKFI	H. K. Ferguson International Company
MOHR	Ministry of Housing and Reconstruction
CMC	Construction Management Contractor
EEA	Egyptian Electric Authority
MTY	Metric Tons per Year

QUATTAMIA CEMENT COMPANY (QCC)

SUMMARY AND RECOMMENDATIONS

1. Borrower: The Government of the Arab Republic of Egypt (GOE)

2. Executing Entities: Suez Cement Company (SCC)

3. Amount of Loan: $95 000,000

4. Proposed Loan Terms:

   A. To the GOE:

   The GOE will repay the loan to AID in dollars over a period of 40 years from the date of the first disbursement of loan funds. The repayment period will include a grace period of 10 years; the loan will be repaid to AID in 61 semi-annual installments beginning 10 years after the date of the first disbursement. The loan will bear interest at the rate of 2 percent per year during the grace period and 3 percent per year thereafter.

   B. To the SCC:

   The GOE will use the loan funds as follows:

   i) A reloan to the SCC of $58.5 million to finance the foreign exchange costs of assets to be acquired by the SCC for the QCC; the reloan will be repaid over fifteen (15) years, including a grace period of five (5) years, with interest at ten (10) percent per annum during the entire 15-year period of the loan.

   ii) A grant of $36.5 million to SCC as an equity contribution, with the proviso that $36.5 of common stock issued will be divided equally among the public sector companies who are the current shareholders in SCC in direct proportion to their respective shareholdings.

5. Project Cost: The total cost of the project is estimated at approximately $196.5 million; comprised of $130.1 million of FX costs and $66.4 million local currency costs. This A.I.D. loan/grant will provide $95.0 million of the FX costs of the project, with the remaining $35.1 million to be provided as a loan from the Bank of Alexandria and from equity purchases, in FX, by Egyptians

working abroad, primarily in the Arab Gulf countries. The international Finance Co. (IFC), arm of the IBRD, is presently reviewing the feasibility study for this project with a view toward making a loan or taking an equity position. All local currency costs will be financed by the GOE and the SCC.

6. Description and Purpose of Project: The project consists of the construction of a cement plant and auxiliary facilities, the development of limestone and clay quarries to provide the bulk of the raw material requirements of the plant, and the construction of water and power lines needed for its operation.

The purpose of this project is to be supportive to the GOE's economic development goals by providing approximately 1.4 million tons per year (MTY) of cement to assist Egypt in implementing an expanded construction program. The alternatives to this project are for Egypt to import the cement which the project will produce or to reduce the size of its planned construction program. Egypt can ill afford an additional foreign exchange drain and a reduced construction program will affect income, employment and growth. None of these alternatives is acceptable from Egypt's perspective, especially since Egypt has the necessary raw materials, human resources and know-how to produce cement at a reasonable and efficient cost.

7. Source of Funds: FY 1978 Supporting Assistance Funds.

8. Mission Views: The Mission fully endorses the project.

9. Statutory Checklist: All statutory criteria have been met (See Annex C).

10. Recommendation: That a loan in the amount of $95,000,000 be authorized on terms and conditions set forth in the Draft Authorization (Annex B).

11. Project Committee:

USAID/Cairo

Chairperson	Robert N. Bakley
Loan Officers	Domenick J. Scarfo and Charles J. Patalive
Engineer	Philip S. Lewis
Counsel	James Phippard
Economist	Thomas Morrison

AID/Washington

Chairperson	Thomas A. Sterner
Loan Officer	Gary R. Redman
Engineer	Edwin Callahan
Counsel	John Mullen
Economist	Leonard G. Rosenberg

I. INTRODUCTION

1.01 The Government of the Arab Republic of Egypt (GOE) has requested a $95 million loan from A.I.D. to finance the majority of the dollar costs of goods and services required for the construction of a 1.39 million MTY plant, which will be located 30 kilometers east of Maadi near the raw materials site. The GOE's application is attached as Annex A. As a result of a series of meetings with representatives of the GOE, the Suez Cement Co. (SCC), and U.S.A.I.D. it was agreed that the $95 million A.I.D. loan to the GOE would be made on normal A.I.D. terms and channeled as follows:

a. $58.5 million loan to the SCC - The GOE would be the prime obligor of the A.I.D. loan for the project. It was further agreed that $58.5 million would be re-lent to SCC on terms agreeable to A.I.D.; most likely on commercial terms (fifteen years to maturity, five years grace period on repayment of principal, with a 10% rate of interest during the entire term of the loan).

b. $36.5 million grant to the SCC - A grant would be passed on to the SCC as an equity contribution. The $36.5 million of common stock would be divided among the ten (10) public sector companies in proportion to their current,respective individual shareholdings.

1.02 The project is the result of pressure exerted by the Egyptian public and private industrial sector, individuals and potential foreign investors. The project will have a major impact on the construction industry and, in turn, economic expansion. It will also assist in the elimination of a "black market" in cement, which generally raises the price of cement to individuals and small private entrepreneurs.

1.03 The project is aimed at increasing the productive capacity of the Egyptian building materials industry which will assist Egypt to meet a portion of its expanding cement requirements. The reduction in benefits for the Egyptian populace as a whole due to the non-implementation of this project, while difficult to quantify, would be enormous. The elimination of 1.39 MTY of cement from 1982 onward in the Egyptian market will mean a substantial decrease in industrial expansion projects, new projects, low-cost housing projects, etc., as well as decreasing employment and income.

1.04 In fiscal year 1976, A.I.D. granted ninety (90) million dollars (Grant 263-0012) to the Government of Egypt to finance the foreign exchange costs of the Suez Cement Company, a new

private sector cement plant with a rated capacity of one million tons per year. This plant, located approximately 40 kilometers south of Suez City, is currently scheduled for start-up in late, 1980. The H.K. Ferguson Company is the A/E firm for this project, while the Fuller Company won the contract to provide the plant equipment.

1.05 Due to projected future increased demand for cement in Egypt and a shortage of foreign exchange for procuring its requirements abroad, the GOE requested A.I.D. in late 1976 to finance the dollar costs of an engineering/economic feasibility study for an additional cement plant to provide a portion of Egypt's near future cement requirements. In April, 1977, the Suez Cement Company entered into a contract with the H.K. Ferguson International Company for performance of this study. The dollar costs of this contract were financed under A.I.D. Feasibility Studies Grant 263-0025. The contract required the H.K. Ferguson Company to assist the SCC in determining the amount of additional cement capacity required by the A.R.E.; the most favorable location and process for this additional cement capacity; and the economic viability of such a facility.

1.06 The preliminary study report completed in August 1978 clearly demonstrates the technical, financial and economic feasibility of this project. Further the preliminary study shows that raw materials for cement production are available in adequate quantity and quality for economic cement production in Egypt, and that the addition of this plant would result in significant savings of the GOE's scarce foreign exchange.

II. BACKGROUND

A. The Egyptian Cement Industry

General

2.01 Egypt has traditionally been a producer of cement, and the cement market constitutes an important segment of the Egyptian economy. Cement is a product essential to the successful implementation of plans underway in Egypt to provide the basic infrastructure necessary for rapid economic development. Egypt's cement is currently produced by four public sector companies: Tourah Portland Cement Company, Helwan Portland Cement Company, National Cement Company, and Alexandria Cement Company. The Alexandria Cement Company is the only one of these companies not located in the Cairo area. A fifth cement company, the A.I.D.-financed Suez Cement Company, is a private sector company scheduled to commence production in 1980.

2.02 Until 1975 cement companies were under the General Organization for Building Materials of the Ministry of Industry. In 1975 they were transferred under the jurisdiction of the Ministry of Housing and Reconstruction (MOHR). The functions of the MOHR have recently been divided between the Ministry of Housing and the Ministry of Development and New Communities. Cement manufacturing, pricing, marketing and expansions now all come under the supervision and direction of the Ministry of Housing.

2.03 In addition to these GOE organizational changes there has been a recent relaxation of GOE policy regarding the amount of control it exercises over the cement industry. The formation of the Suez Cement Company as a private sector company is a direct result of this change in policy.

B. The Egyptian Cement Companies

1. Tourah Cement Company

2.04 The first company producing cement in Egypt was the Tourah Cement Company founded in 1927. The plant, located fifteen kilometers south of Cairo, has six kilns operating on the wet process method with an installed clinker capacity of 1,336,550 tons per year. However, clinker production in 1976 reached only 925,205 tons or 69 percent of installed capacity. Clinker production at Tourah has decreased steadily since 1970/71 at an average annual rate of 4.36 percent. During the same period, cement production declined from 1.32 million tons in 1970/71 to 1.05 million tons in

1976, a 4.03 percent average annual decrease. Clinker and cement production at Tourah make up 35 percent and 32 percent, respectively, of total production in Egypt.

2.05 The product mix at Tourah has changed significantly during this period. Production of both ordinary portland and rapid hardening cement has declined while that of sea water and Karnak cement has increased significantly. Annex D presents Tourah's annual production by type of cement from 1970/71 to 1976.

2. Helwan Cement Company

2. . This company was established in 1929 and commenced operations in 1930. It is located in Helwan, 32 kilometers south of Cairo, and operates seven kilns producing gray cement and two kilns producing white cement. All kilns utilize the wet process.

2.07 Installed clinker capacity in 1976 was 1.3 million tons of gray cement and 100,000 tons of white cement per year. In 1976, gray clinker production reached 865,782 tons, or 66.5% of installed capacity. Clinker production at Helwan decreased steadily by an average annual rate of 4.0 percent between 1970-71 and 1976. Gray cement production during the same period also declined by an average annual rate of 3.8 percent, from 1.3 million tons of cement in 1970-71 to 1.04 million tons in 1976. White cement production increased from 43 thousand tons to 74 thousand tons during this period.

2.08 In 1970-71, clinker and cement production at Helwan accounted for 35 percent and 34 percent, respectively, of total production in Egypt. By 1976, however, Helwan's share of the total had declined to 33 percent for clinker and 32 percent for cement.

2.09 Helwan produces ordinary portland, rapid hardening, sea water, Karnak, slag and white cement. Production by type of cement at Helwan is shown in Annex D.

2.10 Product mix at Helwan has changed during the past six years. Proportionately less ordinary portland, rapid hardening, and karnak cement was produced in 1976 than in 1970/71 while the production of sea water and slag cements increased considerably.

3. National Cement Company

2.11 National located in Tabin, 37 kilometers south of Cairo, was established in 1956 and began operating in 1959. It operates three wet process kilns with an installed clinker capacity of

429,000 tons per year. Clinker production during 1976 reached 400,908 tons or 93 percent of capacity. Cement production increased during the period 1970/71 to 1976 by an average of 0.73 percent annually from 635,000 tons in 1970/71 to 661,000 tons in 1976. Although cement and clinker production have remained stable during the past six years, National's share of total production in Egypt has increased from 13 percent to 15 percent for clinker and from 17 to 20 percent for cement.

2.12 National produces only slag cement since it was originally erected in order to utilize iron slag from the Helwan Iron and Steel Works. Plans exist, however, for diversifying production in the near future. Production from 1971 to 1976 is shown in Annex D.

4. Alexandria Cement Company

2.13 This company was established in 1948 and commenced operating in 1950. It is located near Alexandria, the second largest city in Egypt, about 220 kilometers northwest of Cairo.

2.14 Three kilns are operating at Alexandria (all wet process) with an installed clinker capacity of 455,400 MTY. In 1976 clinker production reached 422,000 tons, 97 percent of installed capacity. Clinker production at Alexandria dropped slightly between 1971 and 1976 by an annual average rate of 0.60 percent.

2.15 Cement production, however, increased by an annual average rate of 0.31 percent during the 1971-1976 period - from 524,000 MTY. Alexandria's share of total clinker and cement production in Egypt during the same period rose from 15 percent to 17 percent for clinker and from 14 percent to 16 percent for cement.

2.16 Alexandria produces ordinary portland, rapid hardening, slag and karnak cement. Production by type of cement is presented in Annex D.

2.17 The decline in the production figures for both the Tourah and Helwan plants can be attributed to a number of factors including the age of the plant equipment, the lack of spare parts, the excessive amounts of kiln down-time, the lack of brick for rebricking the kilns, and the inefficient operation of the plant with partially-bricked kilns.

5. Suez Cement Company

2.18 The AID-financed private sector Suez Cement Company will commence production in 1980. It will produce one million tons per

year using the most advanced technology of the four-stage, preheater, precalciner dry process of cement production.

C. Historical Supply and Demand Situation

1. Historical Demand

2.19 The historical pattern of consumption has occurred within a context of restricted domestic capacity as well as controls on total imports (due to foreign exchange restrictions and other government policies). For this reason it can be assumed that there is considerable "latent" demand which is not reflected in the currently available data on consumption. Evidence to support this assumption comes from (1) the existence of a secondary market with higher than official prices for cement, (2) the frequency with which construction schedules are "stretched out" due to material unavailabilities, including lack of cement, and perhaps the most important, (3) the postponement of residential and industrial construction activity because it is assumed that cement will simply be unavailable. While exact amount of this shortfall is conjectural, a conservative estimate would be 20-30%.

2. Historical Supply

2.20 Production of cement in Egypt started in 1929 when the first cement plant began operation in Tourah. Local production during the 1930's was not sufficient to satisfy local demand and consequently large quantities of cement were imported. By 1940, however, imports declined substantially while exports increased and Egypt gradually became a net exporter of cement until 1975. The recent shift to a heavy dependence on imports is evidence of the significant lack of available production capacity relative to current cement demand in Egypt. The historical trends in cement production, trade and consumption are shown in Table II-1.

2.21 Over the recent past, consumption has grown at an average annual rate of 7.8% (1971-1976). The only interruption in this pattern occurred in 1973 due to the October War. For the most recent year for which statistics are available, 1976, consumption was 4.139 million tons.

2.22 Another interesting perspective on cement demand is the examination of trends in per-capita consumption. The following information in Table II-2 provides the per-capita cement consumption and its derivation for the years 1971-1976.

Table II-1 Supply and Demand for Cement in Egypt*

(000) Tons

Year	Production	Imports	Exports	Consumption
1930	196	192	-	388
1940	362	4	72	293
1950	1019	8	2	1018
1960	2052	17	650	1400
1969/70	3603	-	629	2966
1971	3834	-	901	2887
1972	3923	2	799	3170
1973	3552	2	564	2898
1974	3263	1	181	3114
1975	3616	103	86	3671
1976	3373	603	24	4139

Table II-2

Year	Consumption (000) Tons	Population (000)	Consumption per Capita (kg/person)	Percentage Change %
1971	2887	33,694	85.7	--
1972	3170	34,450	92.0	7.4
1973	2898	35,222	82.3	10.5
1974	3114	36,012	86.5	5.1
1975	3671	36,822	99.7	15.3
1976	4139	37,649	109.9	10.2

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* Sources: Production: 1930-1969/70, Ministry of Housing and Reconstruction, Cement Plant at Suez, 1976
1971-1976, Egyptian Cement Office

Imports, Exports: 1930-1971, Ministry of Housing and Reconstruction, Cement Plant at Suez, 1976.
1972-1976: Central Agency for Public Mobilization and Statistics

Consumption: 1930-1969/70, Ministry of Housing and Reconstruction, Cement Plant at Suez, 1976
1971-1976, Egyptian Cement Office, Prepaid Orders.

2.23 Per capita consumption has been increasing steadily except for the year 1973. Nevertheless, it is still lower than that of most of the Arab countries in the Middle East and North Africa.[1/]

D. Historical Financial Performance of Cement Industry

2.24 U.S.A.I.D. does not have the financial statements of the four public sector companies so as to evaluate their respective financial performance over the past five years. Nevertheless, U.S.A.I.D. is confident in stating that the past financial performance of cement industry has been very poor. This conclusion is based on discussions with management of the four public sector companies and on the disparity between GOE established cement prices per bag and either the imported price of cement or the "unofficial" or "black market" price of cement. Officials of the four public sector companies admit that the GOE established selling price of cement is below the companies' operating costs, with the result that these companies have historically operated in the red. The following will illustrate the disparity in price between the GOE established price (official) and the "black market" price (unofficial) for the years 1973-1977:

Cement Prices in L.E./Ton

	1973	1974	1975	1976	1977
Official	8	11.5	13.4	13.4	18
Unofficial	10.5	18	25	55	40

Recent unofficial market prices have ranged from LE 70 per ton (for quantity purchases) to LE 90 per ton (for small purchases).

2.25 It is for the above reasons that A.I.D. included as a Covenant in its FY 1976 Grant to the GOE the following language: To set cement prices and the level of taxes imposed on cement at a level which will allow SCC to generate a reasonable profit on the investment after payment for all production and other operation costs. U.S.A.I.D. will recommend in this PP that a similar Covenant be included in the Loan Authorization and Agreement.

2.26 GOE pricing policy for cement will be discussed fully in the Marketing Section of this Paper.

1/ Census Bureau, Statistical Review, Production - Trade - Consumption 1974/75 October 1976.

III. THE PROJECT

A. Purpose

3.01 The purpose of the proposed project is to provide Egypt with a new cement plant which will supply a portion of its projected increased cement requirements. By increasing the productive capacity of the cement industry, Egypt will save valuable foreign exchange it would otherwise have to use to import cement.

B. Description

3.02 The project consists of the design and erection of a Portland cement plant capable of producing 1.39 million tons of cement annually. The plant will be located approximately 30 kilometers east of Maadi along the Quattamia road near the raw materials site. Raw materials, limestone and clay, will be quarried, crushed at the quarry site, then transported by overland belt conveyors to covered storage areas adjacent to the cement plant. Cement will be produced using the dry process. Plant operations will include raw mill grinding, homogenizing, kiln feeding, preheating, precalcining, clinker cooling, clinker grinding, gypsum grinding and mixing, cement storage, bagging and bulk loading.

3.03 Auxiliary facilities will include a central control room and laboratory, oil receiving and storage area, bag manufacturing facility, administrative building, canteen and medical center, gatehouse, living quarters, maintenance building and fire station. The project includes procurement of plant equipment; mining and quarry equipment; construction of required civil works and supporting infrastructure; provision of consulting engineering and advisory services; and assistance in training, managing, operating and maintaining the company and its manufacturing facilities. Power will be provided by a high tension power line from the Wadi Hof substation near Tourah to the plant site, a distance of approximately 25 kilometers. Natural gas, fuel oil and water will be piped to the plant site from a

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1/ U.S.A.I.D. is not in receipt of a formal commitment from either the EEA (Egyptian Electricity Authority) or MOH to provide power and water respectively. A Condition Precedent will be included in the Authorization and Agreement which require such formal commitment or evidence that the SCC can, in fact, make other private arrangements to insure a steady and reliable source of water and power.

C. Project Financing

3.04 The A.I.D. assistance will finance the major portion of the foreign exchange costs of the plant equipment, the mining and quarry equipment, the electrical equipment, and the services of a U.S. construction management firm capable of designing the plant, ordering the equipment and supervising the construction of the plant. It is estimated that between 467 and 500 trained professionals and skilled workers will be required to operate the new plant. Since the availability of this type of work force is limited (i.e., those that can be recruited from existing companies), an important initial task of the U.S. construction management firm will be to collaborate with SCC on designing and establishing a training program to satisfy the requirements of both plants. The total estimated foreign exchange cost is $130.1 million. The A.I.D. loan will finance $95.0 million of these costs.

3.05 Of the remaining $35.1 million in project foreign exchange costs, $30.5 million will be financed by the Suez Cement Company with loans obtained either from the International Finance Corporation (IFC) 2/, or from the Bank of Alexandria. The remaining $4.6 million in foreign exchange will be generated through the sale of public shares to investors.

3.06 The Egyptian pound costs of the project will be financed by the Suez Cement Company. These costs include all civil works and plant construction and are estimated at about LE 46.5 million ($66.4 million).

3.07 With the addition of the Quattamia plant production, it is projected that the two A.I.D.-financed cement plants (Suez and Quattamia) will account for 25 percent of Egypt's production by 1986; i.e., 2.39 million tons of a projected 9.55 million total production.

D. Project Assessment and Summary Comments

3.08 U.S.A.I.D. foresees no serious obstacle to contracting with a reputable and experienced U.S. construction management firm.

2/ Both the SCC and USAID desire to give the IFC the right of first refusal regarding financing the remaining foreign exchange costs and have agreed to give IFC until the end of CY 1978 to reach a decision on this matter. Providing IFC does not provide the additionally required financing, this financing will be obtained from the Bank of Alexandria. The Bank of Alexandria has already agreed to lend SCC the required funds at an annual interest rate of 10.5 percent. U.S.A.I.D. will review and approve the loan terms.

There are a number of such firms in the U.S. Further, the procurement of plant equipment, mining and quarry equipment, electrical equipment, and other equipment should pose no major problem as the technology to be used in this cement project is not innovative; i.e., it is identical to that being installed in Tourah and the SCC plant in Suez. The SCC is aware of the difficulties in recruiting qualified personnel to manage and operate the new plant, and they assure U.S.A.I.D. that the training program which is designed by the U.S. construction management firm will be implemented as scheduled.

IV. MANAGEMENT AND LABOR

A. Suez Cement Company's Organization

4.01. The SCC is currently organized under a Board of Directors, consisting of 12 members, whose central function is to monitor the activities of Company management and the performance of the Company. The members of this first Board of Directors were appointed for a period of five years, commencing in March, 1977, the date the Company was officially formed. This Board of Directors is composed of the Chairman and Managing Director of the Suez Cement Company as Chairman of the Board; three members from the investing public sector cement companies, three members from the investing Egyptian banks; two members from the investing insurance companies; and one member from an Egyptian trading company. These ten members then elected an additional two Board members from the private sector.

4.02. Subsequent Boards of Directors will be composed of eight to twelve members elected for three year terms in a general meeting of all shareholders.

4.03. The Board of Directors reviews and evaluates proposed management plans and actions which will have a substantial financial or strategic impact on the Suez Cement Company. Within this, Company management will have considerable latitude in committing financial resources and making business decisions. The Board of Directors will independently evaluate the results of management decisions, principally as reflected in periodic reports of operating and financial performance. To this end, the external auditors for the Company will submit annual reports to the Board of Directors.

4.04. The Suez Cement Company is organized under the Board of Directors into organizational units representing seven major functions, which report directly to the Chairman and Managing Director. These organizational units are designated divisions within which are departments, sections and units at successive levels.

4.05. The seven divisions are as follows:
Office of Chairman and Managing Director
Legal Counsel
Finance and Controller
Plant
Purchasing
Engineering
Administration

The Suez Cement Company's summary and detailed Corporate Management Organization Charts are included as Annex E.

4.06. The principal functions of the seven divisions are described below:

1. Office of the Chairman and Managing Director - The basic function of this office is to provide administrative assistance to the Board of Directors and to the Chairman and Managing Director. Two other administrative functions are performed by this office. One is coordination of public relations, and the other is coordination of marketing activities, mainly involving the Egyptian Cement Office (ECO).

2. Legal Counsel - The basic function of this office is to provide legal counsel and guidance in the ordinary and special activities of the Company. Performance of its function includes preparing or reviewing contracts or other legal documents; reviewing legal and regulatory developments which could affect the Company; instituting legal actions on behalf of the Company, and defending the Company in legal actions instituted by others.

3. Finance and Controller - The basic functions of this division are to provide Company management with accurate and timely analysis and reporting of the financial and operating results of the Company which will facilitate management decisions; to control and safeguard the Company's financial resources; to maintain internal audit of systems and procedures which affect the financial condition of the Company; and to plan, organize and direct the processing of financial and operational data.

4. Plant - The basic functions of the Division of Plant are: (a) to plan, implement, and manage production processes; (b) to maintain quality control over raw materials, additive ingredients, and final product; (c) to plan, schedule, and conduct production operations from quarry and clay pit operations to packaging and bulk storage of cement and, in some instances transportation to off-site distribution centers;

(d) to develop maintenance programs, with technical input from the Division of Engineering, and to maintain all plant facilities and equipment; (e) to compile data and review results of plant operations; (f) to administer all plant administrative activities including personnel, payroll, safety and security, accomodations, transportation, and communications; and, (g) to administer and control the receipt, storage, and distribution of stores and supplies.

5. Purchasing - The basic functions of the Division of Purchasing are the following: (a) purchase or direct the purchase of equipment, materials, and supplies; (b) establish facilities, systems and procedures for receiving, inventoring, storing and safeguarding equipment, materials and supplies; (c) control the disposition of equipment, materials and supplies from storage; (d) initiate authorizations for payment after ensuring that specifications have been met and quantities have been received; and (e) delegate the foregoing types of functions to appropriate departments in the Division of Administration and Division of Plant within prescribed limitations.

6. Engineering - The basic function of the Division of Engineering is to provide engineering and technical services at the corporate staff level which pertain to existing operations and projects, and to new or expanded operations and projects. the Division will: (a) perform certain project engineering services and project control activities representing the Company, where outside contractors have been retained by the Company; (b) provide engineering and technical advice and evaluate new products, processes, and production facilities as requested by the Chairman and Managing Director; (c) provide engineering and, (d) develop and recommend maintenance programs for adoption and implementation by the Manager, Plant.

7. Administration - The basic functions of the Division of Administration are: (a) to develop and provide personnel services for the Company as a Company-wide corporate staff function and administer personnel services at the corporate office, and such services include central personnel administration and records for all employees, programs for employee recruitment, training and development, employee compensation plans and administration and administration of employee benefits; (b) to develop and provide programs for the protection of Company property (i.e. insurance),

security at the plant and corporate office and employee safety; and (c) to provide corporate services which include library, communications and office services and transportation.

B. Senior Management

4.07. The senior management of the Suez Cement Company are experienced, well-qualified individuals. The Chairman and Managing Director is a dynamic individual who has more than thirty years experience in the cement industry as both an administrator and an engineer. As such, he knows all aspects of the industry and is well-respected in both Egypt and abroad for his knowledge and capabilities. This is evidenced by the fact that he was recently elected President of the seven nation Arab Federation for Manufacturing Cement and Cement Products. Further, he was the past Chairman of both the Tourah Cement Company, and the General Organization of Building-Materials and Ceramics. He is regularly consulted by other Cement companies relative to his knowledge of this industry.

4.08. The senior plant management personnel under the Chairman are also hardworking, competent individuals. Both USAID and the consulting engineer, the H.K. Ferguson International Company have been and continue to be impressed by the caliber and competency of these individuals.

C. Plant Staff

4.09. The Suez Cement Company's preliminary staffing guide is included herein as Annex F. It is currently anticipated that there will be 288 employees required for efficient plant operation.

4.10. The numbers of plant staff are minimal at this early stage of the project with approximately two years to plant start-up. However, USAID is confident that the dynamic approach to work by the plant senior management will be contagious and will be reflected in the interest in work shown by the plant staff. There is currently some recruiting of plant staff to fill certain positions required at this early stage. As the feasibility study for this project indicated all four of Egypt's currently producing cement

com nies are overstaffed at all positions, recruiting of personnel experienced in the cement industry is not considered a serious problem. Also, since the SCC is a private sector company, it will be in a position to pay higher wages than the public sector cement companies. This, in itself, should assure the availability of a competent plant staff. High wages is also a step in the right direction toward keeping Egypt's professional and skilled workers at home. In the past, Egypt has lost many of its skilled personnel to other neighboring Arab countries, particularly Saudi Arabia, due to the high pay differential between the countries.

4.11. Further, plans are currently underway to establish a sophisticated training program for plant staff prior to start-up. A Master Plan for a technical training program is currently being formulated by SCC management together with Holderbank/Arab Swiss Engineering Corporation (ASEC). Coopers and Lybrand will prepare a Training program in the financial and management areas of plant operations. The Fuller Company's contract to supply to plant equipment includes $140,000 for training plant personnel in equipment erection and plant start-up.

D. Quattamia Cement Plant Organization, Management, and Plant Staff

4.12. The Quattamia Cement Plant will be an operating division of the Suez Cement Company. Therefore, only plant personnel will be required. Additional senior management personnel will not be needed.

4.13. It is projected that plant operations will require 444 persons, plus 23 persons for the paper bag plant. In addition to the 444 persons mentioned above, it is anticipated that a central office for the management of both plants will be organized which will provide employment for additional staff. It is estimated that about 77 percent of plant personnel will be classified in the skilled category, about 13 percent in the semi-skilled category, 7 percent in the unskilled category, and about 3 percent in management.

E. GOE Role in SCC and Quattamia

4.14. Since both of these plants are private sector, the GOE's role in their operations is fairly limited. The primary control still exercised by the GOE on all Egyptian cement

plants is related to establishing the price at which the plants can sell their cement. There are indications, however, that by the time the production of these plants comes onstream, the price of cement in Egypt will approach the world market price. One of the strong indicators that the price of cement will increase considerably over the next few years is related to the capital investments currently being undertaken to build new cement plants and expand old ones. Nevertheless, the AID Loan Authorization and Agreement will include a covenant that QCC be permitted to establish cement prices for its products which will provide the Company with a reasonable return.

V. TECHNICAL ANALYSIS

A. Plant Site

5.01. The Quattamia Cement Plant, designed to produce approximately 1.39 million tons per year, will be located about 30 kilometers east of Maadi along the Quattamia road. Plant location maps are included as Annex K. This site was selected due to its proximity to the limestone and clay deposits. Clay deposits continuous to an east-west direction were found south of the Quattamia road. In order to preserve this area for clay quarry development, the plant site was established to the east, south of the road, but north of the limestone quarry. Other sites were considered prior to selecting the Quattamia plant site. Plant site selection will be discussed further in the Economic Analysis Section of this paper.

5.02. The plant site is located on land with some natural drainage. A limited amount of earthmoving will be required for site-grading. Plant roads will be developed to provide access to all cement production and support facilities, as well as to the limestone quarry and the clay deposits.

5.03. No utility services are presently available at the site. All utilities required to service cement production and supporting facilities will be developed in conjunction with the plant development.

B. Raw Materials

5.04. A preliminary raw materials investigation has been completed by ASEC. This report indicates that there is a sufficient quantity of limestone for over 100 years of plant operation. Further, the limestone tested shows it is suitable for cement production. Although magnesium oxide, chlorides, and phosphate do exist, the levels are below the permissible limit, providing there is thorough blending of the raw materials.

5.05. Preliminary surface investigations of the clay deposits indicate a high sulfate content. However, analyses of 12-meter deep drilling samples indicate that the sulfates are concentrated near the surface, and that the clay is usable below two meters.

5.06. ASEC and HKFI are currently proceeding with final comprehensive raw materials investigations. The results of these analyses are expected to be available in October 1978. The final design of the plant equipment will be based upon the results of these detailed raw materials investigations.

5.07. Secondary raw materials (gypsum, iron ore, sand) are available locally and will be trucked to the site.

C. Summary Plant Description

5.08. The project includes provisions for development of the limestone quarry, clay pits, stockpiling of raw materials, grinding, pyroprocessing, clinker storage, clinker grinding, cement storage, bag manufacturing and bag or bulk shipment of finished cement. The project also provides for development of off-site and on-site utilities, laboratory facilities, maintenance workshop, employee support facilities and administrative facilities.

5.09. Process and equipment selection were made based on proven technology available to obtain optimum energy and labor utilization, as well as quality control. Energy conservation was considered relative to conveying, grinding and control equipment, and pyroprocessing equipment.

5.10. Crushing of the limestone and clay will be done at the respective quarries to minimize haul distances. Crushed materials will be transported by overland belt conveyors to covered storage buildings adjacent to the cement factory.

5.11. The plant will be designed to incorporate the use of waste heat recovery in the raw mills. Therefore, the raw milling department will be located adjacent to the preheater. Homogenizing and kiln feed silos are planned

to be located immediately adjacent to the raw mills and preheater. This arrangement permits accessability to all levels from the passenger/freight elevator in the preheater tower, as well as limiting the distance required for raw material transport.

5.12. Since the precalciner kiln is very short, when compared to conventional kilns, this permits development of a compact clinker production area with operation from a central control room located adjacent to the clinker cooler building. The Kiln to be utilized in the QCC project has a diameter of 5 meters which permits a production of 1.39 million MTY. The SCC plant in Suez utilizes a 4.7 meter diameter kiln which will produce one million MTY. The central control room and laboratory will be located in the same building. All production areas, including clinker grinding, will be within 250 meters of the central control room.

5.13. Clinker is stored in concrete silos which can be filled and emptied while maintaining a dust-free atmosphere. The planning layout provides for storage capacity to be easily expanded by construction of additional silos.

5.14. Cement loading and packing facilities will be located near the main entrance to the plant, which eliminates heavy traffic through production areas. The arrangement will allow for simultaneous loading of bulk cement and transfer of cement to the bag loading operation. Package cement will be conveyed to a covered truck loading station. The station will be designed to permit four trucks to be loaded simultaneously while four other trucks are being prepared for loading.

5.15. Gypsum and other additives will be delivered to the plant by truck. Front-end loaders will be used for reclaim of these materials from storage areas.

5.16. Roads are planned throughout the production area. A perimeter fence is planned; the Administration Building will be located outside this fence and near the main highway. An access gate to the Administration Building area, separate from the main plant gate, will be provided.

5.17. Housing will be provided adjacent to the cement plant for on-duty management and workers. The housing area will be separated from the factory area by a fence.

5.18. The proposed Plant Layout Plan is shown in Annex L.

D. Facilities

1. Cement Production Line - Process Description

5.19. The limestone crushing plant will be located at the quarry site. Quarry run limestone will be transported from the quarry by truck, discharged into the dump hopper and withdrawn by an apron feeder which facilitates a controlled feed to an impact type crusher. The crushed material will be transported by belt conveyors to covered storage buildings in the cement plant area. The limestone will be reclaimed from one of the storage piles with a traveling bridge type scraper reclaimer. A variable speed slewing rake will be employed to skim a uniform section of material across the end face of the pile. The material will be discharged to the storage building withdrawal belt conveyor, which conveys it to the raw mill belt. Operation of the scraper-reclaimer will be controlled remotely from the central control room.

5.20. Clay will be excavated in the clay pits, loaded into trucks and discharged from the trucks into a dump hopper will be equipped with an apron feeder which feeds a double roll primary crusher. Crushed clay will be transported from the crusher area by an overland conveyor to a covered storage building. Clay will be reclaimed by a traveling bucket wheel type reclaimer. The bucket wheel will take material from across the face of the pile and belt convey it to the withdrawal belt which will transfer it to the raw mill belt. Operation of the clay reclaimer will also be controlled remotely from the central control room.

5.21. Iron ore, and other additives are reclaimed through a dump hopper and feeder system located over the clay belt and discharged to the separate mill feed bins. Limestone and clay will be conveyed from the respective storage with-

drawal belts to the raw mill feed bins on separate, parallel inclined belt conveyors. Four bins will be provided for each mill. Each bin will be mounted on load cells for level control and allow on-line calibration of the raw mill weigh feeders, which proportions the various feed materials to the mill feed belt.

5.22. The raw grinding department will basically consist of two center-discharge mills, closed-circuited with air separators. These systems will be parallel and provide for independent operation. Each mill will be comprised of three compartments - a drying chamber, primary grinding section and secondary grinding section. The system will be capable of drying raw materials with a moisture content of approximately 6%, using kiln preheater gases exclusively. A bypass feature will allow all or part of the kiln gases to bypass the raw mill as required.

5.23. Raw materials - limestone, clay, iron ore and sand- will be fed in weighted proportions to the mill. Material discharged from the primary compartment will be conveyed by a bucket elevator to an air separator. Fine product will be extracted and oversized material, rejected from the separator, will be divided and a portion conveyed to the secondary grinding compartment for additional grinding. The remaining material will be conveyed to the drying chamber.

5.24. The total end product will be combined with fines from the separator and dust collectors, and will be conveyed by a pneumatic pumping system to the homogenizing silos.

5.25. The blending and storage silo arrangement will consist of two blending silos above two storage silos. Raw material will be discharged to the blending silo in the required quantity and composition where the homogenizing process will be initiated. Blending silos will be operated by the "batch system". That is, the composition of the material will be constantly analyzed while being fed into the silo. After homogenization, the finished raw meal will be transferred by gravity to the storage silos.

5.26. The bottom of the storage silo will be equipped with aeration pads to insure the continuous flow of material to the kiln feed system. Kiln feed material will be extracted from either of the storage silos by air-gravity conveyors

and elevators to the kiln feed bin.

5.27. The kiln feed system contains a solids flow meter which will provide a uniform controlled flow of raw meal into the preheater. A constant material level will be maintained in the feed bin by load cells tied in to the withdrawal equipment under the storage silos. An emergency standby system will be provided for feeding the preheater.

5.28. The major components of the kiln system will be a twin four-stage preheater with flash calciner, relatively short kiln, and an air-quench reciprocating grate cooler.

5.29. Raw feed will enter the first of the four-stage preheater cyclone inlets and travel progressively through the second and third stages at higher temperatures. The material will be carried in parallel streams in a dual tower-cyclone arrangement until reaching the single flash calciner, and from there to the twin fourth stage cyclones.

5.30. The flash calciner process will be particularly suitable for the anticipated available raw materials; since a high percentage of alkali is present, a bypass is permitted while maintaining a high efficiency process. From 0 to 50 percent of these gases, heavily laden with volatilized alkalis, chlorides, and sulfur, will be air-quenched to a temperature below the solidification point of the various alkali salts to prevent sticking. The bypass gases will be water-cooled in a spray tower before entering the precipitator. The volume of gases entering the alkali bypass will be controlled by a variable speed fan.

5.31. Remaining kiln gases, after bypass extraction, will enter the flash calciner through an orafice in the riser duct. Also, secondary air coming from the cooler will enter the flash calciner. Several burners will discharge natural gas, or fuel oil, into the flash furnace. This fuel will ignite using the heated secondary air from the cooler mixed with kiln exhaust gases to create a turbulent combustion within the chamber, thereby calcining the raw meal entering from the third stage. The 90 to 95% calcined material will be carried in the gas stream from the flash furnace to the fourth stage cyclone, from which it will be discharged into

the kiln.

5.32. The kiln feed end diameter will be enlarged below the first kiln tire in order to reduce the kiln exit gas velocity, and, therefore, the dust losses to the alkali bypass system.

5.33. The recuperative cooler will be a combination inclined and horizontal reciprocating grate cooler, each with its own fan. All the fans will be driven by variable speed motors in order to conserve power over the entire range of operating conditions. Cooler vent gases will be dedusted by a gravel bed filter before being discharged to atmosphere by the variable speed fan.

5.34. Clinker will be transported to the storage silos by deep bucket conveyors, and bucket elevators. Each system will be provided with a standby. The distribution of the clinker to the various silos will be by a tipping pan conveyor.

5.35. Three cement mills will be provided, each with a nominal capacity of 110 metric tons per hour. All the mills will be the same size, but two would be open circuit, and one would be closed circuit with an air separator. Clinker, gypsum and additives will be withdrawn from bins mounted on load cells by a weighbelt feeder and transported to the mills by an apron conveyor. The finished cement will be conveyed by a pneumatic pumping system to the cement silos. A standby pump will be provided for each mill. Dedusting of the mill vent air will be by electrostatic precipitator.

5.36. A silo cluster will be provided for storage of cement, with a piping system located on top of the silos to distribute cement from the various mills to a selected silo. The cement from the silos will be bulk-loaded directly into trucks with telescopic spouts, or transferred to the packhouse for bagging.

5.37. Four rotary packers will be provided, each having a capacity of packing 2000 bags/hr. of 50 kg bags of cement. The bagged cement will be loaded on trucks by eight belt conveyors.

5.38. The major details of process flow for the Quattamia Cement Plant are presented in Annex M of this paper.

5.39. Equipment selection and process consideration for the Quattamia Plant are based on proven technology and take into account energy conservation, labor utilization, and quality control. The (a) process considerations and (b) the capacities of major equipment (Basic Design Data) are included herein as Annexes N and O, respectively.

2. Bag Manufacturing

5.40. Existing bag manufacturing facilities in other cement plants in Egypt are not considered adequate to supply the needs of the Suez plant and the proposed Quattamia plant, as well as the extensions planned for the existing plants. If all cement is bagged, the plants of the Suez Cement Company will require 48 million bags per year. Plant size was selected to produce 30 million bags per year at one-shift operation. This will be more than sufficient when operating on two shifts, and will provide some allowance for future expansion considering that the amount of bulk delivery is expected to increase.

3. Plant Infrastructure

5.41. Other non-process plant infrastructure to be located within the boundaries of the plant site include:

a. Administration Building

The Administration Building, including the communications center, will provide for parking at ground level, with two floors of offices above. The approximate size of each of the two floors of office space will be 1600 square meters.

b. Canteen and Medical Center

The Canteen and Medical Center will include kitchen and dining facilities capable of feeding approximately 250 persons, locker and toilet facilities for 300 persons, and an emergency medical center. The approximate size

of the facility would be 1700 square meters.

c. Gatehouse

The Gatehouse will include a plant security office, weigh bridge office, cafeteria, and toilet facilities for the drivers. Provisions will be made for three lanes of traffic The approximate size of the facility will be 230 square meters.

d. Living Quarters

Plant housing will be provided for fifteen families. There will also be a six-bedroom guest house. Housing requirements at the plant are based on the minimum required supervisory personnel to maintain critical plant operations on a continuous basis. Total area for the family units and guest house is approximately 2500 square meters.

e. Maintenance Building

The Maintenance Building will include the maintenance workshope, inside parts warehouse and weigh station. An outside parts storage area will be located adjacent to the building. The approximate size of the facility would be 2500 square meters.

f. Fire Station

The Fire Station will house one firetruck, and will provide a kitchen, sleeping quarter, and toilet facilities, for onduting firemen. The Fire Station will be located near the paper bag manufacturing building. Communications will be provided by the plant telephone system. The approximate size of the facility will be 2500 square meters.

4. Utilities

a. Process Requirements

5.42. The utility requirements for the Quattamia plant process at 1.39 million tons per year cement capacity are estimated to be approximately 30 percent greater than the SCC's Suez #1 plant requirements. The following list of utility quantities is based on continuous operation 24 hours per day of the main cement production equipment.

(1) Natural gas is the most desirable fuel, but provision would be made for using oil as an alternate. The consumption of natural gas is estimated at 473,000 cubic meters per day.

(2) Fuel oil consumption is estimated at 470 tons per day and requires storage tanks on site of approximately 36,000 ton capacity.

(3) Water requirements for this "dry process" plant are for recirculated water for cooling the kiln gas, and for spray washing of the various air pollution control streams. The water consumption is estimated at 3,500 cubic meters per day.

(4) Electrical requirements for the cement production equipment are relatively high due to the high degree of mechanization, and minimum manpower requirements. The peak electrical demand is estimated at 30,000 KW.

b. Offsite Utilities

5.43. All utilities required for the Quattamia plant will be designed for twice the actual required capacity to allow for a nominal safety factor and to provide for future expansion. The natural gas, fuel oil and water would be supplied from a common pumping station near Tourah, approximately 32 kilometers from the plant site.

5.44. Natural gas will be connected to an existing main with a 30 cm diameter pipe. Fuel oil will be connected to an existing main line with an insulated 20 cm diameter pipe. Water will be pumped directly from the Nile River using a 20 cm diameter pipe.

5.45. Electric power will be delivered to the plant site via a 66 KV double circuit transmission line from the Wadi Hof 220/66 KV substation (EEA) near Tourah, a distance of approximately 25 km. The transmission line will be capable of transmitting 35 MVA load per circuit and will terminate at a utility-owned 66/11 KV substation on the site. For reliability and continuity of power service, it is recommended

that 2 - 35 MVA transformers be provided at the 66/11 KV substation. All necessary switching and circuit protection requirements would be also provided.

c. Plant Utilities

5.46. Utility requirements within the process requirements as described above, plus the requirements of all infrastructures such as the administration building to be served with natural gas for heating, water for toilet facilities, and electricity for lighting and power. The maintenance building will be served with the same utilities as above for similar facilities, except the electrical requirement will probably be greater. Other infrastructures will require the same utilities with varying consumtion.

E. Technical Assistance

5.47. It is expected that some trained professionals and skilled workers familiar with cement manufacturing will be available to the QCC to the extent that they can be recruited from the existing companies. However, most of the 288 staff required to operate the plant will require training. This is particularly true as the dry process technology is relatively new in Egypt. Some of the training is expected to be supplied by the suppliers of major items of equipment. An important initial task for the U.S. consultant will be to design and establish a training program to begin as personnel are recruited and to continue through the life of the project.

F. Project Cost Estimate

5.48. The detailed project cost estimate in Annex P is summarized in Table V-1 below. In view of the foregoing it is the position of the Mission in Cairo that the requirement of Section 611(a) of the Foreign Assistance Act of 1961, as amended, has been met. This project is based upon sound engineering plans as recommended by HKFI, and a reasonably firm cost estimate also prepared by HKFI. The Mission and SCC reviewed the plans and cost estimate and find them reasonable. An adequate quantity and quality of raw materials are available and necessary utilities will be in place at the time required by the project.

TABLE V-1
QUTTAMIA CEMENT PLANT
CAPITAL COST ESTIMATE

	EGYPTIAN POUND COSTS (000)	U.S. DOLLAR EQUIVALENT (000)	U.S. DOLLAR COSTS (000)	TOTAL (000)
LAND	LE. 369	$ 527	$ -0-	$ 527
Civil Works (Quarry & Plant)	22,477	32,110	-0-	32,110
1/ Equipment - Quarry	-0-	-0-	9,054	9,054
2/ Clinker Production	-0-	-0-	62,182	62,182
Clinker Grinding	-0-	-0-	12,730	12,730
Bagging	-0-	-0-	9,988	9,988
Equipment Assembly & Erection	4,763	6,804	5,500	12,304
Adm Building & Equipment	919	1,313	-0-	1,313
Mobile Equipment & Transport	-0-	-0-	1,682	1,682
Production Equipment Spares	-0-	-0-	11,744	11,744
Laboratory - Workshops	-0-	-0-	1,942	1,942
Bag Plant Equipment	-0-	-0-	4,875	4,875
Bag Plant Civil Works	1,700	2,429	-0-	2,429
3/Off-Site Utilities	5,838	8,340	3,600	11,940
Indirect Construction & Pre-operating costs	2,687	3,839	608	4,447
Sub Total	38,753	55,362	123,905	179,267
4/ Escalation/Contingency	7,733	11,407	6,195	17,242
Total Capital Cost	LE. 46,486	$ 66,409	$ 130,100	$ 196,509

1/ Where applicable, engineering and construction management costs have been included in the line item cost. The total of these costs are estimated at $10 million.
2/ Where applicable, costs for imported equipment and materials include freight and insurance (CIF).
3/ Construction and installation of off-site utilities will be carried out by the Egyptian Government Authorities and/or Ministries. Appropriate provision will be included in the Project Agreement to ensure the timely installation.
4/ Twenty one percent has been added to the Egyptian pound cost for escalation and contingency. Line item dollar costs include a six percent compound escalation amount, five percent of subtotal cost is contingency factor.

5.49 The capital cost estimates were prepared jointly by HKFI, Fuller Company and Coopers & Lybrand. As stated in the notes to Table V-1 the CIF U.S. dollar costs include amounts representing engineering services, and have been escalated by 6 percent per year compounded. Because of the recent dramatic price increases which have occurred in the Egyptian economy, an escalation rate of 16 percent has been utilized in the local cost estimates. In addition a five percent contingency factor has been added to both the U.S. dollar and Egyptian pound costs. A more detailed listing of the U.S. dollar costs is shown in Annex P.

VI. MARKET ANALYSIS

A. Past and Present Cement Situation in Egypt

6.01 Egypt is a major producer and consumer of cement. Historically, it has also been a major exporter, although Egypt has recently shifted to become a net importer. As late as 1974 Egypt was exporting more cement than it imported. However, 1975 marked the first time in many years that Egypt imported more cement than it exported. This situation is attributable to several factors. The local demand for cement to meet construction needs has overtaken the supply available from the Egyptian cement companies. In addition, the October 1973 war resulted in a major program to reconstruct the Canal Zone area which has required unusually large quantities of cement. Also, production output from local manufacturers has been declining over the past several years due to machine obsolescence, difficulties in obtaining spare parts, and delays in investing in new productive capacity.

6.02 Despite the import program, supply shortages are worsening as evidenced by the increasing backlog of unfilled orders which reached nearly one million tons at the end of 1976.

6.03 As discussed earlier in the Background Section of this paper, the 1976 combined domestic cement production of the four Egyptian cement companies was approximately 3.3 million tons.

B. Egypt's Planned Production Increas

6.04 In addition to the current production of the four Egyptian cement companies, there are plans for increasing cement production in Egypt. These planned increases would give Egypt a projected capacity of about 9.6 million tons of cement in 1986.

6.05 The Tourah Cement Company is currently constructing an expansion to its present plant which will produce an additional estimated 750 thousand tons of cement annually using the dry process. This additional production is expected to commence in the summer of 1979.

6.06 The Helwan Cement Company is planning to convert its kiln #7 from wet to dry process and raise its rated capacity to 750 thousand tons annually. Start-up was scheduled for late 1979, but construction has been delayed and will reportedly restart in the near future. It is now expected that production will commence in 1981.

6.07 The Alexandria Cement Company is constructing an extension with a capacity of 300 thousand tons per year. This extension is expected to become operational in the immediate future.

6.08 The Suez Cement has begun construction of a one million ton per year A.I.D.-financed plant in the Suez area. The plant is currently expected to begin production in 1980.

6.09 Further, there are several other plants in various stages of construction, but for which completion has been temporarily halted for one reason or another. A plant with a 500 thousand ton per year rated capacity at Assiut is being built for the Helwan Cement Company. Production was originally scheduled to start in 1980, but it is now assumed that production will start in 1982. National Cement Company also started construction of a 500 thousand ton per year extension with production originally scheduled for late 1978. It is now assumed this plant will begin production in late 1980. Additionally, National Cement has halted temporarily the construction of a one million ton per year extension. This production will probably come on stream in 1983.

6.10 In addition to the above planned extensions, this project, the Quattamia Cement Company, will increase Egypt's cement production by 1.39 million tons per year. It is projected that this plant will commence production in 1982.

6.11 Annex G includes details of the above-described planned increases in cement production.

C. Projected Demand

6.12 The method used for estimating and projecting regional demand for cement was based on regional per capita consumption and projected population growth. This is a generally-accepted, reasonable method of projecting demand for cement. The consumption data represents paid orders for cement registered with the Egyptian Cement Office for each of the seven governorates in Egypt. The population forecast data was provided by the GOE's Central Agency for Public Mobilization and Statistics. Annex J represents a graphic illustration and projected demand statistics by regions.

6.13 Paid orders understate actual effective demand for several reasons. Prepaid orders exceed supply, thus causing long delays in cement deliveries. Consumers must pay in full at the time they order cement. Since considerable delays occur from the time the cement is ordered to the time it is delivered, cement consumers are obliged to invest their funds in a non-productive manner up to several months. It is reasonable to assume, therefore, that some portion of potential consumers decide not to order cement at all.

6.14 There is general agreement that paid orders understate actual demand by 10 to 20 percent; and the feasibility study consultant, HKFI, feels that demand is understated at least 20 percent. However, we have taken a very conservative approach and have based our demand projection on the 10 percent figures.

6.15 Table VI-1 shows the historic and projected supply/demand figures for cement in Egypt, based on the conservative assumptions of 10 percent latent demand in both the actual and projected figures.

TABLE VI-1

	YEAR	TOTAL PRODUCTION (000 tons)	TOTAL DEMAND (000 tons)
A	1970/71	3,769	3,086
C	1971/72	5,697	3,391
T	1973	3,581	3,101
U	1974	3,211	3,341
A	1975	3,518	3,901
L	1976	3,289	4,429
P	1977	3,230	4,815
R	1978	3,500	5,246
O	1979	4,085	5,728
J	1980	4,855	6,268
E	1981	5,895	6,871
C	1982	7,444	7,549
T	1983	8,647	8,813
E	1984	9,161	9,166
D	1985	9,450	10,134
	1986	9,550	11,223

6.16 The above table clearly demonstrates the requirement for the production of the Quattamia plant. Assuming all the planned increases in cement production materialize on schedule (which is highly questionable given past performance) and that all planned production capacities are realized, there is no year in which projected production exceeds projected demand. Further, it is apparent that after 1984 the gap between projected supply and demand will begin to widen.

D. Marketing of Cement

1. Distribution

6.17 All cement in Egypt is distributed by the Egyptian Cement Office (ECO), except cement imported and distributed by private sector firms. ECO was established in 1930 by the Tourah and Helwan companies and was later joined by Alexandria and National. ECO was established primarily to avoid price competition among the companies. Since 1946, however, cement prices have been regulated by the government so that ECO's role changed to production coordination, allocation and distribution of cement to consumers. ECO is also responsible for all exports and for all government imports.

6.18 ECO collects information on a monthly basis on expected production at each plant for the following month. It also collects information regarding expected imports. In addition, ECO estimates expected market requirements for different types of cement. All this information is reported to the Department of Building Materials of the Ministry of Housing which determines the distribution of cement among the various consumers. ECO implements the distribution policy using its own trucks, about 200, or leased trucks, about 500. Rail and river transport is also used but very rarely. Each consumer, informed by the Department of its allotted quota, must then pay ECO in full for the value of its allotment before being given a delivery order. Delays of several months for execution of the delivery order have been common since early 1976.

6.19 ECO is in the process of expanding its staff, facilities and equipment to meet an increasing distribution workload. However, prior to disbursement, A.I.D. will require a distribution plan from ECO which evidences ECO's ability to efficiently distribute the projected increased cement production in Egypt.

6.20 Cement production is allocated among public sector projects and enterprises, private housing, cement product manufacturers and retailers. Cement is allocated on the basis of construction value at a ratio of 10 tons of cement per L.E. 1,000 of construction value. Almost all of the cement is distributed in bags.

2. Pricing Policy

6.21 Cement prices in Egypt are set by the government taking into consideration the cost of production, government social and

political goals, and the cost of imported cement which is allocated as a surcharge on locally manufactured cement sales. Table VI-2 below reflects these cement prices by type of cement as of July 1977.

TABLE VI-2

CEMENT PRICES BY TYPE OF CEMENT, JULY 1977

(L.E./Ton)

Type of Cement	Factory Price		Duties	Imports Subsidy	Total	
	Bulk	In Bags			Bulk	In Bags
Ordinary Portland	7.500	9.500	2.500	6.000	16.000	18.000
Rapid Hardening	8.500	10.500	2.500	6.000	17.000	19.000
Sulphate Resisting	9.500	11.500	2.500	6.000	18.000	20.000
Low Heat	9.500	11.500	2.500	6.000	18.000	20.000
Slag	7.400	9.400	1.100	6.000	14.500	16.500
Karnak	7.400	9.400	1.100	6.000	14.500	16.500
White	18.500	21.200	2.500	6.000	27.000	29.700

Notes: 1. All prices are for local consumption ex-factory greater Cairo.

2. For deliveries ex-Alexandria cement factory, prices are higher by 0.650 L.E.

3. Cement delivered from the North Cairo warehouse, usually to retailers, is sold at 1.8 L.E. higher than ex-factory price. This amount consists of 0.8 L.E. for transport cost and 1.0 L.E. for the retailers' profit. Relatively small quantities of cement are marketed through the warehouse.

4. Cement transport charges are established by the government.

Source: International Management Center.

6.22 Official cement prices in Egypt have risen more than 100 percent between 1971 and 1977. Nonetheless, official prices have always been less than market prices, as expressed in the secondary market, or in prices of cement imported by private firms. A comparison of official and unofficial prices for ordinary portland cement is given in the table below:

TABLE VI-3

Cement Prices in L.E./Ton

	1966-68	1968-70	1970-71	1971-72	1973	1974	1975	1976	1977
Official	6	7	7	8	8	11.5	13.4	13.4	18
Unofficial	7	8.5	9	10	10.5	18	25	55	40

6.23 As long as supply of cement was adequate, the difference between the two prices was small. However, once shortages began occurring, unofficial prices increased faster than official prices. While it is expected that the official price of cement will continue to rise so that, hopefully, in five years it will approach the international market price, A.I.D. will gain the necessary formal GOE assurance that the QCC will be permited to establish cement prices which insure a reasonable financial rate of return.

3. Imports

6.24 As can be seen below, cement was imported in small quantities until 1975 when import volume rose substantially in order to meet shortages in local supply.

	Actual					Estimated	
	1971/72	1973	1974	1975	1976	1977	1978/79
	(Thousand Tons)						
Imports	2	2	1	193	791	200*	1,200*

* See paras 6.28 and 6.30

6.25 About 54% of all cement imported during 1975 and 1976 came from Spain through the port of Alexandria, whereas the remaining 46% came from Roumania through Port Said.

6.26 Until May, 1977, all imported cement was ordered either by the Ministry of Housing and Reconstruction and transported from the port of entry, usually Port Said, directly to the Canal Zone for consumption, or by the Egyptian Cement Office which also handled distribution throughout Egypt. All 1975 imports and about 47 percent of 1976 ECO imports were consumed in Suez, about 25 percent in Cairo, and smaller proportions in other governorates.

6.27 Since May 1977, cement may also be imported by private sector firms. Importers must possess a license, usually valid for one year, issued by the Ministry of Commerce.

6.28 While no limitations have been imposed on the quantities that individual companies may import, a ceiling of 500 thousand tons was set as the total which may be imported in 1977. It is estimated that by November 1977 not more than 200 thousand tons had been imported. The major constraints on importing cement are the lack of foreign exchange and the congestion in the ports of Alexandria and Port Said which may cause delays of about thirty days.

6.29 Prices of cement recently imported by private firms were about L.E. 38 or U.S. $54 per ton f.o.t. (free on truck) at the port of entry. Public sector firms contracted at $43 per ton C.I.F. Alexandria or Port Said 1/ for two orders of 200,000 tons each.

6.30 The Ministry of Housing and Reconstruction has estimated that about 1,200,000 tons of cement must be imported annually by public sector firms until 1979, with additional quantities to be imported by private sector firms.

6.31 It is estimated that 80% of all cement imports will be from Roumania, while most of the balance will be from Spain and small quantities from Cyprus.

6.32 In spite of the cement shortage in Egypt and the recent liberalization of import regulations for private importers, relatively small quantities are imported due to difficulties already described and the disparity between international market and Egyptian cement prices. Consequently, it is unlikely that imports will be a threat to domestic producers supplying the local market.

1/ Shipments C.I.F. Suez are U.S. $4.00 per ton higher.

4. Exports

6.33 During the period 1960-1974, Egypt was a net exporter of cement. However, since 1974 exports declined substantially because of the increasing shortage of cement in the local market. In fact, in 1977, ECO was directed by the government not to export any more cement even though there were orders outstanding from foreign consumers.

6.34 Historically, most of Egyptian cement exports have been to countries in Africa and the Arabian Gulf region, with Libya, Saudi Arabia, Yemen, West Africa and Abu Dhabi predominating. Eastern European countries also imported large quantities of Egyptian cement, probably as part of barter trade agreements. Annex H presents the tonnage of cement exported by Egypt in the period 1971 through 1976 by importing country.

6.35 Egypt is strategically located very near what is perhaps the most rapidly expanding cement market in the world; the oil exporting countries of the Middle East. In addition, several other countries in the areas adjacent to Egypt may also offer export opportunities. Annex I shows the countries which may be potential export markets for Egyptian cement, their annual volume of cement imports in 1976, and the outlook for the future.

6.36 While a number of countries located near Egypt are importers of cement, it should be noted that many of them have plans to become self-sufficient or at least reduce their dependence on imports. Furthermore, competition for these markets, especially those of the Gulf countries, is intense. However, the markets exist, and they provide significant opportunities for Egyptian exports. Egypt has significant opportunities over other countries with respect to pricing and location. The true Egyptian cement cost of production is lower than those of other international manufacturers. Consequently, Egyptian cement is cost competitive.

6.37 Location also gives Egypt a strong advantage over other countries for exporting to Saudi Arabia, Yemen, Sudan and other Gulf and East Africa countries. Saudi Arabia could be a very important market for Egyptian cement. Although a number of cement plants are under construction in Saudi Arabia, it is not anticipated that they will achieve self-sufficiency in the medium term.

VII. FINANCIAL ANALYSIS

A. General

7.01 A rather extensive financial analysis for the Quattamia Cement Plant Project was completed by Coopers & Lybrand and HKFI as part of the feasibility study for this project. As discussed later in the Economic Analysis section, five different sites were evaluated in determining the most feasible location and plant capacity. This financial analysis is restricted solely to the Quattamia site construction and operations. The detailed financial analysis prepared by the consultants is included as Annex R to this paper. Its highlights are presented below.

7.02 Since the receipt of the draft feasibility study, some of the details of the project have changed. This is normal for a project of this magnitude and in the economic and business environment existing in Egypt. For example, the financial analysis presented herein indicates that the total Egyptian pound capital costs are LE 44,169,000 but the most recent estimate given to USAID by HKFI shows the LE requirement as LE 46,486,000 as shown in Table V-1 in the Technical Analysis. Another difference is that the study estimates the A.I.D. would provide $125 million, whereas the A.I.D. loan will be $95 million. The Mission has judged, however, that the financial analysis results are still valid for the project.

B. Capital Cost Estimates and Financing Plan

7.03 Paragraph 5.48 and Table V-1 in the Technical Analysis section present the capital cost estimates which total $196.5 million, including escalation. Of this total, the foreign exchange requirement is $130,100,000 and the Egyptian pound requirement is LE 46,486,000 ($66,409,000).

7.04 The projected financing plan for this project is presented in Table VII - 1 below. The major portion of the foreign exchange requirement is being financed by A.I.D. As discussed earlier, the proceeds of A.I.D.'s loan to the GOE will flow to the Quattamia projects as second step financing to the Suez Cement Company. Of the 95.0 million, the Government will relend to the Suez Cement Company $58.5 million on terms and conditions satisfactory to A.I.D.— most likely on medium-term conditions, that is, over 15 years at 10 percent interest with a five year grace period for the repayment of principal. The remaining $35.5 million will be taken on SCC's books as paid-in capital, with the appropriate shares of stock issued to the ten public sector companies holding stock in SCC in proportion

TABLE VII-1
QUATTAMIA CEMENT PLANT
FINANCING PLAN

($000)

SOURCE	EQUITY	DEBT	TOTAL
A. FOREIGN CURRENCY			
AID	$36,500	$58,500	$95,000
IFC, or other lending institutions	-0-	30,500	30,500 1/
CAPITAL STOCK	4,600	-0-	4,600
TOTAL FOREIGN CURRENCY	41,100	89,000	130,100
B. EGYPTIAN POUNDS			
Egyptian Bank Loans	-0-	61,695	61,695
CAPITAL STOCK	4,714	-0-	4,714
TOTAL EGYPTIAN POUNDS	4,714	61,695	66,409
TOTAL FINANCING	$45,814	$150,695	$196,509 1/
DEBT EQUITY PERCENT	23.3%	76.7%	100%

1/ Should the IFC loan not materize, Egyptian banks have agreed to loan foreign currency to the Project. Conversion rate for this transaction would be LE .75 = $1 and would result in $2.2 million exchange cost.

to their respective current stock holdings. These include the four other cement companies, five Egyptian banks, and one insurance company. These ten companies were the founder public sector investors in SCC. The effect of this transaction by the Government results in a grant to the ten companies which should be booked as an investment on the asset side and contribution to equity on the capital side.

7.05. The above transaction will permit the five Egyptian banks to extend Egyptian pound loans totalling the dollar equivalent to $61.7 million to SCC to finance the bulk of the LE requirements. The Bank of Alexandria has agreed, with the permission and encouragement of the Egyptian Central Bank, to lead the consortium of banks in this venture.

7.06 The remaining $35.1 million foreign exchange requirement after A.I.D.'s contribution, is expected to be financed by the International Finance Corporation (World Bank) and by the sale of stock to the private sector. The project feasibility study is currently being evaluated by the IFC in Washington and a commitment is expected to be forthcoming by December 1978. Should IFC decide not to participate, the Central Bank of Egypt has again agreed that the Bank of Alexandria will be responsible for obtaining foreign currency loan from other Egyptian and foreign banks doing business in Egypt. The Bank of Alexandria has expressed confidence to A.I.D. and the SCC in being able to raise the required foreign exchange should the IFC not participate. This confidence stems from A.I.D.'s participation in the project financing with our requirements that satisfactory return on investment be achieved by sales price revisions.

7.07 Similar to the financing plan utilized for the SCC, A.I.D. will require that a minimum of 20 percent of the total capital stock be sold to the private sector. The other 80 percent will be held by the public sector companies, as discussed in paragraph 7.04 above. The 20 percent, or $9.3 million, will be divided about evenly between foreign currency sales to Egyptians working outside of Egypt and Egyptian pound sales in Egypt. Two years ago when the SCC was founded, the private sector stock was fully subscribed in a very short period of time. Interest has remained high, and SCC feels confident that the new issuance will move into the private sector very quickly and, as in the case of the lenders, particularly since A.I.D. is imposing financial covenants on the SCC.

7.08 The above financing plan results in an 77:23 debt equity ratio. However, when consolidated with the Suez Cement Company's existing capitalization, the overall debt to equity ratio will be 67:33.

C. Analysis

7.09 The financial analysis makes certain operating and financial assumptions in order to arrive at a "basic case" in order to project:

a. Pro forma financial statements,

b. Cash flow and working capital,

c. Financial internal rate of return,

d. Break-even analysis,

e. Debt service capability.

The analysis then adjusts these assumptions in a variety of sensitivity tests to determine the effects of changes in certain variables.

7.10 The base case covers a 3-year construction period and ten years of operation. It assumes production at 60% capacity the first year of operation, 80% the second year, and full capacity during the third and subsequent years. Selling prices are assume to be LE 24/ton for bulk cement and LE 26/ton for bagged cement. The other assumptions for the base case are listed on pages 5 through 8 of Annex R.

7.11 Tables VII-2, VII-3 and VII-4 present the base case projections for the pro forma balance sheet, income statement, and cash flow statement. The working capital position of the project at the beginning of production is negative in the amount of LE 27,996,000. That is, current liabilities exceed current assets by LE 27.996 million. If inventories were considered, the working capital position would still be negative, LE 27,680,000.

7.12 The working capital position becomes slightly worse after the first year of production, LE 29,252,000, but then improves steadily through the next nine years of production. At the end of ten production years, the working capital position is LE 30.545 million. The quick asset ratio, i.e., quick assets divided by current liabilities, is approximately four after ten years of production. Even considering the long-term AID dollar loan due in the next year as a current liability, the project will still be in a positive working capital position.

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PROJECTED STATEMENT OF FINANCIAL POSITION
(All Figures in L.E. and Thousands)

		1981		1982		1991
Current Assets						
Cash On-hand and Time Deposits						
L.E.		L.E. 106		L.E. 173		L.E. 24368
Dollars (stated as L.E. equivalents)		498		783		17954
Total Current Assets		604		956		42322
Current Liabilities						
Short-Term Borrowings		28600		29800		
Accounts Payable		0		408		2675
Profit Sharing Payable		0		0		9102
Total Current Liabilities		28600		30208		11777
Net Current Assets		(27996)		(29252)		30545
Inventories		346		1920		1920
Fixed Assets-Total Fixed Assets	126994		126994		126994	
Less: Accum. Deprec.	0		11172		103951	
		126994		115823		23043
Deferred Charges Net Fixed Assets		23792		22678		0
Total Net Assets		L.E. 123107		L.E. 111169		L.E. 55508
Long-Term Liabilities		L.E. 91107		88372		12696
Equity - Share Capital	32000		32000		32000	
Legal Reserve	0				9643	
Earned Surplus (Deficit)	0		(9203)		1169	
Total Equity		32000		22797		42812
Total Financing		L.E. 123107		L.E. 111169		L.E. 55508

Includes 48 of earned interest on time deposits as a direct reduction of accumulated deferred charges. Total deferred costs actually accumulated are L.E. 23,840.

PROPOSED QUATTAMIA CEMENT PLANT - BASE CASE PROJECT

PROJECTED STATEMENT OF RESULTS OF OPERATION
(All Figures in L.E. and Thousands)

	1982			1991			Cumulative Through 1991
Sales Income		L.E. 19753			L.E. 34472		L.E. 324458
Less: Cost of Cement Sold		11940			19170		183708
Gross Profit On Sales		7813			15302		140750
Less: Operating Costs							
Overhead Plant Costs 1/	3608	3608	0		0	3862	3862
Administrative & General Expenses	929	927	927		927	9270	9270
Financial Charges	6835	6837	2140		2140	64307	64307
Amortization of Pre-operating Capitalized Costs	5669	5669	0		0	28347	28347
Total Operating Costs		17041			3067		105786
Net Profit on Operations		(9228)			12235		34964
Plus: Other Income (Expense)		25			1889		6070
Net Profit Before Tax		9203			L.E. 14124		L.E. 41034

1/ Consists of under-utilized labor and idle plant capacity costs.

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TABLE [illegible]

PROPOSED QUATTAMIA CEMENT PLANT - BASE CASE PROJECT

PROJECTED STATEMENT OF CASH FLOW
(All Figures in L.E. and Thousands)

	Cumulative through	1981	1982	1991
ources of Cash: 1/				
Sales Revenue		0	19753	34472
Collection of Capital Stock		32000	0	0
Short Term L.E. Borrowings		29000	1400	0
Earned Interest on Time Deposits 2/		48	25	760
otal Sources		61048	21178	35232
ses of Cash: 1/				
Payment of Accrued Interest on Dollar Loans - Pre-operating Period		20499	4556	0
Purchase of Materials and Supplies		316	316	0
Payment of Pre-operating Administrative Expenses		1409	0	0
Disbursement Investment Costs in L.E.		35887	0	0
Interest on Short-Term L.E. Borrowings		1932	2280	0
Repayment of Short-Term L.E. Borrowings		400	200	0
Payment of Personnel Expense and Trade Payables		0	6183	8926
Payment of Dollar Funded Loans		0	7290	13655
Payment of Income Tax		0	0	1311
Payment of Dividends and Profit Sharing		0	0	8387
tal Uses		60443	20825	32279
crease (Decrease) in Cash		605	353	2953

Dollar investment is not reflected as either a source or use in the pre-operating period.

Reflected as on offset to deferred charges on the statement of financial position.

7.13 Considering all cash inflows and outflows, the project is forecasted to generate a total net cash flow of LE 204,000. Short-term borrowings are not projected as necessary after the fourth year of production. Over the first ten years of production, the project is expected to generate net cash flows from operations of LE 242,202, exclusive of financial charges.

7.14 The financial rate of return was calculated with cash flows resulting from operations, sales revenue, operating costs, and investment disbursements. The project was assumed to terminate after ten years of production and to have a salvage value equal to net book value. The rate of return excludes the impact of the financing decision by excluding cash flows related to the interest payments, share capital, and dividends. The financial rate of return for the base case project is 10.7%.

7.15 A breakeven analysis for the project shows that it is expected to accumulate a deficit of LE 17.39 million before it generates an operating profit of LE 214,000 in the fourth year of operation. The accumulated retained deficit is forecast to become accumulated retained earnings in the seventh production year. At the end of the tenth year of production, the aggregate net profit is forecast to be LE 41.03 million.

7.16 In the sensitivity analysis, five major variables were identified which might possibly cause significant deviations from the base case:

a. selling prices,

b. increased capital costs,

c. production phase-in to full capacity,

d. sales mix,

e. construction period.

7.17 Net cash generated from operations is not particularly sensitive in the various alternative cases. The base case is projected to generate LE 242,202,000 and compares favorably with all cases except the increased selling price cases and the shorter construction period case. Net cash generated from operations in the worst case, combined increased construction costs and decreased selling prices, only varies from the base case by 15%.

7.18 The financial rate of return reaches 12.3% with higher selling prices and 7.8% with lower selling prices. Lower selling prices, however, are highly unlikely as the Government of Egypt has pledged itself to gradually increase prices to world market levels. If the construction period is reduced to 2.5 years, the rate of return reaches 12.0%, but dips to 9.9% with a 4-year construction period. Other variations are presented in Annex R.

D. Debt Servicing Capability of Egypt

7.20 Egypt's civilian external debt amounted to U.S. $8.3 billion at the end of September 1977, an increase of almost one-third since the end of 1975. Though the size of the debt has increased considerably over the last two years, in other respects the debt situation appears to have improved markedly. Because of the rapid increase in Egypt's receipts from exports of goods and services, total external debt as a proportion of annual trade and services receipts declined from about 250 percent at the end of 1975 to about 140 percent at the end of September 1977. At the end of September 1977, moreover, only 21 percent of the total debt was on commercial terms (suppliers' credits, private cash loans and correspondent bank credits), compared with 33 percent at the end of 1975, and of the commercial debt a smaller proportion was short term in nature. The remaining debt was on concessional terms.

7.21 Projected debt service on official loans, rescheduling agreements and private cash loans in 1978 (which includes all medium-term and long-term debt service except for relatively small amounts under suppliers' credits and correspondent bank credits) is approximately 34 percent of estimated exports of goods and services in 1977, while the comparable projection for 1976 was 28 percent. Excluding principal repayments on official deposits, the corresponding figures are 10 percent for 1978 and 12 percent for 1977. (Data on actual debt service are not available.)

7.22 As part of Egypt's program to restructure its external debt, strict controls have been partly responsible for the fact that the volume of such credits outstanding has shown no increase over the last five years, though a more important factor in this regard may have been Egypt's lack of creditworthiness. More importantly, a policy of reducing the volume of letters of credit opened under correspondent bank credit facilities was adopted in 1976, and early in 1977 a formal program strictly limiting the utilization of such facilities was initiated. Since that time utilization has been held well below the programmed levels, with the result that by the end of September 1977 liabilities under such facilities had fallen below US $1 billion for the first time since 1974.

7.23 Under Egypt's exchange system as recently amended the private sector may borrow from abroad, but almost all the external debt is still owed by the Government and public sector entities. Of the total debt outstanding and disbursed (including interest) at the end of September 1977, 91 percent was owed to IMF-member countries and international organizations, and a similar percentage was denominated in convertible currencies. Aside from these debts, there were bilateral payments agreement liabilities, which during the last two years have been more than offset by assets of a similar character. The external debt figures do not include military debts, which according to public statements by Egyptian officials are of the order of US $4 billion. Most of this amount is denominated in clearing currencies and is owed to the U.S.S.R.; President Sadat has stated that Egypt intends to postpone repayment of these debts for 10 years.

7.24 A factor contributing to Egypt's debt problems in the past has been the absence of a central authority for the recording, analysis and control of external debt, though between them the Central Bank and the Ministry of Economy and Economic Cooperation collected most of the information necessary to the performance of such functions. Recently, however, broader capabilities in this area have been under development in the Central Bank, and on October 19, 1977, an External Debt Department was formally created. Its functions are to conduct research on international organizations, and maintain records of all public external obligations.

7.25 In view of Egypt's heavy debt burden, A.I.D.'s normal concessionary loan terms are proposed -- 40 years, including a 10 year grace period, with an interest rate of 2 percent per year during the grace period and 3 percent per year thereafter. With these terms, particularly the 10 year grace period, along with the positive actions the GOE is currently undertaking to improve its debt situation, repayment prospects for this $95 million loan appear feasible.

E. Summary

7.26 Based on the analysis and given the assumptions and data incorporated in the base case, the project appears to be financially viable. After the first few years of production, the proposed Quattamia plant is projected to generate sufficient cash and profits to:

- remain solvent as an on-going business operation with no additional government financial assistance;
- service its debt;
- eliminate the need for short-term borrowings; and,
- distribute profits to shareholders and personnel.

7.27 Although the financial profitability of the project is judged adequate, full pricing of inputs and outputs would almost certainly improve the situation. A covenant in the loan agreement will serve to strongly encourage the Government of Egypt to move in this direction with the cement industry. The Government has stated in the Five-year Plan, 1978-1982, its intention of moving toward full pricing and has already made some progress in this difficult area.

VIII. ECONOMIC ANALYSIS

8.01 The economic analysis of Quattamia Cement consists of three parts. First, a description of the site selection process is presented. Second, the quantifiable economic costs and benefits are projected in order to determine the project's economic internal rate of return. Third, the qualitative and indirect benefits of the project are described.

A. Site Selection

8.02 Five alternative sites were considered as locations for additional cement production facilities. Four of the sites would involve extensions to existing cement plants: Suez, Helwan, Tourah and National, the last three being in the Cairo area. The fifth site at Quattamia would require a completely new plant.

8.03 The three Cairo sites were rather quickly eliminated from consideration largely because of environmental factors. Cement production, even under the most modern production techniques, has a substantial effect on the environment. The sites at Suez and Quattamia obviously have the least environmental impact on population, and on agricultural and commercial activities. In addition, the Suez and Quattamia sites would be constructed on desert land and not require scarce agricultural lands. The elimination of the Cairo sites was also supported by the greater congestion in Cairo for transportation of cement. The final deciding factor was the Government of Egypt's stated objective in the Five Year Plan, 1978-1982, to foster economic growth and development in regions away from the currently congested areas of the country.

8.04 The final site selection between Suez and Quattamia was made by Suez Cement Company, a private sector company, on the basis of both quantitative and qualitative factors. Both Suez and Quattamia provide acceptable economic rates of return, although that of Suez was about four percentage points higher. This primarily relates to the lower capital costs and the shorter gestation period involved in expanding the SCC as opposed to constructing the new plant at Quattamia.

8.05 The SCC decided in favor of the Quattamia site for several reasons. Two sites in different locations were appealing when considering potential for future company growth and diversification. In addition, with Egypt's substantial problems in cement distribution, the advantages of two distribution points, both strategically located are considerable.

8.06 A number of other qualitative factors also favor Quattamia. Thirteen of these factors were identified as relevant to the site location decision, and nine of them favored Quattamia. These thirteen factors are listed below with the plant site favored by each factor shown in parentheses.

(Quattamia) AID's probable difficulty in proceeding with non-competitive selection of existing Suez I contractors for a Suez extension;
(Suez) Competition between two Egyptian cement companies;
(Quattamia) Competition among the plants of one company;
(Quattamia) Rotation of labor force within plants of one company;
(Suez) Competition for labor between companies;
(Quattamia) Labor availability;
(Quattamia) Labor housing;
(Suez) Decentralization of industry;
(Quattamia) Certainty of water supply;
(Quattamia) Access to fuel supply;
(Quattamia) Community facilities for employees;
(Quattamia) Procurement of maintenance material;
(Suez) Storing of maintenance material.

8.07 Given the fact that both the Suez and Quattamia sites provide adequate economic rates of return, the management decision in favor of Quattamia and the assessment of qualitative factors suggest Quattamia as the most appropriate site.

B. Economic Internal Rate of Return Analysis

8.08 The basic assumptions of the analysis are as follows:

1. Economic Life

8.09 The economic life of the project is estimated at three years of construction and 20 years of operation. By the end of this period, most of the firm's assets will have to be replaced.

2. Cost of Construction and Pre-Operating Expenses

8.10 It is estimated that construction will start in 1979 and will be completed by September 30, 1982.

3. Consultants and Utilities

8.11 In addition to the cost of construction and pre-operating expenses, the cost of consultants and utilities have been estimated and included in the economic analysis. These costs were excluded from the financial analysis because it is expected that they will not be borne by Suez Cement Company. However, they are included in the economic analysis since they are costs attributable to the project and must be considered in assessing project desirability.

4. Operating Costs

8.12 These consist of fixed costs and variable costs. Fixed costs amount to 1,634, thousand LE for each year of operation. Variable costs are estimated at LE 10.95/ton of cement produced. The elements comprising the variable cost are the same as those described in the financial analysis except for two important modifications. Since the price of fuel in Egypt is subsidized by the Government, a shadow price for fuel has been estimated and used in place of the existing price. The shadow price of LE 43.5/ton is approximately equivalent to the market price of mazout in the area. In addition to fuel, a shadow price of U.S. $0.04/KHWs was used for electricity.

5. Inventories

8.13 These consist of raw materials and consumables stores valued at LE 316 thousand during 1981 and 1982 and of clinker and cement output valued at LE 4,696 thousand during 1982. Clinker and cement inventories have been valued at the appropriate shadow prices. It is assumed that all inventories will be sold at the end of the last year of the economic life of the project.

6. Plant Capacity and Phasing of Production

8.14 As described earlier the capacity of the plant is 1,390 thousand tons per annum. It is assumed that 60% of capacity will be produced during the first year of operation, 80% during the second year and 100% during each year thereafter. It is also assumed that sales volume is equal to production volume except during the first year of operation when 60,000 tons of cement will be used for inventory build-up.

7. Cement Prices and Sales Revenue

8.15 Current cement prices ex-factory in Egypt are LE 7.5/ton of bulk cement and LE 9.5/ton of bagged cement. The Ministry of Housing is contemplating raising the price of cement to LE 21/ton ex-factory. However, since the output of the project under study is expected to substitute for imports, the opportunity cost, or shadow price, should be equal to the import price of LE 33/ton c.i.f. Alexandria.

8.16 Given the above assumptions, Table I presents the projected cash flows of Quattamia Cement. Based on the projected net cash flows, the economic internal rate of return is 13.58%. If the construction period can be reduced to two years, as the Chairman of Suez Cement thinks is possible, and the import price of cement increases, more rapidly than other relevant prices, the economic internal rate of return could be well above 15%.

C. Other Benefits: Employment:

8.17 The project will generate employment both directly and indirectly during the construction and operation phases.

8.18 The number of people employed during each year of construction will depend on the phase of construction and the approach which will be adopted. Employment

of local personnel is expected to range from 500 to 1,500 persons, whereas expatriate staff working in Egypt may range from 10 to 50.

8.19 Plant operation will require 444 persons, plus 23 persons for the paper bag plant. Since the Quattamia plant and the Suez plant will be jointly managed by Suez Cement Company, some of the top management personnel will serve both plants. However, it is anticipated that a central office for the management of both plants will be organized which will provide employment for additional staff, not included in the 444 staff members cited above. Although the additional staff will probably be middle management and clerical, the overall costs and benefits associated with income will remain about the same.

8.20 Plant personnel have been classified according to position and salary into skill level categories. These are management, skilled, semi-skilled and unskilled. The number of personnel in each category and their average monthly salary is presented in Table II.

8.21 About 77% of plant personnel have been classified into the skilled category, about 13% in the semiskilled category, 7% in the unskilled category and about 3% in management. Since classifications have been based on average salary, it is possible that some personnel are erroneously classified. Nonetheless, it is evident that most plant employees will be skilled workers. Given the relative shortage of skilled employees in Egypt, the project will have both positive and negative impacts on national employment. Negative impacts will result in the skilled professions which are in short supply in Egypt. By necessity, the project will attract workers currently employed elsewhere. Although higher wages to attract these workers will raise aggregate national consumption, it is possible that the decline in production of the plants which the skilled workers deserted will be greater than any gains in aggregate consumption. The net impact on the economy will depend on the relative value of the decline in output in other plants as compared to the value of the output of the project under study. Whereas it is possible for a negative employment impact to occur in the short run, it is almost certain that positive impacts in the long run will outweigh any short run negative impacts.

8.22 The project will create opportunities which will provide employment to graduates of technical schools and to skilled Egyptians returning from employment abroad. It will also provide alternative employment opportunities

TABLE VIII-1

CASH INFLOWS AND OUTFLOWS OF QUATTAMIA CEMENT PLANT

(thousand LE)

	1979	1980	1981	1982	1983	1984-2001	2002
Inflows							
Sales Revenue	--	--	--	25542	36696	45870	45870
Inventories	--	--	--	--	--	--	4696
Salvage Value	--	--	--	--	--	--	1218
TOTAL	--	--	--	25542	36696	48570	51784
Outflows							
Pre-operating Expenses	682	359	368	--	--	--	--
Cost of Construction	66649	48394	11951	--	--	--	--
Utilities	3120	3120	3121	--	--	--	--
Consulting Fees	5392	5392	5392	--	--	--	--
Operating Costs:							
Fixed Costs	--	--	--	1634	1634	1634	1634
Variable Costs	--	--	--	7785	12176	15221	15221
Inventories	--	--	316	--	--	--	--
TOTAL	75843	57265	21148	9419	13810	16855	16855
Net Cash Flows							
Inflows-Outflows	(75843)	(57265)	(21148)	16123	22886	29015	34929

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TABLE VIII - 2

NUMBER OF PLANT PERSONNEL BY SKILL CATEGORY

Skill Category	Number of Staff	Average Monthly Salary (L.E.)
Management		
Managing Director	1	1000
Legal Advisor	1	500
Works Manager	1	500
Planning Officer	1	210
Works Engineer	1	390
Production Manager	1	390
Shift Engineer	4	285
Work Chemist	1	285
Financial Director	1	285
Administrative Manager	1	285
Paper Bag Manager	1	285
Total Management Staff	14	
Skilled		
Planning Draftsman	2	140
Exec. Secretaries	4	140
Mechanical Foreman	3	210
Workshop		
Mechanics	15	140
Turners/Millers	2	140
Fitters	15	140
Welders	6	140
High Tension Electricians	3	140
Instrument Electricians	4	140
Electronic Specialist	4	140
General Electrician	12	140
Garage		
Foreman	2	210
Truck Mechanic	15	140
Dozer, labor mechanic	15	140
Car mechanic	10	140
Welder	2	140
Quarry Staff	42	140
Crusher Staff	14	140
Mining Staff	50	140
Kiln	24	140
Central Control Staff	8	210
Packing Plant Staff	45	140
Quality Control	9	210
Lab Analysis & Testing	9	140
Purchase Staff	3	140
Financial Department		
Sales	3	140
Central	3	140
Accounting	5	140
Costing	2	140

TABLE VIII-2 CONTINUED

Skill Category	Number of Staff	Average Monthly Salary (L.E.)
Security	2	140
Personnel Staff	15	140
Paper Bag Plant		
Machinist	3	210
Mechanic	1	140
Electrician	1	140
Dispatch Supervisor	1	140
Controller	4	210
Total Skilled Staff	358	
Semiskilled		
Blacksmith	1	70
Plumber	2	70
Carpenter	1	70
Masons	2	70
Stores staff	9	70
Clerk	2	70
Weighing bridge staff	9	70
Clerk	1	70
Cashier	2	70
Guards	12	70
Medical	7	70
Canteen personnel	12	70
Gate guard	1	70
Total, Semiskilled	61	
Unskilled		
Helpers	34	40
Total	467	

to Egyptians contemplating leaving the country to work elsewhere. Given the propensity of many qualified Egyptians to leave the country for work abroad, the incentive created by this project for skilled workers to remain in Egypt is very important. It is well known that human capital is one of the most important and necessary factors for rapid economic growth.

Wages:

8.23 The total wages generated during construction cannot be accurately calculated due to lack of precise estimates at this time of the number of people to be employed, the corresponding length of employment and wage structure. It is estimated that the total local cost of construction will exceed LE 41 million. This cost includes both income in the form of salaries and wages as well as income from the sale of equipment and other supplies.

8.24 Income generated during the operation of the plant is estimated at LE 756,600 per annum. Income accruing to the total number of personnel in each skill category is presented below:

Skill Category	Number of Staff	Annual Income (LE)
Management	14	63,240
Per cent of total	3.0	8.4
Skilled	358	625,800
Per cent of total	76.6	82.7
Semi-skilled	61	51,240
Per cent of total	13.1	6.8
Unskilled	34	16,320
Per cent of total	7.3	2.1
TOTAL	467	756,600
Per cent of total	100.0	100.0

8.25 Most of the direct income in salaries and wages will accrue to management and skilled employees. This is probably typical of a modern industrial project which requires sophisticated equipment and sophisticated labor force for efficient operation. In view of the present income distribution in Egypt where management and skilled employees are in the higher income classes, the project is not expected to contribute significantly to income redistribution by providing income to the lesser skilled labor groups in Egypt. However, in the long run, the project will provide incentive for unskilled workers to receive training and will create tangible employment opportunities.

Foreign Exchange:

8.26 Once the plant reaches full production, it will save the Egyptian economy the equivalent of LE 45,870 thousand in foreign exchange annually. Since virtually all raw materials are available locally, this project will make a significant contribution to Egypt's balance of payments.

D. Summary and Conclusions:

8.27 The economic feasibility of the project was evaluated on the basis of the economic rate of return and on the basis of socio-economic impact on the national economy.

8.28 The economic rate of return was calculated by taking into consideration all quantifiable costs and revenues attributable to the project. Shadow prices were used wherever existing prices of inputs or output diverged from the true value of those items. Accordingly, shadow prices were used for cement, fuel, electricity and, as part of the sensitivity analysis, of the foreign exchange. The economic rate of return was calculated to be 13.58%.

8.29 The economic rate of return as a criterion of project acceptance by the policy maker must be compared to the economic or social discount rate. The appropriate discount rate is a national parameter which is concerned with value judgments, national objectives and facts which are relevant to all projects under consideration by the national policy makers. In the absence of a national policy on the appropriate discount rate, the economic rate of return of this project must be compared to the discount rate selected by institutions or individuals. The World Bank, in general, recommends 10-12% as the appropriate discount rate for

industrial projects in developing economies. Estimates in Egypt ranged from 8% to 15% and probably expressed the social rate of discount as a measure of the marginal productivity of capital. However, as stated earlier from a national point of view the decision maker must evaluate the project by comparing its rate of return to a social rate of discount related to national objectives, factual data and value judgment.

8.30 While the economic rate of return is an important criterion of project assessment it does not envelope all the considerations necessary for a complete evaluation. This is due to data unavailability and the nature of certain variables which may not be accurately expressed in quantitative terms. Accordingly, economic impacts of the project with respect to employment, income, foreign exchange, national and regional economic development, resource utilization, future capacity and development of a cement products industry were considered. While the project is expected to have no significant impact on regional development, it is expected to result in substantial positive net impacts on all other variables considered. It will satisfy a large segment of currently unmet domestic demand for cement and will result in a major contribution to industrial development in Egypt.

IX. SOCIAL ANALYSIS

9.01 The significant change that is expected as a result of this project is in the increased capacity of the nation to support the well being of the population through more and better construction materials. The project does not focus on any particular institution, local population or sub-group, therefore, direct social/cultural changes are not to be expected. However, the spread effect in terms of employment opportunities in construction and related industry and services will be of positive benefit. Other positive spread effects are expected in development of more and better housing, schools and social infrastructure.

9.02 The project will directly create between 467 and 500 new jobs. Assuming the latter figure, the distribution of personnel requirements will be as follows:

Plant Management	15
Maintenance	200
Production	245
Laboratory	35
Administration	5
	500

9.03 Additionally, it is estimated that ECO will increase its staff by approximately 75-100 to handle a larger marketing and distributed workload related to projected increased cement production. Some of the new jobs directly created will go to women. The number of indirect jobs which will be created, while difficult to quantify, should result in many more women entering the job market.

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X. ENVIRONMENTAL ANALYSIS

10.01 The feasibility study consultant, HKFI, completed an Initial Environmental Examination (IEE) for this project in November 1977. This IEE recommended an Environmental Assessment (EA), and discussed four basic areas of concern, i.e. dust control, noise, solid and sanitary waste and land use. HKFI made recommendations as follows with regard to these four items:

a) Dust Control

10.02 Some relaxation in EPA guidelines for air emission is appropriate for this plant as it will be situated in a remote desert area. Electrostatic precipitators are recommended for the kiln and raw mill dust emissions. Gravel bed filters combined with primary cyclone collectors are recommended for collection of dust from the exhaust air from the clinker coolers. For the balance of plant operations, it is recommended that the dust-laden air be ducted to a bag house type collector. The filter medium in these bag houses could be of synthetic or cotton material. If cotton is used, there is the possibility of manufacturing the bags in Egypt which would have obvious economic advantages. Finally, dust generated by open dumping, wind blowing over open stockpiles, and vehicle traffic can be effectively suppressed by water sprays.

b) Noise

10.03 For hearing protection the best approach is careful selection of equipment and isolation of the noise generators. This is most effectively accomplished during the early design and plant layout phase of engineering when choosing equipment and where isolation and acoustical treatment can be planned. Loud noises from crushers, burners, fans and other equipment rapidly attenuate by transmission losses through building walls, barriers, and absorption. Future community planning should account for proximity to the plant and traffic patterns to minimize the impact of noise and dust.

c) Solid and Sanitary Waste

10.04 The primary solid waste disposal problem relates to alkali dust precipitated in the kiln bypass circuit. Other collected dusts are reintroduced into the process. In most cement plant operations alkali dust is normally pugged with water and stockpiled in a semi-pelletized form for eventual depositing in an exhausted section of the quarry. The waste material eventually hardens because of the presence of entrained cement dust and water and is non-polluting from then on: this procedure is recommended for this facility.

10.05 The wet process waste streams, such as slurries collected from wash down, quench, and other process sprays, would be collected in a settling pond for eventual water recycling and dredging the deposits of the sludge for disposal as landfill or disposal in the quarry.

10.06 Other solid wastes generated by the plant and nearby communities should be handled in a conventional manner, i.e. deposit in sanitary land fills. Again, exhausted sections of quarry are ideal for this application.

10.07 In all land fill applications and slurry ponding, careful consideration should be given to pollution of existing underground water sources. Proximity of water tables should be established and soil percolation rates studied to evaluate potential hazard.

10.08 Sanitary and waste waterborne sewage should be processed in the conventional manner; i.e. presettlement, followed by natural aerobic lagooning if it is desired to recirculate the water. If the design provides for an effluent, it should be chlorinated before release through leach fields; otherwise provision should be made for evaporation.

d) Land Use

10.09 The minimum emission standards of 99.0% proposed for the kiln and other process circuits of the plant are recommended due to the plant's remote desert site; here the impact on land use and the desert ecology will be minimized.

10.10 A copy of HKFI's IEE is available with the Near East/Project Development/ Egypt Office for study by interested parties.

10.11 The consultant projects that its detailed Environmental Assessment of this project will not be completed until early FY 79. However, our recent discussion with HKFI concluded that, due to the isolated location of this plant, this project will create no adverse environmental problems which cannot be handled by installation of appropriate plant equipment. A primary potential environmental problem created by cement plants is the emission of dust into the atmosphere. This type of problem will be kept to a minimum by installation of modern equipment, e.g. electrostatic precipitators, gravel bed filters, and bag filters, to remove the dust particles from the plant emissions. The fact that the plant is located approximately 30 kilometers east of Maadi in an isolated desert area, assures that only a minimum amount of plant dust will reach a populated area. This is further assured by the fact that eleven months of the year the prevailing winds blow across Maadi west to east into the uninhabited desert. Further, the consultant indicates that during the one month of the year when the prevailing winds blow east to west toward Maadi, that most plant dust would be dispersed before reaching Maadi, and this would have little, if any, effect on the air quality in the Maadi area. As a related point, Maadi now has a heavy normal ambient dust level of about 35 metric tons per square kilometer per month.

10.12 Further, the consultant states that, with the installation of proper equipment, the air quality in the general area of the plant and employees housing will not constitute a health hazard to the plant employees or their families.

10.13 It is, therefore, anticipated that a negative determination is forthcoming from the consultant.

10.14 Further, the HKFI assessment will not only address environmental problems, but will also include analyses of measures that would be recommended to the SCC for inclusion in the related project design criteria

10.15 A copy of the Environmental Assessment will be made available upon request to NE/PD/E, to all interested parties as soon as it is submitted by the consultant.

XI. IMPLEMENTATION PLAN

A. Schedule

11.01 At this time it is not possible to provide a detailed implementation schedule. A firmer and more realistic schedule will be available in October or November 1978, when HKFI completes the feasibility study report of this project and it is submitted to SCC and A.I.D. for approval.

11.02 With the above qualification, a tentative overall project schedule is presented below. HKFI's detailed implementation schedule - accepted by SCC and U.S.A.I.D. - will, of course, be used to measure project progress and for evaluation purposes.

Loan Authorization	Sept.	1978
Loan Agreement Signed	Sept.	1978
Conditions Precedent Met 1/	Feb.	1979
Project Construction Management Firm Employed	Mar.-April	1979
Design Work Complete and Initial Equipment IFB's Prepared	Sept.-Oct.	1979
First Annual Evaluation	Oct.	1979
Start of Civil Works Construction	Nov.	1979
Second Annual Evaluation	Oct.	1980
Start of Equipment Erection	Feb.	1981
Third Annual Evaluation	Oct.	1981
Plant Start-Up	May	1982
Commercial Operations Begin	Aug.	1982
Project Assistance Completion Date	Sept.	1982
Final Evaluation	Oct.	1982
Terminal Disbursement Date	Mar.	1983

B. Type of Project Execution

11.03 The SCC will engage a U.S. Construction Management Contractor (CMC) to implement the project. This type of contract is similar to a turnkey contract. The CMC acts for and in behalf of the SCC as agent to coordinate and control third party construction contractors, and to provide engineering services and/or to coordinate and control third party engineering contractors. The CMC will provide the SCC with a completed operational manufacturing facility. Annex Q details the advisory and responsibility elements of the CMC in implementing corresponding project activities.

C. Contracting Procedure/Procurement

11.04 Goods and services financed by the proposed loan/grant will be procured in accordance with the competitive procedures set forth in A.I.D. Handbook 11.

1/ Peoples Assembly will reconvene in November 1978, which is the reason for the 150 day requirement to meet C.P.'s.

11.05 All equipment, materials and services financed by the A.I.D. loan will be of U.S. source and origin.

D. A.I.D. Financing Procedures

11.06 All equipment and materials procurement financed by this loan will be by Letters of Commitment (L/Comm), as will the cost of services to be performed by the U.S. Construction Management firm and other U.S. Consultants. At the request of SCC, A.I.D. will either open direct L/Comms for procurement of goods and services to U.S. firms or open L/Comms with a U.S. Bank(s) selected by SCC. The procurement L/Comms will list the items eligible for A.I.D. financing, and appropriate Letters of Credit will be issued thereunder to eligible suppliers furnishing equipment and materials.

E. Monitoring and Reporting

11.07 Upon signing of the Loan Agreement, U.S.A.I.D. will issue an Implementation Letter which, among other things, will contain the necessary guidance and details on the type of reports required (e.g., progress and shipping) and the reporting formats to be followed. Throughout the life of the project, U.S.A.I.D. will look to the U.S. Construction Management Contractor for satisfactory project progress. Any routine problems, together with corresponding suggested solutions, will be brought to the attention of U.S.A.I.D. in the form of monthly progress reports prepared by the CMC and SCC. Serious problems requiring immediate attention will be brought to the personal attention of the U.S.A.I.D. Project Manager and his counterpart in SCC. Project progress will be determined by measuring actual results against the project schedule being developed by HKFI (see para 11.01-11.02) and will be discussed at semi-annual meetings between SCC, the CMC and U.S.A.I.D.

F. U.S.A.I.D. Monitoring Staff

11.08 The first A.I.D.-financed project being built in Suez is being monitored by a U.S.A.I.D. Project Manager, who possesses a heavy engineering background. The Project Manager has worked almost from the inception of the first cement plant project with SCC. Since this project: a) will also be implemented with SCC management and b) is almost an exact duplicate of the first A.I.D.-financed cement plant, the Mission does not foresee at this time any need for an additional A.I.D. direct hire to monitor this project. However, depending on the workload in the CDE Office when implementation of this project commences, U.S.A.I.D. will,

if warranted, establish an additional position for a local engineer to assist the Project Manager in monitoring the two A.I.D.-financed cement projects.

G. Evaluation

11.09 Approximately one year after the execution of the Loan Agreement, a joint U.S.A.I.D./SCC evaluation of the project will be conducted to examine whether:

a. the delivery of project inputs is on schedule;
b. the assumptions are still valid; and
c. the project outputs can be completed as scheduled.

11.10 It is U.S.A.I.D.'s opinion that outside assistance will not be required to conduct the annual evaluations. In the event that outside assistance is required, the contingency factor in A.I.D.'s cost estimate provides for approximately $100,000 for this assistance.

11.11 One year after the first evaluation, a second evaluation will be conducted in the same manner and with the same scope as the initial evaluation. The annual evaluations will, of course, determine if any corrective steps should be taken and if re-design is necessary.

11.12 With regard to the GOE's cement pricing policy, the Loan Agreement will contain a condition precedent requiring the GOE to furnish a plan acceptable to AID for rationalization/liberalization of cement prices. Further, the GOE will be required to covenant in Loan Agreement that it will implement such plan towards cement pricing liberalization. USAID will continuously monitor GOE's progress with regard to liberalizing cement pricing and will hold discussions with GOE as required to assure project objectives are met. It should also be noted that towards accomplishing this goal, the Loan Agreement will require the GOE to covenant that cement prices will be set at a price which will allow the QCC to generate a reasonable profit after paying for all production and other operating costs.

11.13 SCC and U.S.A.I.D. will conduct an "ex post facto" evaluation to determine that the end of project conditions have been established.

H. Eligibility Date

11.14 The eligibility date for financing any U.S. dollar project cost will be the date of signing of the Loan and Sub-Loan and Grant Agreement(s), by authorized representatives of the Arab Republic of Egypt, the Government of the United States of America, and the Suez Cement Company.

I. Terminal Dates

(i) Conditions Precedent

11.15 The terminal date for meeting conditions precedent will be 150 days from the date of the Loan Agreement signing (see footnote to para 11.02)

(iii) Letters of Commitment and Disbursement

11.16 The terminal date for opening Letters of Commitment will be March 31, 1982, the date by which all orders will be placed; and the terminal date for disbursement will be March 31, 1983, seven months after commercial plant operations to allow sufficient time for payment of all bona fide project costs.

(iii) Project Assistance Completion Date (PACD)

11.17 The PACD is September 30, 1982, one month after commercial plant operations have commenced.

XII. RECOMMENDATION, CONDITIONS AND COVENANT

A. Recommendation

12.01 Subject to the conditions and covenants listed below, we recommend that A.I.D. authorize a Loan to the Government of Egypt in the amount of $95 million for the procurement of goods and services leading to the construction of a cement plant in the greater Cairo area with a capacity of approximately 1.39 million metric tons per year. We further recommend that the loan terms to the GOE be that the loan principal be repaid in 40 years, including a 10-year grace period, with interest at two percent (2%) per annum during the grace period and at three percent (3%) per annum thereafter. Thereafter, of the $95 million loan, the GOE will pass on $36.5 million as a grant to the Suez Cement Co. and the remaining $58.5 million will be relent to the SCC at terms and conditions satisfactory to A.I.D. Most likely the relending terms will be for a 15-year period, including a 5-year grace period on the repayment of principal, with an interest rate of ten percent (10%) during the entire life of the reloan. Procurement of equipment, materials and services will be of United States source, origin and nationality.

B. Conditions Precedent

12.02 Prior to the first disbursement under the Loan, or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, the Borrower will, except as the Parties may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D.:

*(a) An opinion of the Egyptian Minister of Justice or other Legal Counsel acceptable to A.I.D., that the Loan Agreement and the Reloan and Regrant Agreements have been duly authorized and/or ratified by, and executed on behalf of the Borrower and SCC, and they constitute valid and legally-binding obligations in accordance with all of their terms.

*(b) A statement of the names of the persons holding or acting in the Offices of the Borrower and SCC specified in the Loan Agreement, and of any additional representatives, together with a specimen signature of each person specified in such statement.

*(c) An executed loan agreement between the GOE and SCC for $58.5 million under terms and conditions satisfactory to A.I.D.

*(d) An executed grant agreement between the GOE and the SCC for $36.5 million, acceptable to A.I.D., specifying that the SCC will issue stock for such $36.5 million to the present ten (10) public sector company shareholders and that each individual public sector company's share will be proportional to its present ownership in SCC relative to the other public sector companies.

*(e) Copies of loan agreements between SCC and the lending institutions providing the necessary foreign exchange in excess of the loan and the necessary local currency for the project (now estimated to be not less than thirty million five hundred thousand United States Dollars ($30,500,000) and sixty one million six hundred and ninety five thousand Egyptian pounds (LE 61,695,000), together with evidence that the conditions to effectiveness of these loans have been met and that the lending institutions are prepared to make disbursements against their loans.

*(f) An executed contract acceptable to A.I.D., for consulting engineering services for the project, with a firm acceptable to A.I.D.

*(g) Evidence that SCC's authorization to operate as a company subject to the provisions of law 43, as amended, includes the right of SCC to implement the project.

12.03 Prior to additional disbursement under the loan or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, for any purpose other than to finance the consulting engineering services for the project, the Borrower will, except as the parties may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D.:

*(a) An executed agreement between SCC and the Ministry of Housing ("MOH"), satisfactory to A.I.D., providing for the furnishing of a timely and sufficient supply of water to the project.

*(b) An executed agreement between SCC and the Egyptian Electricity Authority ("EEA"), satisfactory to A.I.D., providing for the furnishing of a timely and sufficient supply of electricity to the project.

*(c) A valid and effective underwriting agreement, satisfactory to A.I.D., with an entity satisfactory to A.I.D., for sufficient stock to be sold to the private sector to insure that twenty percent of all SCC stock is held by the private sector. Such agreement shall contain terms and conditions satisfactory to A.I.D..

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* CP's and covenants to be included in the authorization are marked with an asterisk.

*(d) Evidence that SCC has obtained legal title to (a) the plant site, (b) the limestone and clay quarries and (c) other sites required for the project.

*(e) A plan for the implementation of a rational cement pricing system.

C. Covenants

12.04 The loan agreement will contain A.I.D. standard covenants. In addition, the following covenants will be included:

*(a) Reloan Agreement. In order to assist SCC in carrying out the project, the Borrower shall relend to SCC fifty eight million five hundred thousand United States Dollars ($58,500,000) from the loan under a reloan agreement ("Reloan Agreement") between the Borrower and SCC under terms and conditions satisfactory to A.I.D.

*(b) Sub-Grant Agreement. In order to assist SCC in carrying out the project, the Borrower shall grant to SCC thirty-six million five hundred thousand United States dollars ($36,500,000) from the loan under a sub-Grant ("Sub-Grant Agreement") between the borrower and SCC under terms and conditions satisfactory to A.I.D.

*(c) Cement-Pricing. The Borrower agrees to set cement prices and the level of taxes imposed on cement, at a level which will permit SCC to generate a reasonable profit on its investment after paying for all production and other costs of operation. Borrower further agrees to hold periodic consultations with A.I.D. concerning cement pricing.

*(d) Cement Distribution Plan. The Borrower agrees that the Egyptian Cement Offices ("ECO") shall submit, within one year from the date of signature of the agreement, a cement distribution plan, acceptable to A.I.D.

*(e) Provision of Water and Electricity. The borrower agrees to cause MOH and EEA, or other organization acceptable to A.I.D., to provide timely and sufficient source of water and electricity to the project site.

*(f) Environmental Protection. The Borrower shall insure that environmental and pollution controls designed to meet environmental protection standards satisfactory to A.I.D. are installed in the plant as a part of the project and that such controls are thereafter maintained in good condition and properly utilized.

12.05 The following special covenants are subject to negotiations and will not be shown in the Authorization.

(a) QCC will furnish to A.I.D., not later than the end of each fiscal year, copies of its audited financial statements for the preceding fiscal year together with notes of the auditors, if any.

(b) QCC will furnish to A.I.D. any information which A.I.D. may reasonably request relating to the qualifications and experience of the individuals proposed to any executive or management position.

(c) QCC will undertake not to contract any long-term debt or any short-term debt in excess of L.E. 1 million or its foreign exchange equivalent, unless A.I.D. has previously approved such borrowing in writing.

(d) SCC will undertake to reach agreement, with the public sector companies owning stock in SCC and QCC, that such public sector companies will sell 100% of their respective shares to private sector individuals and/or firms by 1985.

(e) The Borrower and Company agree not to declare any dividend or make any other distribution with respect to the Company's paid-in-capital or reserves unless after giving effect to such dividend the Company's ratio of current assets to current liabilities is at least 1.5:1 (60:40) and its ratio of long-term debt to net worth is no greater than 2:1 (60:40). For purposes of this covenant, the following definitions shall apply:

Quote current assets unquote shall mean the sum of unrestricted cash available for use in current operations, marketable securities (excluding securities, whether marketable or not, made for purposes of control, affiliation, or other continuing business advantage), receivables collectible in the normal course of business within one year, and inventories (excluding spare parts) valued at the lower of cost or market.

Quote current liabilities unquote shall mean all obligations of the Company due on demand or within one year or whose liquidation is reasonably expected to require the use of existing sources classified as current assets. Obligations shall include, but not be limited to, accrued taxes on or measured by income and current maturities of long-term debt.

Quote long-term debt unquote shall mean any and all loan contracts and agreements, bonds debentures, notes or other debt, whether secured or unsecured, which shall be payable after twelve (12) months from the balance sheet date on which the determination is made, as shown by the Company's financial statements, all determined and prepared in accordance with generally accepted accounting principles. Debt shall be deemed to be incurred (a) under a loan contract or agreement, on the date and to the extent that it is drawn down pursuant to such loan contract or agreement, and (b) under a guarantee, on the date the guarantee is entered into, but only to the extent of the amount of the guaranteed debt outstanding.

Quote net worth unquote shall mean the aggregate amount of the Company's unimpaired capital, surplus (including appropriate revaluations acceptable to A.I.D.) and reserves out of surplus determined in accordance with generally accepted accounting principles.

ANNEX A

DRAFT LETTER

Mr. Donald S. Brown
Director
Agency for International Development
American Embassy
Cairo

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Dear Mr. Brown:

The Government of Egypt (GOE) approves of the construction of an approximate 1.39 million ton per year cement plant in Egypt to help meet the rapidly increasing demand for this product and which is required for Egypt's continuing economic development.

The total cost of designing and constructing the required facilities has been estimated at $196.5 million, including a foreign exchange component of $130.1 million. The International Finance Corporation is reviewing this project and may provide $35.0 million. Failing this, the Bank of Alexandria will organize a consortuim of Egyptian Banks who will make available $35.0 million to the Suez Cement Company (SCC).

We, therefore, request the Agency for International Development to provide a loan of $95.0 million. This loan will cover the majority of foreign exchange costs, including design and engineering, onsite and offsite facilities, equipment, materials and spare parts, and training in the operation and maintenance of the facilities.

The GOE will: a) relend $58.5 million of the A.I.D. loan to the SCC, and b) grant SCC $36.5 million. The $36.5 million dollar grant will appear on SCC's books as equity, with the $36.5 million

of share stock to be distributed among the ten (10) public sector companies who are presently shareholders in SCC in direct proportion to their respective share holdings. The GOE also assures that the required local currency costs of the project will be available when required for successful project execution.

Yours truly,

Gamal El-Nazer
Deputy Chairman
For Investment Authority
In Charge of American Aid to Egypt

UNCLASSIFIED

Department of State

INCOMING TELEGRAM

ANNEX A-1

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NE C-1

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ACTION AID-31

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FM AMEMBASSY CAIRO
TO SECSTATE WASHDC IMMEDIATE 3917

UNCLAS CAIRO 21280

AIDAC

E.O. 11652:N/A
SUBJECT: FY 78 PROJECT - CEMENT PLANT

1. SUBJECT LOAN APPLICATION RECEIVED BY MISSION VIA LETTER DATED SEPT. 16, 1978, FROM GAMAL EL NAZER, DEPUTY CHAIRMAN FOR INVESTMENT AUTHORITY, IN CHARGE OF AMERICAN AIDS TO EGYPT, TO DIRECTOR BROWN. LETTER TEXT FOLLOWS:

" THE GOVERNMENT OF EGYPT (GOE) APPROVES OF THE CONSTRUCTION OF AN APPROXIMATE 1.39 MILLION TON PER YEAR CEMENT PLANT IN EGYPT TO HELP MEET THE RAPIDLY INCREASING DEMAND FOR THIS PRODUCT AND WHICH IS REQUIRED FOR EGYPT'S CONTINUING ECONOMIC DEVELOPMENT.

THE TOTAL COST OF DESIGNING AND CONSTRUCTING THE REQUIRED FACILITIES HAS BEEN ESTIMATED AT $196.5 MILLION, INCLUDING A FOREIGN EXCHANGE COMPONENT OF $130.1 MILLION. THE INTERNATIONAL FINANCE CORPORATION IS REVIEWING THIS PROJECT AND MAY PROVIDE $35.0 MILLION. FAILING THIS, THE BANK OF ALEXANDRIA WILL ORGANIZE A CONSORTIUM OF EGYPTIAN BANKS WHO WILL MAKE AVAILABLE $35.0 MILLION TO SUEZ CEMENT COMPANY (SCC).

WE, THEREFORE, REQUEST THE AGENCY FOR INTERNATIONAL DEVELOPMENT TO PROVIDE A LOAN OF $35.0 MILLION. THIS LOAN WILL COVER THE MAJORITY OF FOREIGN EXCHANGE COSTS, INCLUDING DESIGN AND ENGINEERING, ONSITE AND OFFSITE FACILITIES, EQUIPMENT, MATERIALS AND SPARE PARTS, AND TRAINING IN THE OPERATION AND MAINTENANCE OF THE FACILITIES.

THE GOE WILL: A) RELEND $58.5 MILLION OF THE A.I.D. LOAN TO THE SCC, AND B) GRANT SCC $36.5 MILLION. THE $36.5 MILLION DOLLAR GRANT WILL APPEAR ON SCC'S BOOKS AS EQUITY, WITH THE $36.5 MILLION OF SHARE STOCK TO BE DISTRIBUTED AMONG THE TEN (10) PUBLIC SECTOR COMPANIES WHO ARE PRESENTLY SHAREHOLDERS IN SCC IN DIRECT PROPORTION TO THEIR RESPECTIVE SHARE HOLDINGS. THE GOE ALSO ASSURES THAT THE REQUIRED LOCAL CURRENCY COSTS OF THE PROJECT WILL BE AVAILABLE WHEN REQUIRED FOR SUCCESSFUL PROJECT EXECUTION."

2. REQUEST CONFIRMATION OF RECEIPT BY NE/PD. MATTHEWS

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UNCLASSIFIED

DEPARTMENT OF STATE

AGENCY FOR INTERNATIONAL DEVELOPMENT

WASHINGTON

A.I.D. Loan 263-K-051

Deputy
THE ADMINISTRATOR

PROJECT AUTHORIZATION
AND REQUEST FOR ALLOTMENT OF FUNDS

PART II

Name of Country: Arab Republic of Egypt

Name of Project: Quattamia Cement

Number of Project: 263-0052

Pursuant to Part II, Chapter 4, Section 532 of the Foreign Assistance Act of 1961, as amended, I hereby authorize a loan to the Arab Republic of Egypt, (the "Cooperating Country") of not to exceed Ninety-Five Million United States Dollars ($95,000,000) (the "Authorized Amount") to help in financing certain foreign exchange costs of goods and services required for the project as described in the following paragraph.

The project consists of assistance to the Government of the Arab Republic of Egypt to provide the foreign exchange costs of materials, equipment and services for the construction of a cement plant by the Suez Cement Company (SCC) at Quattamia with a capacity to produce approximately one million three hundred and ninety thousand metric tons annually, and including auxiliary facilities, development of limestone and clay quarries, and construction of water and power lines needed for plant operations. The entire amount of the A.I.D. financing herein authorized for the project will be obligated when the project agreement is executed.

I hereby authorize the initiation of negotiation and execution of the project agreement by the officer to whom such authority has been delegated in accordance with A.I.D. regulations and Delegations of Authority subject to the following essential terms and covenants and major conditions, together with such other terms and conditions as A.I.D. may deem appropriate:

a. Interest Rate and Terms of Repayment

The Cooperating Country shall repay the loan to A.I.D. in United States Dollars within forty (40) years from

the date of first disbursement of the loan, including a grace period of not to exceed ten (10) years. The Cooperating Country shall pay to A.I.D. in United States Dollars interest from the date of first disbursement of the loan at the rate of (a) two percent per annum during the first ten (10) years, and (b) three percent per annum thereafter, on the outstanding disbursed balance of the loan and on any due and unpaid interest accrued thereon.

b. Source and Origin of Goods and Services

Except as A.I.D. may otherwise agree in writing, goods and services financed by A.I.D. under the project shall have their source and origin in the United States.

c. Conditions Precedent to First Disbursement

Prior to the first disbursement under the loan, or to the issuance of documentation pursuant to which disbursement will be made, the Borrower will, except as the parties may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D.:

(1) An opinion of the Egyptian Minister of Justice, or other legal counsel acceptable to A.I.D., that the loan agreement, the reloan agreement and the sub-grant agreement have been duly authorized and/or ratified by, and executed on behalf of the Arab Republic of Egypt and SCC, and that they constitute valid and legally binding obligations in accordance with all of their terms.

(2) A statement of the names of the persons holding or acting in the offices of the Borrower and SCC specified in the Loan Agreement, and of any additional representatives, together with a specimen signature of each person specified in such statement.

(3) A reloan agreement, satisfactory to A.I.D., for the project between the Borrower and SCC, in the amount of $58.5 million.

(4) A sub-grant agreement for the project between the Borrower and SCC in the amount of $36.5 million, containing terms and conditions satisfactory to A.I.D.

(5) Copies of loan agreements between SCC and the lending institutions providing the necessary foreign exchange in excess of the loan and the necessary local currency for the project (now estimated to be not less than thirty million five

hundred thousand United States Dollars ($30,500,000) and sixty one million six hundred and ninety five thousand Egyptian pounds (LE 61,695,000), together with evidence that the conditions to effectiveness of these loans have been met and that the lending institutions are prepared to make disbursements against their loans.

(6) An executed contract acceptable to A.I.D., for consulting engineering services for the project, with a firm acceptable to A.I.D.

(7) Evidence that SCC's authorization to operate as a company subject to the provisions of law 43, as amended, includes the right of SCC to implement the project.

d. Conditions Precedent to Additional Disbursement

Prior to disbursement under the loan, or to the issuance by A.I.D. of documentation pursuant to which disbursement will be made, for any purpose other than to finance the consulting engineering services for the project, the Borrower will, except as the parties may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D.:

(1) An executed agreement between SCC and the Ministry of Housing ("MOH"), satisfactory to A.I.D., providing for the furnishing of a timely and sufficient supply of water to the project.

(2) An executed agreement between SCC and the Egyptian Electricity Authority ("EEA"), satisfactory to A.I.D., providing for the furnishing of a timely and sufficient supply of electricity to the project.

(3) A valid and effective underwriting agreement, satisfactory to A.I.D., with an entity satisfactory to A.I.D., for sufficient stock to be sold to the private sector to insure that twenty percent of all SCC stock is held by the private sector. Such agreement shall contain terms and conditions satisfactory to A.I.D..

(4) Evidence that SCC has obtained legal title to (a) the plant site, (b) the limestone and clay quarries and (c) other sites required for the project.

(5) A plan for the implementation of a rational cement pricing system.

e. Covenants

The loan agreement will contain A.I.D. standard covenants. In addition, the following covenants will be included:

(1) Reloan Agreement. In order to assist SCC in carrying out the project, the Borrower shall relend to SCC fifty eight million five hundred thousand United States Dollars ($58,500,000) from the loan under a reloan agreement ("Reloan Agreement") between the Borrower and SCC under terms and conditions satisfactory to A.I.D.

(2) Sub-Grant Agreement. In order to assist SCC in carrying out the project, the Borrower shall grant to SCC thirty-six million five hundred thousand United States dollars ($36,500,000) from the loan under a sub-Grant ("Sub-Grant Agreement") between the borrower and SCC under terms and conditions satisfactory to A.I.D.

(3) Cement Pricing. The Borrower agrees to set cement prices and the level of taxes imposed on cement, at a level which will permit SCC to generate a reasonable profit on its investment after paying for all production and other costs of operation. Borrower further agrees to hold periodic consultations with AID concerning cement pricing.

(4) Cement Distribution Plan. The Borrower agrees that the Egyptian Cement Offices ("ECO") shall submit, within one year from the date of signature of the agreement, a cement distribution plan, acceptable to A.I.D.

(5) Provision of Water and Electricity. The borrower agrees to cause MOH and EEA, or other organization acceptable to A.I.D., to provide timely and sufficient source of water and electricity to the project site.

(6) Environmental Protection. The Borrower shall insure that environmental and pollution controls designed to meet environmental protection standards satisfactory to A.I.D. are installed in the plant as a part of the project and that such controls are thereafter maintained in good condition and properly utilized.

RHNeate

Deputy Administrator

9/24/78

Date

ANNEX C

EGYPT -- Maddi Cement (Quattamia Cement)

6C(2) - PROJECT CHECKLIST

Listed below are, first, statutory criteria applicable generally to projects with FAA funds, and then project criteria applicable to individual fund sources: Development Assistance (with a sub-category for criteria applicable only to loans); and Security Supporting Assistance funds.

CROSS REFERENCES: IS COUNTRY CHECKLIST UP TO DATE? IDENTIFY. HAS STANDARD ITEM CHECKLIST BEEN REVIEWED FOR THIS PROJECT?

A. GENERAL CRITERIA FOR PROJECT.

1. App. Unnumbered; FAA Sec. 653(b)

(a) Describe how Committees on Appropriations of Senate and House have been or will be notified concerning the project; (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than $1 million over that figure plus 10%)?

(a) Project was described in FY 1978 Congressional Presentation as Maddi Cement.
(b) Planned obligation is within the level of funds appropriated for Egypt for FY 1978.

2. FAA Sec. 611(a)(1). Prior to obligation in excess of $100,000, will there be (a) engineering, financial, and other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?

(a) Yes.

(b) Yes.

3. FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?

No further legislative action is required to implement the project.

4. FAA Sec. 611(b); App. Sec. 101. If for water or water-related land resource construction, has project met the standards and criteria as per Memorandum of the President dated Sept. 5, 1973 (replaces Memorandum of May 15, 1962; see Fed. Register, Vol 38, No. 174, Part III, Sept. 10, 1973)?

Not applicable.

5. FAA Sec. 611(e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed $1 million, has Mission Director certified the country's capability effectively to maintain and utilize the project?

Yes. (Annex t)

A. ANNEX C

6. FAA Sec. 209, 619. Is project susceptible of execution as part of regional or multilateral project? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs. If assistance is for newly independent country, is it furnished through multilateral organizations or plans to the maximum extent appropriate?

Project is not susceptable to execution as regional or multilateral program.

7. FAA Sec. 601(a); (and Sec. 201(f) for development loans). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.

The project: (a) assists industries which export; (b) supports private sector industries; (c) finances modern management and new industry; (d) provides industrial employment which unions may enroll.

8. FAA Sec. 601(b). Information and conclusion on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).

The funds are for the financing of U.S. source and origin equipment, materials and services, competitive procurement procedures will be utilized.

9. FAA Sec. 612(b); Sec. 636(h). Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized to meet the cost of contractual and other services.

The agreement with the GOE will so provide and co-mit such funds.

10. FAA Sec. 612(d). Does the U.S. own excess foreign currency and, if so, what arrangements have been made for its release?

Yes. Release and utilization of funds if needed within scope of related local currency project.

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

Development Assistance not applicable in Egypt.

a. FAA Sec. 102(c); Sec. 111; Sec. 281a. Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production, spreading investment out from cities to small towns and rural areas; and (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions?

ANNEX C

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b. FAA Sec. 102, 103, 104, 105, 106, 107. As assistance being made available: [Include in applicable paragraph -- e.g., a, b, etc. -- which corresponds to source of funds used. If more than one fund source is used for project, include relevant paragraph for each fund source.]

(1) [103] for agriculture, rural development or nutrition; if so, extent to which activity is specifically designed to increase productivity and income of rural poor; [103A] if for agricultural research, is full account taken of needs of small farmers;

(2) [104] for population planning or health; if so, extent to which activity extends low-cost, integrated delivery systems to provide health and family planning services, especially to rural areas and poor;

(3) [105] for education, public administration, or human resources development; if so, extent to which activity strengthens nonformal education, makes formal education more relevant, especially for rural families and urban poor, or strengthens management capability of institutions enabling the poor to participate in development;

(4) [106] for technical assistance, energy, research, reconstruction, and selected development problems; if so, extent activity is:

(a) technical cooperation and development, especially with U.S. private and voluntary, or regional and international development, organizations;

(b) to help alleviate energy problem;

(c) research into, and evaluation of, economic development processes and techniques;

(d) reconstruction after natural or manmade disaster;

(e) for special development problem, and to enable proper utilization of earlier U.S. infrastructure, etc., assistance;

(f) for programs of urban development, especially small labor-intensive enterprises, marketing systems, and financial or other institutions to help urban poor participate in economic and social development.

ANNEX C

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(5) [107], by grants for coordinated private effort to develop and disseminate intermediate technologies appropriate for developing countries.

c. FAA Sec. 110(a); Sec. 209(e). Is the recipient country willing to contribute funds to the project, and in what manner has or will it provide assurances that it will provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or has the latter cost-sharing requirement been waived for a "relatively least-developed" country)?

d. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing?

e. FAA Sec. 207; Sec. 113. Extent to which assistance reflects appropriate emphasis on; (1) encouraging development of democratic, economic, political, and social institutions; (2) self-help in meeting the country's food needs; (3) improving availability of trained worker-power in the country; (4) programs designed to meet the country's health needs; (5) other important areas of economic, political, and social development, including industry; free labor unions, cooperatives, and Voluntary Agencies; transportation and communication; planning and public administration; urban development, and modernization of existing laws; or (6) integrating women into the recipient country's national economy.

f. FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civic education and training in skills required for effective participation in governmental and political processes essential to self-government.

ANNEX C

B1

g. FAA Sec. 201(b)(2)(-4) and -(8); Sec. 201(e); Sec. 211(a)(-3) and -(8). Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities and self-sustaining economic growth; or of educational or other institutions directed toward social progress? Is it related to and consistent with other development activities, and will it contribute to realizable long-range objectives? And does project paper provide information and conclusion on an activity's economic and technical soundness?

h. FAA Sec. 201(b)(6); Sec. 211(a)(5), (6). Information and conclusion on possible effects of the assistance on U.S. economy, with special reference to areas of substantial labor surplus, and extent to which U.S. commodities and assistance are furnished in a manner consistent with improving or safeguarding the U.S. balance-of-payments position.

2. Development Assistance Project Criteria (Loans only)

Development Assistance not applicable in Egypt.

a. FAA Sec. 201(b)(1). Information and conclusion on availability of financing from other free-world sources, including private sources within U.S.

b. FAA Sec. 201(b)(2); 201(d). Information and conclusion on (1) capacity of the country to repay the loan, including reasonableness of repayment prospects, and (2) reasonableness and legality (under laws of country and U.S.) of lending and relending terms of the loan.

c. FAA Sec. 201(e). If loan is not made pursuant to a multilateral plan, and the amount of the loan exceeds $100,000, has country submitted to AID an application for such funds together with assurances to indicate that funds will be used in an economically and technically sound manner?

d. FAA Sec. 201(f). Does project paper describe how project will promote the country's economic development taking into account the country's human and material resources requirements and relationship between ultimate objectives of the project and overall economic development?

e. FAA Sec. 102(a). Total amount of money under loan which is going directly to private enterprise, is going to intermediate credit institutions or other borrowers for use by private enterprise, is being used to finance imports from private sources, or is otherwise being used to finance procurements from private sources?

f. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete in the U.S. with U.S. enterprise, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan?

3. Project Criteria Solely for Security Supporting Assistance

FAA Sec. 531. How will this assistance support promote economic or political stability?

The project will create the industrial foundation for future expansion of basic infrastructure and productive enterprise.

4. Additional Criteria for Alliance for Progress

Not applicable.

[Note: Alliance for Progress projects should add the following two items to a project checklist.]

a. FAA Sec. 251(b)(1), -(8). Does assistance take into account principles of the Act of Bogota and the Charter of Punta del Este; and to what extent will the activity contribute to the economic or political integration of Latin America?

b. FAA Sec. 251(b)(8); 251(h). For loans, has there been taken into account the effort made by recipient nation to repatriate capital invested in other countries by their own citizens? Is loan consistent with the findings and recommendations of the Inter-American Committee for the Alliance for Progress (now "CEPCIES," the Permanent Executive Committee of the OAS) in its annual review of national development activities?

ANNEX C

6C 3' - STANDARD ITEM CHECKLIST

Listed below are statutory items which normally will be covered routinely in those provisions of an assistance agreement dealing with its implementation, or covered in the agreement by exclusion (as where certain uses of funds are permitted, but other uses not).

These items are arranged under the general headings of (A) Procurement, (B) Construction, and (C) Other Restrictions.

A. Procurement

1. FAA Sec. 602. Are there arrangements to permit U.S. small business to participate equitably in the furnishing of goods and services financed?	**Procurement of goods and services shall be pursuant to established AID regulations.**
2. FAA Sec. 604(a). Will all commodity procurement financed be from the U.S. except as otherwise determined by the President or under delegation from him?	**Yes.**
3. FAA Sec. 604(d). If the cooperating country discriminates against U.S. marine insurance companies, will agreement require that marine insurance be placed in the U.S. on commodities financed?	**Yes.**
4. FAA Sec. 604(e). If offshore procurement of agricultural commodity or product is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity?	**There will be no such procurement.**
5. FAA Sec. 608(a). Will U.S. Government excess personal property be utilized wherever practicable in lieu of the procurement of new items?	**Consideration will be given to the use of excess property where practical.**
6. MMA Sec. 901(b). (a) Compliance with requirement that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed shall be transported on privately owned U.S.-flag commercial vessels to the extent that such vessels are available at fair and reasonable rates.	**Yes.**
7. FAA Sec. 621. If technical assistance is financed, will such assistance be furnished to the fullest extent practicable as goods and professional and other services from private enterprise on a contract basis? If the facilities of other Federal agencies will be utilized,	**Technical assistance will be provided, to the fullest extent practicable from private business or a contract basis.**

are they particularly suitable, not competitive with private enterprise, and made available without undue interference with domestic programs?

3. International Air Transport. Fair Competitive Practices Act, 1974

If air transportation of persons or property is financed on grant basis, will provision be made that U.S.-flag carriers will be utilized to the extent such service is available? **Yes.**

B. Construction

1. FAA Sec. 601(d). If a capital (e.g., construction) project, are engineering and professional services of U.S. firms and their affiliates to be used to the maximum extent consistent with the national interest? **Yes.**

2. FAA Sec. 611(c). If contracts for construction are to be financed, will they be let on a competitive basis to maximum extent practicable? **Yes.**

3. FAA Sec. 620(k). If for construction of productive enterprise, will aggregate value of assistance to be furnished by the U.S. not exceed $100 million? **Not applicable.**

C. Other Restrictions

1. FAA Sec. 201(d). If development loan, is interest rate at least 2% per annum during grace period and at least 3% per annum thereafter? **Not applicable.**

2. FAA Sec. 301(d). If fund is established solely by U.S. contributions and administered by an international organization, does Comptroller General have audit rights? **Not applicable.**

3. FAA Sec. 620(h). Do arrangements preclude promoting or assisting the foreign aid projects or activities of Communist-Bloc countries, contrary to the best interests of the U.S.? **The Agreement will so stipulate.**

4. FAA Sec. 636(i). Is financing not permitted to be used, without waiver, for purchase, long-term lease, or exchange of motor vehicle manufactured outside the U.S. or guaranty of such transaction? **Financing is not permitted to be used for such purposes.**

ANNEX C

5. Will arrangements preclude use of financing:

a. FAA Sec. 114. to pay for performance of abortions or to motivate or coerce persons to practice abortions? **Yes.**

b. FAA Sec. 620(g). to compensate owners for expropriated nationalized property? **Yes.**

c. FAA Sec. 660. to finance police training or other law enforcement assistance, except for narcotics programs? **Yes.**

d. FAA Sec. 662. for CIA activities?

e. App. Sec. 103. to pay pensions, etc., for military personnel? **Yes.**

f. App. Sec. 106. to pay U.N. assessments? **Yes.**

g. App. Sec. 107. to carry out provisions of FAA Sections 209(d) and 251(h)? (transfer to multilateral organization for lending). **Yes.**

h. App. Sec. 501. to be used for publicity or propaganda purposes within U.S. not authorized by Congress? **Yes.**

TABLE 1

TOURAH CEMENT CO. PRODUCTION BY TYPE OF CEMENT, 1970/71 - 1976

(Thousands of Tons)

Types of Cement	1970/71		1971/72[a]		1973		1974		1975		1976	
	Quantity	% of Total	Quantity	% of Total	Quantity	% of Total	Quantity	% of Total	Quantity	% of Total	Quantity	% of Tot
Ordinary Portland.....	963	73	1,273	65	776	63	714	66	777	67	660	6
Rapid Hardening.....	210	16	325	16	156	12	129	12	145	12	54	
Slag.....	-	-	-	-	8	1	-	-	-	-	-	-
Sea Water.....	14	1	37	2	32	3	24	2	28	2	35	
Karnak.....	133	10	335	17	265	21	215	20	217	19	304	29
TOTAL	1,320	100	1,970	100	1,237	100	1,082	100	1,167	100	1,053	100

a/ 18 months

Note: Individual numbers may not add to totals due to rounding.

Source: Booz, Allen and Hamilton, Strategic Study for Building Materials and Ceramics, Vol. I, 1977.

TABLE 2

HELWAN CEMENT CO. PRODUCTION BY TYPE OF CEMENT, 1970/71 - 1976

(Thousands of Tons)

Types of Cement	1970/71		1971/72[a]		1973		1974		1975		1976	
	Quantity	% of Total	Quantity	% of Total	Quantity	% of Total	Quantity	% of Total	Quantity	% of Total	Quantity	% o Tot
Gray Cement												
Ordinary Portland.....	945	71	1,244	64	729	61	645	60	755	64	626	56
Rapid Hardening.....	172	13	246	13	113	9	93	9	62	5	76	[illegible]
Sea Water.....	40	3	60	3	44	4	81	7	109	9	87	[illegible]
Slag.....	-	-	13	1	-	-	-	-	105	9	180	[illegible]
Karnak.....	133	10	307	16	279	23	217	20	89	8	74	[illegible]
Total, Gray.....	1,290	97	1,870	97	1,165	97	1,036	96	1,120	95	1,043	9[illegible]
White Cement[b]..	43	3	61	3	38	3	47	4	59	5	74	7
TOTAL	1,333	100	1,931	100	1,203	100	1,083	100	1,179	100	1,11[illegible]	100

a/ 18 months
b/ Subsequent analysis excludes white cement.
Note: Individual numbers may not add to totals due to rounding.
Source: Booz, Allen and Hamilton, Strategic Study for Building Materials and Ceramics, Vol. I, 1977.

TABLE 3

- NATIONAL CEMENT COMPANY-CEMENT PRODUCTION 1970/71 - 1976

(Thousands of Tons)

Type of Cement	1970/71 Quantity	1971/72[a] Quantity	1973 Quantity	1974 Quantity	1975 Quantity	1976 Quantity
Slag	635	1,038	669	611	705	661
TOTAL	635	1,038	669	611	705	661

a/ 13 months

Source: Booz, Allen and Hamilton, Strategic Study for Building Materials and Ceramics, Vol. 1, 1977.

TABLE - 4

- ALEXANDRIA CEMENT CO. PRODUCTION BY TYPE OF CEMENT, 1970/71 - 1976

(Thousands of Tons)

Type of Cement	1970/71		1971/72[a]		1973		1974		1975		1976	
	Quantity	% of Total	Quantity	% of Total	Quantity	% of Total	Quantity	% of Total	Quantity	% of Total	Quantity	% of Total
Ordinary Portland.....	271	52	378	46	237	47	241	50	269	51	245	46
Rapid Hardening.....	82	15	186	23	99	19	98	20	127	24	128	24
Slag.....	115	22	45	5	-	-	-	-	-	-	-	-
Karnak.....	56	11	209	26	173	34	144	30	129	25	160	30
TOTAL	524	100	818	100	509	100	483	100	525	100	533	100

a/ 18 months

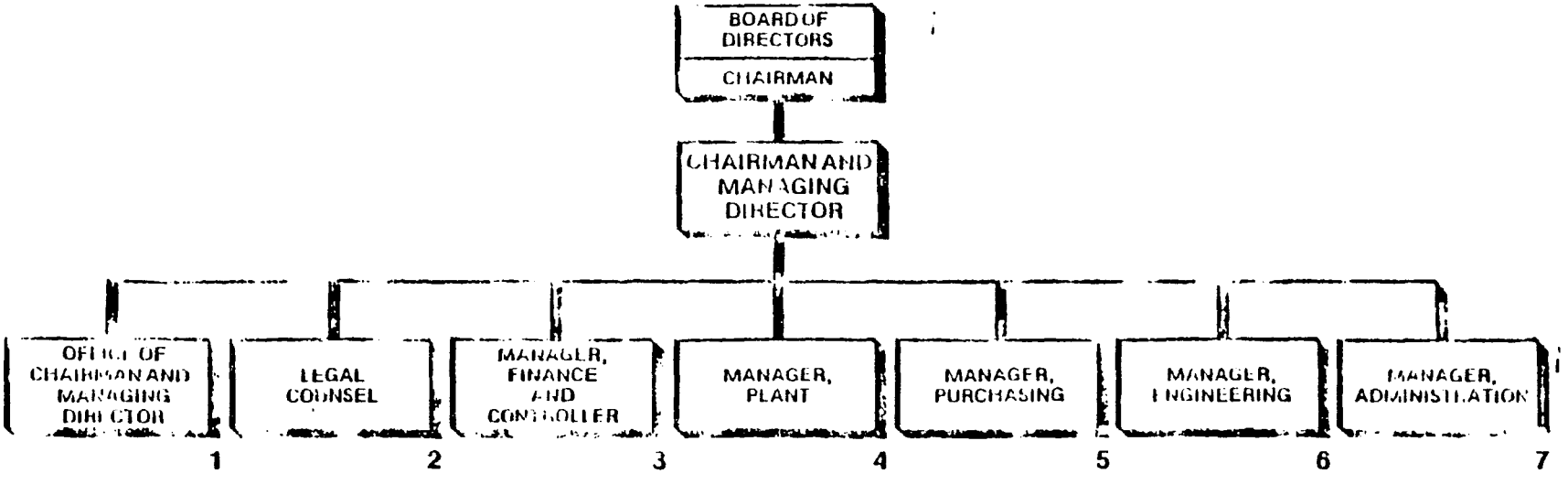
Note: Individual numbers may not add to totals due to rounding.

Source: Booz, Allen and Hamilton, Strategic Study for Building Materials and Ceramics, Vol. 1, 1977.

CHART: CORPORATE
Corporate

SUEZ CEMENT COMPANY

CORPORATE MANAGEMENT ORGANIZATION



May 31 1971

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CHART 1
Division 1

SUEZ CEMENT COMPANY

OFFICE OF CHAIRMAN AND MANAGING DIRECTOR

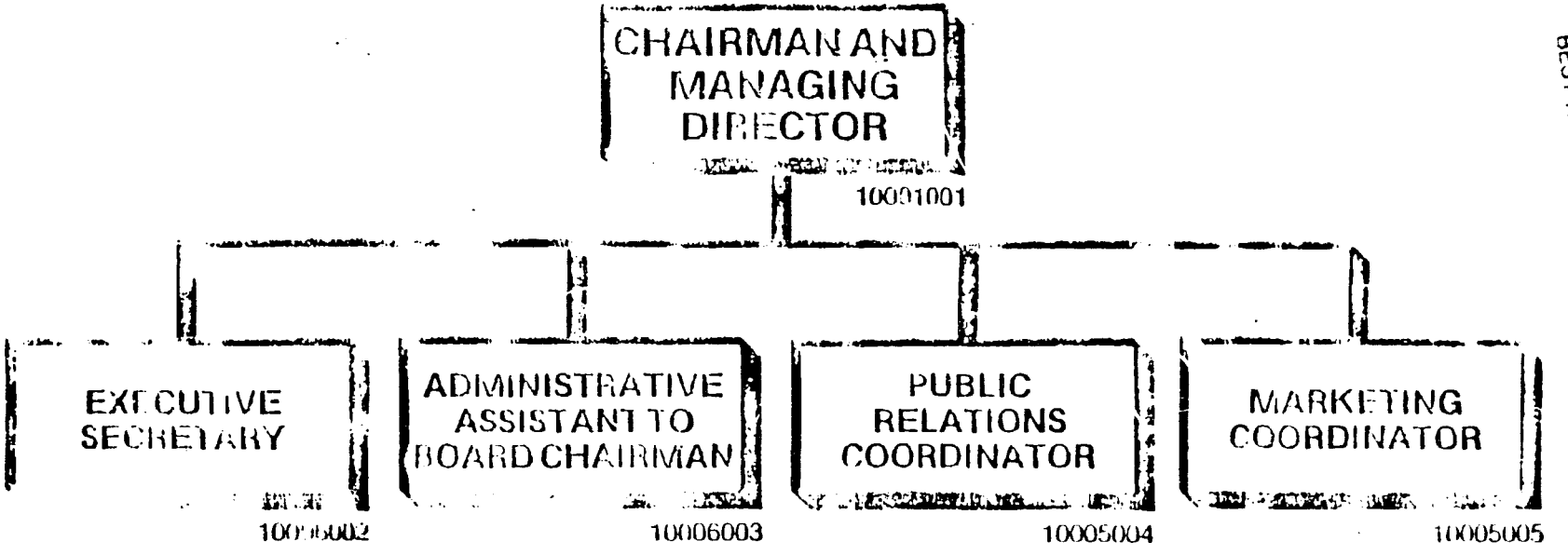

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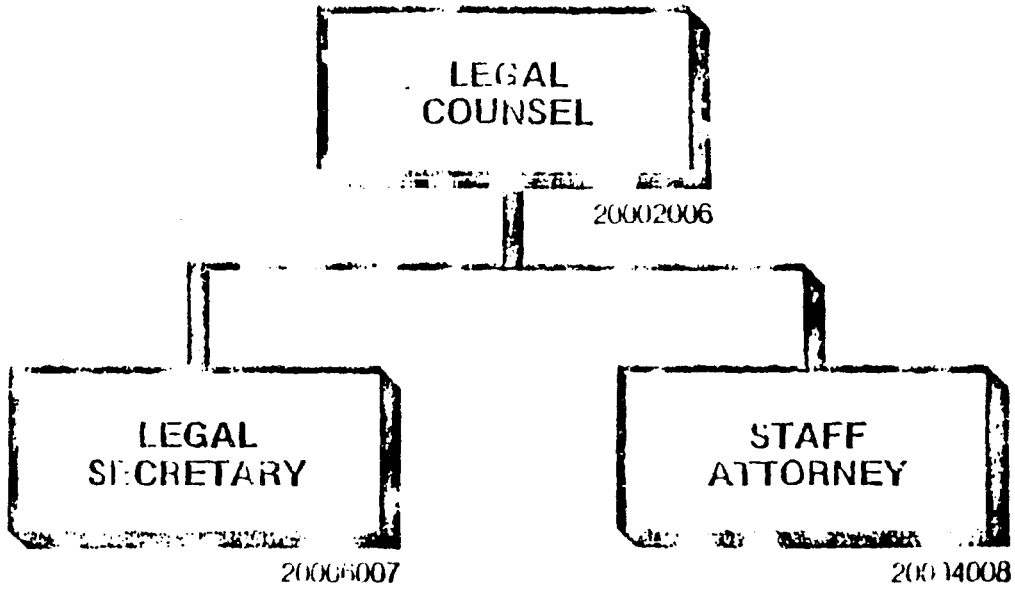
CHART 2
Division 2

SUEZ CEMENT COMPANY

LEGAL COUNSEL



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SUEZ CEMENT COMPANY

FINANCE AND CONTROLLER

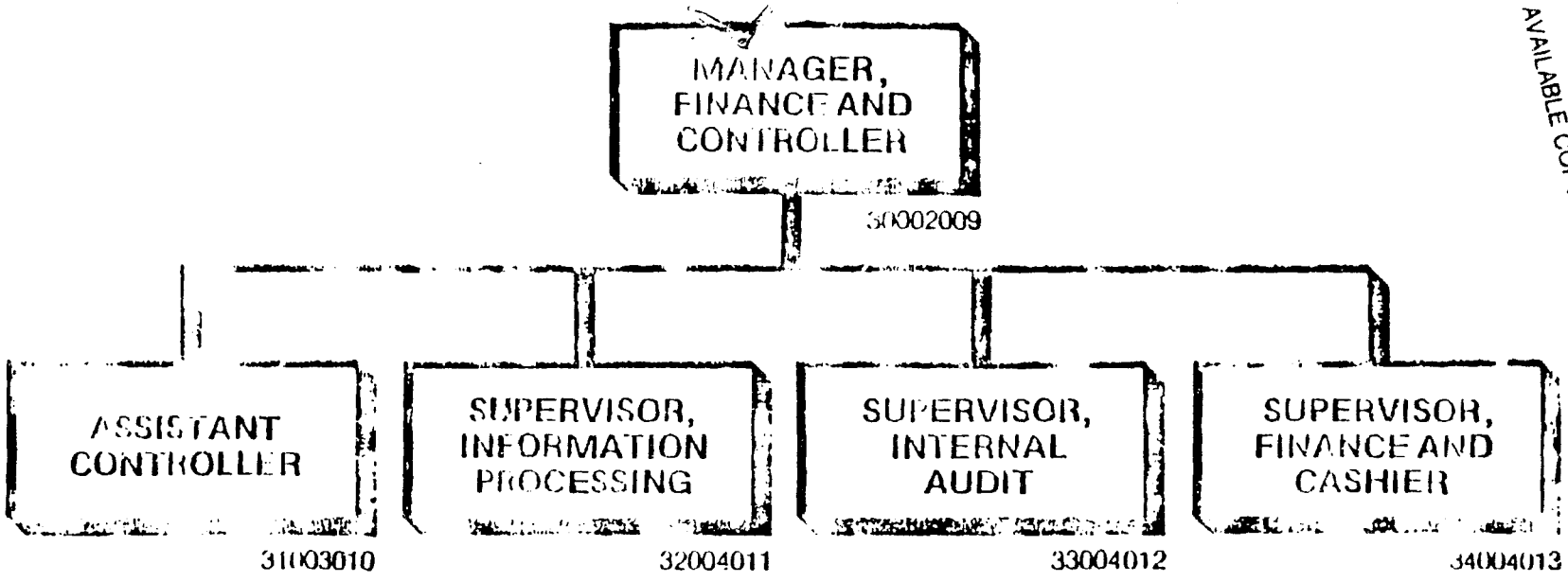

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CHART 4
Division 4

SUEZ CEMENT COMPANY

PLANT

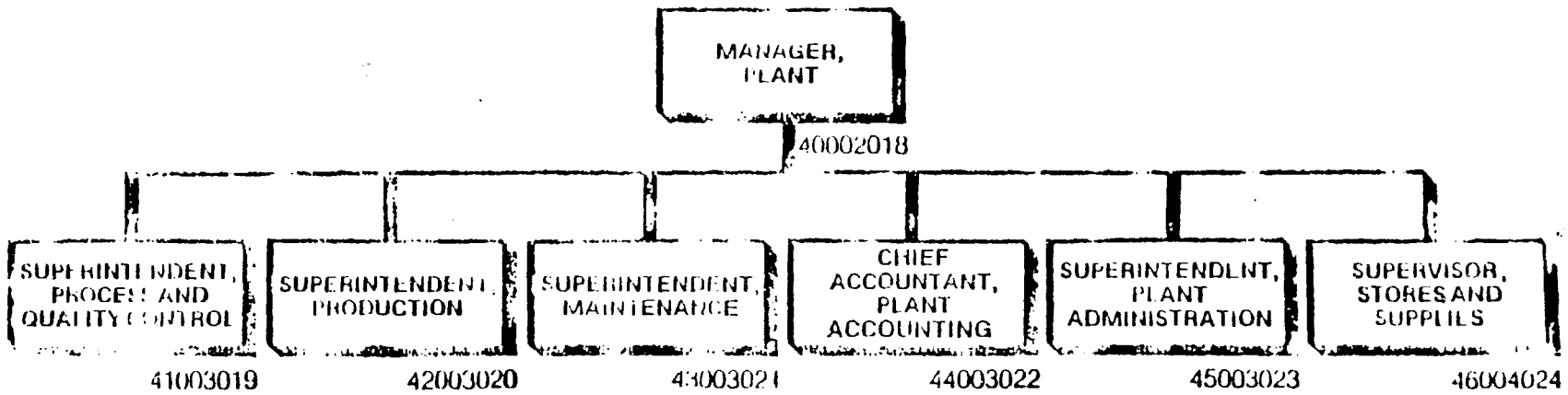

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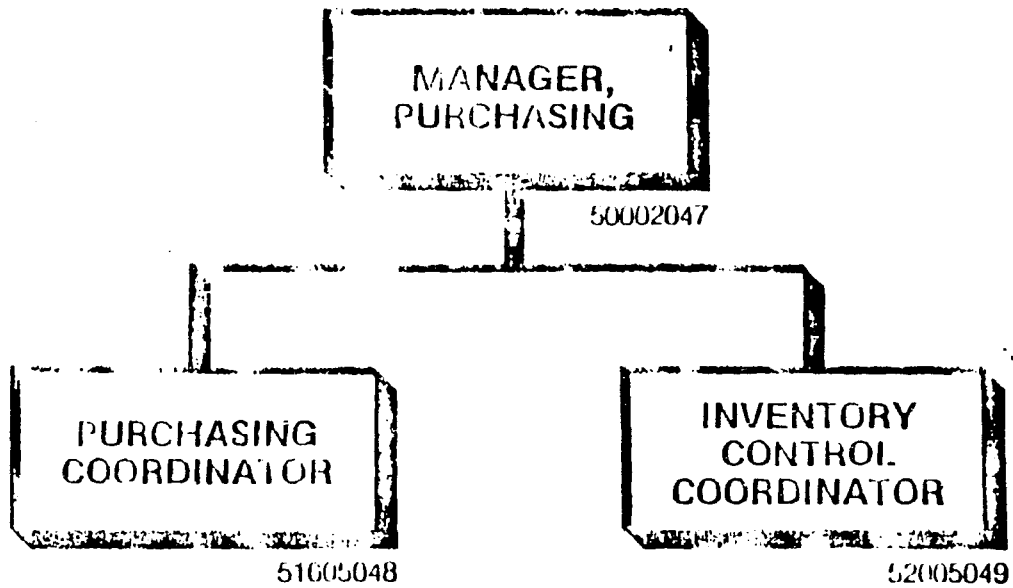
CHART 5
Division 5

SUEZ CEMENT COMPANY

PURCHASING



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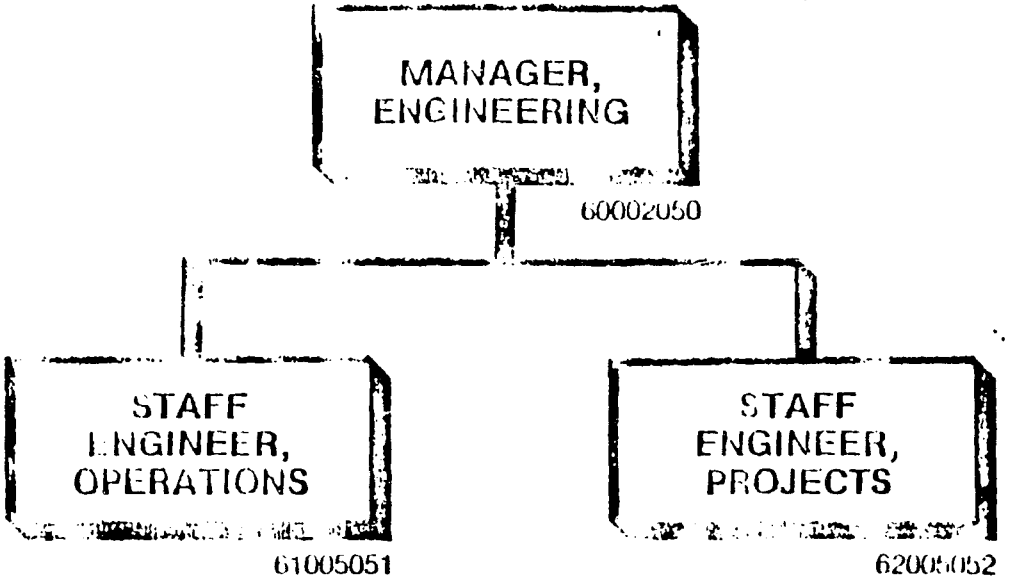
May 31, 1978

SUITZ CEMENT COMPANY

ENGINEERING



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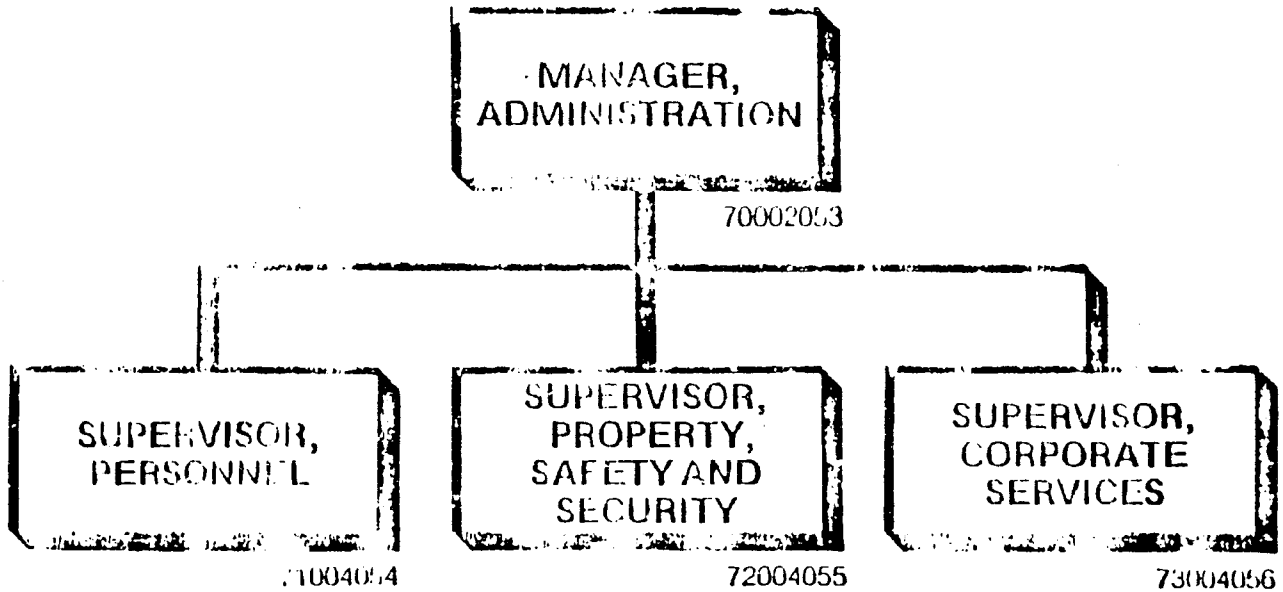
SUEZ CEMENT COMPANY

ADMINISTRATION



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May 31, 1978

SUEZ CEMENT COMPANY

PRELIMINARY STAFFING GUIDE

Organizational Unit/Position	Staffing Guide: Position Type	Staffing Guide: Number of Staff	Corporate Organizational: Authorized Date	Corporate Organizational: Position Number
OFFICE OF CHAIRMAN AND MANAGING DIRECTOR				
Chairman and Managing Director			5/31/78	1001
Executive Secretary			5/31/78	6002
Administrative Assistant to Board Chairman			5/31/78	6001
Public Relations Coordinator			5/31/78	5004
Marketing Coordinator			5/31/78	5005
Secretary		3		
LEGAL COUNSEL				
Legal Secretary			5/31/78	2006
Legal Secretary			5/31/78	6003
Staff Attorney			5/31/78	1008
FINANCE AND CONTROLLER				
Manager, Finance and Controller			5/31/78	200
Bilingual Secretary		1		
ASSISTANT CONTROLLER				
Assistant Controller			5/31/78	3010
General Accounting				
Supervisor, General Accounting			5/31/78	4014
Accountant, General Ledger		1		
Accountant Trainee		1		
Accounting Clerk		1		
Clerk Typist		1		
Operations Performance Analysis				
Supervisor, Operations Performance Analysis			5/31/78	4015
Cost Analyst		1		
Clerk Typist		1		
Budgeting and Financial Analysis				
Supervisor, Budgeting and Financial Analysis			5/31/78	4016
Financial Analyst		1		
Trainee		1		
Clerk Typist		1		

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SUEZ CEMENT COMPANY

PRELIMINARY STAFFING GUIDE, continued

Organizational Unit/Position	Staffing Guide: Position Type	Staffing Guide: Number of Staff	Corporate Organization Manual: Authorized Date	Corporate Organization Manual: Position Number
INFORMATION PROCESSING				
Supervisor, Information Processing			5/31/78	4011
System Analyst/Programmer			5/31/78	5017
Clerk Typist		1		
INTERNAL AUDIT				
Supervisor Internal Audit			5/31/78	4012
Audit Clerk		1		
Clerk Typist		1		
FINANCE AND CASHIER				
Supervisor, Finance and Cashier			5/31/78	4011
Disbursement Clerk		1		
Cashier Clerk		2		
Payroll Clerk		1		
Clerk Typist		1		
PLANT				
Manager, Plant			5/31/78	2018
Bilingual Secretary		1		
PROCESS AND QUALITY CONTROL				
Superintendent, Process and Quality Control			5/31/78	3019
Process Planning				
Supervisor, Process Planning			5/31/78	4025
Chemist, Process		1		
Laboratory Technician		1		
Clerk Typist		1		
Quality Control				
Supervisor, Quality Control			5/31/78	4026
Chemist, Control		4		
Laboratory Technician		4		
Laboratory Assistant		2		
Clerk Typist		1		

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SUEZ CEMENT COMPANY

PRELIMINARY STAFFING GUIDE, Continued

Organizational Unit/Position	Staffing Guide: Position Type	Staffing Guide: Number of Staff	Corporate Organization Manual: Authorized Date	Corporate Organization Manual: Position Number
PRODUCTION				
Superintendent, Production			5/31/78	3020
Operations Scheduling				
Supervisor, Operations Scheduling			5/31/78	4027
Operation Scheduler		1		
Clerk Typist		1		
Quarry and Clay Pit Operations				
Supervisor, Quarry and Clay Pit Operations			5/31/78	4028
Quarry Operations				
Foreman, Quarry Operations			5/31/78	7030
Power Shovel Operator		2		
Relief Man		1		
Crusher Loader Operation		1		
Driller		2		
Driller Helper		2		
Explosiveman		1		
Explosiveman Helper		1		
Conveyor Tender		1		
Relief Man		1		
Truck Driver		3		
Lead Mechanic		1		
Electrician		1		
Helper		2		
Laborer		2		
Clay Pit Operations				
Foreman, Clay Pit Operations			5/31/78	7031
Crusher Loader Operator		1		
Conveyor Tender		1		
Relief Man		1		
Truck Driver		1		
Laborer		2		

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SUEZ CEMENT COMPANY

PRELIMINARY STAFFING GUIDE, Continued

Organizational Unit/Position	Staffing Guide: Position Type	Staffing Guide: Number of Staff	Corporate Organization Manual: Authorized Date	Corporate Organization Manual: Position Number
Cement Plant Operations				
Supervisor, Cement Plant Operations			5/31/78	4029
Operations Engineer				
Operations Engineer			5/31/78	5012
Process Controller		4		
Cement Operations				
Foreman, Cement Operations			5/31/78	7011
Conveyor Tender		4		
Mixer/Blender		4		
Cement Mill Tender		4		
Grinding Mill Tender		4		
Relief Tender		4		
Laborer, Raw Material		4		
Laborer, Mill		4		
Clinker Operations				
Foreman, Clinker Operations			5/31/78	7033A
Kiln Feeder Tender		4		
Kiln Burner Cooler Tender		4		
Kiln-Mill Helper		4		
Kiln-Mill Relief		4		
Clinker Silo Tender		4		
Kiln-Mill Mechanic		4		
Kiln-Mill Laborer		4		
Packing and Loading				
Foreman, Packing and Loading			5/31/78	7034
Cement Silo Operator - Bin Man		1		
Bagger		12		
Bag Loader		3		
Bulk Loader		1		
Checker		1		
Laborer, Packing and Loading		8		
Fork Lift Operator		2		
Mechanic, Pack House		1		

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SUEZ CEMENT COMPANY

PRELIMINARY STAFFING GUIDE, Continued

Organizational Unit/Position	Staffing Guide: Position Type	Staffing Guide: Number of Staff	Corporate Organization Manual: Authorized Date	Corporate Organization Manual: Position Number
MAINTENANCE				
Superintendent, Maintenance			5/31/78	3021
Maintenance Scheduling				
Supervisor, Maintenance Scheduling			5/31/78	4015
Work Order Control Clerk		1		
Engineer-Trainee		1		
Clerk Typist		2		
Mechanical and General Maintenance				
Supervisor, Mechanical and General Maintenance			5/31/78	4036
Mechanical Shop				
Foreman, Mechanical Shop			5/31/78	7016
Machinist		2		
Machinist Helper		1		
Mechanical Repairman		4		
Mechanical Repairman Helper		2		
Welder		2		
Welder Helper		1		
General Maintenance				
Foreman, General Maintenance			5/31/78	7039
Mason Bricklayer		1		
Carpenter		1		
Painter		1		
Pipe and Metal Mechanic		2		
Lead Automotive Mechanic		1		
Automotive Repairman		2		
Mobile Crane Operator		1		
Fork Lift Operator		1		
Helper		6		
Leadman, Plant Service Labor		1		
Yardman		7		
Laborer		8		
Vacuum Cleaner Operator		1		

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SUEZ CEMENT COMPANY

PRELIMINARY STAFFING GUIDE, Continued

Organizational Unit/Position	Staffing Guide: Position Type	Staffing Guide: Number of Staff	Corporate Organization Manual: Authorized Date	Corporate Organization Manual: Position Number
Electrical Equipment and Instruments				
Supervisor, Electrical Equipment and Instruments			5/31/78	4017
Electrical Equipment				
Foreman, Electrical Equipment			5/31/78	7040
Electrical Repairman		4		
Electrical Repairman Helper		2		
Power System Controlman		2		
Electrical and Instrument Shop				
Foreman, Electrical and Instrument Shop			5/31/78	7041
Instrument/Electronics Repairman		3		
Controls Serviceman		3		
Communications Technician		1		
Helper		3		
PLANT ACCOUNTING				
Chief Accountant, Plant Accounting			5/31/78	3033
Accountant, Payroll and Cash Disbursement			5/31/78	5043
Accountant, Operation Data			5/31/78	5041
Accounting Clerk		1		
Timekeeper		4		
Shipping Clerk		1		
Tally Clerk		1		
Clerk Typist		1		
PLANT ADMINISTRATION				
Superintendent, Plant Administration			5/31/78	3023
Office Services				
Supervisor, Office Services			5/31/78	4044
Receptionist - Telephone Operator		1		
Teletype Operator - Typist		4		
Office Supply - Mail Clerk		1		
Office Boy		3		
Janitor		1		

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SUEZ CEMENT COMPANY

PRELIMINARY STAFFING GUIDE, Continued

Organizational Unit/Position	Staffing Guide: Position Type	Staffing Guide: Number of Staff	Corporate Organization Manual: Authorized Date	Corporate Organization Manual: Position Number
Plant Personnel Services				
Supervisor, Plant Personnel Services			5/31/78	4045
Training Specialist		1		
Employment Specialist		1		
Personnel Records - Clerk Typist		1		
Social Services Personnel Assistant		6		
Safety and Security				
Supervisor, Safety and Security			5/31/78	4046
Plant Gatekeeper		4		
Fireman and Emergency Service		4		
First Aid Nurse		1		
Stores and Supplies				
Supervisor, Stores and Supplies			5/31/78	4024
Storekeeper Clerk		3		
PURCHASING				
Manager, Purchasing			5/31/78	2047
Bilingual Secretary		1		
Purchasing Department				
Purchasing Coordinator			5/31/78	5048
Inventory Control Department				
Inventory Control Coordinator			5/31/78	5049
ENGINEERING				
Manager, Engineering			5/31/78	2050
Operations Department				
Staff Engineer			5/31/78	5051
Engineering Trainee		1		
Projects Department				
Staff Engineer			5/31/78	5052
Engineering Trainee		2		
ADMINISTRATION				
Manager, Administration			5/31/78	2053
Bilingual Secretary		1		

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SUEZ CEMENT COMPANY

PRELIMINARY STAFFING GUIDE, Continued

Organizational Unit/Position	Staffing Guide: Position Type	Staffing Guide: Number of Shift	Corporate Organization Manual: Authorized Date	Corporate Organization Manual: Position Number
Personnel				
Supervisor, Personnel			5/31/78	4054
Personnel Records				
Administrator, Personnel Records			5/31/78	5057
Personnel Records Clerk		1		
Clerk Typist		1		
Recruitment, Training and Development				
Administrator, Recruitment, Training and Development			5/31/78	5058
Recruiter		1		
Trainer		1		
Draftsman		1		
Compensation and Benefits				
Administrator, Compensation and Benefits			5/31/78	5059
PROPERTY, SAFETY AND SECURITY				
Supervisor, Property, Safety and Security			5/31/78	4055
Property and Insurance				
Administrator, Property and Insurance			5/31/78	5060
Safety and Security				
Administrator, Safety and Security			5/31/78	5061
CORPORATE SERVICES				
Supervisor, Corporate Services			5/31/78	4056
Library				
Administrator, Library			5/31/78	6062
Library Clerk		1		
Clerk Typist		1		

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SUEZ CEMENT COMPANY

PRELIMINARY STAFFING GUIDE, Continued

Organizational Unit/Position	Staffing Guide: Position Type	Staffing Guide: Number of Staff	Corporate Organization Manual: Authorized Date	Corporate Organization Manual: Position Number
Communications				
Administrator, Communications			5/11/78	6061
Receptionist/Switchboard Operator		1		
Teletype Operator		3		
Office Services and Transportation				
Administrator, Office Services and Transportation			5/31/78	6064
Typist		3		
Senior Driver		1		
Driver		4		
Office Boy		4		

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PLANNED INCREASES IN CEMENT PRODUCTION
(Thousand Tons)

Existing and Planned Capacity	1976 Actual	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
					Projected Annual Production						
A. Existing Capacity											
Tourah	1,053	1,035	1,125	1,250	1,270	1,250	1,190	1,190	1,190	1,190	1,190
Helwan	1,042	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050	1,050
National	661	620	620	570	540	570	620	620	620	620	620
Alexandria	533	525	525	525	525	500	500	500	500	500	500
TOTAL A	3,289	3,230	3,320	3,395	3,385	3,370	3,360	3,360	3,360	3,360	3,360
B. Under Construction (construction on-going)											
Tourah..Extension	----	----	----	450	600	675	750	750	750	750	750
Helwan Extension	----	----	----	----	-----	450	600	675	750	750	750
Alexandria Extension	----	----	180	240	270	300	300	300	300	300	300
Suez Cement Co. I, at Suez [a]	----	----	----	----	300	700	850	950	1,000	1,000	1,000
TOTAL A+B	3,289	3,230	3,500	4,085	4,555	5,495	5,860	6,035	6,160	6,160	6,160
C. Under Construction (construction halted)											
National Extension I	---	----	----	----	300	400	450	500	500	500	500
Assiut	---	----	----	----	-----	-----	300	400	450	500	500
TOTAL A+B+C	3,289	3,230	3,500	4,085	4,855	5,895	6,610	6,935	7,110	7,160	7,160
D. Under Tender											
National Extension II	----	----	-----	-----	-----	-----	-----	600	800	900	1,000
TOTAL A+B+C+D	3,289	3,230	3,500	4,085	4,855	5,895	6,610	7,535	7,910	8,060	8,160
E. Under This Study											
New Facility	----	----	----	----	------	-----	834	1,112	1,251	1,390	1,390
TOTAL A+B+C+D+E	3,289	3,230	3,500	4,085	4,855	5,895	7,444	8,647	9,161	9,450	9,550

[a] Production is expected to start in the third quarter of 1980

Note: Start-up production is estimated at 60% the first year, 80% the second year, 90% the third year and 100% the fourth and subsequent years of operation.

EGYPTIAN CEMENT EXPORTS BY IMPORTING COUNTRY, 1971/1972 - 1976

(tons)

Importing Country	1971/72[a]	1973	1974	1975	1976
Libya	340,063	353,003	79,938	26,847	4,748
Poland.....	162,130	19,400	—	—	—
Saudi Arabia	140,616	91,590	45,301	31,019	7,787
West Africa	130,156	20,489	22,300	10,890	1,404
Syria	115,259	2,298	500	—	—
Bulgaria	71,200	—	—	—	—
Yugoslavia.....	53,985	—	—	—	—
Abu Dhabi	39,030	—	16,984	11,500	—
Somalia	26,155	9,229	—	581	—
Yemen	21,225	25,434	15,650	9,750	808
West Germany	18,450	—	—	—	—
Ceylon	17,550	—	—	—	—
Brazil	17,465	—	—	—	—
Aden	10,100	—	—	—	—
Panama	5,500	—	—	—	—
Albania	4,420	—	—	—	—
Malta	690	—	—	—	—
Jordan	1,733	500	1,000	—	6,305
Sudan	500	800	1,050	2,992	2,370
Morocco	—	—	3,200	—	6,000
Other	—	—	250	—	—
TOTAL	1,776,227	522,743	186,173	93,579	29,422

Table _____

POTENTIAL EXPORT MARKETS FOR EGYPTIAN CEMENT

Country	Imports in 1976 (Thousand Tons)	Future Outlook
United Arab Emirates.....	1200	Imports will decline after 1980 as domestic capacity increases. Small quantities may be imported for several years longer.
Kuwait	1400	Imports will increase until 1980, then decline to a lower level.
Bahrain	150[a]	Imports expected to increase substantially.
Qatar	1400[a]	Imports will continue to increase.
Iran	800[a]	Self-sufficient after 1980.
Oman	409[a]	Will continue at this level.
Syria	750[a]	Imports will be reduced as new plants.are completed.
Lebanon	-	Used to be an exporter. Likely to need imports for reconstruction.
Yemen	Small quantities are imported.	
Morocco	224[a]	There are plans to become self-sufficient.
Algeria	2000[a]	Local production will increase. Imports will continue.
Libya	2050[a]	Imports will continue.
Burundi	17[a]	Imports will continue.
Djibouti	25	Imports will continue.
Somalia	54	Imports will probably continue.

a/ Data for 1975

Source: Coopers & Lybrand Internal Study, 1977

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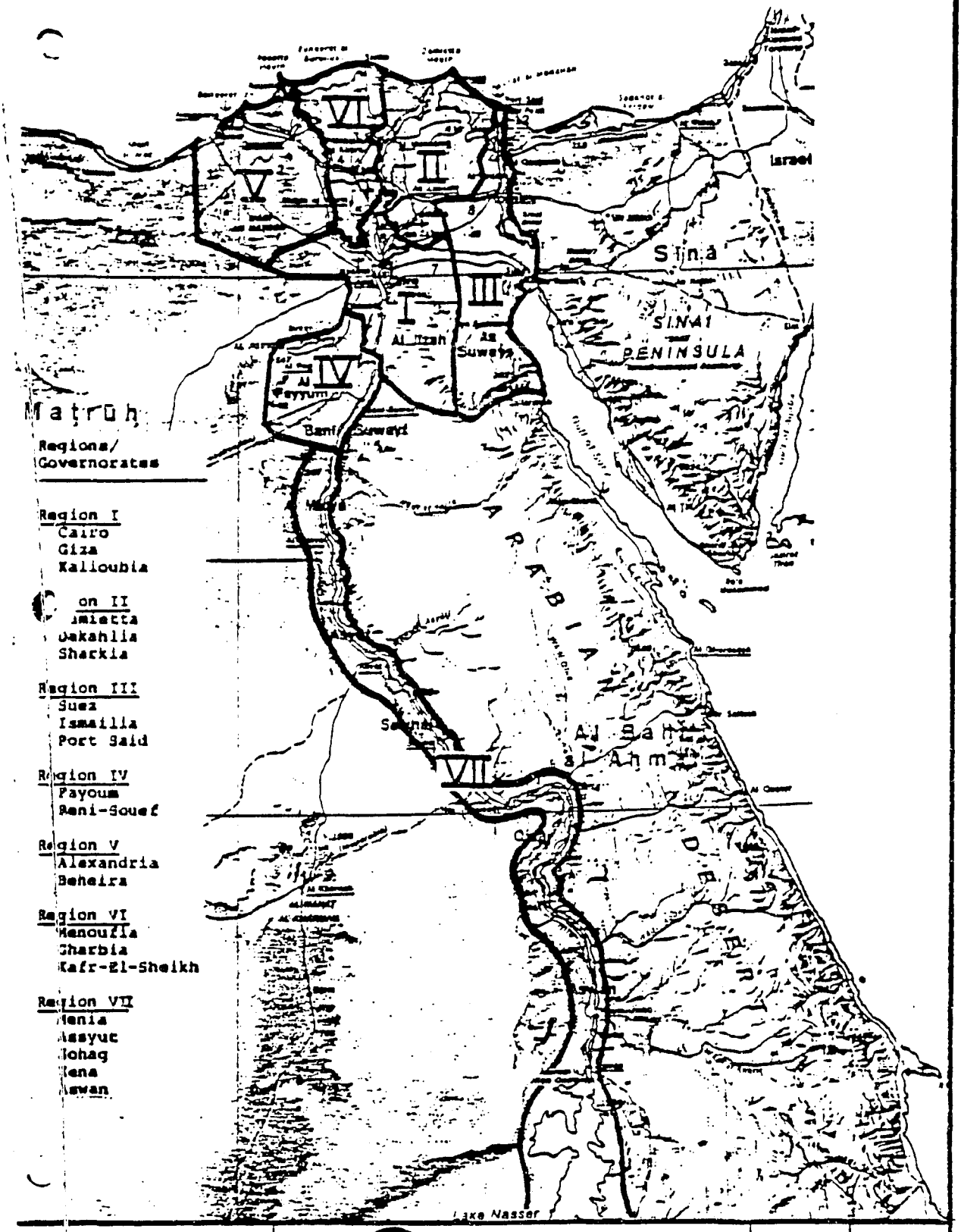
REGIONS FOR DEMAND ANALYSIS



EZ CEMENT COMPANY	H.K. FERGUSON INTERNATIONAL COMPANY	H.K.E W.O. 2990	NO. TT-1

PROJECTED LOCAL DEMAND FOR CEMENT BY GOVERNORATE, 1977-1986
Estimate a/
(Thousand Tons)

REGIONS / GOVERNORATES	1977 Quantity	1977 % of Total	1978 Quantity	1978 % of Total	1979 Quantity	1979 % of Total	1980 Quantity	1980 % of Total	1981 Quantity	1981 % of Total	1982 Quantity	1982 % of Total	1983 Quantity	1983 % of Total	1984 Quantity	1984 % of Total	1985 Quantity	1985 % of Total	1986 Quantity	1986 % of Total
REGION I	1,898	39.42	1,948	37.90	2,003	36.36	2,183	34.84	2,288	33.30	2,397	31.75	2,512	30.22	2,631	28.70	2,756	27.28	2,887	25.71
Cairo	1,153	23.95	1,210	23.07	1,271	22.19	1,334	21.28	1,400	20.38	1,470	19.47	1,543	18.56	1,619	17.66	1,699	16.77	1,783	15.88
Giza	443	9.20	464	8.84	486	8.48	509	8.12	534	7.77	559	7.40	586	7.05	613	6.69	642	6.34	673	6.00
Kalioubia	302	6.27	314	5.99	326	5.69	340	5.42	354	5.15	368	4.87	383	4.61	399	4.35	415	4.10	431	3.84
REGION II	748	15.53	854	16.28	976	17.04	1,116	17.80	1,276	18.57	1,458	19.31	1,667	20.05	1,904	20.77	2,176	21.47	2,486	22.14
Dakahlia	64	1.37	75	1.43	86	1.50	98	1.56	112	1.63	128	1.70	146	1.76	167	1.82	190	1.87	217	1.93
Dakahlia	347	7.20	395	7.53	451	7.87	515	8.22	588	8.56	670	8.88	765	9.20	873	9.51	995	9.82	1,135	10.11
Sharkia	435	6.96	384	7.32	439	7.67	503	8.02	576	8.38	660	8.74	756	9.09	865	9.44	991	9.78	1,134	10.10
REGION III	262	5.44	318	6.06	385	6.72	467	7.45	566	8.24	686	9.09	833	10.02	1,008	11.01	1,224	12.08	1,482	13.21
Suez	86	1.79	105	2.00	128	2.23	157	2.50	192	2.79	235	3.11	288	3.46	351	3.83	429	4.23	525	4.68
Ismailia	100	2.08	121	2.31	147	2.57	177	2.82	214	3.11	259	3.43	314	3.78	381	4.16	461	4.55	559	4.98
Port Said	76	1.58	92	1.75	110	1.92	133	2.12	160	2.33	192	2.54	231	2.78	277	3.02	334	3.30	401	3.57
REGION IV	125	2.60	137	2.61	149	2.60	163	2.60	178	2.59	195	2.58	213	2.56	233	2.54	254	2.51	278	2.48
Fayoum	65	1.35	71	1.35	77	1.34	85	1.36	93	1.35	102	1.35	112	1.35	122	1.33	134	1.32	147	1.31
Beni-Suef	60	1.25	66	1.26	72	1.26	78	1.24	85	1.24	93	1.23	101	1.21	111	1.21	120	1.18	131	1.17
REGION V	755	15.68	823	15.69	897	15.66	977	15.59	1,065	15.50	1,161	15.38	1,265	15.22	1,379	15.04	1,503	14.81	1,637	14.58
Alexandria	364	7.56	397	7.57	433	7.56	472	7.53	515	7.50	562	7.44	613	7.37	669	7.30	730	7.20	796	7.09
Behira	391	8.12	426	8.12	464	8.10	505	8.06	550	8.00	599	7.93	652	7.84	710	7.75	773	7.63	841	7.49
REGION VI	534	11.09	603	11.49	681	11.89	770	12.28	869	12.65	982	13.01	1,110	13.35	1,253	13.67	1,416	13.97	1,600	14.25
Menufia	161	3.34	180	3.43	203	3.54	227	3.62	255	3.71	286	3.79	321	3.86	360	3.93	405	4.00	454	4.04
Gharbia	233	4.84	264	5.03	298	5.20	338	5.39	382	5.56	433	5.74	490	5.89	554	6.04	627	6.19	710	6.32
Kafr-el-Sheikh	140	2.91	159	3.03	180	3.14	205	3.27	232	3.38	263	3.48	299	3.60	339	3.70	384	3.79	436	3.88
REGION VII	421	10.24	523	9.97	557	9.72	592	9.44	629	9.15	670	8.88	713	8.58	757	8.26	805	7.94	855	7.61
Menia	123	2.55	131	2.50	140	2.44	149	2.38	158	2.30	168	2.23	179	2.15	190	2.07	203	2.00	215	1.91
Assyut	99	2.06	105	2.00	111	1.94	118	1.88	125	1.82	133	1.76	141	1.70	150	1.64	159	1.57	168	1.50
Sohag	117	2.43	124	2.36	131	2.29	139	2.22	147	2.14	156	2.07	166	2.00	176	1.92	186	1.84	197	1.75
Kena	106	2.20	112	2.13	120	2.09	127	2.03	135	1.96	144	1.91	153	1.84	162	1.77	172	1.70	183	1.63
Aswan	48	1.00	51	0.97	55	0.96	58	0.94	61	0.93	65	0.91	70	0.89	75	0.86	85	0.84	92	0.82
AGGREGATE	4,815	100.00	5,246	100.00	5,728	100.00	6,268	100.00	6,871	100.00	7,549	100.00	8,313	100.00	9,166	100.00	10,134	100.00	11,22.	100.00

a/ Based on projected per capita consumption of cement, with + 10% adjustment factor in consumption to account for latent demand

Note: Individual numbers may not add to totals due to rounding.

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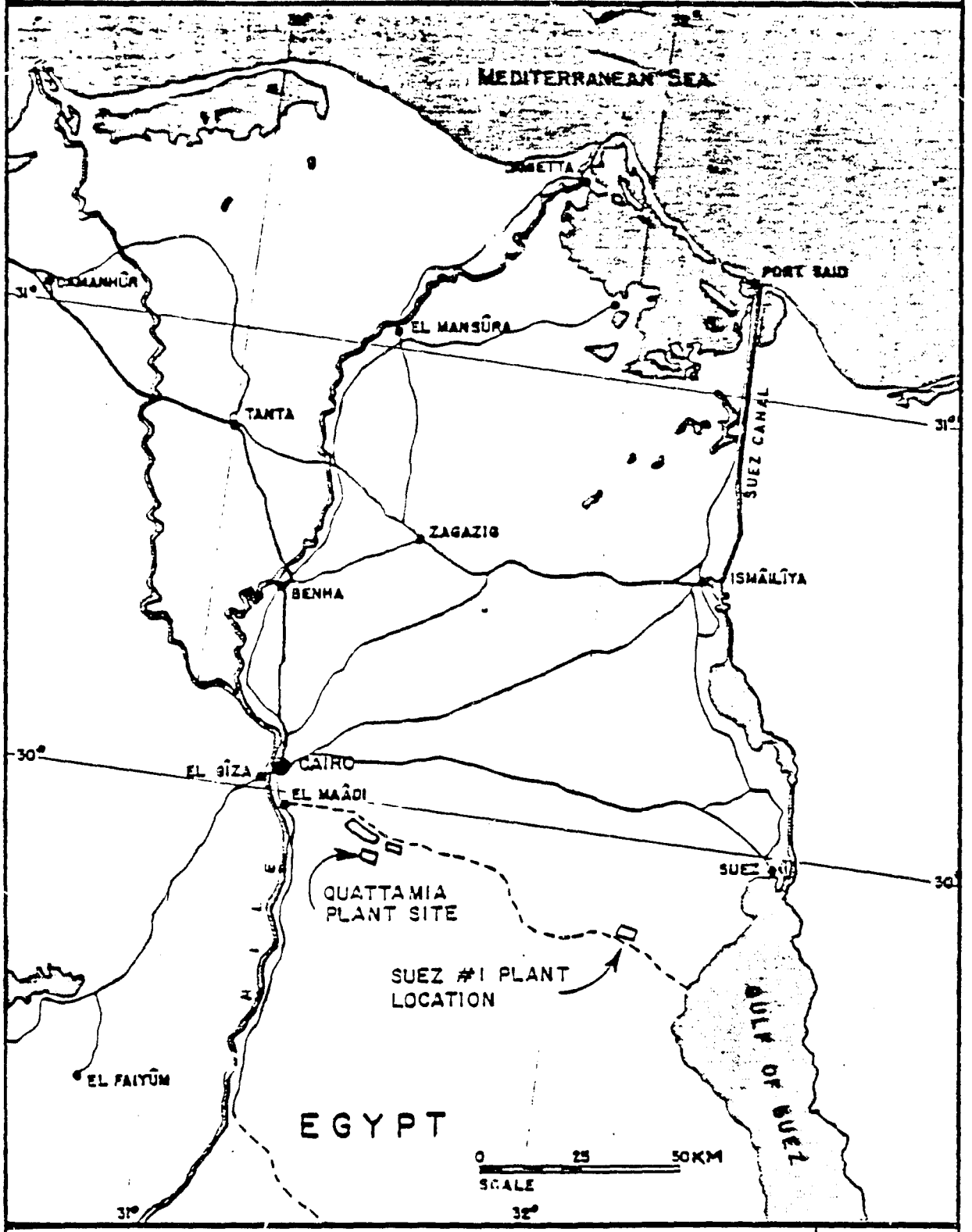
Annex J 2 of 2

SUEZ CEMENT COMPANY
FEASIBILITY STUDY

H.K. FERGUSON INTERNATIONAL COMPANY
THE H. K. FERGUSON COMPANY



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LOCATION MAP

APPENDIX A

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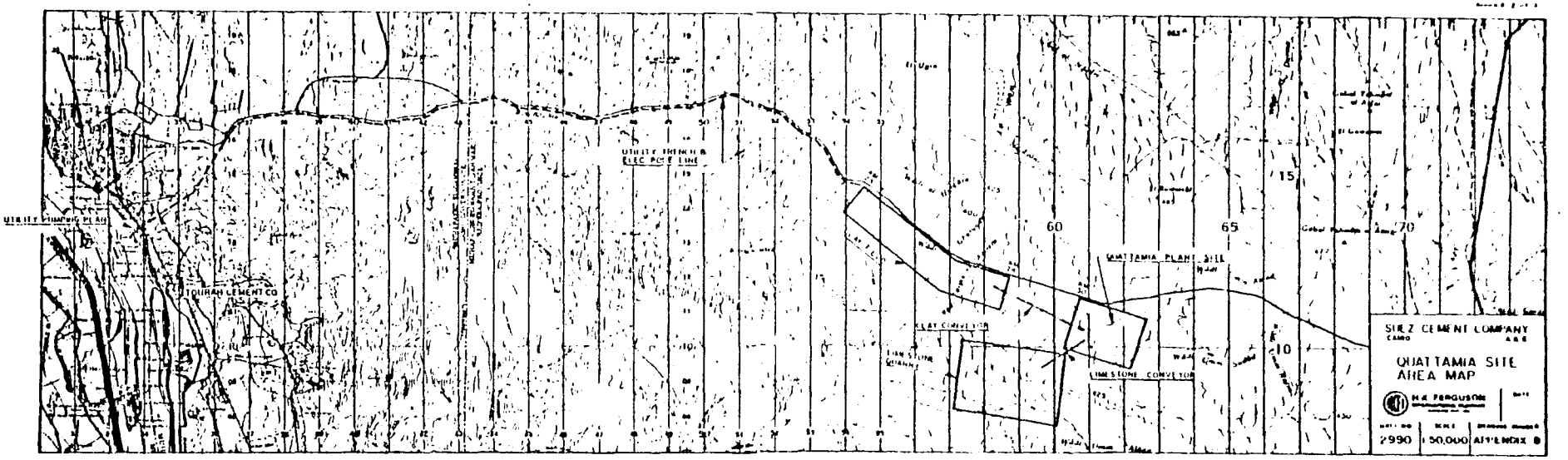

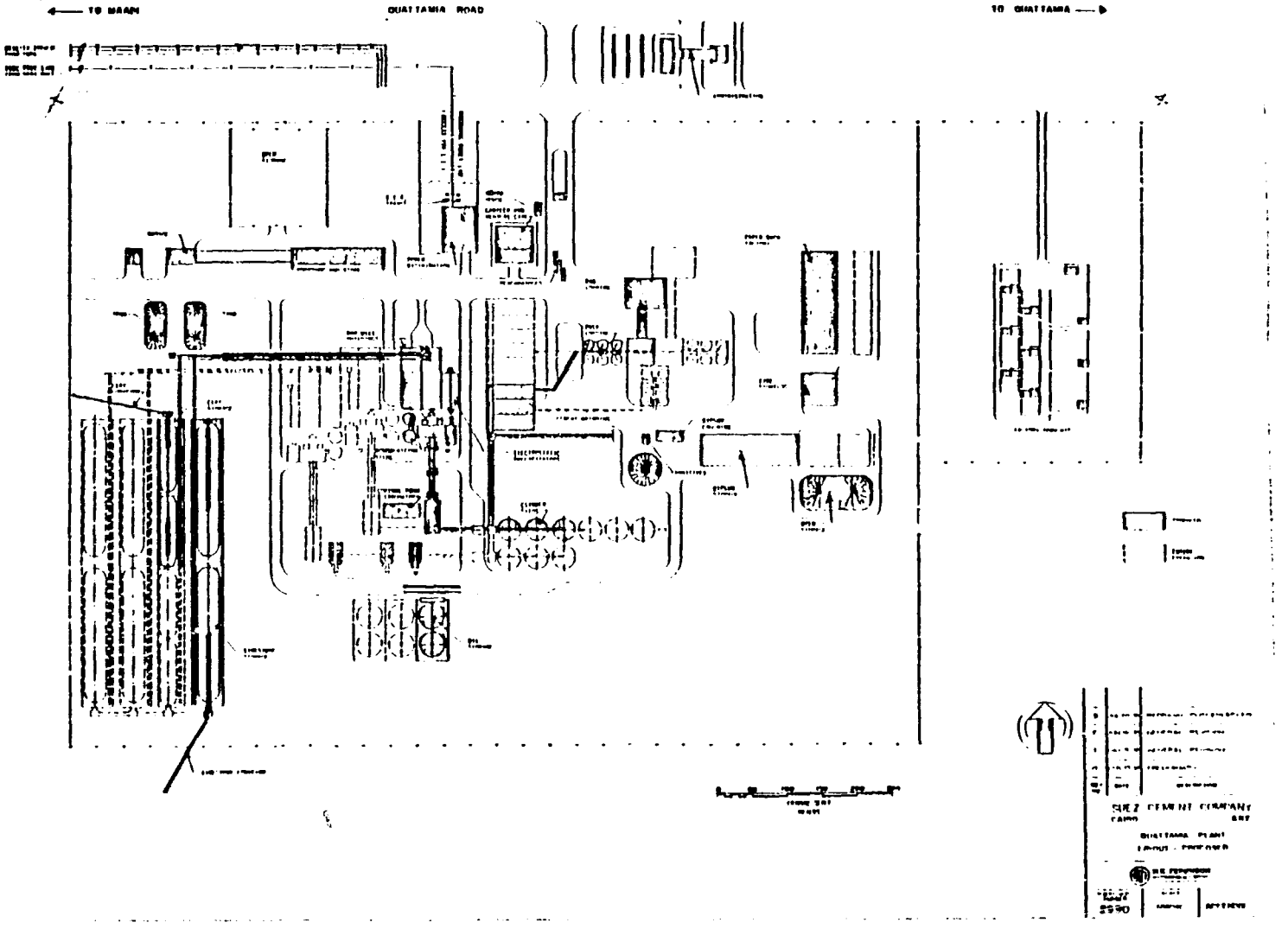

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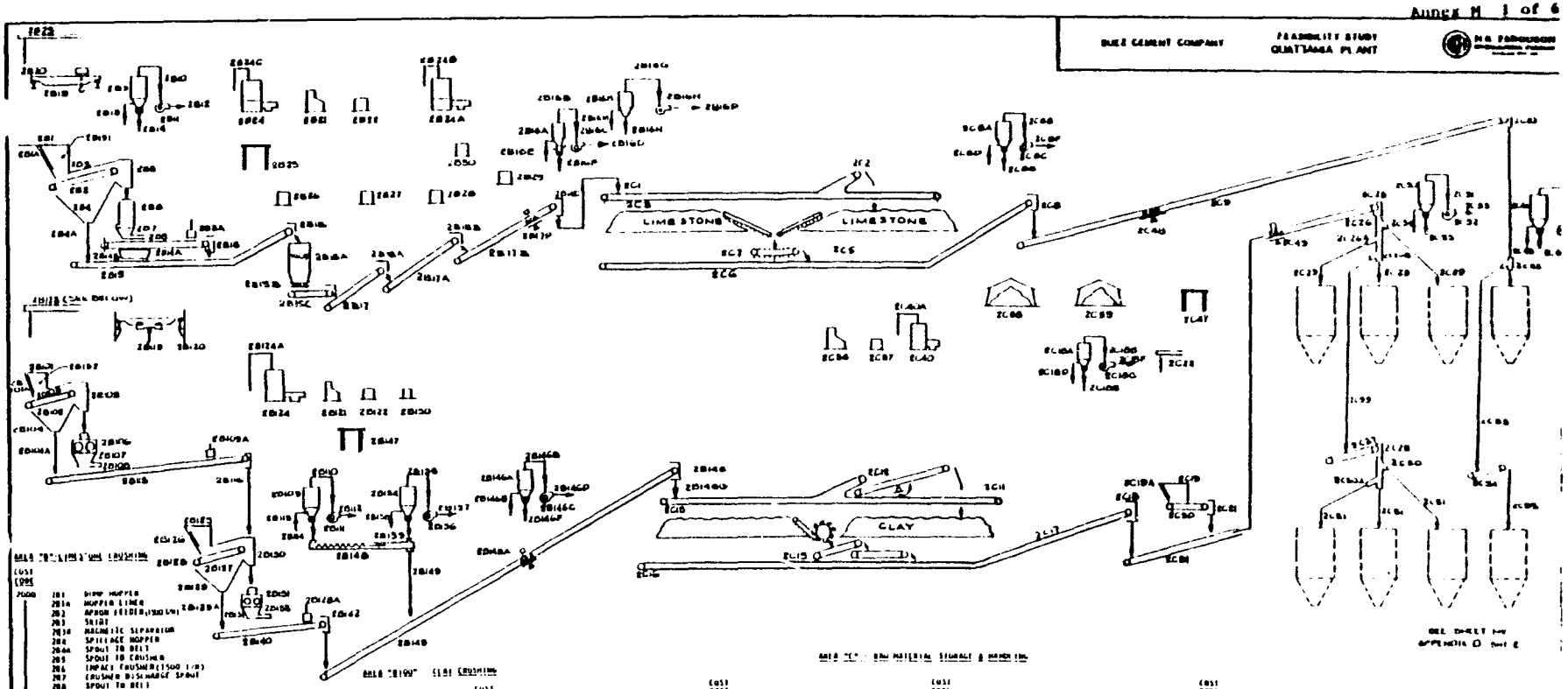
DUKE CEMENT COMPANY — FEASIBILITY STUDY — QUATTAMARA PLANT — H.B. FERGUSON



REV NO.	DATE	DESCRIPTION
3	[illegible]	FINAL ISSUE
2	[illegible]	GENERAL REVISION
1	[illegible]	GENERAL REVISION

TITLE

WO 2990

PROCESS DIAGRAM
LIMESTONE & CLAY CRUSHING & STORAGE

APPENDIX

SHEET 1

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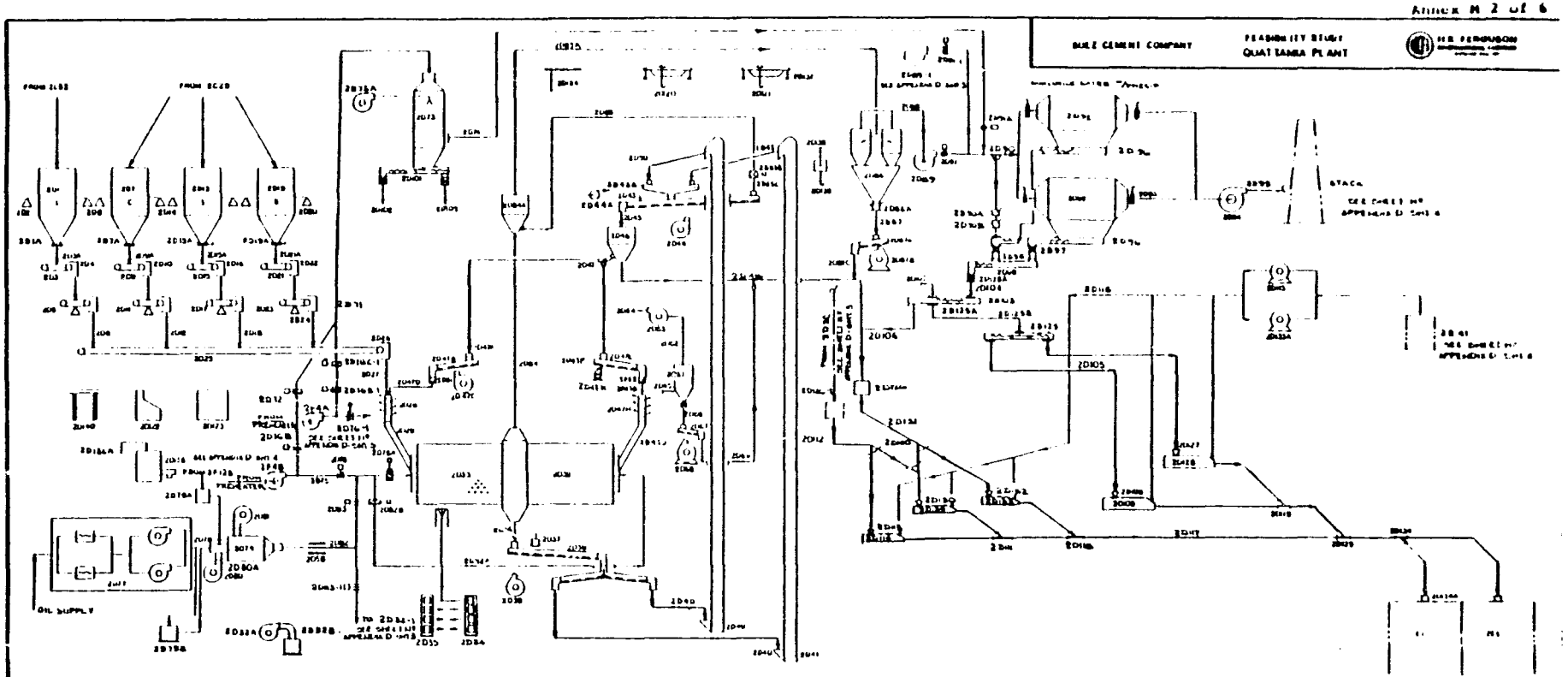
BULEZ CEMENT COMPANY

FEASIBILITY STUDY
QUATTAMBA PLANT

H.B. FERGUSON



NOTES

REV NO	DATE	DESCRIPTION
3		FINAL ISSUE
2		GENERAL REVISIONS
1		GENERAL REVISIONS

TITLE

PROCESS DIAGRAM
RAW MILL AREA

WQ 2990

APPENDIX D

SHEET 2 OF 6

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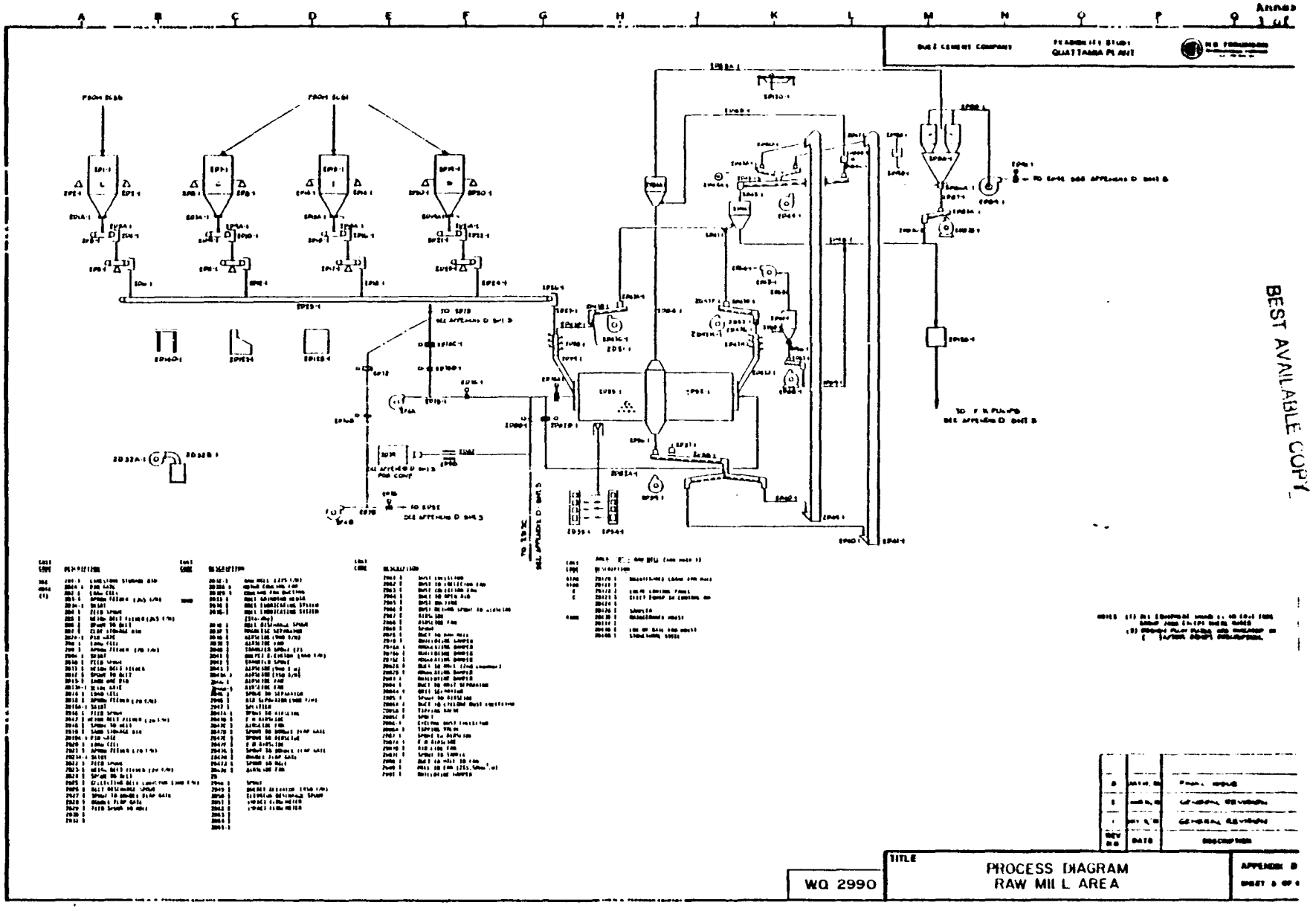
DUKE CEMENT COMPANY
QUATTAMBA PLANT
WQ 2990
TITLE
PROCESS DIAGRAM
RAW MILL AREA
APPENDIX B
SHEET 3 OF 4
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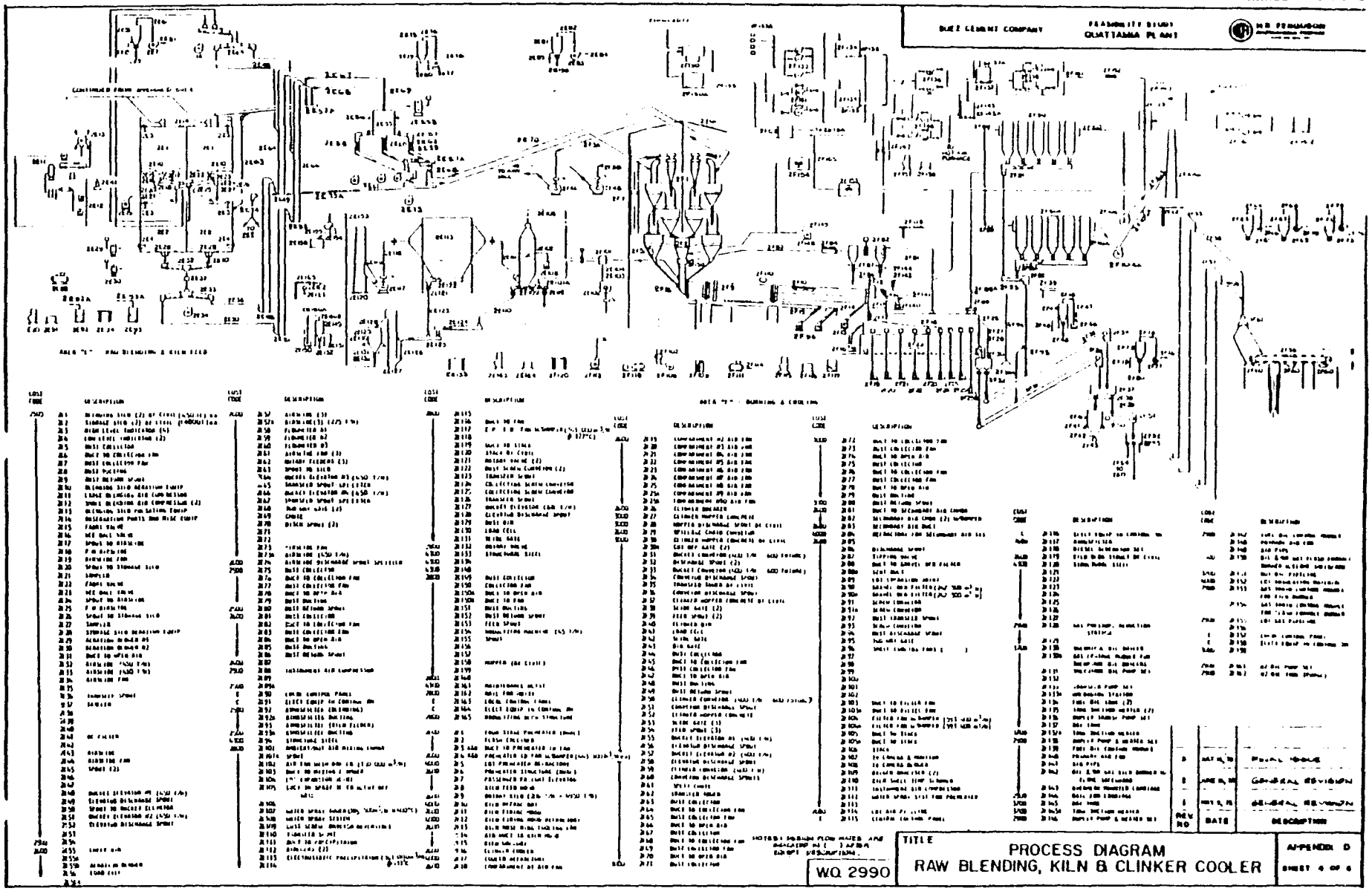

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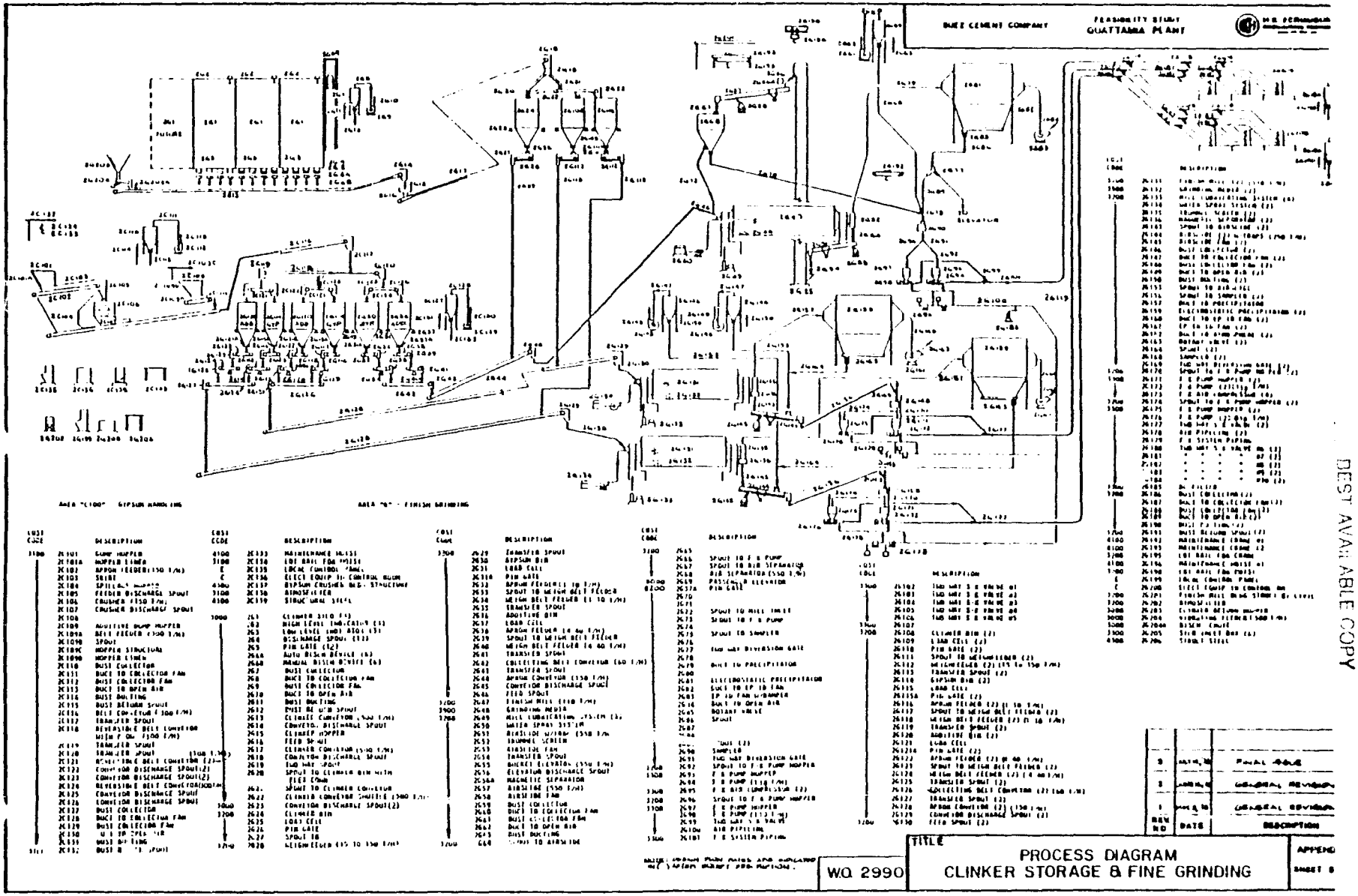

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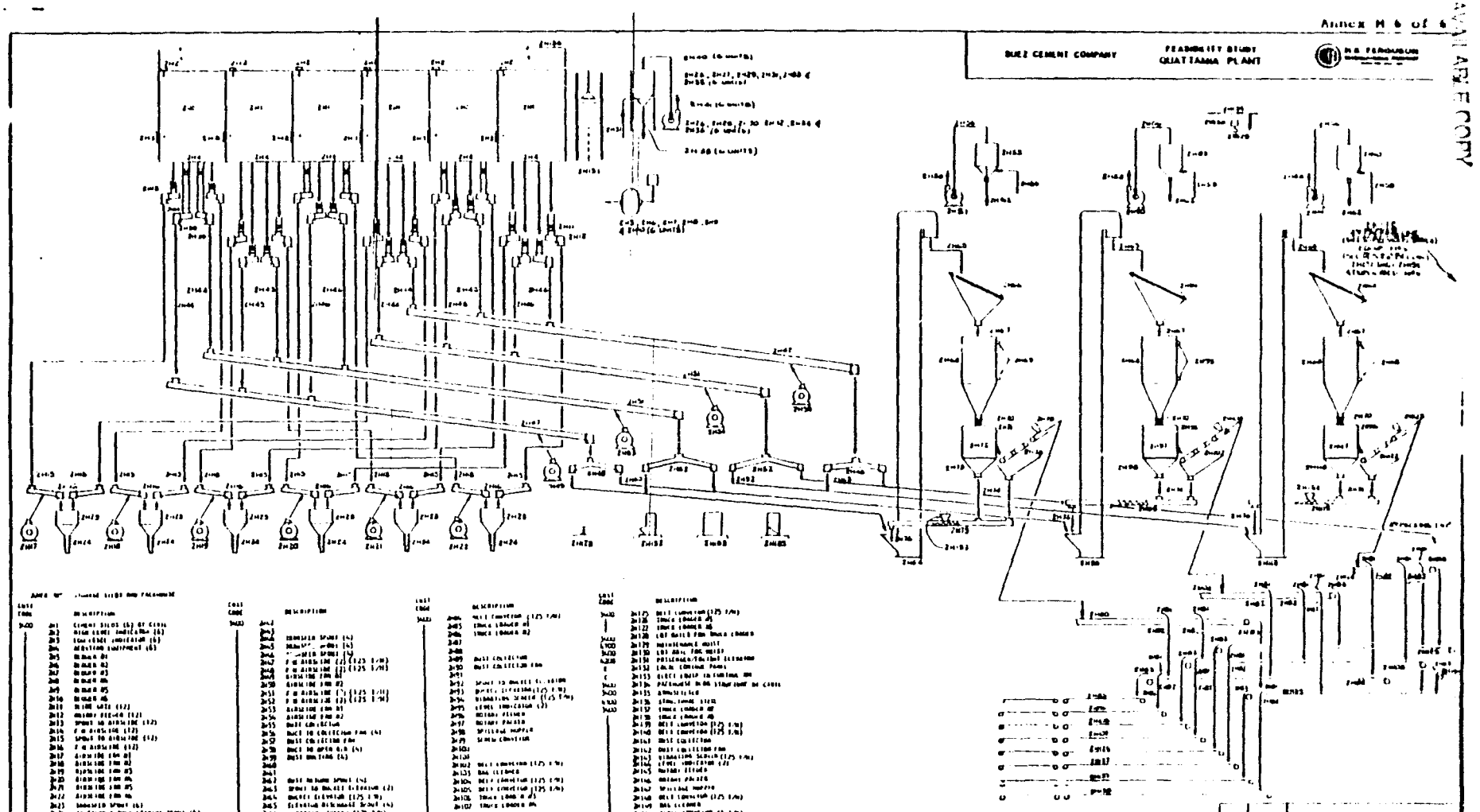
SUEZ CEMENT COMPANY

FEASIBILITY STUDY
QUATTAMIA PLANT

H.B. FERGUSON



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2	[illegible]	[illegible]
1	[illegible]	[illegible]

WQ 2990

TITLE

PROCESS DIAGRAM
CEMENT STORAGE & BAGGING

APPENDIX D

SHEET 6 OF 6

BEST AVAILABLE COPY

PROCESS CONSIDERATIONS

A. Crushing

1) Limestone will be crushed open circuit in a single rotor impact crusher with wear-resistant hammers.

2) Clay will be crushed in double roll crushers arranged in series for high size reduction. These machines are particularly suited for crushing of moist materials which are liable to cause clogging.

3) The limestone and clay crushing plants will be located at their respective quarries to minimize the haul distances by motorized quarry vehicles.

4) Quarrying and crushing will be operated on a one shift per day, six days per week basis initially and expandable to multiple shift when the capacity of the cement factory is increased by the addition of another kiln.

B. Raw Material Storage and Reclaim

1) With the covered stockpile arrangement, preblending of the crushed limestone and clay will be facilitated without the problems created by air pollution.

2) The limestone and clay storage and reclaim areas can be operated from the central control room without attendants in the areas.

3) Future expansion of the clay area will be possible with a minimum amount of new equipment by extending the clay building.

4) Iron ore and sand which will be used in relatively small quantities in the raw mix will be easily reclaimed with front end loader.

C. Raw Grinding Department

1) Two raw material grinding mills will be provided. Each mill system can be operated completely independent from the other.

2) The raw grinding mills will be located adjacent to the kiln-preheater tower, from which hot waste gases would be utilized in the mills, to dry the raw materials during the grinding operation.

3) Raw grinding mills will be designed with separate compartments for the coarse and fine grinding of the raw materials which is very efficient in regard to power consumption.

D. Raw Meal Blending and Storage

1) The specific power consumption for batch blending will be low since the air compressors for mixing will be used only for a relatively short period of time.

2) The two blending silos will be directly over the two kiln feed storage silos permitting transfer of the blended material to storage by gravity.

3) Two blending silos will be required for intermittent or batch blending. While the mix in one silo is being blended pneumatically, the other is being filled.

4) By having the blending storage silos adjacent to the preheater, recirculation of the raw mix will be possible for the homogenizing silos with a minimum of additional equipment.

5) Batch blending will permit chemical deviations of the raw material within wide deviations and relatively long duration and still be corrected before being transferred to the kiln feed storage.

E. Kiln Feed System

1) The preheaters can be fed from either silo with a system of bucket elevators and air gravity conveyors through a solids flow meter.

2) Recirculation of the raw mix from the solids flow meter back to storage will be provided to permit testing of the system before start-up of the preheater.

3) Elevating raw meal with bucket elevators require much less power than using pneumatic pumps.

4) Recirculation of raw material will be possible from the homogenizing silos back into the homogenizing or into storage silos.

F. Kiln System

1) Because of the large, clinker production capacity, it will be necessary to use a twin tower suspension preheater in order to keep the size of the heat transfer vessels within practical limits.

2) A flash furnace will be located between the preheater and the kiln. By adding a large portion of the fuel required to make clinker at this point, it will be possible to use a smaller diameter kiln for a given throughput.

3) A portion of the kiln exhaust gases bypass the preheater. These gases are rich in undesirable chemical elements that are removed from the system. The precalciner system allows greater amounts of bypass for chemical control while maintaining good efficiency.

4) The principal advantages offered by the precalciner are improved process control through isolation of the calcination process which normally takes place in the kiln, reduced thermal loading in the kiln resulting in increased refractory life, and reduced No_x emissions rate.

G. Dust Collectors

1) The gravel bed filter can readily handle surges of gas volume, dust loading, or gas temperature as can be expected on clinker cooler vent, without seriously affecting equipment or performance.

2) Electrostatic precipitators provide high operational reliability with low maintenance costs as well as low specific power consumption when compared to a bag filter for kiln and mill exhaust gases.

3) I.D. fan drives are variable speed for maximum efficiency at a wide range of operating conditions.

4) Electrostatic precipitators are double chamber type with isolating dampers and can be operated independently.

H. Clinker Transport & Storage

1) A standby clinker handling system will provide for maximum kiln operational security.

2) All metal conveyors will be used thereby eliminating problems due to occasional high clinker temperature.

3) Use of a deep bucket elevator will eliminate the need for a lengthy tunnel and allow location of the clinker silos closer to the cooler.

4) The clinker can be filled and emptied while maintaining a dust free atmosphere.

5) Gypsum and additive storage will be provided near the cement grinding building. Reclaiming of the materials will be by front end loader.

I. Cement Grinding

1) Three (3) mills will be used (of the same size as Suez I) to provide a maximum standardization of spare parts.

2) Separation of the mill drive room from the main building will permit dust free operation and maintenance.

3) Two (2) open circuit and one (1) closed circuit milling systems will provide high operating flexibility.

4) The cement grinding facility will be centrally located to control room and laboratory.

5) Cement storage will be near cement grinding which minimizes the cement pumping distance.

6) All mills will have classifying linings in the second compartment for high grinding efficiency.

J. Cement Loading and Packing

1) Loading facilities will be located near the main plant gate which eliminates heavy traffic through production areas.

2) Bulk loading with a minimum of equipment will be possible without affecting transfer of cement to bag loading operation.

3) Four rotary type packing machines will be provided in a pack-house adjacent to the cement silos. Packaged cement will be conveyed to a covered truck loading station where four trucks can be loaded simultaneously while four other trucks are being prepared.

4) The packing plant will be located immediately ~~adjacent to loading~~ dock to minimize handling of the bags.

5) Paper sacks for packaged cement will be manufactured on site.

K. Central Control Room and Laboratory

1) An independent building will permit immediate construction of building without interference or delays from any mechanical construction.

2) Location of the laboratory with the central control room allows for the best quality control.

3) The control room will be immediately adjacent to the burner floor, which is beneficial, especially at start-up.

4) The central location of the control room permits shorter electrical cable runs for the present plant as well as future expansion.

L. Oil Receiving and Storage

1) Oil storage and receiving will be located outside of the production area, south of the burner floor. Piping runs for distribution to high usage areas will be kept at a minimum.

2) Fuel oil truck traffic will be on the perimeter road outside of the production areas.

PRELIMINARY BASIC DESIGN DATA
(MATERIAL BALANCE)

1.0 BASIC FACTORS USED IN CALCULATION OF DESIGN DATA

1.1 Plant Capacity

Material	Tons Per Day (Metric)	Tons Per Yr. (Metric)	Remarks
Clinker	4500 (Normal)	1,350,000	Assuming 300 days/yr
Clinker	4950 (Max.)	1,485,000	Assuming (Normal X 110%)
Cement	4725 (Normal)	1,417,500	Assuming 5% Gypsum
	5197 (Max.)	1,559,250	Assuming 5% Gypsum

1.2 Design Operating Hours

Department	Hrs/Day	Days/Wk	Hrs/Wk	Days/Yr
Quarry Limestone	7	6	42	300
Clay	7	6	42	300
Other Raw Matls.	3	6	18	300
Gypsum & Additives	7	6	42	300
Raw Mill	22	6	132	300
Kiln	24	7	168	300
Finish Mills	22	6	132	300
Packing & Loading	14	6	84	312

2.0 KILN DEPARTMENT

2.1 Raw Mix Quantities

2.1.1 Assuming:

a. Loss on Ignition (raw mix) = 35.0%
b. System Dust Loss = 4.0%

2.1.2 Then

a. Tons raw mix per ton clinker = $\frac{1.00}{.65 \times .96}$ = 1.60 (dry basis).

b. For Preliminary Basis use 1.60 tons (dry raw)/ton clinker.

2.1.3 Dry Raw Mix usage to kiln: Tons (metric)

Based on clinker production of	4500tpd	4950tpd
Anually (300 days)	2,160,000	2,376,000
Weekly (7 days)	50,400	55,440
Daily (24 hours)	7,200	7,920
Hourly	300	330

2.1.4 Raw Mix requirements as fed to kiln:

a. Moisture Content < 0.5%

b. sp. gr. (Avg. aerated) (Normal) 1.0
(high, deaerated) 1.45
(Low, max. aeration) .6

c. Design; Kiln Feed Rate Max. (330 + 10% recycle) x1.25 = 450tph

Kiln Feed Rate Min. 1/3 (300tph normal) = 100 tph

d. Expected Normal feed rate max. 330tph + 10% recycled = 363tph

2.2 Homogenization

a. 2 Blending Silos @ 4500 t each = 9000 t total

b. Sp. gr. for Volume design = 1.0

c. Sp. gr. for use in Structural design = 1.6

d. Hrs. of kiln feed in each blending silo = $\frac{4500tpd}{300}$ = 15 hrs

Hrs. of kiln feed in each blending silo = $\frac{4500tpd}{330}$ = 13.6 hrs.

Total with both blending silos full 2 x 15 = 30 hrs
Total with both blending silos full 2 x 13.6 = 27.2 hrs

Note: Dust from P/H is returned to Blending Silo

e. Input rate to Homogenizing silo (with raw mill running)
450 (from Raw Mill/s) + 33 (from P/H) = 483tph

f. Input rate to Homogenizing silo (with raw mill down) = 33tph from dust collectors.

2.3 Kiln Feed Storage

a. 2 Feed silos @ 14000t each = 28000t total

b. Sp. gr. for Volume design = 1.0

c. Sp. gr. for Structural design 1.6

d. Kiln feed supply per silo = $\frac{14000}{300 + 10\%}$ = 42 hours

basis on normal production with Extra 10% allowance for Loss from P/H.

Total kiln feed supply (both silos Full) = 84 hrs. or 3-1/2 days

IF kiln is held at maximum rate $\frac{28000}{330 + 10\%}$ = 77 hrs. or 3.2 days

2.3.1 Max. kiln feed inventory in 2 feed silos plus 2 blending silos

a. 2 x 14000t + 2 x 4500t = 37000t

b. Max. hrs of operation at 4500tpd clk rate = $\frac{37000}{300}$ = 123 hr = 5 days 3 hrs.

c. Max. hrs of operation at 4950 tpd clk rate = $\frac{37000}{330}$ = 112 hr = 4 days 16 hrs.

2.4 Fuel for Kiln

2.4.1 No. 6 Bunker C Fuel Oil; Sp. gr. = .95

a. Kiln Fuel consumption (net) = 800 Kcal/kg clk.
@ 25% bypass = 800,000 Kcal/t clk.

b. Average Heating Value of Fuel Oil (Net. calorific value) = 9,000-10,000 K cal/kg

c. At max. clk. production fuel oil usage = 440 - 396tpd

At max. clk. production fuel oil usage = 18.4 - 16.5tph

d. Oil Storage

Total = 2 tanks @ 20500 t = 41000t

i. At Lower Heating Value &

Max rate = $\frac{4100t}{440tpd}$ = 93 days

e. Fuel

	To Kiln	To Precalciner
% heat input normal	40%	60%

2.4.2 Natural Gas

a. Average Heating Valve (Net) = 8010 kcal/m^3

Average Heating Valve (Net) = 6545 kcal/kg

b. At max clinker production natural

gas usage $\frac{800\ 000\ Kcal/t \times 4950t/day}{8010\ Kcal/m^3}$ = 494,382m^3/day

@ 25% bypass = 20,600m^3/hr

= 343m^3/min

= 5.72m^3/sec.

or $\frac{800,000\ Kcal/t \times 4950\ t/day}{6545\ Kcal/kg}$ = 605,042Kg/day

= 25,210Kg/hr

@ 25% bypass = 420Kg/min

= 7.00Kg/sec

c. Fuel

	To Kiln	To Preheater
% heat input normal	40%	60%
Input rate for 4950tpdclk	2.80Kg/sec	4.20Kg/sec
Input rate for 4950tpdclk	168Kg/min	252Kg/min

2.4.3 No. 2 oil supply tanks

2 x 30t each = 60t

2.5.0 Clinker Handling System & Storage

2.5.1 Kiln discharge rate

	Normal	Upset Condition*
at 4950tpd clinker tph	206	400
at 4500tpd clinker tph	188	375

*upset condition assumed approximately 2x normal rate.

2.5.2 Clinker Handling System from Cooler into Clinker Silos

Normal 206 + approx. 10 % = 225tph
For design use:
Upset condition of approx. 200% x 206 = 400tph

3.0 RAW MILL DEPARTMENT

3.1.0 Raw Meal Requirement to Kiln for clinker production:

At a rate of 4950tpd = 330tph clinker

At a rate of 4500tpd = 300tph clinker

3.1.1 Raw Meal Size to kiln
12% residue on 90 micron
35% residue on 40 micron

3.2 Raw Mill department Design (Operation of 22 hrs/day)

$$330\text{tph} \times 1.25 \text{ catch-up factor} \times \frac{24\text{hrs}}{22\text{hrs}} = 450\text{tph} = 2 \text{ mills @ } 225\text{tph}$$

Alternative for 22hr/day & 6 days per week

$$330\text{tph} \times \frac{24\text{hrs}}{22\text{hrs}} \times \frac{7 \text{ days}}{6 \text{ days}} = 420\text{tph reg'd so a } 450\text{tph}$$

mill system provides 7% catch-up factor

3.2.1 Mill/s hp = 9000 hp

1 mill @ 9000 hp 2 mills recommended

2 mills @ 4500 hp

3.2.2 Mill hp-hr/t = $\frac{9000hp}{4500hp}$ = 20 hp-hr/t

Mill Kw-hr/t = 20hp-hr/t x .7457 Kw/hp = 14.9Kw-hr/t

3.3 Mill Discharge Handling System

	1 mill	2 mills
a. Sized for recirculating load of	300%	
b. Handling system 450 + 3(450) =	1800tph	900tph
3.4 Air Separator/s Sized for Input of	1800tph	900tph

3.5 Raw Mill Feed Storage Bins

	Limestone	Clay	Iron	Sand
Mix Proportions (assumed)	80%	12%	4%	4%
Total: 450tph mill rate	360	54	18	18
Each mill = 225tph	180	27	9	9
Design: Bin Capacity in tons	270	140	140	140
Withdrawal system - tph	245*	70	20	20
Weigh feeding system tph (min.)	24.5	7.0	2.0	2.0
Weigh feeding system tph (max.)	245	70	20	20

* Withdrawal rate is adequate for mix with 100% limestone requirement.

3.6 Raw Handling feed system to Mill; design rate: 225 x 1.33 = 300tph

3.7 Design pump rate into blending silos from each mill system:
225 x 1.25 = 280tph

4.0 RAW MATERIALS QUARRYING, CRUSHING, HANDLING & STORAGE

4.1.0 Quarrying and Crushing of Limestone.

4.1.1 Operated 7 hrs. per day, 6 days per week, 42 hrs. per wk.

4.1.2 Design Limestone requirement if 90% L.S. in Mix and Kiln producing 4950 tpd of clinker. Limestone required =

330tph x .90 x 24hrs x 7 days = 49896 t/week

$\frac{49896 t/wk}{42 hrs/wk}$ = 1188tph reqd.

1188tph ÷ 0.80 = 1485tph @ 80% efficiency

Use 1500tph crusher system

At 4950 tph clk. rate efficiency reqd = $\frac{1188}{1500} \times 100 = 79.2\%$

at 4500 tpd clk. rate efficiency reqd = $\frac{1188 \times \frac{300}{330}}{1500} \times 100 = 72\%$

4.1.3 Limestone Handling System into Storage stockpile design rate.

1500tph x 1.4 factor to handle crusher surges = 2100tph

Suggested alternate: basis of using an inline surge bin after first belt with controlled maximum feed rate of 1500tph onto conveying system.

4.1.4 Limestone Reclaiming from storage stockpile; design recovery rates:

Reclaimer = 500tph
Withdrawal belt = 500 x 1.2 = 600tph

4.1.5 Limestone stockpile capacity 2 @ 55000t each = 110,000t

Days of operation @ 4950tpd clinker rate & 90% Limestone Mix:

$\frac{55000}{300 \times .90} = \frac{185 \text{ hrs}}{24}$ = 7-3/4 dys ea pile. Total = 15½ days

Days of operation @ 4950tpd clinker rate @ 80% limestone mix:

$\frac{55000}{330 \times .80} = \frac{208 \text{ hrs}}{24}$ = 8.68 dys. Total ≐ 17-1/3 days

Days of operation @ 4500tpd clinker rate @ 90% L.S. in mix.

$$\frac{55000}{300 \times .90} = \frac{204 \text{ hrs}}{24} = 8\tfrac{1}{2} \text{ days each pile.}$$ Total = 17 days.

Days of operation @ 4500tpd clinker rate @ 80% limestone mix.

$$\frac{55000}{300 \times .80} = \frac{229 \text{ hrs}}{24} = 9.55 \text{ days.}$$ Total = 19 days.

4.1.6 Belt handling system into Raw Mill Limestone Feed Bins.

Reclaimer rate 500 x 1.2 = 600tph

4.2.0 Quarrying & Crushing of Clay.

4.2.1 Operated 7 hrs per day, 6 days per week, 42 hrs. per wk.

4.2.2 Clay requirement if 25% clay in mix and kiln producing 4950 tpd of clinker. Clay required =

330tph x .25 x 24 hr. x 7 days = 13860 t/week

$$\frac{13860 \text{ t/wk}}{42 \text{ hrs}} = 330 \text{ tph reqd if 25\% clay in mix}$$

$$\frac{330 \times .12 \times 24 \times 7}{42} = \frac{6653 \text{ t/wk}}{42} = 158\text{tph reqd if 12\% clay in mix.}$$

Use 375tph crusher system: then

	Mix with 12% clay	Mix with 25% clay
At 4950tpd clk rate, Clay tph rate	158	330
At 4950 tpd clk rate, efficiency reqd	42.1%	88.0%
At 4500 tpd clk rate, clay tph rate	144	300
At 4500 tpd clk rate, efficiency reqd.	38.4%	80%

4.2.3 Clay Handling System into storage stockpile design rate 375 tph x 1.4 factor to handle surges = 525 tph

4.2.4 Clay reclaiming rate from storage stockpile design rate use = 225 tph

4.2.5 Clay and additive feed system design rate = 400 tph

4.2.6 Clay Stockpile Capacity 2 @ 14000t each = 28000 t

Days of operation @ 4950 tpd clk rate & 25% Clay in mix

$\frac{14000t}{330x.25} = \frac{170 \text{ hrs}}{24}$ = 7 days each pile. Total = 14 days

Days of operation @ 4500 tpd clk rate @ 25% clay in mix

$\frac{14000t}{300 \times .25} = \frac{187}{24}$ = 7.8 days each pile. Total = 15.6 days

Days of operation @ 4950 tpd clk rate & 12% Clay in mix

$\frac{14000t}{330 \times .10} = \frac{424 \text{ hrs}}{24}$ = 14.7 days each pile. Total = 29.4 days

Days of operation @ 4500 tpd clk rate @ 12% clay in mix

$\frac{14000t}{300 \times .12} = \frac{389}{24}$ = 16 days each pile. Total = 32 days

5.0 CLINKER STORAGE AND FINISH GRINDING

5.1 3 silos @ 20,000t each = 60,000t (same as Suez I)

Kiln operation @ 4950tpd

$\frac{20,000t}{4950tpd}$ = approx. 4 days to fill a 20,000t silo

60,000 = Approximately 12 days kiln operation

Kiln operation @ 4500 tpd = approximately 4.4 days to fill a 20,000t silo

60,000 = approximately 13.3 days kiln operation

5.2 Clinker Storage Silo Withdrawal System

Use design rate for withdrawal of: 330 x 1.5 = 500tph

Recommend use of high temperature belt conveyor with space for second conveyor for second kiln.

5.3 Finish Mill System

Clinker production from kiln

$\frac{4950tpd}{24\ hr}$ = 206.25tph clinker; 4950tpd x 7 = 34650t/wk clinker

Say 5% Gypsum

206.25 x 1.05 = 216.56tph cement; 34650 x 1.05 = 36383 t/wk cement

For finish milling operation of

22 hr/day; 6days/wk; 132 hr/wk

$\frac{36383t/wk}{132hr/wk}$ = 275.6tph

Using design for 330 tph cement @ 3000 Blaine

$\frac{275.6}{330}$ x 100 = 83.5% efficiency to match kiln production rate

Finish grinding to be in 3 mill circuits of equal capacity

$\frac{330tph}{3}$ = 110tph each

1 - 6000hp mill in closed circuit for 110tph cement @ 3000 Blaine

2 - 6000hp mills in open circuit for 110tph cement each @ 3000 Blaine

These finish mill circuits are duplicates of the open and the closed finish grinding circuits at Suez I. Suez II is to have a second open circuit grinding system.

The sizes and capacities of mills, all auxiliary equipment, feed bins (each circuit with 1-120t clinker bin, 1-100t gypsum bin, and 1-100t additive bin), weigh feeders, materials handling are same as Suez I.

Feed handling system to cement mill: Design rate:

110 x 1.33 = approx. 150tph

5.4 Finish Mill Discharge Handling System

a. Sized for recirculating load of 400%

b. Handling system 110 + 4(110) = 550tph

c. Air separator sized for input of 550tph

5.5 Gypsum Crushing & Handling

5.5.1 Operation: 7h/d; 6d/wk; 42hr/wk & 80% efficiency

Say 5% Gypsum

330tph cement x .05 = 16.5tph gypsum

Minimum gypsum crushing capacity =

$\frac{16.5\text{tph} \times 22\text{hr}}{7\text{ hr}}$ = 51.9tph @ 100% efficiency

Assume at times mills may run 24 hrs then

$\frac{16.5\text{tph} \times 24}{7\text{ hrs}}$ = 56.57tph @ 100% efficiency

At 80% efficiency = $\frac{56.57}{.80}$ = 70.71tph

Gypsum product from impactor to be greater than 95% minus 25mm. Each mill system @ 5% gypsum producing 110tph cement uses $\frac{16.5\text{tph}}{.80}$ = 5.50 tph gypsum.

Maximum hours of operation from full 100t gypsum bin using 5% gypsum in cement =

$\frac{100\text{t}}{5.5\text{tph}}$ = 18.2 hrs.

If mills run 24 hours: 16.5tph x 24 hr = 396 tpd gypsum used

To crush in 5 hrs with 93% efficiency $\frac{396}{.93 \times 5}$ = 85tph crusher

Within 7 hr run 2 hrs available for filling additive bins

5.5.2 Gypsum Crusher & Feeding Design Rate = 85tph

Suggested alternate is to increase gypsum crusher size to obtain a crushing rate of approximately 150tph.

The capital cost increase would be minimal for crusher with larger motor. The increased production improves system flexibility and frees operator for other tasks.

5.5.3 Gypsum Crusher Feed Hopper - Approx. $9m^3$

5.6 Additive Hopper & Feeding System to Conveyor & Mill Feed Bin

5.6.1 Additive Hopper Size - Approx $9m^3$

5.6.2 Additive feeder and materials handling conveying system (for gypsum and additives) to Bins: Design rate = 150tph.

Time req'd to fill 3-100t bins @ 150tph rate = 2 hrs.

Time req'd to fill 3-100t bins @ 300tph rate - 1 hr.

Suggested alternate: Use design capacity of approximately 300tph. The capital cost increase will be minimal for only slight increase in drive horsepower would be involved because 24" belts would be used in either case. Required operator time would be less and free operator to perform other tasks.

5.7 Finish Mill System Weigh Feeder Design Rates

For Clinker:	10:1 ratio	15 - 150tph
	Size	- 25mm
	Density	1.4 t/m^3
	Temperature Less Than	110^oC
For Gypsum:	10:1 ratio	1 - 10 tph
	Size	- 25mm
	Density	1.25 t/m^3
	Temperature Less Than	80^oC

For Additives:	10:1 ratio	4 - 40tph
	Size	- 25 mm
	Density	1.36 t/m^3
	Temperature Less Than	80^oC

6.0 CEMENT STORAGE SILOS AND PACKHOUSE

System design & Equipment Size & Design same as Suez I except use 4 vs 3 packers.

6.1 Cement silos six (6) at 10,000t capacity = 60,000
Design feed rate into silos from each mill system = 110 x 1.25 = 138tph
Bulk loading spouts: 6

6.2 Packers: 4 Systems each with an 8 spout rotary packer for 2000 - 50 kg bags per hour.
Total output from 4 systems = 400tph.

6.2.1 Bag truck loaders: 8 arranged for use at 8 truck loading docks.

6.3 Operation & Output of Bagged Cement

$$7 \text{ hrs/shift} \times 4 \text{ packages} \times 2000 \text{ bags/hr} \times \frac{50\text{kg ea}}{1000\text{kg/t}} = 2800\text{t/shift}$$

2800 t x 6 days/wk = 16800 t/shift/wk

16800 t x 52 weeks = 873,600t/y/shift

With 2 shifts (ie 14 hr/day) max. output = 1,747,200 tpy in bags

$\frac{1,559,250 \text{ tpy}}{1,747,200}$ = approx. 90% efficiency req'd to ship 100% of plant output. at maximum yearly production in bags.

$\frac{1417500 \text{ tpy}}{1,747,200}$ = approx. 80% efficiency req'd to ship

100% of plant output at normal yearly production in bags.

7.0 WASTE DUST NODULIZING & DISPOSAL

7.1.1 Quantity of waste dust assumed:

4% of kiln feed.

.04 x 330tph = 13.2tph alkali dust

7.1.2 Waste dust surge bin
for 20 hrs. capacity

20 x 13.2 = 264t

7.1.3 Nodulizer operation for 7 hr/day 7 days/week

13.2t/hr x 24 hr/day = 317 t/d ÷ 7 hr/day = 45.0 t/hr.
nodulizing rate.

Design:
45.0 x 1.3 = 60 ton/hr. nodulizing rate.

Discharge to surge pile for loading into trucks by front end loader.

PROJECT COST ESTIMATE

Description	Egyptian Pounds (LE 000)		U.S. Dollars ($ 000)	
A. Procurement Cost				
Cement Prod. Line-Mechanical C.I.F. including Spare Parts	-0-		74,741	
Cement Prod. Line—Electrical C.I.F. including spare parts	-0-		21,501	
Bag Manufacturing Equipment	-0-		4,875	
Limestone Quarry Equipment, C.I.F.	-0-		8,400	
Clay Quarry Equipment C.I.F. including spare parts	-0-		1,172	
Workshop equipment C.I.F. including spare parts	-0-		1,291	
Laboratory Equipment C.I.F. including spare parts	-0-		534	
Total Procurement Costs		00		112,515
B. Construction Costs				
Civil Work—Bag Plant	2,429		-0-	
Civil Work on Site (Quarry & Plant)	32,110		-0-	
Administration Buildings	1,313		-0-	
Erection	6,804		5,500	
Off-site Utilities	8,340	50,996	3,600	9,100
C. Other Costs				
Capital Investment not included In Construction Costs				
Land for Plant Site		527		-0-
Vehicles for Transportation of S.C.CO. Personnel	-0-			1,682
Mobile Equipment for Operation of Plant	-0-			
D. Indirect Costs				
Temp. Facilities - Equipment	-0-		454	
Temp. Facilities - Install	-0-		114	
Temp. Facilities - Operation	-0-		25	
Temp. Facilities - Maintain	-0-		15	
Construction Tests	27		-0-	
Construction Housing	250		-0-	
Preoperating Costs	440		-0-	
Initial Materials	531		-0-	
Fixed Preoperating Costs	476		-0-	
Variable Preoperating Costs	254		-0-	

Misc. SCC Consultants Expenses	1,247		-0-
Facilities at Quarry	189		-0-
Facilities at Clay Pit	189		-0-
Indirect Construction Costs (Utilities)	236		-0-
Total Indirect Costs		3,839	608
Sub-Total		55,362	123,905
Contingency and Excalation		11,407	6,195
TOTAL PROJECT COST		66,409	130,100
Combined Dollar and LE costs	$196,509		

CONSTRUCTION MANAGEMENT

Elements of Design/Construction			
FUNCTION	USAID	SCCO	U.S. C/M Firm
Financial Matters			
Obtain Financing	R	R	
Obtain Letter of Credit	R	R	C
Project Cash Flow		R	A
Approval of Invoices for Suppliers and Subs.			R
Payment of Invoices		R	A
Manufacturing Process			
Concept of Process		R	A
Process Design		R	A
Drawings			R
Equipment Specifications			R
Control System Specification			R
Facilities			
Conceptual Layout		R	A
Design			R
Drawings			R
Vendor/Shop/Erection Dwgs			R
Procurement			
Prepare Specifications		R	A
Preparation of Bid Documents		R	A
Selection of Vendor		R	A
Issue Purchase Order		R	A
Transport in US-at Sea		R	A
Insurance		R	A
Transport & Storage in Egypt		R	A
Management			
Control Systems on Design/Procurement/Constr.			
Cost		R	A
Planning		R	A
Scheduling		R	A
Quality		R	A

FUNCTION	USAID	SCCO	U.S. C/M Firm
Construction Management			
Organization at Site		R	A
Supervision at Site			R
Manning at Site			R
Selection of Site Personnel			R
Determine Authority and Level of Supervision		R	A
Construction Forces			
Selection Local Hire or Subcontractors		R	A
Selection of Subcontractor		R	A
Selection of US or Local		R	A
Authority over Local Hire and Subcontractors		R	A
Liabilities			
Cost		R	
Time		R	
Performance		R	
Training		R	
Start-Up			
Testing Equipment		R	A
Debugging		R	A
Commissioning		R	A
Proof of Performance Runs		R	A

C = Consult with or Advise Client
A = Act as Agent for Client
R = Responsibility (Includes One or More of the Following)
- Making Decisions
- Approvals
- Taking Actions

Financial Analysis

1. Approach

A financial analysis is essential to an overall project evaluation. This effort deals with the process of using the technical engineering, financial, and economic information developed in other parts of the study to determine the financial feasibility of the project. To effectively and efficiently address this requirement, the study team developed a model which generates projected financial statements for alternative sets of conditions which might describe the project. In this way, particular factors critical to overall project success can be highlighted and tradeoffs available to leaders and policy makers can be clearly identified.

The primary objective of this analysis is to provide an examination of the financial results of the proposed Quattamia cement plant based upon the available data. The financial analysis includes, but is not limited to, the following financial and operational information:

- Project capital costs and operating capital requirements;
- Profitability, including cement sales volumes, prices, and operating costs; and
- Financing, including equity investment, a loan from the United States Agency for International Development (USAID) and other short- and long-term debt requirements.

The financial analysis chapter of the report addressed the following information:

- Methodological Approach -- This section describes the development of the computerized financial projection system used for generating the various projected financial statements under a variety of alternative scenarios for both financial and operational sensitivity analyses. The projected financial statements cover a time frame

which includes the project's pre-construction phase, construction phase, and first ten years of operations.

- Base Case Analysis -- The available information provided to us and described in this section deals with data input and assumption, and reflects the data entered into the projection system. This data, along with the projected financial statements generated from the computerized time sharing model, represent the "base case"[1/] This section of the chapter presents a detailed financial analysis of this base case, including: presentation of the projected financial statements, cash flow and working capital analysis, internal rate of return analysis, earnings and profitability analysis, and financing requirements.

- Sensitivity Analysis -- Variations in key factors and assumptions are considered in this section to determine their sensitivity on the financial results. The key factors examined include: selling prices, capital costs, production phase-in and full production level, bulk/bagged sales mix, construction period schedule, and various combinations of the above factors.

On the basis of an examination of the base case and consideration of the sensitivity analysis, the financial and operational results are summarized and pertinent conclusions which can be drawn from the analysis are presented.

2. Summary and Conclusions

After the first few years of production, the proposed Quattamia plant is projected to generate sufficient cash and profits to:

[1/] All data assumptions underlying this base case are shown in Schedule II, page R-5 thru R-8. The financial analysis and findings of the base case are shown in column 1 of Schedule II.

- remain solvent as an ongoing business operation with no additional government financial assistance;
- service its debt;
- eliminate the need for short-term borrowings; and
- distribute profits to shareholders and personnel

The study indicates the amounts of capital required to finance the project. Considering the base case assumptions, L.E. 60.65 million of L.E. capital and L.E. 91.107 million of dollar financing must be available to the project. Schedule III has more detail on the above financing requirements. Without such financing the project can not proceed to completion. The study team has not evaluated the potential for attracting prospective lenders and investors.

It is very important to mention that deviation from the assumptions included in the base case can have a significant impact on the achievability of the projected financial results, and consequently, the financial viability of the project.

The following observations summarize the major conclusions of the 10 cases on which the sensitivity analysis was performed in the report:

- Selling Prices -- The proposed financial results are extremely sensitive to the prices at which the cement is sold. Selling prices below the base case assumption of L.E. 24/ton of domestic bulk cement, L.E. 26/ton of domestic bagged cement, and L.E. 23/ton of export bagged cement will have a major negative financial impact on the project.
- Construction Costs and Construction Period -- Although less sensitive than selling price in terms of impact on earnings and cash flow, an increase in construction costs and/or construction period from the base case

assumptions will result in the requirement for additional financing, and increased financial charges against earnings.

- Production level of the Plant -- The projections assume production level of 1.39 million metric tons per year (MMTPY). The sensitivity analysis indicates that if attained production levels average 95% of 1.39 MMTPY (or 1.32 MMTPY), aggregate net earnings and cash flow for the first 10 years of operation will fall approximately 35% and 5%, respectively, from the base case projections. Should production levels actually attained be at still lower levels, the project could be financially unviat e.

TABLE # 1 BASE CASE INPUT DATA AND ASSUMPTIONS

Ref. #	Description	Source	Data
1.	Plant Capacity (tonnage per year)	H. K. Ferguson Company	1,390,000
2.	Capital Costs:	H. K. Ferguson Company	
	L.E. (in 000's)		35,887
	$ (L.E. equivalent in 000's)		91,107
3.	Other Costs of Project:	H. K. Ferguson Company	
	L.E. (in 000's)		2,041
	$ (L.E. equivalent in 000's)		-
4.	Projected USAID Loan:		
	Loan Amount in $ (L.E. equivalent in 000's)	Study Team	87,535
	Grace Period for Repayment	Suez Cement Company	4-1/2 years
	Interest Rate (per annum)	Suez Cement Company	10%
	Amortization Period	Suez Cement Company	10-1/2 years
	Frequency of Repayment	Suez Cement Company	semi-annual
5.	Other Long-Term Debt:	Coopers & Lybrand	
	Loan Amount in $ (L.E. equivalent in 000's)		3,572
	Grace Period for Repayment		4-1/2 years
	Interest Rate (per annum)		10%
	Amortization Period		5 years
	Frequency of Repayment		semi-annual
6.	Equity Investment (in 000's L.E.)	Suez Cement Company	32,000
7.	Construction Period	H. K. Ferguson Company	3 years
8.	Production Period Analyzed	Coopers & Lybrand	10 years

TABLE V.1 BASE CASE INPUT DATA AND ASSUMPTIONS

(Continued)

Ref. #	Description	Source	Data
9.	Production Phase-In (% of capacity):	Suez Cement Company	
	First Year of Operation		60%
	Second Year of Operation		80%
	Third & Subsequent Years of Operation		100%
10.	Sales Mix (as % of Production)1/:	H. K. Ferguson Company/ Suez Cement Company	
	Export Bagged		10%
	Domestic Bulk:2/		
	- First Year of Operation		10%
	- Second Year of Operation		20%
	- Third Year of Operation		30%
	- Fourth Year of Operation		40%
	- Fifth & Subsequent Years of Operation		50%
	Domestic Bagged:2/		
	- First Year of Operation		90%
	- Second Year of Operation		80%
	- Third Year of Operation		70%
	- Fourth Year of Operation		60%
	- Fifth & Subsequent Years of Operation		50%

1/ Sales during the first year of operation represents 60% of production less an initial inventory build-up of 60,000 tons each of cement and clinker; sales in all subsequent years reflect total production.

2/ The bulk/bag sales distribution is based upon domestic sales, i.e., cement production less export sales of 10%.

TABLE V.1 BASE CASE INPUT DATA AND ASSUMPTIONS

(Continued)

Ref. #	Description	Source	Data
11.	Selling Prices (Per Ton; in L.E.)	Study Team	
	Export Bagged		23
	Domestic Bulk		24
	Domestic Bagged		26
12.	Production Costs:		
	Variable Costs/Ton Cement (in L.E.)	Arab Swiss Engineering Company	5.8
	Annual Labor Cost	Arab Swiss Engineering Company	
	Cement Plant (L.E.)		1,564,660
	Paper Bag Manufacturing Plant(L.E.)		69,595
	Depreciation Rates (Annual % of Gross Fixed Asset):	Coopers & Lybrand	
	Mine, Quarry & Related Equip.		12.2%
	Clinker Production Equip. & Installations		8.4%
	Clinker Grinding Equip. & Installations		7.0%
	Packing Equip. & Installations 3/		10.0%
	Other Fixed Assets		10.0%
13.	Conversion Ratios:	H. K. Ferguson Company	
	Tonnage of quarry material required per ton of clinker produced		1.65
	Tonnage of clinker required per ton of cement produced		0.952
14.	Interest Rates (% per annum on outstanding balances)		
	Earned interest rate on surplus cash	Coopers & Lybrand	5.0%
	Interest rate on local short-term borrowings	Suez Cement Company	8.0%

3/ Includes bag manufacturing plant.

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TABLE ·.1 BASE CASE INPUT DATA AND ASSUMPTIONS

(Continued)

Ref. #	Description	Source	Data
15.	Amortization Rates of Pre-operating Expenses (per annum)	Egyptian Law	20%
16.	Collection Rate on Receivables	Egyptian Cement Office	100%
17.	Disbursement Rates on Payables	Coopers & Lybrand	
	Personnel Expenses		Disburse total expense in current period.
	Trade Accounts Payable		Disburse 83% of total expense of current period plus total outstanding balance of prior period.
	Income Taxes Payable		Total disbursement of prior year accrual.
	Profit Participation Payable		Total disbursement of prior year declaration.
	Dividends Declared		Total disbursement of prior year declaration.
18.	Allocation of Net Income:		
	Legal Reserve	Egyptian Law	Amount Variable 4/
	Income Taxes	Egyptian Law	Amount Variable 4/
	Profit Participation	Coopers & Lybrand	Amount Variable 4/
	Dividend Distribution	Coopers & Lybrand	Amount Variable 4/
	Unappropriated Earned Surplus	N.A.	N.A.

N.A. = Not Applicable; this represents the residual of net income less the sum of allocations to legal reserve, income taxes, profit participation, and dividends declared.

4/ The amount of net income allocated to legal reserve, income taxes, profit participation, and dividend distribution is dependent upon year of operation (tax exempt for first 8 years of operation) and financial management policies. The study team allocated net income to these categories on the basis of sound financial management procedures within the framework of Egyptian taxation laws.

Additional Financial Analyses

The study team was asked by the Suez Cement Company and USAID officials to perform additional sensitivity analyses on the original financial projections for the proposed Quattamia cement plant and to consider the combined financial results of both Suez Cement Company plants. The methodological approach to these analyses is the same as that discussed in Chapter I, Section V.

This chapter is a discussion of these additional financial considerations. As in the basic financial projection analysis presented in Chapter 1 of this Executive Summary, the financial forecasts and analysis must be subjected to careful judgment since deviation from the assumed events and data may result in a substantive impact upon the conclusions which may be drawn.

A. Additional Sensitivity Analysis

The highlights of the two additional sensitivity analyses performed at the request of the management of the Company after the Report on Phase II, Part 1 had been drawn up, are shown on Schedule III. They call for the following observations:

- The first variation shows the combined impact of reducing the construction period to two and one half years (instead of three), increasing the construction cost in Egyptian pounds by 10%, and limiting the maximum actual production (from the fourth year onwards) to 95% of 1.39 MMTPY, all other assumptions being unchanged from the base case as discussed in Chapter 1. The generation of cash income from sales of cement starting six months earlier reduces the amount of borrowings needed to finance the construction costs in Egyptian pounds (albeit increased by 10%) and the financial charges in Egyptian pounds are accordingly lower. This advantage, however, is more than offset by the reduction of income resulting from production at 95% of 1.39 MMTPY and the aggregate net profit as projected for the twelve years through 1993 is reduced by 14.3% compared to the base

case, while the return on equity is reduced by 10% from 9% to 8.1%.

- The second additional analysis takes into account the same variations as the first one plus two other factors, viz. an increase of L.E. 2.0 per ton in the price of all domestic sales and the increase of the rate of interest on borrowings in Egyptian pounds from 8% to 11% per year. The resulting increase in the financial charges is more than offset by the potential earnings (calculated at 5% per annum) from the additional surplus cash resources generated as a result of the higher selling prices, so that the aggregate net profit is increased by 24.4%, compared to the base case. The return on equity is increased by 30% from 9% to 10.7%.

Both these analyses underscore the importance already indicated of maintaining a high level of cash income from sales. During the first ten years of production, when a substantial portion of the operating profits is absorbed by financial charges, any reduction of the gross income from sales, whether caused by reduced volume or lower selling price, will be very detrimental to the project's financial equilibrium.

In conclusion, we wish to point out that while the financial projections referred to thus far in this executive summary, related to the sole Quattamia plant, can, with proper interpretation, provide much valuable information for the study of alternative modes of financing and operating conditions, any serious study of the financial feasibility of the Company's projects must be based on projections of the overall financing plan and operating program embracing the two plants. Financial considerations regarding the joint operations of the Suez and proposed Quattamia plants are presented in the next paragraph.

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FINANCIAL ANALYSIS OF BASE CASE AND ADDITIONAL VARIATIONS REQUESTED

SCHEDULE III

(All Amounts in Thousands)

	Base Case	Additional Variation A1	Additional Variation A2
Assumptions Underlying Calculations:			
Construction Period	3 years - 1979-1981	3 1/2 yrs - July 79-Dec 81	3 1/2 yrs - July 79-Dec 81
Capital Investment Cost in L.E.	L.E. 35.887	Plus 10% = L.E. 39.476	Plus 10% = L.E. 39.476
Rate of Annual Production as Capacity	1982: 60% 1983: 80% 1984: 100% 1985 and after: 100%	1982: 60% 1983: 80% 1984: 90% 1985 and after: 9[illegible]	1982: 60% 1983: 80% 1984: 90% 1985 and after: 9[illegible]
Selling Prices (Per Ton)			
Domestic Bulk	L.E. 24	L.E. 24	L.E. 28
Domestic Bagged	L.E. 26	L.E. 26	L.E. 26
Export Bagged	L.E. 23	L.E. 23	L.E. 23
Rate of Interest on Borrowings in L.E.	8% p.a.	8% p.a.	11% p.a.
All Other Assumptions for Base Case & Cases A1 & A2 as per Schedule 1			
Estimated Financing in L.E. Required Before Start of Production:			
Capital Investment Costs	L.E. 35.887	L.E. 39.476	L.E. 39.476
Pre-operating Admin. Expenses	1.409	1.409	1.409
Purchase of Raw Materials and Supplies	116	116	116
Interest Payments on ADB Financed Loan	19.695	13.130	13.130
Interest Payments on Other Borrowings	2.736	1.496	1.867
Cash on Hand at Start of Production	605	709	738
TOTAL	L.E. 60.648	L.E. 56.336	56.336
Proposed Financing in L.E.			
Equity Shares	L.E. 32.000	L.E. 32.000	L.E. 32.000
Debt: Borrowings in L.E.	28.600	24.300	24.300
Earned Interest on Time Deposits	48	36	36
TOTAL	L.E. 60.648	L.E. 56.336	L.E. 56.336
Capital Investment Costs in Dollars			
Financed by ADB	($125,000) L.E. 87.535	($125,000) L.E. 87.535	($125,000) L.E. 87.535
Financed by Other Sources	($ 5,100) L.E. 3.572	($ 5,100) L.E. 3.572	($ 5,100) L.E. 3.572
TOTAL	($130,100) L.E. 91.107	($130,100) L.E. 91.107	($130,100) L.E. 91.107
Cost of Repayment of Financing of Dollar Costs (Including Interest) After Start of Production	L.E. 134.346	L.E. 134.346	L.E. 134.346
Peak Borrowing in L.E.	(1982) L.E. 29.800	(1982) L.E. 25.200	(1982) L.E. 25.000
Total Cost of Repayment of Borrowings in L.E. (Including Interest)	(1982-1986) L.E. 38.372	(1982-1986) L.E. 32.460	(1982-1985) L.E. 33.928
Results of Operations (10 Years)			
Aggregate Losses	(1982-1984) L.E. (27.839)	(1982-1984) L.E. (25.770)	(1982-1984) L.E. (22.152)
Aggregate Profits - Before Tax	(1985-1993) L.E. 99.503	(1985-1993) L.E. [illegible].150	(1985-1993) L.E. 101.301
Aggregate Net Profit	(1982-1993) L.E. 71.664	(1982-1993) L.E. 61.380	(1982-1993) L.E. 79.149
Allocation of Profits			
Income Tax Assessed	(1990-1993) L.E. 6.241	(1990-1993) L.E. 4.918	(1990-1993) L.E. 6.825
Profit Distributions Declared	(1988-1993) L.E. 45.839	(1989-1993) L.E. 39.734	(1987-1993) L.E. 57.504
Retained Earnings	L.E. 19.584	L.E. 16.728	L.E. 14.819
TOTAL - as above	L.E. 71.664	L.E. 61.380	L.E. 79.149
Net Cash Generated From Operations (Before Payment of Financial Charges)	(1982-1993) L.E. 294.131	(1982-1993) L.E. 278.680	(1982-1993) L.E. 306.[illegible]
Position at the End of 1993			
Net Book Value of Equity as Measured by Total Net Assets (All Long-term Debt Being Paid Off)	L.E. 51.584	L.E. 48.728	L.E. 56.809
Rate of Return on Equity			
Investment in Equity	(1979-1981) L.E. 32.000	(1979-1981) L.E. 32.000	(1979-1981) L.E. 32.000
Revenue:			
. Dividends (Including 1993 Dividend Paid Out in 1994)	(1989-1994) L.E. 41.520	(1990-1994) L.E. 43.520	(1988-1994) L.E. 52.480
. Book Value of Equity as at 31/12/1993	(1993) L.E. 51.584	(1993) L.E. 48.728	(1993) L.E. 56.809
Rate of Return (Discounted Cash Flow)	9.3%	8.1%	10.7%

Financial Analysis of Suez Cement Company

This paragraph provides an examination of financial considerations of the total Suez Cement Company. Based upon discussions on 17/18 July, 1978 with management of the Suez Cement Company and officials of the United States Agency for International Development (USAID) subsequent to the preparation of the Phase II, Part 1 Report, the management and officials provided the study team with additional financial data and assumptions for the purpose of supplemental financial analysis. The methodological approach, i.e., the use of the computerized financial projection model along with information generated from the system (projected financial statements, production summary statements, etc.), is identical to that used in the financial analysis for the Phase II Part 1, scope of work.

For this analysis, not only is the proposed Quattamia cement facility considered as a "stand alone" project, but the combined operations of the Suez and proposed Quattamie plants are also examined. A thorough financial feasibility study of a project should consider the project not only as a separate entity, but also in conjunction with the other operations with which the project is related (i.e., the total firm). This is particularly significant and realistic for this study since results of operations of the Suez plant, particularly cash generated from operations, can impact the proposed Quattamia plant.

The remainder of this section provides the following information:

- Data and Assumptions -- This subsection describes the basic data input and general assumptions provided by the Suez Cement Company and USAID/Cairo and used for the new "base case" projections. In addition, the variations in data and assumptions for sensitivity analysis are presented.
- Financial Results -- This subsection addresses the financial results in terms of key financial indicators such as

financing, results of operation, cash flow and return on equity. Both the new "base case" projections and the various scenarios of the sensitivity analysis are considered.

- Summary and Conclusions -- This subsection presents the summary of the financial results and all pertinent conclusions which can be drawn from the analysis.

Note that two "base cases" are considered as part of this analysis. First, the proposed Quattamia plant is considered as a separate entity, i.e., a "stand alone" project. Secondly, a firm-wide perspective is provided with results of operations from both the Suez and proposed Quattamia plants considered jointly. Given the more pertinent approach of joint operations, sensitivity analysis is performed on a firm-wide basis, with Suez operations held constant and the proposed Quattamia operations varied to determine the impact of changes in assumptions and data for the new cement facilities upon the entire firm (Suez Cement Company).

Again, it must be reiterated that the projected statements developed for this analysis are compiled from unaudited technical and financial data and assumptions which are currently available. To the extent that assumed events do not materialize and the data is modified, the financial results may vary substantially from the forecasts presented herein, and may have a substantive impact upon any conclusions which can be drawn.

1. Data and Assumptions

   The basic data and assumptions for the analysis were provided by the Suez Cement Company and USAID officials. The basic data and assumptions for the proposed Quattamia facility, highlighted in Schedule IV, are as follows:

   - Construction Period -- A two and one half (2-1/2) year construction period, commencing in July 1979 and ending in December 1981, is assumed.

- Capital Investment Costs -- A total capital investment of L.E. 128,387,000 is projected. This amount consists of L.E. 92,500,000 in U. S. dollar costs (expressed in L.E. equivalents)1/ and L.E. 36,887,000 in local currency costs. Costs not covered by equity & USAID financing are assumed to be obtained from local borrowings.
- Equity Financing -- Equity financing of L.E. 40,000,000 is assumed, with L.E. 8,500,000 of share capital issued for cash and L.E. 31,500,000 of share capital issued to the public sector against equipment paid for by USAID. This equity financing arrangement is significantly different from the original set of assumptions and reflects a later financing plan proposed by USAID.
- USAID Financing -- A loan of $50,000,000 or L.E. 35,000,000 has been proposed by USAID.
- Interest Rate on Short-Term Borrowings -- An interest rate of eleven percent (11%) per annum is assumed.
- Production Phase-In -- Operations are anticipated to commence in 1982 with production at 60%, 80% and 100%, of capacity (1,390,000 tons of cement per annum) in 1982, 1983 and 1984 (and after) respectively.
- Selling Prices -- Selling prices of L.E. 26, L.E. 28, and L.E. 29 per ton are assumed for domestic bulk, domestic bagged, and export bagged cement, respectively.

All other financial data and general assumption, including operating costs, regarding the proposed Quattamia plant are the same as those presented in the financial analysis.

1/ This figure differs from the original base case (see Schedule I) in U. S. dollar cost estimate of L.E. 91,107,000 as a result of consideration of a higher exchange rate (approximately 0.75 L.E. per dollar versus 0.70 L.E. per dollar) for the purchase of dollars from local currency borrowings (approximately $29,400,000).

chapter of the H. K. Ferguson International report on Phase II Part 1 of the Suez Cement Company Feasibility Study.

The basic data input and general assumptions for the operations of the Suez plant are also presented in Schedule IV, pg.

This data is summarized below:

- Construction Period -- The construction period is three (3) years, commencing in January, 1978 and ending in December, 1980.
- Capital Investment Costs -- Capital investment costs total L.E. 96,671,000 (including revaluation of dollar costs of equipment at the Suez plant in the amount of L.E. 28,000,000), with L.E. 62,410,000 in U.S. dollar costs (expressed in L.E. equivalents) and L.E. 34,261,000 in local currency costs.
- Equity Financing -- Total equity for the Suez plant amounts to L.E. 44,400,000, composed of: L.E. 11,000,000 in share capital issued for cash; L.E. 5,400,000 in share capital issued to the public sector against equipment paid for by USAID; and L.E. 28,000,000 in revaluation of dollar costs of equipment for the Suez plant.
- USAID Financing -- USAID financing is anticipated to consist of an L.E. 25,296,000 loan and an L.E. 3,565,000 grant.
- Interest Rate on Short-Term Borrowings -- An interest rate of eleven percent (11%) per annum is assumed.
- Production Phase-In -- Operations are anticipated to commence in 1981, with production at 60%, 80% and 100% of capacity (1,000,000 tons of cement per annum) in 1981, 1982 and 1983 (and after), respectively.

- Selling Prices -- Selling prices of L.E. 26 per ton of domestic bulk cement, L.E. 28 per ton of domestic bagged cement and L.E. 29 per ton of export bagged cement are assumed.

These financial data and assumptions for the Suez plant are considered constant thorughout all forecasts; sensitivity analysis is performed on the Quattamia plant only.

Three key assumptions were modified to determine their financial impact upon the combined operations of Suez and Quattamia. The factors for the proposed Quattamia facilities for which the sensitivity analysis were performed are:

- Construction period estended by six (6) months to three (3) years with production commencing in July, 1982.
- The investment costs in local currency increased by ten percent (10%); and
- Production reduced during the third and subsequent years of operations to ninety-five percent (95%) of capacity.

A fourth variation, the combination of the three previous variations, is also considered.

2. Financial Results

This subsection presents the financial analysis of the new "base case" projections and the various scenarios generated. The key factors considered are: financing, results of operations, cash flow, and return on equity. The financial results and analysis are presented in Schedule IV, pgs. ES-20 and ES-21.

A. Examining the new "base case" projections of the proposed project alone, i.e., the new Quattamia facility, provides the following information:

- The financing required before start-up of operations is projected to be L.E. 68,500,000, the largest portions representing capital investment costs of L.E. 35,887,000 in local currency and L.E. 26,000,000 in dollars (expressed in L.E. equivalents). The sources of this financing are share capital (L.E. 8,500,000) and short-term borrowings (L.E. 60,000,000). This amount of short-term debt of L.E. 60,000,000 which occurs in 1981, represents the peak amount of local borrowings required throughout the analysis period (1978 to 1993).
- The project is forecasted to accumulate a deficit of L.E. 1,532,000 prior to generating a profit (1982-1993) is projected to be L.E. 141,046,000, allocated as follows: L.E. 8,039,000 for assessment of income taxes; L.E. 93,241,000 for declaration of profit sharing and dividents; and L.E. 39,766,000 for retained earnings.
- The net cash generated from operations (excluding financial charges) through 1993 is projected at L.E. 335,384,000.
- The rate of return on equity is forecasted to be 13.7% based upon outflows (from the investor's perspective) of L.E. 40,000,000 in equity investments, and inflows for dividend payments of L.E. 85,500,000 (including those declared in 1993 and paid in 1994) and a book value (also considered as an inflow) of equity at December 31, 1993 of L.E. 79,767,000.

B. Inclusion of the Suez facility provides the following combined results of operations:

- The financing required before start-up of operations is projected at L.E. 105,408,000. Most of this requirement consists of capital investment costs, which includes L.E. 70,809,000 in local currency costs and L.E. 26,000,000 in dollar costs (expressed in L.E. equivalents). The sources of this financing are: share

capital L.E. 19,530,000; cash generated from Suez operations (L.E. 3,518,000); and short-term debt (L.E. 82,000,000), which is the peak amount of short-term borrowings during the period analyzed.

- The Company is projected to accumulate a deficit of L.E. 4,499,000 prior to generating a profit of L.E. 3,939,000 in 1982. The aggregate net profit (1989-1992) of L.E. 257,142,000 is allocated as follows: L.E. 14,919,000 for income taxes assessed: L.E. 174,552,000 for profit participation and dividend declaration; and L.E. 67,671,000 for retained earnings.
- The net cash generated from the operations of both plants (excluding financial charges) through 1993 is L.E. 594,975,000.
- The rate of return on equity is computed to be 12.2% based upon outflows (from the investor's perspective) of L.E. 84,000,000 in equity investment (including L.E. 28,000,000 revaluation of equipment at the Suez plant) and inflows of L.E. 161,280,000 in dividend payments and L.E. 155,316,000 as a book value of equity (considered as an inflow) at December 31, 1993.

The projected results of joint operation of the two plants are less sensitive to variations in key factors (construction period, production level, and investment costs) as compared to the projected results of the proposed Quattamia plant alone. The results of the sensitivity analysis of the projections for the joint operation of the plants shown in Schedule IV, are summarized as follows:

- The financing required in the alternative cases do not vary by more than 4% from the base case. Major elements of both the financing required and financing sources do not very by more than ± 5%.
- The peak amount of borrowings in the base case is L.E. 82,000,000. In the variations considered, this amount did not vary by more than ± 5%.

- The aggregate losses which the Company can expect before a profit is generated is relatively sensitive. Compared to the base case amount of L.E. (4,499,000), the three year construction period decreases the maximum aggregate loss by 17% to L.E. 3,745,000 The combination of all factors raises the maximum loss to L.E. 5,834,000.
- The cumulative results of operations through 1993 are also relatively sensitive. When all variations are considered, the amount of cumulative net profit decreases by 15% from the base case amount.
- The cumulative net cash generated from operations is very insensitive to the variations considered.
- The rate of return varies from 13.7% in the base case to 10.7% in the situation where all three variations are considered. The rates of return for the individual factor variations all fall within this range.

3. Summary and Conclusions

Based on the assumptions and data incorporated into the base case, the financial projections indicate the following:

- The peak amount of short-term borrowings required by the Company is projected to be approximately L.E. 82,000,000.
- The accumulated net profit for the Company through 1993 is projected to be approximately L.E. 250,000,000.
- The financing required before start-up of Quattamia from sources other than USAID is projected to be approximately L.E. 105 million.
- The two plants are projected to generate sufficient cash to repay all debt and distribute profits to shareholders and personnel.

- The rate of return on equity is projected to be in the range of 12.2% to 10.7%.

As in the analysis of the Quattamia plant alone, potential financial viability of the combined operation of the two plants is indicated by the above factors.

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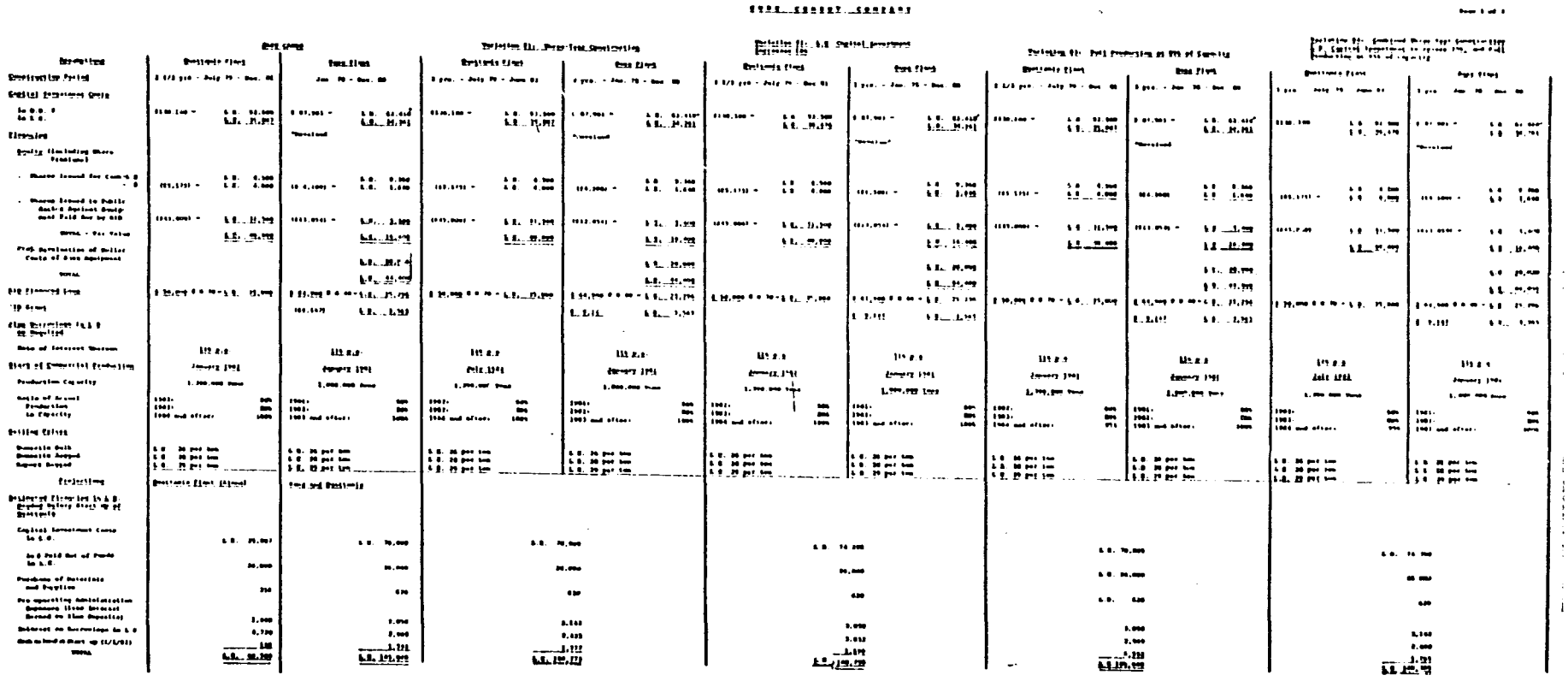

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ANNEX R
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AID 1020-18 (3-78)

Annex S

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project
From FY 79 to FY 81
Total U.S. Funding $95 million
Date Prepared 9/11/78

Project Title & Number: Quattamia Cement, Project 263-0052

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes. To stimulate continuing industrial expansion and economic recovery. To effect a liberalization of the GOE cement pricing policy.	Measures of Goal Achievement: 1. Increased GDP 2. Reduced balance of payments deficit, particularly the reduction of cement imports 3. Increased employment 4. Expansion of industry in the Cairo and Delta Areas. 5. Increased price of cement to a level at or near world market price.	1. GOE statistical data 2. GOE statistical data and ECO records. 3. QCC payroll records and GOE employment statistics for Cairo 4. GOE statistical data for the Cairo and Delta region. 5. Official cement prices	Assumptions for achieving goal targets 1. That negotiations leading to a settlement of political problems will continue and will achieve reasonable progress; that warfare will not be resumed 2. That the policies and actions of the GOE concerning fiscal and monetary policy, prices, debt management, and investment (e.g. "open door" policy) will foster continued growth
Project Purpose: To furnish a large share of the cement requirements of the greater Cairo Area as well as the Delta Area to the north of Cairo in accordance with the GOE development and expansion goals for this area.	Conditions that will indicate purpose has been achieved: End of project status. Quattamia sales revenues generated for 8.3 million tons in 1982, 1.1 million tons in 1983, and 1.39 million tons during the remaining estimated 18 years of cement production	QCC and ECO sales records.	Assumptions for achieving purpose 1. That no major delays occurred to preclud plant operation 1982 2. No major delays in ECO establishing sale office and having available necessary transport equipment for the distribution of cement. 3. That GOE plans for development and expansion of the Cairo and Delta regions proceed as reasonably expected
Outputs: A 1.39 million ton per year cement plant constructed and operational at the Quattamia site near Cairo.	Magnitude of Outputs: Plant operating at 60% capacity the first year, 80% the second and 100% thereafter	QCC production records	Assumptions for achieving outputs 1. No major problems with testing the plant and start-up. 2. Adequate power and water feeding plant. 3. QCC management and line staff capable of operating and maintaining plant.
Inputs: 1. $ AID - Equipment + Services 2. $ IFC, or other Banks - Equipment + Services 3. LE - Bank Consortium - Civil Works 4. $ and LE - Sale of Stock - Civil Works and Equipment.	Implementation Target (Type and Quantity) 1. $95 million 2. $30.5 million 3. LE 43.2 million 4. $4.6 million and LE 3.3 million	1. QCC A/E delivery records and site inspections 2. QCC reports on progress of construction 3. Signed contract, QCC progress reports and site inspections.	Assumptions for providing inputs 1. No significant delays in: a) procurement & delivery of equipment. b. acquisition of training program. c. installation of training program. d. civil construction 2. local banks provide necessary local currency in timely fashion. 3. no difficulties encountered in recruitme of QCC management and line staff.

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ANNEX T

CERTIFICATION PURSUANT TO
SECTION 611(e) OF THE
FOREIGN ASSISTANCE ACT OF 1961, AS AMENDED

I, Donald S. Brown, Director for the Agency for International Development in Egypt, having taken into account, among other things, the maintenance and utilization in Egypt previously financed or assisted by the United States and technical assistance and training planned under this project, do hereby certify that in my judgement Egypt has both the financial capability and human resources capability to effectively maintain and utilize the capital assistance to be provided for the construction of a cement plant with a capacity of approximately 1.39 million tons per annum.

Donald S. Brown
Director

Date