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AGENCY FOR INTERNATIONAL DEVELOPMENT

Washington, D. C. 20523

PROJECT PAPER

EGYPT: Alexandria Electrical Network
Modernization (263-0194)

August 24, 1989

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AGENCY FOR INTERNATIONAL DEVELOPMENT
PROJECT DATA SHEET

1. TRANSACTION CODE
 A = Add
 C = Change
 D = Delete
 Amendment Number _____

DOCUMENT CODE 3

2. COUNTRY/ENTITY
 Egypt

3. PROJECT NUMBER
 263-0194

4. BUREAU/OFFICE
 Asia/Near East Bureau [03]

5. PROJECT TITLE (maximum 40 characters)
 Alexandria Electrical Network Modernization

6. PROJECT ASSISTANCE COMPLETION DATE (PACD)
 MM DD YY
 08 | 31 | 97

7. ESTIMATED DATE OF OBLIGATION
 (Under "B:" below, enter 1, 2, 3, or 4)
 A. Initial FY: [89] D. Quarter: [4] C. Final FY: [90]

8. COSTS (\$000 OR EQUIVALENT \$1 = 2.57) As of June 1, 1989

| A. FUNDING SOURCE | FIRST FY 89 | | | LIFE OF PROJECT | | |
|------------------------|-------------|--------|------------|-----------------|--------|-----------|
| | B. FX | C. L/C | D. Total | E. FX | F. L/C | G. Total |
| ADP Appropriated Total | | | | 50,000 | | 50,00 |
| (Grant) | (15,500) | () | (15,500) | (50,000) | () | (50,00) |
| (Loan) | () | () | () | () | () | () |
| Other U.S. | | | | | | |
| 1. | | | | | | |
| 2. | | | | | | |
| Host Country | | 22,319 | 22,319 | | 25,124 | 25,12 |
| Other Donor(s) | | | | | | |
| TOTALS | 15,500 | | 37,819 | 50,000 | 25,124 | 75,12 |

9. SCHEDULE OF AID FUNDING (\$000)

| A. APPROPRIATION | B. PRIMARY PURPOSE CODE | C. PRIMARY TECIL CODE | | D. OBLIGATIONS TO DATE | | E. AMOUNT APPROVED THIS ACTION | | F. LIFE OF PROJECT | |
|------------------|-------------------------|-----------------------|---------|------------------------|---------|--------------------------------|---------|--------------------|---------|
| | | 1. Grant | 2. Loan | 1. Grant | 2. Loan | 1. Grant | 2. Loan | 1. Grant | 2. Loan |
| (1) ESF | 740B | 825 | | 0 | | 15,500 | | 50,000 | |
| (2) | | | | | | | | | |
| (3) | | | | | | | | | |
| (4) | | | | | | | | | |
| TOTALS | | | | 0 | | 15,500 | | 50,000 | |

10. SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each)

11. SECONDARY PURPOSE CODES

12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)

A. Code _____

B. Amount _____

13. PROJECT PURPOSE (maximum 480 characters).

Modernize and rehabilitate the electrical network serving Alexandria thereby reducing energy losses and enhancing the efficiency and productivity of the network.

14. SCHEDULED EVALUATIONS

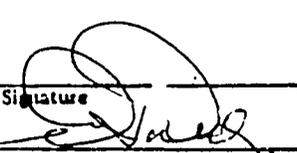
Interim MM YY MM YY Final MM YY
 02 | 93 | | | 09 | 96

15. SOURCE/ORIGIN OF GOODS AND SERVICES
 000 94 Local Other (Specify) _____

16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of a _____ page PP Amendment)

USAID/Egypt Controller concurs with the proposed methods of implementation and financing.

17. APPROVED BY

Signature: 

Title: Charles F. Weden, Jr.
 Acting Mission Director

Date Signed MM DD YY
 08 | 24 | 89

18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AMENDMENTS, DATE OF DISTRIBUTION
 MM DD YY

Phillip R. Amos
 AD/EM



UNITED STATES AGENCY for INTERNATIONAL DEVELOPMENT

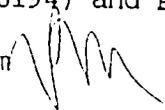
CAIRO, EGYPT

ACTION MEMORANDUM TO THE DIRECTOR

DATE: August 23, 1989

FROM: A/OD/PDS/PS, Basharat Ali 

SUBJECT: Approval of the Alexandria Electrical Network
Modernization PP (263-0194) and Project Authorization

THRU: AD/PDS, Vivikka Molldrem 

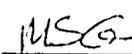
Problem: Your signature is required to approve the PP for the Alexandria Electrical Network Modernization Project No 263-194 for \$50 million. All necessary clearances have been obtained.

Discussion: The subject PP has been reviewed by the Project and the Executive Committees and the revisions noted in the decision memorandum have been made. The following changes have been made and where appropriate have been highlighted in the PP itself:

1. The response to AID/W's PID approval cable has been made more clear and explicit, especially concerning the financial viability of the implementing agencies. (See Annex A, pp. 6-7, and Executive Summary p. V point 2.)
2. The socioeconomic analysis states that the direct beneficiaries of the Project constitute a cross section of the population of Alexandria, and that all Alexandria residents benefit from the dispatch control center (p. 42).
3. There is a new economic and financial analysis in the Project Paper (pp. 44-53). Within that analysis, the economic benefits of the dispatch control center are explained on pp. 51-53.

Recommendation: That you sign the PP facesheet, the Project Authorization, the 611(E) certification, and the Gray Amendment certification.

Clearances

OD/DR/UAD, MGould 

AD/DR, Paul Thorn 

AD/FM, PAROS 

LEG, KO'Donnell 

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UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

CAIRO, EGYPT

EGYPT: ALEXANDRIA ELECTRICAL NETWORK MODERNIZATION

PROJECT PAPER

PROJECT NO. 263-0194

AUGUST 1989

UNCLASSIFIED

EGYPT: ALEXANDRIA ELECTRICAL NETWORK MODERNIZATION

PROJECT NO. 263-0194

TABLE OF CONTENTS

| | <u>PAGE</u> |
|--|--------------------|
| PROJECT DATA SHEET | |
| TABLE OF CONTENTS | |
| REFERENCES | |
| GLOSSARY | |
| EXECUTIVE SUMMARY | i |
| DRAFT PROJECT AUTHORIZATION | ix |
| 1.0 BACKGROUND AND PROJECT RATIONALE | 1 |
| 2.0 PROJECT DESCRIPTION | 5 |
| 3.0 RELATIONSHIP TO DEVELOPMENT STRATEGIES | 7 |
| A. Conformity with Recipient Strategy and Programs | 7 |
| B. Relationship to CDSS | 8 |
| C. Other Donors | 9 |
| 4.0 PROJECT COST ESTIMATE AND FINANCIAL PLAN | 10 |
| A. Cost Estimate | 10 |
| B. Section 611 (a) Determination | 12 |
| C. Disbursement Schedule | 14 |
| D. Assessment of Implementing Agency's Contracting and Voucher Examination Ability | 14 |
| E. Funding Source And Utilization | 16 |
| 5.0 IMPLEMENTATION | 18 |
| A. Schedule | 18 |
| B. Procurement Plan | 18 |
| C. Training | 22 |
| D. Financing Procedures | 23 |
| E. Monitoring and Evaluation | 23 |
| F. Audits and Financial Reviews | 29 |
| 6.0 PROJECT ANALYSES | 30 |
| A. Managerial/Administrative Analysis Host Country | 30 |
| B. Summary of Technical Analysis | 38 |
| C. Environmental Considerations | 39 |
| D. Social Soundness Analysis | 40 |
| E. Economic and Financial Analysis | 44 |
| 7.0 REQUIREMENTS AND COVENANTS | 54 |

ANNEXES:

- A. PID APPROVAL MESSAGE
- B. LOG FRAME MATRIX
- C. STATUTORY CHECK LIST
- D. REQUEST FOR ASSISTANCE
- E. TECHNICAL ANALYSIS
- F. DETAIL IMPLEMENTATION SCHEDULE
- G. INITIAL ENVIRONMENTAL EXAMINATION AND
AID/W CONCURRENCE CABLE
- H. FINANCIAL STATUS OF AEDC AND EEA
- I. DETAILED DISBURSEMENT SCHEDULE
- J. DETAILED COST ESTIMATE
- K. GRAY AMENDMENT CERTIFICATION
- L. SECTION 611(E) CERTIFICATION

REFERENCES:

- 1 Urban Electric Distribution - Project Paper
AID-DLC/P-2265 September 1977
- 2 Medium Tension (11-KV) System Control Alexandria dated
January 1986 prepared by Harza Overseas Engineering
co. and Sabbour Associates Revised March 1986.
- 3 Load Forecast for Alexandria by Electric Power Systems
Engineering Company August 1985.
- 4 EEA Alexandria Zone Monthly Report for January 1989.
- 5 Annual Report of Electric Statistics 1987 - Ministry
of Electricity and Energy and Egyptian Electricity
Authority.
- 6 Audit Report No. 6-263-86.1 dated December 17, 1985 -
Audit Report of Urban Electric Distribution Project.
- 7 Audit Report No. 6-263-89-2 dated December 13, 1988 -
Audit Follow-up on USAID/Egypt's Actions In Response
to prior Audit of Project No. 263-0033, Urban Electric
Distribution.
- 8 Audit Report No. 6-263-89-2 dated December 13, 1988 -
Audit Follow-up on USAID/Egypt's Actions In Response
to Prior Audit of Project No. 263-0033, Urban Electric
Distribution.
- 9 Feasibility Study Report - Alexandria Regional Control
Center SCADA and Communications System - August 1987.
- 10 Project Paper - National Energy Control Center
September 1976.
- 11 Project Assistance Completion Report -
National Energy Control Center Project No. 263-0023
dated January 28, 1988.
- 12 Alexandria Control Center - Preliminary Concepts
prepared by Harza Overseas Engineering Company dated
December 1, 1988.
- 13 Country Development Strategy Statement FY89 - Egypt.

GLOSSARY

| | |
|----------|--|
| ADB | African Development Bank. |
| AEDC | Alexandria Electric Distribution Company. |
| AID | Agency for International Development. |
| AID/W | Agency for International Development - Washington. |
| CDSS | Country Development Strategy Statement. |
| D L/Comm | Direct Letter of Commitment. |
| DR/UAD | Development Resources Directorate, Office of Urban Administration and Development. |
| EDA | Egyptian Electric Distribution Authority. |
| EEA | Egyptian Electricity Authority. |
| EOPS | End of Project Status |
| FX | Foreign Exchange. |
| GOE | Government of Egypt. |
| IBRD | International Bank for Reconstruction and Development. |
| KV | Kilo-volt. |
| KW | Kilowatt. |
| KWhr | Kilowatt-hours. |
| LC | Local Currency. |
| MEE | Ministry of Electricity and Energy. |
| MVA | Mega Volt Amper. |
| MW | Mega Watt. |
| MWhr | Mega Watt-hour. |
| PACD | Project Assistance Completion Date. |

PID Project Identification Document.
PP Project Paper.
PSC Personal Services Contract.
SCADA Supervisory Control and Data Acquisition.
UED Urban Electric Distribution.
UPS Unified Power Systems.
U.S. United States.
USAID Agency for International Development - Cairo Mission.

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EGYPT - ALEXANDRIA ELECTRICAL NETWORK MODERNIZATION

EXECUTIVE SUMMARY

PROJECT TITLE: Alexandria Electrical Network Modernization.

PROJECT NO.: 263-0194

AMOUNT OF TOTAL AID FUNDING: \$50 million

HOST COUNTRY CONTRIBUTIONS:

The Government of Egypt (GOE) contributions are L.E. 57.16 million in cash and L.E. 7.41 million "in-kind" for a total of L.E. 64.57 million (\$1.00 = L.E. 2.57).

PROJECT ASSISTANCE COMPLETION DATE:

A Project Assistance Completion Date of August 31, 1997 is proposed.

SUMMARY OF PROJECT

Introduction:

Under the Urban Electric Distribution (UED) Project (263-0033), scheduled to terminate in September 1991, the electric distribution systems in Alexandria, Cairo, Shebin El Kom and Beni Suef were partially rehabilitated and expanded. Approximately 70% of Alexandria's residential and small commercial customers have been provided with improved quality electric service.

Even after completion of the UED project, significant areas of Alexandria will still be served by antiquated distribution facilities. Some of the problems include voltage levels which are not sufficient to operate appliances; frequent and lengthy service interruptions due to the deteriorated condition of the distribution network; thermal damage to cable insulation

resulting in eventual cable failure; and dangerously overloaded transformers that are subject to short-circuits when the insulation fails. In addition, there is no effective way to collect and display information on the operation of the 66 KV/11 KV substations so that EEA personnel can effectively manage the system.

The proposed project directly addresses these problems and builds on the lessons learned from the UED Project. The project is consistent with Mission, Agency and GOE policies as it will improve the efficiency of energy use.

Project Description:

The goal of the project is to improve productivity and general welfare of the five to seven million people residing and working in the Alexandria governorate. The purpose of the project is to improve and rehabilitate the electrical network serving Alexandria thereby reducing energy losses and enhancing the efficiency and productivity of the network.

This will be an eight year project incrementally funded over two years. The project will consist of two components: (1) further rehabilitation of the existing Alexandria distribution network; and (2) the installation of a dispatch control center to collect and display the essential data necessary for the effective management, supervision and control of the Alexandria subtransmission and distribution system. In addition, the consultants selected to rehabilitate the distribution network will assist the AEDC's staff in the necessary planning and design required to introduce 20KV as a distribution voltage to serve the area west of Alexandria along the Mediterranean sea.

The Alexandria Electrical Distribution Company (AEDC) and the Egyptian Electricity Authority (EEA), both within the Ministry of Electricity and Energy, will be the implementing agencies for the proposed project. AEDC will be responsible for the distribution work and EEA will be responsible for the dispatch control center.

Project outputs will include: (1) six hundred (600) transformer points and associated secondary conductors rehabilitated or replaced; (2) twenty (20) 11-KV distribution points and associated feeders installed; (3) seventeen thousand (17,000) service points modernized; (4) a dispatch control center installed and operational; and (5) AEDC and EEA staff trained in areas and numbers to be determined by the distribution and dispatch control center consultants selected to implement the project.

End of Project Status:

The following conditions are expected to exist at the end of the project:

- 1) The new or modernized distribution points, transformer points and associated overhead circuits will be providing reliable and stable voltage to consumers.
- 2) The distribution system will no longer pose potential fire hazards because of worn insulation or the threat of lethal shock.
- 3) The dispatch control center will be collecting and displaying critical data on the subtransmission and distribution system necessary to effectively manage and control the system.
- 4) Trained AEDC and EEA personnel will be fully responsible for continuing improvements to the distribution system and will be operating and maintaining the dispatch control center.

Cost Estimate and Financial Plan:

The total AID and GOE costs are estimated at \$50 million and L.E. 64.57 million which includes LE 7.41 million in-kind contribution. The project cost estimate is summarized below in Table 1:

TABLE 1
PROJECT COST ESTIMATE

| | AID (\$000) | GOE (L.E.000)* | |
|---------------------|----------------|-------------------|------|
| Consultant Services | | | |
| Distribution | 3,200 | 5,600 | AEDC |
| Control Center | 3,600 | 1,200 | EEA |
| Distribution System | 13,600 | 51,760 | AEDC |
| Control Center | 24,000 | 6,010 | EEA |
| Project Contingency | 5,350 | 0 | |
| Evaluations/Audits | 250 | 0 | |
| Total | \$50,000 | L.E.64.570 | |

*L.E. 2.57 = \$1.00 as of June 1, 1989

A.I.D. will finance the foreign exchange costs of distribution materials and mobile equipment, training and approximately 16 person years of consultant services for the proposed improvements to the distribution system. A.I.D. will also finance the equipment, design, installation, training and approximately 17 person years of consultant services for the dispatch control center.

The Government of Egypt (GOE) will finance local goods and services. The GOE in-kind contribution will include office space and equipment, building facilities and land.

Implementation Plan:

A direct AID contract will be executed with a U.S. consulting firm to assist AEDC in the implementation of the distribution project component. The firm will provide services to assist in the planning, designing, procurement of equipment, monitoring of construction, training, reporting, controlling materials and other activities necessary to realize improvements to the distribution system in Alexandria.

In addition, it is anticipated that two bulk purchases of AID financed distribution materials and equipment, each consisting of five to six host country contracts, will be required. The installation of the distribution materials and equipment will be conducted by the AEDC's crew and Egyptian contractors.

A host country contract will be executed with a U.S. consulting firm to assist EEA in preparing a detailed plan for the dispatch control center, preparing cost estimates, developing procurement documents, evaluating proposals, awarding the contract(s) for the installation of a dispatch control center, providing construction and installation supervision for the center, and preparing necessary reports.

A host country contract will be executed for the detailed design, supply and installation of the dispatch control center.

Project Analyses:

The findings of project analyses are presented below:

1. The Technical Analysis concludes that the methods proposed for the modernization of the Alexandria Electrical Network are technically sound and the most cost effective.

2. The Economic and Financial Analysis indicate that the project would be unsound if the government maintains the current large subsidy to consumers. However, with economic pricing of electricity, the energy saved by the project would result in a reasonably positive rate of return to the economy and to the AEDC. The project becomes financially and economically viable if the government adjusts prices to economic levels over a ten year period. Evidence of the government's willingness to raise prices is seen by the 30% average increase introduced in March 1989. To promote and support continued rate of adjustment, the project will rely on the successful negotiation of a rate reform implementation program. These negotiations will involve the IBRD under a proposed power sector loan and USAID under the Power Sector Support Project. The preparation of the proposed new (economic) rate structure will be carried out over the next year by a USAID financed Cost of Service study. The scope of works for this study has been prepared and agreed to by the EEA.
3. The Social Soundness Analysis concludes that the socio-cultural impact of the project will be positive. Approximately 1.2 million people as well as commercial establishments and small to medium-sized industries will benefit directly from the improved service provided by the project. The project is gender neutral.
4. The Managerial/Administrative Analyses of AEDC and EEA found that both organizations, with the technical assistance provided for in the project, will have the contracting and accounting capabilities to effectively implement the project. In addition a Requirement Precedent will be included in the Project Agreement requiring that the AEDC and the EEA establish and staff management teams fully authorized to make all decisions necessary to implement the project.
5. The Initial Environmental Examination (IEE) recommends a negative determination. The Bureau Environmental Coordinator has concurred in this determination.

Project Negotiating Status:

The project has been designed in close collaboration with the AEDC and the EEA. Both organizations agree with the Project's objectives, Requirements Precedent, Covenants and the implementation plan. The ODE's requests for assistance are included as Annex D.

Compliance with the AID/W PID approval Cable:

The PID for the Alexandria Electrical Network Modernization was reviewed by the ANE PRC on March 17, 1989. The AA/ANE authorized the mission to proceed with the development of the project in accordance with the following guidance contained in PID approval cable (State 137130 dated May 3, 1989). The issues identified by ANE PRC and the Project Paper discussion are summarized below.

1. The existing capabilities and deficiencies of the implementing agencies, should be described and steps to be taken to assure that the investment will not deteriorate over time. The establishment of a sister relationship with a U.S. utility might be desirable.

This issue has been addressed in detail in Section 6.1. of the Project Paper. The existing operations and maintenance procedures of AEDC were updated and standardized under the Urban Electric Distribution Project (Project No. 263-0033) and are being utilized by AEDC crews to operate and maintain their electrical network. Implementing these procedures will assure proper utilization of materials thereby extending their life and improving the realibility and efficiency of the network. The benefits of establishing a sister relationship between AEDC and a U.S. utility will require investigation.

2. The PP should develop the financial status of the implementing agencies as operating entities and include an economic analysis based on the whole electric power system including the costs of electricity generation.

Section 6.0 E of the Project Paper and Annex H addresses the financial status of the implementing agencies.

EEA is the sole electricity generating entity in Egypt. It is government wned and operated. AEDC is a dependent company within the government owned electricity generation and distribution system. This means that the wholesale price AEDC must pay to EEA for electricity is determined so that the spread between the wholesale rate and the government set retail rate structure provides sufficient revenues to cover AEDC operating costs. When AEDC performance in operations and bill collection exceed the

expected level, AEDC "earns" a surplus which is distributed to its shareholders (principally EEA). This has been the case for the past several years. When performance falls below planned levels, presumably management improvements are made in AEDC by the ministry or the wholesale price of electricity is reduced so that AEDC is put on a new break-even point.

The corporate organization of the generation and distribution of electricity coupled with the EEA's direct link to the GOE budget ensure that the GOE budget is ultimately responsible for the financial obligations of the entire system.

3. The PP should examine energy demand management alternatives that the implementing agencies could initiate.

Section 6.01 of the PP addresses this issue. Both AEDC and EEA have initiated demand management activities. AEDC introduced solar water heaters, imposed penalties on customers having low power factor, substantial fees for installing large capacity services and charging inspection fees for new loads. EEA has initiated a demand management study for selected large customers when will consider "time of day" rates.

4. The PP should deal with the project's contribution to energy policy rationalization and integration with national economic policies and goals.

Section 3.0, Relationship to Development strategies addresses this issue and indicates that the GOE has developed a plan to gradually increase energy prices to their economic prices by the mid 1990's. The Power Sector Support Project Project Paper will address this issue in detail.

5. The component that includes grid expansion to the west of Alexandria should be analyzed and justified both financially and economically.

After careful review of the area west of Alexandria by members of the Project Committee, it was concluded that AID financing was not required for equipment and distribution materials to be used for grid expansion.

6. An Initial Environmental Examination (IEE) should be prepared and approved by the AID/W Environmental Coordinator.

The Mission prepared an IEE for this project and obtained the ANE Environmental Coordinator's approval in May 1989.

A complete description of the AID/W PID approval Cable and USAID Cairo's response is included in Annex A of the PP.

Recommendation:

That the Mission Director or his authorized representative authorize a Grant of \$50 million in Economic Support Funds (ESF) for the Alexandria Electrical Network Modernization project. This eight year project will be incrementally funded over a two year period, with \$14 million authorized in FY 89 and \$36 million authorized in FY 90.

Project Committee:

| | |
|--|-------------------------|
| Technical Office Chairperson: | Hosam G. Ismail, DR/UAD |
| Project Support Office Co-Chairperson: | Sidney Chambers, PDS/PS |
| | Charles Crane, FM/FA |
| | John Hunt, DR/UAD |
| | Kevin O'Donnell, LEG |
| | Khaled Sherif, PDS/E |
| | Salwa Youssef, PDS/PS |
| | Todd Amani, PDS/P |

PROJECT AUTHORIZATION

Name of Country: Arab Republic Name of Project : Alexandria
of Egypt Electrical
Network
Modernization

Number of Project: 263-0194

1. Pursuant to Section 531 of the Foreign Assistance Act of 1961, as amended (the "Act"), I hereby authorize the Alexandria Electrical Network Modernization Project (the "Project") for the Arab Republic of Egypt ("Cooperating Country") involving planned obligations not to exceed Fifty Million United States Dollars (\$50,000,000) in grant funds over eight years from the date of authorization, subject to the availability of funds in accordance with the A.I.D. OYB/allotment process, to help in financing the foreign exchange cost of goods and services required for the Project.
2. The Project will assist the Cooperating Country to improve selected areas of the electrical distribution network serving Alexandria and to modernize the control of Alexandria's subtransmission and distribution systems in order to improve efficiency of operation. The estimated Life of Project is eight years from the date of authorization.
3. The Project Agreement, which may be negotiated and executed by the officer(s) to whom such authority is delegated in accordance with A.I.D. regulations and delegations of authority, shall be 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.
4. Source and Origin of Goods and Services

Goods and services financed by A.I.D. under the Project shall have their source and origin in the Cooperating Country or in the United States, except as A.I.D. may otherwise agree in writing.

Ocean shipping financed by A.I.D. under the Project shall, except as A.I.D. may otherwise agree in writing, be financed on flag vessels of the United States.

5. Requirements Precedent to Disbursement

(a) First Disbursement

Prior to any disbursement of Grant funds or to the issuance of any commitment documents under the Grant, the Cooperating Country shall, except as the Parties may otherwise agree in writing, furnish to A.I.D., in form and substance satisfactory to A.I.D.:

(1) A statement of the names and titles of the persons who will act as the representatives of the Cooperating Country, together with a specimen signature of each person specified in such statement.

(2) Evidence that the proceeds from the Grant, except for funds used to finance consulting services, have been loaned to the implementing agencies, the Alexandria Electric Distribution Company (AEDC) and the Egyptian Electricity Authority (EEA), on terms and conditions mutually agreeable to the Cooperating Country and the AEDC and the EEA.

(3) Evidence that the local currency required for the Project has been budgeted by the Cooperating Country and will be available for timely expenditure by AEDC and EEA.

(b) Additional Disbursements - Particular Contracts

Prior to the disbursement or to the issuance of any commitment documents under the Grant for financing of particular contracts for goods or services, the Cooperating Country shall present to A.I.D., in form and substance satisfactory to A.I.D., executed copies of such contracts.

(c) Additional Disbursements - Distribution work

Prior to the disbursement or to the issuance of any commitment documents under the Grant for financing Project-related distribution work, the Cooperating Country shall furnish to A.I.D., in form and substance satisfactory to A.I.D.:

(1) Evidence that the positions of Chairman and Deputy Chairman for Operations of the AEDC have been filled.

(2) Evidence that the AEDC has been granted the necessary authority by the appropriate Cooperating Country authorities to implement independently the rehabilitation of such distribution work, including authority to review and approve procurement documents, to approve contract awards and invoices, and to take other managerial actions related to that portion of the Project, and

(3) Evidence that the AEDC has established and staffed a management team fully authorized to make all decisions necessary to implement such distribution work.

(d) Additional Disbursements - Dispatch Control Center

Prior to the disbursement of Grant funds or to the issuance of any commitment documents under the Grant for financing the dispatch control center, the Cooperating Country shall furnish to A.I.D., in form and substance satisfactory to A.I.D.:

(1) Evidence that the EEA has acquired land necessary for implementation of this Project component.

(2) Evidence that the EEA has established and staffed a management organization fully authorized to make all decisions necessary to implement the dispatch control center component of the Project.

(3) Evidence that the necessary radio frequencies have been allocated for the communications system to be associated with the dispatch control center.

6. Covenants

The Cooperating Country shall covenant in substance as follows:

(a) Contractors, architects, consultants and subcontractors working on the Project, regardless of nationality, shall be exempt from the application of Egyptian law related to decennial liability.

(b) Any social insurance assessments and any taxes on expatriates arising under Grant-financed contracts will be paid directly or reimbursed in a timely manner by the Cooperating Country from its own resources.

(c) The Cooperating Country will promote the selection by AEDC and EEA of qualified personnel for training sufficiently in advance of the installation and start-up of Project-funded equipment, so that trained personnel will be on site and fully qualified to operate and maintain the equipment when it is in service.

(d) Work order procedures, specifications, procurement documents and the stores and warehousing inventory procedures established under the A.I.D.-financed Urban Electric Distribution Project, will continue to be used as appropriate by AEDC for the rehabilitation of the electrical distribution system of the project.

(e) The Cooperating Country, through AEDC and EEA, will provide AID, on a quarterly basis, with copies of their accounting records on local currency and in-kind contributions provided for the project.

(f) The Cooperating Country, through AEDC and EEA will provide AID, at such times and at such details as AID may reasonably specify in Project Implementation Letters, monthly operating reports covering system operation, performance and management.

(g) Within one year of the effective date of the Project-financed consulting services contract for distribution system improvements, AEDC will develop, for A.I.D. approval, and thereafter implement, a plan to transfer to AEDC personnel complete implementing responsibility for the Project by a reasonable date.

(h) AEDC and their consultant will on a continuing basis review the power factor of the 11KV feeders and, when necessary, will purchase and install additional capacitors to maintain individual 11KV feeder a power factor of 95 percent.

Approved: 
Charles F. Weiden, Jr.
Acting Mission Director
USAID/Cairo

Date: 8/24/89

Clearances:
OD/UAD: MGould MSG 22 Aug 89
AD:DR: PThorn [Signature]
LEG: KO'Donnell [Signature]
AD/PDS: VMolldrem [Signature]
AD/FM: PAmos [Signature]
A/OD/PDS:PS: BALi [Signature]

1.0 BACKGROUND AND PROJECT RATIONALE

1.01 Electric energy was introduced into Egypt in 1893. In Alexandria, electric energy was provided by a French company, Libon and Partners. This company was nationalized in 1963. All distribution activities were vested in the Egyptian General Organization for Distribution of Electric Power which was formed in 1963. In 1965 the organization was merged with similar organizations for implementation of electricity projects and for the production and transmission of electric power to form the Egyptian General Organization for Electricity.

1.02 In 1976, the Egyptian Electricity Authority (EEA) was created. EEA was responsible for the planning, construction, operation and maintenance of the bulk power supply system referred to as the Unified Power System (UPS) and the distribution and sale of electric energy. As UPS grew, it became necessary to establish seven regional distribution companies.

1.03 One of the regional distribution companies created was the Alexandria Electric Distribution Company (AEDC), which was established in 1978. All seven distribution companies were placed under the Egyptian Electric Distribution Authority (EDA) upon its creation in 1986.

1.04 AEDC's service area, which includes the City of Alexandria, extends approximately 90 km (including a 35km stretch transferred recently from Behira Distribution Company) along the Mediterranean Sea and extends south away from the sea 7-10 Km to Lake Mariot and the desert. Except for the new service area, the area is densely populated with the residents living in urban high rise apartment buildings. There is very little undeveloped land suitable for future development except south into the desert or to the west. The population of the area has been estimated to be five million (with an estimated influx of an additional two million people during the summer tourist season) and is continuing to grow.

1.05 Industries of various types and sizes have developed in southern areas of Alexandria. The large industries are served directly by the EEA at 66 KV. AEDC purchases its energy for distribution from EEA at a negotiated rate and distributes electric energy to consumers at 11 KV and 220 volts 50 hertz.

1.06 The new service area, taken over by AEDC in July 1988, is west of the city and contains a few rural villages and summer resorts in various stages of development. EEA has

constructed a 220/66/20 KV substation in this area which will be the source for a future 20 KV distribution network to be installed by AEDC. A temporary 66/11 KV substation is currently being used to supply the area.

1.07 Under the AID financed Urban Electric Distribution (UED) Project (Project 263-0033), major improvements were made to AEDC's system, thus improving service to a major portion of the area. Three new substations are being constructed for EEA which will reduce the distance from a supply point to a large number of consumers. In addition, a major portion of the 11 KV underground system has been renovated. New 11 KV cables and 11 KV distribution points have been installed, replacing old cables which were approaching the end of their useful lives or had been failing resulting in frequent and prolonged outages. Overload conditions were relieved in areas where work was completed.

1.08 The aggregate peak demand of AEDC's system was 825 MW in 1988 with 2,760 million KWhr purchased from EEA. During the same period, AEDC billed its consumers for 2,380 million KWhr. The difference between the amount purchased and the amount sold represents system losses of 380 million KWhr (13.7 % of sales). In FY 86/87, 43 percent of all energy distributed was sold to commercial and residential customers and 40 percent was sold to industry. The remaining 17% was sold to the government or used for street lighting. In 1987 approximately 96% of AEDC's residential customers and 92% of their commercial customers used an average of less than 300 KWhrs per month.

1.09 Transformer points (where the 11 KV voltage is stepped down to utilization voltage) installed by the French and taken over by AEDC provided a nonstandard three phase service of 127 volts which was inherently hazardous to users. AEDC is replacing the non standard and hazardous services with the standard three phase utilization voltage in Egypt of 220 volts. Additionally, the secondary cables (low tension) have become overloaded to the point where voltage drops and losses are excessive. The streets where these circuits were installed are narrow and the conductors are attached directly to buildings. Because new buildings have been constructed near existing circuits, balconies and window shutters interfere with the conductors. These conditions may cause and in some cases have caused the insulation on the surface of the conductor to be worn off, creating a potential for fire or for human

contact with the energized conductor. To correct these conditions, approximately 600 of the 1,200 transformer points and their associated overhead circuits have been modernized by the UED Project.

1.10 The three phase 220 volt low tension distribution system along the sea front consists of underground cables most of which were installed prior to 1952. Service entrance drops, many in undersized or deteriorated service boxes, were often no more than a connection made by twisting wires around each other. These poorly made connections have deteriorated causing frequent short-circuits and fires. The deteriorated service boxes located at street level in the outside building walls left conductors exposed. This condition exposes the public to electric shock. Approximately 23,000 of the 40,000 service boxes on the system will have been replaced at the completion of the UED Project.

1.11 The need to make improvements is not unusual for a distribution system that has been in place for some time and where demand is growing. The size of conductors and transformers, when installed, were probably adequate to meet existing loads with some additional capacity allowed for load growth. This oversizing in anticipation of future growth is standard practice for utilities so that as small loads are added, major system improvements are not warranted. However, any system experiences faults and short circuits from time-to-time which deteriorate the electric system. As generating capacity is added to the system, the magnitude of the short circuit currents carried by the electrical apparatus when faults occur hasten the deterioration of the system and as load limits of individual circuits in the system are exceeded, major improvements must be made to provide adequate service.

1.12 USAID financed the construction of EEA's National Energy Control Center (NECC). The NECC (project 263-0023) was completed in July 1987. The NECC monitors, supervises and controls the UPS which includes the 500 KV and the 220 KV networks, together with associated hydro and thermal generating stations. The NECC provides improved reliability and economy of operation of the UPS by on-line computerized control. EEA plans to construct dispatch control centers for each of its five zones and to connect these centers to the national center. These zone or "regional" centers are to monitor and control the 66 kv subtransmission and the distribution system down through the circuit breakers that supply the 11 kv

distribution system. A regional control center at Nag-Hammadi for the EEA Upper Egypt Zone was built and is being operated by EEA. The Overseas Economic Cooperation Fund of Japan financed the Nag-Hammadi regional control center.

1.13 In Alexandria, monitoring of 66 KV and 11 KV circuit loading is done manually at each substation by AEDC's staff contracted to EEA. Overall data analysis and retention is lacking. In the event of a widespread system disturbance, EEA has no way of monitoring and displaying the condition of the system so that quick decisions can be made for restoring service.

1.14 The present dispatch center does have a radio communications system for relaying messages, but it can not be expanded or modernized to monitor and operate the present system efficiently. The complexity of the present network creates problems that can only be effectively monitored and analyzed utilizing real time data from the many items of equipment spread throughout the system. The Control Center will provide the means to initiate preventive action and communicate instructions.

1.15 Consumers have been experiencing abnormally low voltage and frequent interruptions of service since 1970 indicating that investments in improving the system are justified.

2.0 PROJECT DESCRIPTION

2.01 The goal of the project is to improve productivity and general welfare of the five to seven million people residing and working in the Alexandria Governorate.

2.02 The purpose of the project is to improve and modernize the electrical network serving Alexandria thereby reducing energy losses and enhancing the productivity of the network.

2.03 The project will consist of two components: 1) further rehabilitation of the existing Alexandria distribution network; and 2) the installation of a dispatch control center to obtain and display the essential data necessary for the effective management, supervision and control of the Alexandria subtransmission and distribution system. In addition, the consultants selected to rehabilitate the distribution network will assist AEDC's staff in the planning and design of the 20 KV distribution system to be introduced in the new area west of Alexandria.

2.04 AEDC will be the implementing agency for the component of the project to rehabilitate the distribution network. AEDC crews will carry out most of the work of installing the underground cable, transformer points, renovation of service connections and service boxes, and other work required to change service connections to the renovated system.

2.05 EEA will be the implementing agency for the component of the project to install the dispatch control center. EEA will be responsible for the operation and maintenance of the control center.

2.06 Project outputs will include the installation of approximately 250 km of 11 KV underground cable and twenty 11 KV distribution points, renovation of 600 distribution transformer points with associated three phase 220 volt overhead circuits, renovation of 17,000 service connections made to the three phase 220 volt distribution system, the installation of a dispatch control center for monitoring and displaying the operating status of the system, and appropriate training of AEDC and EEA staff in areas to be determined by the consultants selected to implement the proposed project.

2.07 Additional distribution capacitors are required to further improve the distribution systems' efficiency. The

amount of additional capacitors will be determined by the consultant working with AEDC. These capacitors would be entirely consistent with the goal and purpose of the proposed project.

2.08 The conditions expected to exist at the end of the project are as follows:

- 1) The new distribution points, transformer points and associated overhead circuits will be providing reliable service at adequate voltage levels to consumers.
- 2) The distribution system will no longer pose potential fire hazards because of worn insulation or the threat of lethal shock.
- 3) The dispatch control center will be collecting and displaying critical data on the subtransmission and distribution system necessary to effectively manage and control the system.
- 4) Trained AEDC personnel will be fully in charge of continuing improvements to the distribution system.
- 5) Trained EEA personnel will be effectively operating the dispatch control center.

2.09 AID will finance the foreign exchange costs of materials, equipment, training and approximately 16 person years of consultant services for the proposed improvements to the distribution system. AID will also finance the equipment, design and installation training and approximately 17 person years of consultant services for the dispatch control center. The actual amount and areas of training under both project components, as well as the number and types of vehicles purchased, will be determined by the contractors selected in collaboration with AEDC and EEA.

2.10 The Government of Egypt (GOE) will finance the local currency costs of the project. This will include supplying and installing 250 km of 11 KV underground cable, twenty 11 KV distribution points, and installing materials associated with the 600 transformer points. The GOE in-kind contribution will include personnel, office space and equipment, building facilities and land.

3.0 RELATIONSHIP TO DEVELOPMENT STRATEGIES:

3.01 The major issues in the electric power sector include:
1) the electricity subsidy and the need for pricing reforms;
2) rehabilitation of existing plants, conservation, energy loss reduction and load management; and 3) organizational development of the Ministry, the EEA and the EDA.

3.02 Historically, A.I.D. policy in the electric power sector has primarily supported power generation, rehabilitation, pricing reform and training. The current CDSS continues to support this policy.

3.03 GOE is working on a plan with USAID to rationalize energy pricing to match world energy prices over a reasonable period of time. Pricing energy at its economic value will contribute to a more efficient and rational allocation of resources throughout the economy and will have a positive impact on Egypt's budget deficit.

A. Conformity with Recipient Strategy and Programs

3.04 The GOE Five-Year Plan (1987/88 - 1991/92) confirms the importance of the electric power sector in Egypt's economic development. The Five Year Plan provides for power investments of LE 4.2 billion which represents ten percent of the total Five-Year Plan investment.

3.05 One of the GOE's major objectives in the electric power sector is to improve existing electrical networks in order to meet customer demands. Although only LE 229 million has been allocated for the rehabilitation and expansion of electrical networks, LE 75 million of which is budgeted for Alexandria, the GOE considers these investments to be a critical element of the long term strategy for socioeconomic development.

3.06 The project's purpose is to rehabilitate selected areas of the electrical network serving Alexandria and to modernize the control of the subtransmission and distribution system in order to improve efficiency of operation. This conforms to the GOE's stated objective of renovating and replacing existing generating stations, transformers and grids. The GOE has undertaken a continuing program to modernize the existing networks in order to improve reliability and efficiency in providing electric energy to residential and small commercial customers. The GOE is also expanding electrical networks in existing population centers and constructing additional networks to serve customers in new population centers.

B. Relationship to CDSS

3.07 In providing improved infrastructure for the growth of productivity in the Alexandria area, the project clearly conforms with the overall thrust of the CDSS. The project also addresses the CDSS goal to "reduce distribution losses in the national grid by 20% by 1991 through installation of distribution capacitors."

3.08 The CDSS notes that:
"despite massive investments in power, problems in the system prevent it from providing the energy needed for expanded productivity"

The CDSS cites poor efficiencies in transmission and distribution end use that result in electric power losses of more than 20%. This contributes to

"poor system reliability, inability to meet peak demands, brownouts and blackouts, reduced productivity in both the manufacturing and service sectors, and unproductive investment in standby on-site diesel generation."

3.09 This project addresses these problems directly and, when combined with previous network rehabilitation funded under the UED project will eliminate most occurrences in the Alexandria area. The project involves primarily the rehabilitation and modernization of existing networks.

3.10 The major electric power sector issue addressed by the CDSS is the pricing of electric energy. Egypt's energy policies, which price electricity substantially below its real cost, have contributed to the growing fiscal deficit, overconsumption and uneconomical investments (primarily capital investments in generation and transmission facilities) in the sector. Therefore, USAID's strategy has been to emphasize the need for price increases.

3.11 The CDSS limitations on USAID activity in the power sector in the absence of significant price increases applies to physical improvement in power generation. This project focuses on alternative means of meeting energy needs as part of a "least cost" energy strategy emphasizing rehabilitation, conservation, training and planning. Thus, the project contributes to the CDSS strategy even without price increases. With the recent increase in electricity tariffs announced by the government in March 1989, the project will contribute to an improved service that customers are willing to pay more for which can serve as the basis for justifying subsequent rate increases.

C. Other Donors

3.12 The World Bank (IBRD) considers energy price reforms to be crucial for economic reform and is ready to provide a major infusion of funds to the electric power sector under an effective reform scenario. The IBRD has financed three projects in the power sector including the rehabilitation and extension of distribution systems in urban, suburban and rural areas outside of Cairo and Alexandria. Given the recent increases in electricity tariffs, the IBRD is expected to finance a fourth project involving combined cycle additions to existing gas turbines and transmission system additions.

3.13 The African Development Bank (ADB) likewise has taken an increasingly active role in the electric power sector in recent years. The ADB shares the pricing concerns of AID and the IBRD. They had linked financing of their most recent project, the installation of two 325 MW generating units at Cairo West, to a substantial electricity price increase before mid-1989. Implementation of this project began only after the tariff increases of March 1989. The ADB has financed nine projects in the power sector in the last fifteen years, of which four involved the extension of electrical networks along the Suez Canal and in rural areas of Egypt. The other five involve increasing power generation.

3.14 The Government of Finland has financed studies to identify the most effective means to reduce energy losses on electrical networks through the installation of capacitors and has financed capacitors, cables and other accessories for the modernization of electrical networks.

3.15 Other donors have provided "soft" loans which have been used for the purchase of cables, switchgear and other accessories for the modernization of electrical networks in Egypt.

4.0 PROJECT COST ESTIMATE AND FINANCIAL PLAN

A. PROJECT COST ESTIMATE:

- 4.01 The project costs are estimated to be \$50 million and LE 64.57 million. Over the eight year life of project USAID will finance \$6.8 million of technical assistance and \$43.2 million of commodities. The \$50 million will only be used to finance the foreign exchange costs of the project.
- 4.02 The GOE contribution will consist of LE 57.16 million in cash and LE 7.41 million in-kind for a total of LE 64.57 million. The cash contribution will be used to finance all local currency costs of the project. All commodities provided to the project by AEDC and EEA will be considered as cash contributions. All personnel, office space and equipment, etc. furnished by AEDC and EEA will be considered in-kind contributions.
- 4.03 An escalation rate is defined as the discrete rate of inflation for any given commodity or service. A five percent per annum rate of escalation is used on all dollar costs. A twelve percent per annum rate of escalation is used on all Egyptian Pound (LE) costs. The estimated project cost is based on the above escalation factors combined with the projected timing of order placement.

Distribution System Improvement

- 4.04 The cost estimate of materials, equipment and supplies for the distribution component of the project is based on recent purchases of similar material under the UED Project. Since it is expected that the overhead cable and connectors will be purchased in two lots, the costs for one half of the materials were escalated for two years and the other half for five years. Since capacitors, project vehicles and supplies will be purchased as required, escalation for these items has been estimated for four years. One half of the Egyptian Pound costs have been escalated for two years, and the other half for four years.

The cost of consulting services was estimated based on a total cost of \$150,000 per person year for approximately 16 person years and includes six vehicles for the consultants' use. Escalation was calculated for two years. The LE costs of consulting services were escalated for three years.

Dispatch Control Center

- 4.05 The cost estimate for the dispatch control center is based on the Feasibility Study Report "Alexandria Regional Control Center - SCADA and Communications System", dated August 1987 prepared by Marubini of Japan. The study was prepared for EEA, and, according to EEA, the cost estimate is suitable for international procurement. The study proposed two control rooms, a regional control center for EEA and a distribution control center. The 220 KV substations in the area are monitored/controlled from the National Energy Control Center (NECC). The study included the monitoring/control of the 66 KV system, 11 KV substation buses, and 11 KV distribution points. USAID does not intend to include the monitoring, communications to or control of the 11 KV distribution points as part of the proposed project.
- 4.06 The 1987 cost estimate was adjusted to reflect the elimination of one control room and to reduce the number of remote terminal units (RTUs) and their associated relay point-to-multipoint communication links from a planned 130 to an estimated 60, a 54 percent reduction. The estimated reduction of the feasibility study's costs for equipment (includes RTU's, sequence of events recorders, computer, monitors, dynamic mapboard, map/machine interface, and power stabilizers) was 54 percent. The feasibility study cost for the communication system has also been reduced because of the smaller number of multi-channel point-to-multipoint microwave installations and because it was based on a communications interface for 180 RTUs. Escalation has been factored in for a total of four years to the U.S. dollar costs and to the LE costs.
- 4.07 The estimated cost of training, most of which may be provided by the supply/installation contractor, is slightly less than that recommended in the Marubini study. For the NECC, 428 person months of training and

inspection time in the United States were utilized. Since the proposed center will not perform all of the functions included in the NECC, the training requirements have to be substantially reduced to reflect the training required for this less complex system and reduced scope of the center. Training costs include course costs, per diem, travel in the U.S. and insurance. Costs may also include bringing instructors to Alexandria to conduct courses. EEA is expected to finance the cost of international travel.

- 4.08 The cost of the consulting services is based on approximately 17 person years of service at an estimated \$175,000 per person year plus the cost of four vehicles. Dollar costs and IE costs have been escalated for three years. The current cost of the dispatch control center consultants is higher than the current cost of the distribution system consultants because the types of engineers required for each system are different.
- 4.09 Because the electric distribution system is constantly growing and changing, particular care must be taken to assess the needs which the dispatch control center must meet. Therefore, the scope of work will require that the consultant prepare a detailed statement of the function of the center, describe what equipment will be included and provide a cost estimate prior to USAID approving the request for proposals for supply and installation of the center.
- 4.10 The estimated costs shown in Table 4-1 are considered a reasonable, firm amount for installing an adequate dispatch control center for EEA.
- 4.11 A contingency of approximately 12 percent has been included in the entire project cost estimate.

B. SECTION 611(a) REQUIREMENTS

- 4.12 The estimated costs of the goods and services to accomplish the project purpose have been based on a sound engineering approach to achieving project outputs and on available cost data. The plans for accomplishing the project purpose are consistent with good utility practices. Therefore, it is the conclusion of the Project Committee and the Mission chief engineer that the requirements of Section 611 (a) of the Foreign Assistance Act of 1961, as amended, have been satisfied. (These requirements are that prior to

TABLE 4-1
ALEXANDRIA ELECTRICAL NETWORK MODERNIZATION
PROJECT COST ESTIMATE

| BUDGET ELEMENT | AID \$(1000) FX | GOE CONTRIBUTION | |
|-------------------------------------|-----------------------|-----------------------------|-----------------------------|
| | | AEDC LE (000) IN-CASH | AEDC LE (000) IN-KIND |
| 1. CONSULTING SERVICES | | | |
| A. DISTRIBUTION SYSTEM | 3,200 | 5,600 | 0 |
| B. DISPATCH CONTROL CENTER | 3,600 | 1,200 | 0 |
| SUBTOTAL | 6,800 | 6,800 | 0 |
| 2. DISTRIBUTION SYSTEM | | | |
| A. COMMODITIES | | | |
| 1. VEHICLES | 1,150 | 0 | 0 |
| 2. ELECT. DISTRIBUTION EQUIPMENT | 12,100 | 41,100 | 0 |
| 3. TOOLS & SUPPLIES | 350 | 0 | 0 |
| B. INSTALLATION | 0 | 7,850 | 0 |
| C. PROPERTY & BUILDINGS | 0 | 0 | 2,810 |
| SUBTOTAL | 13,600 | 48,950 | 2,810 |
| 3. DISPATCH CONTROL CENTER | | | |
| A. CONTROL SYSTEM | 10,800 | 0 | 700 |
| B. COMMUNICATION SYSTEM | 11,100 | 1,410 | 3,000 |
| C. BUILDING FACILITIES | 600 | 0 | 750 |
| D. TRAINING | 1,500 | 0 | 150 |
| SUBTOTAL | 24,000 | 1,410 | 4,600 |
| 4. PROJECT CONTINGENCY | | | |
| | 5,350 | 0 | 0 |
| 5. EVALUATIONS/AUDITS | | | |
| A. SURVEY AND EVALUATIONS | 200 | 0 | 0 |
| B. AUDITS | 50 | 0 | 0 |
| SUBTOTAL | 150 | 0 | 0 |
| TOTAL PROJECT COST | 50,000 | 57,160 | 7,410 |

For detail, See Annex J.

obligation of funds the cost of furnishing the assistance be "reasonably firm" and that engineering, financial and planning necessary to implement the assistance be completed.)

C. DISBURSEMENT SCHEDULE

- 4.13 The estimated disbursement schedule for the \$50 million is shown in Table 4-2.

For details, see Annex I.

D. ASSESSMENT OF IMPLEMENTING AGENCIES' CONTRACTING AND VOUCHER EXAMINATION CAPABILITY

- 4.14 AID's Financial Management Directorate (FM) conducted a preliminary assessment of the contracting and voucher examination capabilities of AEDC. While AEDC has been responsible for over \$33 million of AID funds from the UED project with no apparent problems, the conclusion of the preliminary assessment was that a more detailed assessment should be conducted. The follow-up assessment concentrated on the voucher examination and accounting process for technical assistance contracts, the area of concern in the preliminary assessment. The overall conclusion of both assessments is that AEDC has the contracting and accounting capabilities to implement this project.

- 4.15 FM has also assessed EEA's contracting and voucher examination capabilities. The assessment found that throughout the implementation of previous EEA projects, EEA has performed well in the review of project designs, contract documents and IFB's; approval and award of contracts; and overall management of contractor performance. The strengths of EEA's contracting and voucher examination system are good segregation of duties, good documentation of decisions and a thorough system of approvals. These same strengths however,

Table 4-2
USAID/CAIRO
ANTICIPATED PROJECT DISBURSEMENT SCHEDULE
PROJECT 263-0194
ALEXANDRIA ELECTRICAL NETWORK MODERNIZATION
USAID DOLLAR DISBURSEMENTS ONLY (\$000)

| BUDGET ELEMENT | FY90 | FY91 | FY92 | FY93 | FY94 | FY95 | FY96 | FY97 | FY98 | TOTAL |
|-------------------------|------|-------|---------|---------|---------|----------|----------|---------|---------|----------|
| CONSULTING SERVICES | 60 | 670 | 1,080 | 1,100 | 1,100 | 1,100 | 950 | 640 | 100 | 6,800 |
| DISTRIBUTION SYSTEM | 0 | 0 | 4,000 | 3,350 | 600 | 4,500 | 1,000 | 150 | 0 | 13,600 |
| DISPATCH CONTROL CENTER | 0 | 0 | 0 | 0 | 2,500 | 9,000 | 7,600 | 3,000 | 1,900 | 24,000 |
| PROJECT CONTINGENT | | | | | | 2,500 | 2,000 | 400 | 550 | 5,350 |
| EVALUATIONS/AUDITS | 15 | | | 60 | | 100 | | | 75 | 250 |
| TOTAL | \$75 | \$670 | \$5,080 | \$4,510 | \$4,200 | \$17,200 | \$11,550 | \$4,190 | \$2,625 | \$50,000 |

sometimes have contributed to slowness and delays in contracting actions. Based on FM/FA's review and USAID's extensive prior experience with EEA's contracting capabilities, it is our opinion that EEA's contracting capabilities and voucher examination procedures are satisfactory. It is our opinion that EEA is well equipped to undertake the activities proposed by this project.

- 4.16 In accordance with the requirements of the Sixteen Payment Verification Policy Statements, Table 4-3 illustrates the methods of project implementation and financing by AID for the Alexandria Electrical Network Modernization project.

E. FUNDING SOURCE AND UTILIZATION

- 4.17 The proposed grant of \$50 million will be used to finance the goods and services imported for project purposes. The Project Grant Agreement will include a Requirement Precedent to Disbursement that the GOE will make the proceeds of the Grant available to AEDC and EEA on terms and conditions approved by appropriate GOE authorities.
- 4.18 The GOE Egyptian Pound contributions will be used to fund the purchase of local goods and services, and for payment of salaries and other costs as may be required to achieve the purpose of the project. The Project Grant Agreement will contain a Requirement Precedent that sufficient Egyptian Pounds have been budgeted to carry out project implementation and that funds will be available to AEDC and EEA for timely expenditure.

TABLE 4-3
 USAID/CAIRO
 IMPLEMENTATION AND FINANCING METHODS
 PROJECT 263-0194
 ALEXANDRIA ELECTRICAL NETWORK MODERNIZATION

USAID FINANCING ONLY

| BUDGET ELEMENT | IMPLEMENTATION METHOD | FINANCING METHOD | APPR COST (MILLIONS) | CONTRACT METHOD | IMPLEMENTING AGENCY |
|-----------------------------------|--------------------------|---|-------------------------|--------------------|------------------------|
| 1. <u>CONSULTING SERVICES</u> | | | | | |
| A. DISTRIBUTION SYSTEM | AID DIRECT | DIRECT PAY | 3.20 | AID DIRECT | AID |
| B. DISPATCH CONTROL CENTER | HCC | DIR L/COMM | 3.60 | HC | EEA |
| 2. <u>DISTRIBUTION SYSTEM</u> | | | | | |
| A. COMMODITIES | | | | | |
| 1. VEHICLES | HCC | DIR L/COMM | 1.15 | HC | AEDC |
| 2. ELECT. DISTRIBUTION EQUIP. | HCC | DIR L/COMM | 12.10 | HC | AEDC |
| 3. TOOLS & SUPPLIES | HCC | DIR L/COMM | 0.35 | HC | AEDC |
| 3. <u>DISPATCH CONTROL CENTER</u> | HCC | DIR L/COMM | 24.00 | HC | EEA |
| A. CONTROL SYSTEM | | | | | |
| B. COMMUNICATION SYSTEM | | | | | |
| C. BUILDING FACILITIES | | | | | |
| E. TRAINING | | | | | |
| | | This will be treated as one 'Turnkey' contract. | | | |
| 4. <u>PROJECT CONTINGENCY</u> | | | 3.350 | | |
| 5. <u>EVALUATIONS/AUDITS</u> | | | | | |
| A. SURVEY & EVALUATIONS | AID DIRECT | DIRECT PAY | 0.200 | AID DIRECT | AID |
| B. AUDITS | AID DIRECT | DIRECT PAY | 0.050 | AID DIRECT | AID |

In all cases except consulting services for distribution system, Evaluations and Audits Direct Letters of Commitment will be used. The justification for using this method is that GOE does not have adequate foreign exchange available to first pay and then await reimbursement.

5.0 IMPLEMENTATION

A. SCHEDULE:

- 5.01 It is anticipated that the project will be authorized in August 1989 and the Project Agreement signed in September 1989. The Implementation Schedule, Table 5-1 provides a timetable for the major activities that must occur in order to achieve the project outputs. A more detailed schedule of activities identifying responsible parties is provided in Annex F.
- 5.02 The terminal date for establishing disbursing authorizations will be September 30, 1996.
- 5.03 The Project Assistance Completion Date (PACD) will be August 31, 1997, eight years from the scheduled date for signing the Project Agreement.
- 5.04 The Terminal Date for Disbursement will be May 30, 1998.

B. PROCUREMENT PLAN:

General

- 5.05 The procedures and guidelines contained in AID Handbook 11, Host Country Contracting, shall apply to the procurement of goods and services for the project except the consulting services for the distribution component which will utilize Federal Acquisition Regulations (FAR) and will be an AID direct contract.
- 5.06 In the past, application of certain host country laws have had an adverse impact on contractors financed by AID. Therefore, covenants will be included in the Grant Agreement exempting AID-financed project contractors from the application of the "Decennial Liability Law" and "Social Insurance and Taxes on Expatriates."
- 5.07 Use of U.S. minority owned, small and/or economically and socially disadvantaged subcontractors will be encouraged to the maximum extent practicable in the procurement process. A set-aside for Section 8(a) small business enterprises is not considered appropriate given minimal staffing expected by the U.S. consultant, the demonstrated experience required of the consultant and the technical complexity of the project. However, all notices and advertisements

Table 5-1
IMPLEMENTATION SCHEDULE

| | |
|--|-------|
| Project Agreement Signed | 8/89 |
| Initial Conditions Precedent Satisfied | 11/89 |
| Contract Signed for Consulting Services for Distribution Work | 6/90 |
| Contract Approval for Consulting Services for Dispatch Control Center | 12/90 |
| Contracts for First Tranche of Distribution Material Placed | 9/91 |
| Distribution Material Starts Arriving | 9/92 |
| Project Officer Conducts Formal Review of Project | 2/93 |
| Supply and Installation Contract Approved for Dispatch Control Center | 6/93 |
| Contracts for Second Tranche of Distribution Materials Approved | 2/94 |
| Equipment Installed at Dispatch Control Center | 2/96 |
| Testing of Dispatch Control Center Complete | 6/96 |
| Project Evaluated | 7/96 |
| Terminal Date for Establishing Disbursing Authorizations | 9/96 |
| Contract for Distribution Consultants Terminates | 12/96 |
| Warranty Period for Dispatch Control Center | 6/97 |
| Contract for Consultants for Dispatch Control Center Terminates | 6/97 |
| Project Assistance Completion Date (PACD) | 8/97 |
| Terminal Date for Disbursements | 5/98 |

See also Annex F pages 1 and 2

placed in the U.S. soliciting expressions of interest from or announcing opportunities to submit bids by U.S. firms or organizations on this project will state that the prime contractor will make every reasonable effort to identify and make the maximum practicable use of Gray Amendment entities.

Consulting Services - General

- 5.08 Project implementation has been planned assuming that the services of two consulting firms will be required for the two discrete components of the project. While there may be firms qualified to provide all the necessary services, the project will be best served by the broader competition from dividing the services.

Distribution System Consulting Services

- 5.09 A firm will be selected to provide technical services under an AID direct contract to assist AEDC in the planning, design, procurement, and monitoring of construction, training, reporting, controlling materials and other activities necessary to realize improvements to the distribution (20 KV and below) system and to provide general support to AEDC relating to the project. A work order procedure detailing construction activities necessary to realize effective use and sizing of equipment and materials was developed during the implementation of the UED Project. It is important that AEDC personnel be fully familiar with engineering procedures such as estimating circuit loading and determining the maximum length of low tension circuits for various size conductors. The application of such procedures will prevent excessive voltage drop and assure that the protection devices on the primary and secondary side of distribution transformers will respond to faults at the end of the low tension circuit. Therefore, it is important that the consultant work closely with the various technical and operating sections of AEDC. To assure that this is done, the project agreement will contain a covenant requiring the development of a plan, acceptable to USAID, and implementation of that plan within one year from the effective date of the consultant's contract. The plan should explain how AEDC and the consultant propose to transfer the responsibility for continuing the work order procedures and stores inventory control procedures so that during the last year of implementation AEDC personnel will have full responsibility for project implementation under the general guidance of the consultant.

Dispatch Control Consulting Services

- 5.10 A firm will be selected to provide the necessary technical services under a host country contract for the dispatch control center. Services will include but will not be limited to: preparing a detailed plan for an adequate EEA control center; assessing the suitability of the proposed location; preparing cost estimates; preparing procurement documents; evaluating proposals; assisting EEA in awarding a single responsibility (design, supply, install, test, start-up, train and commission) contract; monitoring progress; reporting; approving invoices; inspection and testing of equipment; and other appropriate activities necessary for the timely completion of an adequately staffed center.

Distribution Materials, Equipment, Supplies and Services

- 5.11 It is anticipated that there will be two bulk purchases of AID financed distribution materials. Each bulk purchase will consist of an estimated six host country contracts.
- 5.12 USAID, under the UED project, has previously approved specifications and tendering documents for host country procurement for most of the distribution materials which will be required by the proposed project. These documents are available at AEDC and will be used by AEDC to the maximum extent possible for project implementation. The consultant will work closely with AEDC's project team to update existing procurement documents and prepare new documents if required.

Dispatch Control Center

- 5.13 A host country turnkey, (single responsibility) contract for the detailed design, supply and installation of equipment, training of EEA staff and placing the system in operation (including the establishment of a spare part inventory management system) is planned for the dispatch control center. Because of rapid changes in technology and the difficulties experienced in achieving a timely award for the AID financed National Energy Control Center, a modified two-stage bidding process (See Handbook 11, Chapter 3, Clause 3.7) has been used in developing the implementation schedule (See also Annex F). Experience with previous procurements has indicated that the

difficult part of the process is getting all bids on the same technical base in light of the widely divergent technical capabilities of "standard" pieces of equipment an individual supplier might propose to keep the proposal within budget. Use of the two-stage procedure should reduce these types of procurement problems. However, the control center equipment to be procured may not require the high degree of sophistication and a specification may be able to be written that fully defines the procurement. Lessons learned from the NECC project in procurement of sophisticated systems for similar application of this type will be reviewed by the consultant before reaching a decision on the type of procurement document to be used. Should the result of the revision indicate that a detailed specification could be written with reasonable expectation of achieving an award, the normal procurement process will be followed and the implementation schedule would be shortened.

General

5.14 No procurement waivers are contemplated. A vehicle procurement plan will be prepared by AEDC, EEA and their respective consultants in accordance with Mission Order 1-7 prior to the procurement of any project vehicles. All AID financed procurement actions will be in accordance with AID Handbook 11 with the source/origin of goods and services limited to AID Geographic Code 000.

C. TRAINING

5.15 Training programs will be included in the contract for the dispatch control center. In addition, it is expected that the scope of work for each consultant will include formal and informal training requirements. This element of the consultants' work is considered important to achieving the desired end-of-project status with AEDC staff fully in charge of continuing improvements to the distribution system and with EEA staff fully responsible for the operation and maintenance of the dispatch control center. Consultants' contracts will require that a training plan be developed in accordance with AID Handbook 10 guidelines and Mission Order 10-1, Participant and In-Country Training.

5.16 A covenant will be included in the project agreement assuring availability of AEDC and EEA personnel for training.

D. FINANCING PROCEDURES

- 5.17 The AID grant to finance the U.S. dollar costs of the project will be made to the GOE. The funds will be passed from the GOE to AEDC and EEA on terms and conditions approved by the appropriate GOE authorities. It is anticipated that the proceeds of the grant used to finance consulting services be passed on to AEDC and EEA as grants with the remainder for commodities and construction services passed on as loan for AEDC and EEA.
- 5.18 AID direct letters of commitment and AID direct payment will be the methods of financing.

E. MONITORING AND EVALUATION

- 5.19 The information collected and analyzed in this monitoring and evaluation plan will be used by the project consultant, AEDC, EEA, and USAID project management.
1. Institutional Locus
- 5.20 It will be the responsibility of the project consultant team leaders and AEDC/EEA project management teams to ensure that project purpose and output data is collected, analyzed and communicated to USAID project management in a timely, understandable, and actionable way so that timely modifications and improvements in project implementation can be made. Information on project impacts will be gathered in special studies and external evaluations.
- 5.21 USAID's monitoring responsibilities will be carried out by the Power System Group within the Office of Urban Administration and Development of the Development Resources Directorate. The group is experienced and adequately staffed to carry out this responsibility. In addition to participating in annual reviews of progress and annual workplans (described below), USAID will conduct periodic site visits to confirm progress indicated in monthly reports (described below).
2. Goal, Purpose and Output Questions, Indicators and Data Collection Methodologies
-

5.22.a) Project Goal:

The goal of this project is to provide a reliable and efficient electrical network to improve productivity and general welfare of the five to seven million people residing and working in the Alexandria governorate.

-1- Goal Level Questions:

To what extent has more reliable electrical service reduced productivity losses and inefficient practices in small scale industrial and commercial establishments? To what extent has more reliable electric service enhanced the welfare of Alexandria residents?

-2- Indicators

- * Reduction in direct costs of spoiled products and idle factors of production.
- * Reduction in indirect costs associated with using standby sources of power and less efficient production techniques et al.
- * Time and labor savings attributable to reliable performance of electrical appliances used in residential housekeeping, nutrition, and leisure activities.
- * Improved reliability of public and essential services.
(street lighting, hospitals, et al).
- * Enhanced longevity of household appliances.

-3- Data Collection Methodology:

The impacts of unreliable electrical service on various classes of users existing at the outset of this project will be established via a baseline survey which is described under "Special Studies" below. The survey will be conducted no later than year 1 of implementation.

5.23.b) Project Purpose:

To modernize and improve the electrical network serving Alexandria thereby reducing energy losses and enhancing productivity of the network.

-1- Purpose Level Questions:

Has the efficiency and reliability of the Alexandria distribution system improved? What contribution has the energy control system made to improved efficiency of system operations?
(Note that the control center will not be operational until the last year of the project)

-2- Indicators:

- * Average frequency and duration of power outages.
- * System energy losses.
- * Number of consumers receiving nominal standard voltage.
- * System operating expenses per kilowatt hour of electricity sold.

-3- Data Collection Methodology:

It will be the responsibility of the AEDC/EEA/project management teams to establish procedures for collecting, analyzing, and reporting data on purpose level indicators. It appears likely that baseline values on frequency and duration of power outages can be compiled from existing consultant reports. If not, baseline values for these indicators will be established in conjunction with the baseline survey of electricity consumers in areas to be upgraded (described below in "Special Studies").

Data on system energy losses are available from AEDC administrative data.

Data on number of customers receiving nominal standard voltage will be compiled from review of voltage records. (According to project managers, 0 customers in target neighborhoods are receiving nominal standard voltage at present and all customers in target areas will receive it by the end of the project.)

Operating expenses per kilowatt hour of electricity sold is included as a variable to capture overall operating efficiencies attributable to system modernization and to installation and use of the energy control center. This data should be available from EEA administrative records.

5.24.c) Project Outputs:

The outputs necessary to achieve these objectives include installation of 20 distribution points and associated feeders, 600 transformer points and overhead conductors, modernization of 17000 underground service points, installation of the dispatch control center and provision of consulting services.

-1- Output level Questions:

The key output level questions are: Is installation of distribution and transformer points, et al proceeding as planned? Is modernization of underground service points proceeding as planned? Is installation of dispatch control center proceeding as planned? Is dispatch control center being used as planned? If the answer to any of these questions is no, then what factors are constraining timely or appropriate installation/modernization/use? How can these constraints be overcome?

-2- Indicators:

- * # of 11KV distribution points installed.
- * # of transformer points installed.
- * # of service points modernized.
- * # of control center personnel trained.
- * Control center % completed.

-3- Data Collection Methodology:

Procedures will be developed by the project consultant for collecting information on output level indicators.

3. Special Studies:

5.25.a) Survey of Alexandria Electricity Consumers:

A survey will be undertaken in years 1, 3 and 6 of project implementation to establish a baseline and gather data on productivity and welfare impacts of improved electrical service on different classes of Alexandria users. This survey will be repeated prior to or in conjunction with the midterm and final evaluations. Classes of users which should be considered for inclusion in the surveys are low, medium and high income residential consumers, small scale industries, commercial establishments, providers and users of public and essential services (telephone, water and sewage treatment (if relevant), hospitals, schools, and public illumination.)

It is envisioned that this survey will be conducted by a local research firm using a scope of work which will be drafted in conjunction with the Mission evaluation

officer. An illustrative questionnaire for industrial electricity consumers is appended to this Monitoring and Evaluation plan. Similar questionnaires will be developed by the local research firm for other relevant classes of users.

5.26.b) Dispatch Control Center

It will be too soon to assess the effects of the dispatch control center on the productivity of the network at the time that the final evaluation is undertaken. Project consultants will monitor and report on indicators relevant to control center performance during the last year of project. It may also be desirable to undertake a special study after two or three years of control center operation to document impacts on the network. This study would occur after PACD.

4. Feedback Procedures:

Monitoring:

5.27 Project consultants selected to implement the two components of the project will have the primary responsibility for monitoring all activities. The consultants jointly with the AEDC/EEA project management teams will be required to include the following features in their monitoring system:

- a) Monthly Reports
- b) Joint Annual Reviews of Progress
- c) Annual Work Plans

a) Monthly Reports:

5.28 The purpose of the reports will be to communicate implementation progress and problems to USAID project management. These reports will discuss planned versus actual progress on input, output and purpose level indicators; will identify existing or expected problems/ constraints which may cause delays; will propose and rank solutions to these problems; and will present revised timetables for accomplishment of tasks, when appropriate.

5.29 The reports will be clear and brief. They should be action oriented. They should avoid unnecessary detail. They should be written to be read by a busy project manager.

5.30 An important feature of these reports will be a prioritized list of issues which require action by USAID project management. These issues will be presented in table format with entries for the following: assigned priority; brief description of issue; date identified; assistance needed; by when; and current status. Issues will be repeated in the table until they are resolved.

b) Joint Annual Review Review of Progress:
5.31 The purpose of the joint annual reviews is to assess the past year's implementation progress and to develop a strategy for attaining next year's targets. This strategy will be embodied in the annual workplan, discussed below. The consultant, AEDC and EEA officials, USAID project management, and project committee members will participate in the joint annual review. Participants will review progress on input, output and purpose level indicators to determine whether implementation is progressing satisfactorily. They will also propose solutions to implementation problems which are identified.

c) Annual Workplan:
5.32 The annual workplan will be developed jointly by the consultant, USAID project management, and AEDC and EEA officials, using conceptual guidance contained in the project paper and incorporating necessary changes suggested by review of implementation experience to date. The annual workplan is intended to answer the questions "What exactly will we achieve this year? and "How will we achieve it?" The annual workplan will describe output and purpose level targets/benchmarks for the coming year, will ensure that adequate data is being collected to verify progress toward the targets, and will detail a strategy for attaining these targets (e.g. task(s), sequence, responsible party(ies), target dates, deliverables), possible impediments/constraints to success, ways of preventing these impediments from materializing, and alternative courses of action to pursue if they do materialize.

5. External or Major Evaluations:

5.33 Major evaluations to be managed by USAID project management and the Mission Evaluation office are scheduled for the third and the sixth year of the project. The first evaluation will be broader in its scope than the annual reviews of progress described

above. Its purpose will be to: 1) assess persistent implementation issues; 2) and to document preliminary impacts to project beneficiaries in Alexandria neighborhoods where electric service has been upgraded. The major sources of data for this evaluation will be in input, output, and purpose level indicators, joint annual reviews of previous years, and a repeat of the electricity consumers survey described under "Special studies".

- 5.34 A final evaluation is scheduled for the 6th year of the project. This evaluation will assess progress made toward achieving project purpose and goal and, to the extent possible, comment on the contribution to network performance made by the Energy control Center. The major sources of data for this evaluation will be previous joint annual reviews of progress, the interim evaluation, data collected and analyzed via the project monitoring system, and a repeat of the baseline survey and data generated from the energy control center.

6. Budget:

- 5.35 Roughly (U.S.\$200,000) of the U.S.\$50 million designated for this project has been set aside for special studies, external evaluations and other data collection, monitoring and evaluation activities.

F. AUDITS AND FINANCIAL REVIEWS:

- 5.36 The Central Audit Agency, an independent agency, is required by Egyptian law to perform audits on all government agencies. In addition, the Central Audit Agency performs quarterly audits on both EEA and AEDC. Both EEA and AEDC have full time resident auditors from the Central Audit Agency on company premises. Notwithstanding the audit coverage provided by the GOE, this project provides \$50,000 for compliance audits and financial reviews to ensure that funds are spent in accordance with the intention of the Project Paper, Project Agreement and subsequent PIIs.

6.0 PROJECT ANALYSES

A. MANAGERIAL/ADMINISTRATIVE ANALYSIS

HOST COUNTRY:

6.01 The Alexandria Electric Distribution Company (AEDC) and the Egyptian Electricity Authority (EEA) will be the implementing agencies for the proposed project. Both organizations are branches of the Ministry of Electricity and Energy (MEE). An organization chart of the MEE Figure 6-1 shows the various organizations within the Ministry.

A. The Alexandria Electric Distribution Company (AEDC):

6.02 AEDC will be the implementing agency for the distribution component of the project. AEDC is one of seven electric distribution companies which comprise the Egyptian Distribution Authority (EDA), a branch of the Ministry of Electricity and Energy (MEE). AEDC is organizationally divided into three main administrative divisions (Technical, Operation, and Financial and Commercial). The Manpower Development and the Legal Affairs Divisions are support divisions.

6.03 The Technical Division is responsible for planning, designing and procuring the necessary materials needed to meet load growth and to provide a reliable electric network for Alexandria. This network covers 13 districts which are divided into three geographical sectors: east, center and west.

6.04 The Operation Division is responsible for implementing the plans developed by the Technical Division as well as operating and maintaining the electrical network and the associated equipment of the 11 KV and the 380 Volt systems. Also AEDC maintains and operates the 66 KV system on behalf of EEA.

6.05 The Financial and Commercial Division is responsible for collecting customer bills and maintaining all accounting records for all billing and procurement activities within AEDC. AEDC employs about 5,700 permanent employees, of which about 380 are professional engineers and 950 are technicians. There are 260 male engineers and 120 female engineers.

SCHEMATIC ORGANIZATION OF MINISTRY OF ELECTRICITY AND ENERGY

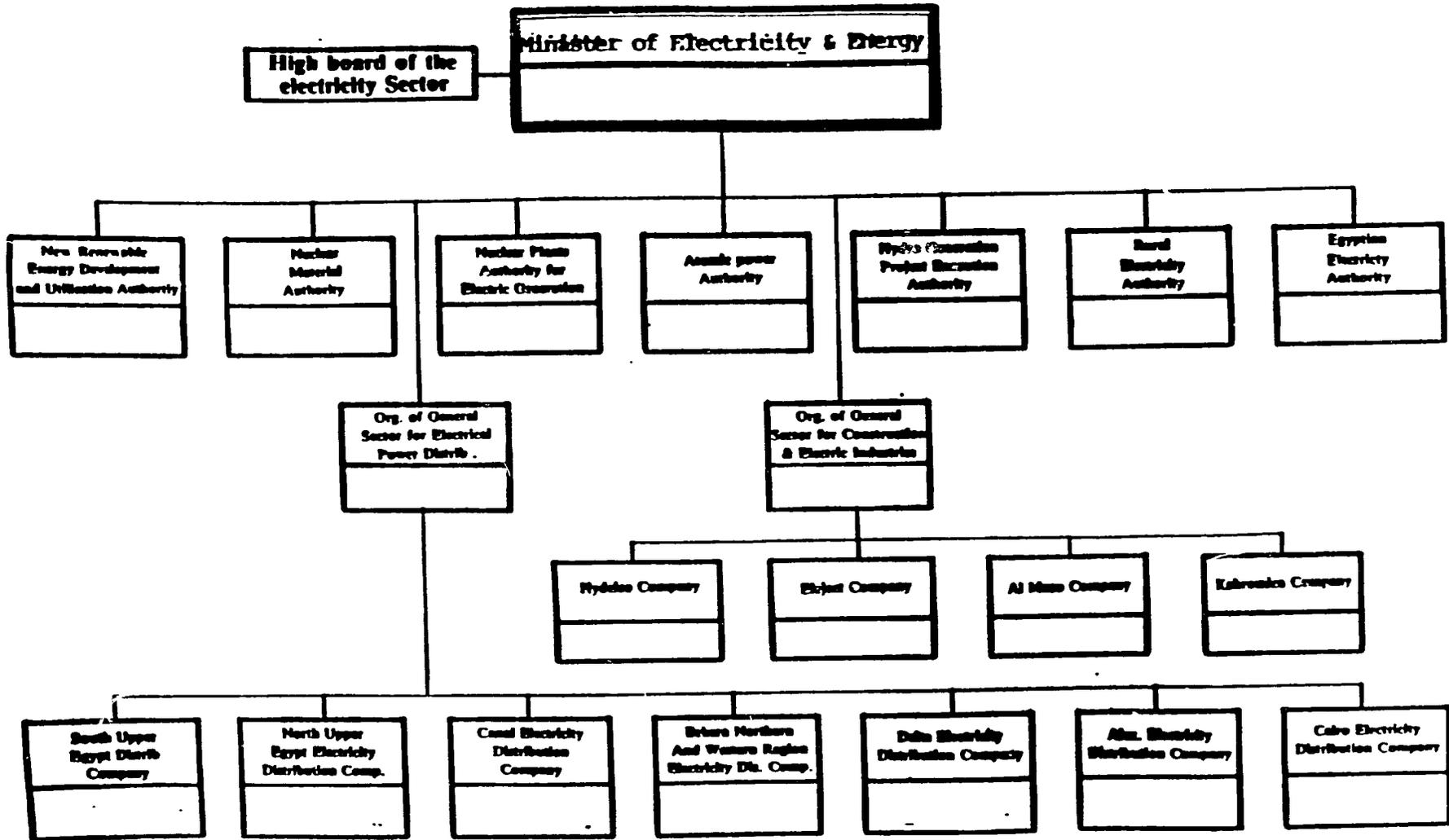
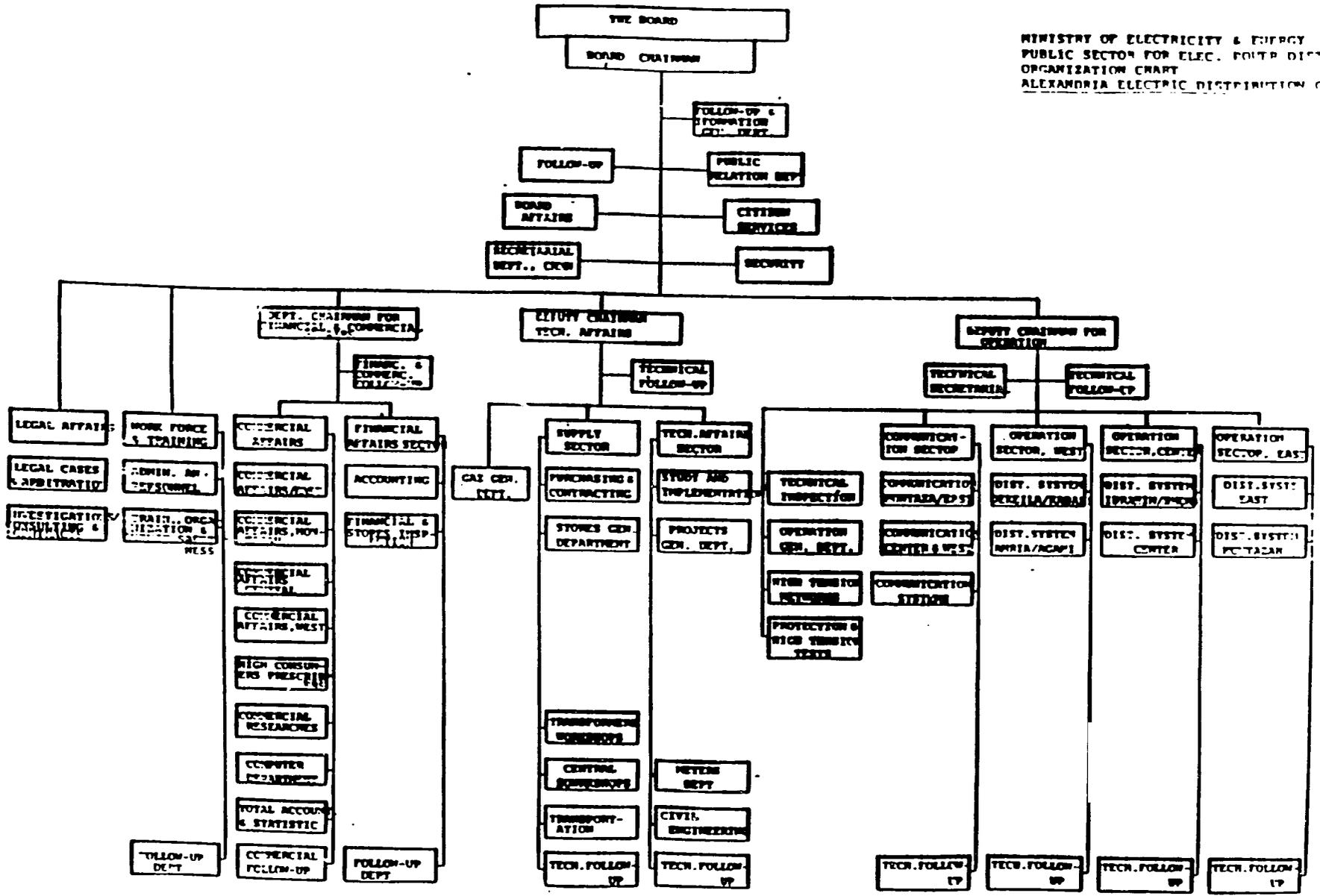


Figure-1
Organization Chart of MEE

MINISTRY OF ELECTRICITY & ENERGY
 PUBLIC SECTOR FOR ELEC. FOURTH DIST.
 ORGANIZATION CHART
 ALEXANDRIA ELECTRIC DISTRIBUTION CO.



32
 Figure 6-2
 Organization Chart of AEDC

- 6.06 The attached organization chart, Figure 6-2 shows the organization structure pattern including top and middle managers within AEDC. Promotion criteria for AEDC personnel to both middle and top management include seniority, performance, and attending specific management and technical courses, as well as obtaining an advanced degree in the field of specialization. Accordingly, managers of AEDC are well experienced in their respective fields of specialization and are capable of effectively executing their duties. AEDC has demonstrated its capability to implement AID financed projects effectively.
- 6.07 AEDC received \$33 million of the \$97 million AID-financed Urban Electric Distribution (UED) Project and has utilized the funds effectively. While the UED Project experienced implementation problems, the funds made available directly to AEDC have been effectively utilized. AEDC has been at the forefront of standardizing equipment, material, and construction; developing work order procedures for detailing proper system design; allocating material according to the design; and developing and utilizing warehousing inventory procedures.
- 6.08 AEDC and the consultant under the UED Project have developed a construction manual for operation and maintenance of all equipment and electrical distribution materials which includes standard installation criteria to be adhered to by AEDC personnel to assure proper materials installations. These standardization procedures include voltage drop calculations, feeder sizing, circuit breakers settings and transformer loadings. Applying these criteria will reduce deterioration and lengthen the useful life of the materials. The distribution consultant will be required to adopt this construction manual and update it as required.
- 6.09 The benefits of establishing a "sister" relationship between AEDC and a U.S. utility have been discussed with AEDC. It was concluded that the idea may have merit but required further investigation. USAID will investigate the merits of similar relationships with other AID missions and if merited will encourage AFDC, working with their distribution consultants, to review the idea and propose a "sister" relationship plan if appropriate. The scope of work of the distribution consultant will provide for this review.

- 6.10 AEDC is pursuing demand management activities. AEDC has introduced solar water heaters in its service area to reduce use of electrical energy for this purpose. AEDC obtained from the Egyptian Authority for Development and Utilization of New and Renewable Energy 375 solar heaters of various sizes. In response to limited publicity, those interested in having a solar heater installed applied to AEDC. The heaters are installed by AEDC at the cost of the applicant who pays a monthly fee which is collected by AEDC for the Authority of Renewable Energy for a period of 99 months. Response has been good, and 350 have been installed, even though installation costs are relatively high.
- 6.11 In addition, the Ministry of Electricity and Energy, the EEA and the AEDC use mass media (newspapers, T.V., radio, magazines) to encourage customers to conserve energy.
- 6.12 AEDC has also been active in applying demand meters and power factor meters to selected customers. Charges are made for demand as well as for improper power factor in accordance with rates approved by the Government of Egypt. Most of the loads served by AEDC do not lend themselves to attempting a load management program such as reducing demand during peak load time or developing a rate system or billing at different rates during peak load and off-peak times. EEA does however practice demand management with selected large customers to identify opportunities to implement demand management during peak demand periods and to consider "time of day" rates.
- 6.13 AEDC does not serve any industries that utilize large amounts of heat for which cogeneration might be considered. However, there are individual customers who have installed their own generating equipment because AEDC could not provide them with the service. (It is doubtful that such an arrangement is more economical than providing central station generated energy due to economy of scale.)
- 6.14 AEDC has established a procedure for handling requests for new loads which should alert its engineers when an individual circuit approaches loaded conditions. When a request for new service or for adding load is received, a district engineer inspects the location of

the additional load and determines what needs to be done to provide service. For this inspection AEDC charges a fee of LE 16.50. A substantial fee is charged for installing a large service connecting the service from the distribution system to the customer's meter. These cost recovery practices plus the design and type of materials to be used to improve the system are expected to make it easier for AEDC to physically maintain the system and reduce illegal connections.

- 6.15 The monitoring, data accumulation and analysis which will be possible with the proposed dispatch control center should, while operating the overall system more efficiently, alert EEA to the need for maintenance or changes to relieve overload conditions.
- 6.16 Prior to the formation of the Egyptian Electric Distribution Authority (EDA) AEDC personnel were responsible for reviewing, evaluating, approving and executing contracts with various suppliers under the UED project. However, with the formation of the EDA in 1986, AEDC has had to obtain concurrence from the EDA prior to approving or awarding contracts. This requirement is time consuming and a potential source of costly delays. While it is understandable that AEDC must report to the higher Egyptian Distribution Authority, it is desirable that AEDC, for purposes of implementing the distribution work of the project, operate as an independent utility responsible for its own actions. Therefore, a requirement precedent to disbursement will be included in the project agreement requiring AEDC to establish a project management team with authority to make the decisions required to implement the distribution component of the project. The team will be composed of a project manager, a project engineer, a procurement & financial specialist, an accountant and a legal advisor. Additionally, to continue the development of AEDC staff, a covenant will be included in the project agreement requiring the development and implementation of a plan whereby: a) procurement procedures developed under the UED Project will be continued under the distribution system of the proposed project; and b) during the last year of implementation, AEDC personnel will have full responsibility for the distribution system implementation under the general guidance of the consultant.

SCHEMATIC ORGANIZATION OF EGYPTIAN ELECTRICITY AUTHORITY

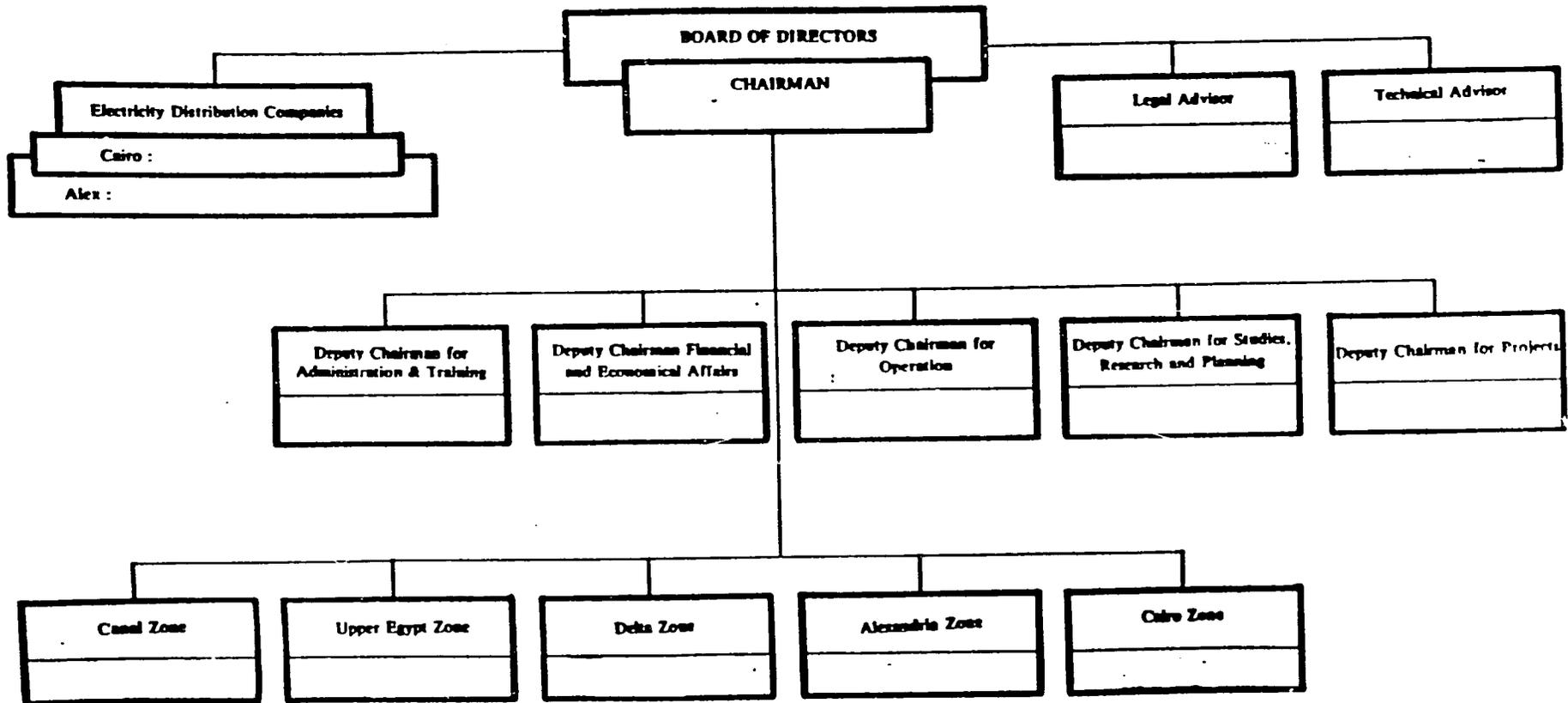


Figure 6-3
Organization Chart for EEA

B. The Egyptian Electricity Authority (EEA):

- 6.17 EEA will be the implementing agency for the dispatch control center component of the project. The EEA is the operating authority for the Ministry (MEE) responsible for the planning, construction, operation and maintenance of the Egyptian Unified Power Systems (UPS), which consists of the generating units and bulk energy transmission systems.
- 6.18 EEA is organizationally divided into five administrative divisions (planning, construction, operation, and finance and manpower development) and five operational zones (Cairo, Alexandria, Delta, Canal and Upper Egypt). EEA personnel have effectively managed the operation and maintenance of a complex system of generation and transmission facilities in their respective zones. The attached organization chart Figure 6-3 shows the organization structure of EEA. EEA's promotion for middle and top management positions are similar to those used by the AEDC.
- 6.19 EEA employs about 27,040 permanent employees, of which 2754 are employed by the EEA Alexandria Zone. Within the EEA Alexandria zone there are 411 professional engineers and chemists and 815 technicians. The facilities of the EEA Alexandria zone presently include a total installed generating capacity of 1030 MW (713 MW in steam turbine capacity and 317 MW in gas turbine capacity), 332 km. of 220 KV transmission lines and 1790 (MVA) of transformer capacity.
- 6.20 The EEA Alexandria Zone, successfully manages the operation and maintenance of generation and transmission facilities serving Alexandria and the Northwest coast up to Salloum City on the Libyan border.
- 6.21 EEA's primary responsibility under this project will be to manage the installation of the dispatch control center. A Requirement Precedent to Disbursement will be included in the project agreement requiring EEA to establish a project management team reporting directly to the President of the EEA Alexandria Zone who in turn will report to the EEA Chairman. This team will have the authority to make day-to-day decisions and approvals. The team will be composed of a project manager, a project engineer, a financial specialist, an accountant and a legal expert.

B. SUMMARY OF TECHNICAL ANALYSIS

- 6.22 The proposed improvements to AEDC's distribution system and the installation of a supervisory control and data acquisition system (dispatch control center) are technically feasible and necessary for the development of an efficient electric distribution system to serve the people in Alexandria. Rehabilitating the existing electrical distribution system is the most cost effective means to improve service to existing customers. The alternatives to rehabilitating the existing system are: a) to construct a new distribution system; or b) to do nothing. The first option would not be practical, and the second would lead to the eventual collapse of electrical services in Alexandria.
- 6.23 AEDC purchases power for distribution from EEA at 15 existing substations at 11 KV. There are six additional substations under construction which will substantially increase the power supply to AEDC. EEA has also provided a 20 KV supply point for utilization by AEDC. The capacity of the supply transformers is adequate. However, the demands on an electric utility can change system requirements in a specific area dramatically in a very short period of time. A project review is scheduled for 1993 and the status of the supply transformer capacity will be reviewed at that time. EEA's capability to supply energy from the Egyptian Unified Power System (UPS) is adequate considering the planned additions to its system and the return to more normal water levels in Lake Nasser thereby assuring full output from the High Dam hydro-generating plant. There appears to be no reason, from the supply point of view, why AEDC should not proceed with investments to improve its system and operation.
- 6.24 System design parameters (e.g. voltage drop and circuit loading) have been established under the UED Project. These parameters should continue to be used to develop lists of materials and equipment to be financed under the proposed project. No unusual technology is being introduced in the distribution system, but introducing 20 KV as distribution voltage requires different planning and design considerations from that used for the more familiar 11 KV system. The financial and operation benefits of capacitors to maintain individual 11 KV feeder at a power factor of or near 95 percent are very significant. Operation of capacitors is new

to AEDC's staff. It is important that the impact of the capacitors installed by EEA and AEDC under the UED Project be continuously reviewed and additional capacitors installed when necessary to maintain a high power factor. A Covenant will be included in the project agreement requiring such a review.

6.25 The design of the dispatch control center will incorporate proven technology. The equipment to be installed will include a relatively sophisticated communication system and a computer (with appropriate software programs) for storing and analyzing data related to the system's operation. This equipment and software will be new to EEA Alexandria Zone personnel. Therefore, a detailed statement of the system's requirements and operating parameters, including staffing requirements and training plans, must be prepared by a consultant with extensive experience in planning, specifying, and installing similar systems and developing supporting units for systems operation and maintenance. Extensive training of EEA's personnel by the equipment suppliers will be required. A Requirement Precedent to Disbursement of funds for installing the dispatch control center will require such a detailed statement as well as assurances that necessary radio frequencies have been allocated.

6.26 Annex E provides a more detailed technical analysis of the proposed project.

C. ENVIRONMENTAL CONSIDERATIONS:

6.27 The electrical power system in Egypt consists of generating facilities and a network for the transmission and distribution of electrical energy. This project consists of (1) procuring distribution materials to rehabilitate the distribution system at the 11 KV and 220 volt levels for selected areas in Alexandria; and (2) designing and installing a dispatch control center to collect data from 66/11 KV substations necessary to allow the operators to efficiently monitor, manage, and control selected equipment in the substations.

6.28 The procurement of the distribution materials and control center equipment will require warehouse facilities to store the materials and inventory procedures to account for the stock and utilization of

the materials during the construction phase of the Project. Existing warehouse facilities will be utilized for this Project which were constructed in Alexandria under the UED Project. These facilities are the properties of the AEDC and the EEA.

- 6.29 The initial environmental examination of the project indicates no environmental impact on the atmosphere, water quality, land use, natural resources or health. The overall environmental impact of the project is directly beneficial to the people residing in Alexandria. There will be an improvement in the supply of electric energy which will benefit consumers. No change or movement of population is expected as a direct result of the project.
- 6.30 There are no significant physical energy resources or conversion processes included in the proposed project. To the extent that the project improves the efficiency of the distribution system and its operation, a reduction in the use of physical energy resources would be expected. Based on the assessment of the environmental considerations of the proposed project, the project recommends a negative determination as indicated in Annex G. The Bureau Environmental Coordinator concurred with the recommendation on May 19, 1989.

D. SOCIAL SOUNDNESS ANALYSIS

Socio-Cultural Feasibility

- 6.31 Improvements in the quality of electric service, as measured by consistently adequate voltage and continuity of service, can only result in positive socio-cultural impacts because the availability of a reliable, adequate supply of electric energy and its use has such a positive impact on well-being and economic production. Supplying the consumer with electric power of adequate voltage level, whether the energy is used for lighting, to operate a saw or refrigerator, or operate a radio receiver or a television set enhances the benefits to the consumer. Operating appliances outside their designated voltage rating can cause overheating or failure and will shorten their lifespan.
- 6.32 The activities included in the proposed project are similar to those performed under the Urban Electric Distribution Project (except for the dispatch control center). There is no cultural, political or social reason the project cannot be successfully carried out as described in this Project Paper.
- 6.33 To make use of electrical energy an investment must be made by the consumer. The costs include the devices, (light bulb or air conditioner), necessary wiring, AEDC's connection charge, etc. No one wants to make such an investment if, for example, the light bulb will produce a light source only equivalent to a candle or only the fan operates in an air conditioner because the voltage is insufficient to start the compressor.
- 6.34 In addition to the initial investment, the consumer must pay a price for the energy consumed. Certainly, consumers will react negatively to such charges after having made the investment to use electrical energy and finding that they are not receiving adequate service. Improvement in service should have a positive impact on the amount a consumer is willing to pay for energy.

Spread Effects

- 6.35 AEDC staff have successfully carried out similar distribution work under the Urban Electric Distribution (UED) Project. The dispatch control center will create new positions for which EEA staff will be trained. EEA

employs a number of women engineers and the positions created at the dispatch control center will provide additional opportunities for training women. In developing the training plan, the dispatch control consultant will consider any cultural limitations on travel or other activities which may limit women's training opportunities, and develop a training plan which maximizes women's participation.

- 6.36 Transformer points and the associated overhead circuits will be installed by local contractors. The dispatch control center will be installed by a U.S. contractor. Local employment opportunities will be provided under both contracts.
- 6.37 The Project will have a positive effect on AEDC and EEA staff. The major beneficiaries of the Project, however, extend well beyond the boundaries of AEDC's service area.

Beneficiaries

- 6.38 The largest group of beneficiaries will be those AEDC customers who will have improved electric service to their residences. Commercial establishments and industries with improved service will also directly benefit. Beneficiaries of low income are represented by more than 85 percent of the customers. Each of the installed transformer points serves approximately 500 customers. Assuming four people benefit from each meter and 600 transformer points are rehabilitated, approximately 1.2 million people will directly benefit from the proposed Project. These beneficiaries constitute a cross section of the population of Alexandria.
- 6.39 Most of the residential customers and the industrial and commercial establishments in Alexandria will directly benefit from the dispatch control center through improved reliability of electric service. Additionally, since the Alexandria distribution system is supplied with energy from the Egyptian UPS, improving the efficiency and operation of the system will benefit all users of electric energy supplied from the UPS.

Conclusion

- 6.40 By making physical improvements to the system, the project will have a direct positive impact on 1.2 million people and will indirectly benefit the entire population of Alexandria. AEDC's and EEA's staff will benefit from on the job training provided by the consultants, including the training associated with the installation of the dispatch control center. The benefits from the dispatch control center extend directly to the people of Alexandria and indirectly to other private citizens, commercial establishments, and industries nationwide served with electric energy from the Egyptian UPS.

E. ECONOMIC AND FINANCIAL ANALYSIS

1. INTRODUCTION

- 6.41 The low price of electricity is one of the key economic distortions affecting the pattern of resource allocation in Egypt. The level and structure of electricity rates have encouraged consumption and investment in energy intensive processes. Currently the average price is 4 piasters (PT 4) per KWhr while the economic cost (based on the long run marginal cost) of generation and high voltage transmission is estimated at PT 17.1 per KWhr. Final distribution through the medium and low voltage network may add PT 4 per KWhr to the cost. The subsidy in the electricity rates results primarily from the GOE's underpricing of fuels used to generate electricity and from subsidies in the cost of capital provided through undervalued foreign exchange and negative real interest rates. There is also a small on-budget subsidy to EEA to cover the total system's operating losses.
- 6.42 Within the rate structure, the largest subsidies are provided to the first 100 KWhr per month of residential consumption, the first 100 KWhr per month of commercial consumption and the total consumption of large public sector companies who operate on high and very high voltages. These rates are below PT 2.8 per KWhr. The highest rates, PT 14 per KWhr and up, are charged to large residential and commercial consumers.
- 6.43 Private sector joint venture companies organized under Law 43 (foreign investment law) pay a PT 4 per KWhr premium above the rate charged to a similar domestic company. There is no rate differential for on/off peak load for any category of consumer.
- 6.44 The program to reduce the electricity subsidy is a central topic in the macroeconomic policy reform agenda now under discussion with the IMF, the IERD and USAID. In the case of the IERD and USAID, the allocation of significant new resources for power generation depend upon progress in reducing the subsidy. Furthermore, the AFDB has conditioned its power loan on progress in developing a new rate structure.
- 5.45 Since the start of the GOE/IMF discussions in 1986, rates have been raised twice, by 29% in April 1987 and 30% in March 1989. The 1987 increase raised the rates

for industry and large residential and commercial consumers by 40% or more. The 1989 increase raised industrial rates by another 66% although several very highly subsidized factories were exempted. Overall, these price rises have reduced the average subsidy from 82% of the economic price to 76.5%. The latest price rises in March 1989 were judged by USAID and the IBRD sufficient to proceed with projects which will finance new electricity generation.

6.46 Policy discussions leading to further reductions in the electricity subsidy are anticipated for at least the next five years. These discussions will be conducted primarily in the context of future IMF standby agreements, IBRD structural adjustment and energy sector loans and USAID's Power Sector Support Project.

6.47 At this stage in the discussions there is a critical need to comprehensively recalculate the rate schedule on the basis of the long and short run marginal cost of electricity and the costs of servicing each category of customer. In conjunction with our development of the Power Sector Support project, USAID has financed the preparation of the scope of work for this comprehensive study (cost of service study). The study and final report with the proposed economic rate schedule is expected to be completed in 1990. This study will also be financed by USAID.

6.48 Development and negotiation of the Alexandria Electrical Network Modernization project has not been an element of the Mission's policy dialogue on energy price distortions. Rather, this project has focused on institutional and quality of service concerns at the retail end of the electricity system. The primary counterpart organization, AEDC, has no authority and little influence in setting rates. However, the quality of its service in terms of efficiency and reliability will be an influencing factor in the GOE's management and amelioration of popular resistance to further rate increases.

2. Financial Analysis for the Upgraded Distribution System

6.49 AEDC is a dependent company within the government owned electricity generation and distribution system. This means that the wholesale price AEDC must pay to EEA for electricity is determined so that the spread between

the wholesale rate and the government set retail rate structure provides sufficient revenues to cover AEDC operating costs. When AEDC performance in operations and bill collection exceed the expected level, AEDC "earns" a surplus which is distributed to its shareholders (principally EEA). This has been the case for the past several years. When performance falls below planned levels, presumably management improvements are made in AEDC by the Ministry of Electricity or the wholesale price of electricity is reduced so that AEDC is put on a new break-even point.

- 6.50 The corporate organization of the generation and distribution of electricity coupled with the EEA's direct link to the GOE budget ensure that the GOE budget is ultimately responsible for the financial obligations of the entire system.

A. FINANCIAL INTERNAL RATE OF RETURN (IRR)

- 6.51 The calculation of the financial IRR has been limited to the investment in the rehabilitation of the medium and low voltage distribution system under AEDC's jurisdiction. The investment in the control center has been excluded. This decision was made because of the highly speculative nature of estimating the benefits of the control center from EEA and AEDC data. However, the economic effects of the control center are discussed in section 3 of this analysis.
- 6.52 The costs of materials, equipment and supplies for distribution system improvement are approximately \$16.80 million and LE 57.36 million. These costs include the required 11 KV underground cables and accessories, 11 KV distribution points, transformers and switches, various overhead cables, underground cable risers, project vehicles and consulting services.
- 6.53 The financial benefits used in determining the IRR have been limited to the revenues received by AEDC from the sale of the electricity saved as a result of Project improvements in the distribution system. AEDC estimates the Project's rehabilitation activity will result in a recovery of two percent of the total KWhr's currently distributed by AEDC.^{1/}

^{1/} The 2 percent estimate comes from a SCADA report for a similar project in Alexandria. It should be understood that this figure is only a rough estimate of the savings by AEDC under this project.

| FISCAL YEARS | FISCAL YEARS | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--------------|------|------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--|
| | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | | | |
| Energy Costs | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | | |
| Energy Costs (US \$ 000) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Energy Costs | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Energy Costs | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fossil Inflation Related to US \$ | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | |
| Exchange Rate (LE/\$) | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | |
| US Dollar Costs | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TOTAL PROJECT COSTS (constant) | 60 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | |
| US Inflation Rate | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | |
| TOTAL PROJECT COSTS (constant) | 60 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | 59 | |
| REVENUES : (US \$ '000) | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FISCAL YEARS | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | | | |
| AEDC KWH Dist. (1) | 2998 | 3043 | 3195 | 3355 | 3521 | 3693 | 3872 | 4058 | 4252 | 4454 | 4664 | 4882 | 5108 | 5343 | 5587 | 5840 | 6102 | 6373 | 6653 | 6942 | 7240 | 7548 | 7865 | 8192 | 8529 | 8876 | 9233 | |
| KWH 000 Saved (2) | 0 | 0 | 0 | 13419 | 2818 | 44384 | 62178 | 81558 | 102627 | 124408 | 146944 | 170280 | 194472 | 219472 | 245328 | 272000 | 299536 | 327896 | 357040 | 386928 | 417624 | 449100 | 481336 | 514304 | 547984 | 582356 | 617408 | |
| Ann. Sav. (LE 000) | 0 | 0 | 0 | 557 | 1127 | 1775 | 2486 | 3262 | 4105 | 5018 | 5994 | 7036 | 8148 | 9334 | 10598 | 11944 | 13376 | 14898 | 16504 | 18198 | 19984 | 21856 | 23810 | 25852 | 27978 | 30194 | 32496 | |
| Annual Savings \$ (Ex. Rate=LE 2.5/\$) | 0 | 0 | 0 | 215 | 451 | 710 | 994 | 1305 | 1637 | 2017 | 2440 | 2908 | 3424 | 3990 | 4608 | 5280 | 6008 | 6796 | 7648 | 8568 | 9560 | 10628 | 11776 | 12998 | 14292 | 15664 | 17112 | |
| US Inflation | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | 0.04 | |
| Adjusted Annual Savings (\$000) | 0 | 0 | 0 | 191 | 385 | 584 | 786 | 992 | 1201 | 1413 | 1628 | 1846 | 2068 | 2294 | 2524 | 2758 | 3000 | 3248 | 3504 | 3768 | 4040 | 4320 | 4608 | 4904 | 5208 | 5520 | 5840 | |
| Net Benefits | -60 | -59 | -59 | -4874 | -2047 | -4961 | -1622 | -557 | 1001 | 963 | 926 | 890 | 856 | 823 | 791 | 761 | 732 | 703 | 676 | 650 | 625 | 601 | 578 | 556 | 535 | 514 | 493 | |

At 21 Energy Savings:

IRR @ LE 0.04/KWH= -3.951
IRR @ LE 0.21/KWH= 19.081

At 12 Energy Savings:

IRR @ LE 0.04/KWH= -9.53
IRR @ LE 0.21/KWH= 6.812

At 32 Energy Savings:

IRR @ LE 0.04/KWH= -0.0001392
IRR @ LE 0.21/KWH= 29.652

N.B.: The above calculations reflect a 2% energy savings at PT 4/KWH. The calculations for the other IRRs is not shown above.

(1) AEDC KWH distributed grows at 5% annually.

(2) KWH saved are 2% of AEDC KWH distributed. Two other scenarios are examined:

-- KWH saved = 1% of AEDC KWH distributed

-- KWH saved = 3% of AEDC KWH distributed

- 6.54 The financial IRR is based on AEDC receiving the current average price of 4 PT per KWhr for the total amount of electricity saved.^{1/} In the first scenario this price is projected to remain constant in real terms throughout the life of the equipment -- 25 years from Project start up. Reduced losses (electricity saved) begin in year four of the Project and rise linearly to year eight at which time the maximum savings occurs. See Table 6-1. The maximum savings then remains constant for the remaining life of the network. The maximum amount of electricity saved is calculated as two percent of the demand expected in year eight. Demand in year eight has been projected as a five percent compound growth over the 1988 quantity of electricity distributed. The IRR has been calculated in real terms with dollar inflation assumed to be four percent per year and LE depreciation relative to the dollar dropping from twenty percent in the first three years of the project to five percent after year six then to zero after year eleven. This assumes Egypt implements structural adjustment and stabilization under IMF/IBRD guidance.
- 6.55 As anticipated, because of the low price of electricity, the financial IRR is negative (-3.92%). This negative financial rate of return is mitigated if the revenue generated by new connections or upgraded connections within the existing distribution system are considered. However, revenues generated from connection fees have not been estimated or included since it is not possible to determine how many of the new connections or upgrades result from the greater reliability of the system due to the Project versus the general increase in demand stimulated by the prevailing subsidy.
- 6.56 Alternative IRR's of -9.53% and -0.00% were calculated on the basis of alternative savings scenarios -- 1% savings and 3% energy savings respectively.
- 6.57 Finally, under a price reform scenario which is more compatible with the assumptions on devaluation and inflation, the financial IRR was calculated to be a positive 9.27%. See Table 6-2. Under this scenario, the average real price is projected to grow to the

^{1/} The 4.0 piasters tariff is the average tariff charged to all consumers of electricity in Egypt. For the major electricity users in Alexandria, commercial and household customers, the tariff may be slightly higher or lower depending on monthly rates of consumption.

economic price of 21 PT per KWhr over a ten year period (commensurate with the economy's likely structural adjustment schedule). Demand is projected to remain constant at the 1988 level as the price increases counter the demand effects of increased income resulting from the structural adjustment. In this fourth case, the savings scenario is a constant 2% of the quantity of electricity sold in 1988 by AEDC. Inflation and local currency depreciation assumptions were the same as in the first three scenarios. This IRR is particularly important. It indicates that the Project is financially viable and offers a competitive financial rate of return even though no growth in demand or revenue from connection fees materializes because of the price correction process.

B. Economic IRR

- 6.58 The four electricity savings scenarios prepared for the financial IRR were recalculated on the basis of the economic price of electricity. As expected the IRR's are positive in all cases. They are 6.81%, 19.08% and 29.65% for the electricity savings of 1%, 2%, and 3% respectively of the demand projected in year 8. The IRR for the fourth case (2% energy savings on the straight lined 1988 load) was 11.45%.

C. A Further Note on Economic Benefits

- 6.59 The ultimate determinant of the economic viability of this project is the willingness of the government to take timely price correction measures. However, there is a tendency to consider the actual economic value of this project at this time to be positive even if the financial IRR as calculated above is negative due to the low price of electricity. (It should be noted that the economic IRR calculated above is speculative in that it is the result of a "what if the prices were right" scenario). This tendency to believe the project has a positive economic IRR even at the low price level now prevailing stems from the sense that there are substantial benefits to users from a more adequate and reliable system. These benefits are not reflected in the analyses. For example, adequate and reliable power permits small industries and workshops who cannot afford backup generation to work more productively. Not only is the work of these firms uninterrupted, the longevity of their machines is enhanced. Households and commercial enterprises are assumed to benefit similarly from adequate and reliable power. However,

these economic benefits have not been considered because of several methodological problems.

- 6.60 First, there is an almost complete omission of the informal industrial and commercial sectors in the government's data on industrial and commercial activity. There is no credible information on the aggregate cost of interruptions or brownouts to these firms. In fact, cost calculations for large firms are also not accurate because of prevailing wage and price distortions. Second, estimating the economic benefits of reliable power to households is even more difficult methodologically. However, the most important problem is that at the current price, some percentage of the industrial demand for electricity may be for uneconomic activity. Also, some percentage of residential and commercial demand may be simply wasted.
- 6.61 Consequently, at the present price, it is not possible to state that the aggregated uses of the electricity saved by this project will produce a net economic benefit or a loss. It is only when the price of electricity reaches its economic level that one could safely conclude that net positive economic benefits beyond those measured by the price of electricity are realized by consumers of electricity when the adequacy and reliability of the system is improved.
- 6.62 The government is undertaking energy price reform and is expected to continue to reduce the subsidy in order to diminish its distortional effects on the economy. As this price reform continues, the positive economic benefits on the consumer side are expected to increase and the negative economic uses to decrease.

3. ANALYSIS OF ECONOMIC BENEFITS FROM THE DISPATCH CONTROL CENTER

A. Review of Benefits

- 6.63 Network operation in the Alexandria zone is becoming more complex and will continue to do so in the future as the network expands. The present control center in Alexandria is less than adequate. When the proposed control center is completed, monitoring and control of

the Alexandria power system will be fully automated. At that time, EEA will be able to acquire more information and maintain better control of their system.

- 6.64 A dispatch control center would normally supervise and control the primary subtransmission and distribution substations within regions like Alexandria. The number and/or duration of outages from substations can be reduced by the introduction of computerized supervisory and control data acquisition systems, resulting in significant benefits being derived in terms of electricity sales, increased revenue and reduction of the effects of disruptions on industries.
- 6.65 EEA's and AEDC's data on outages, brownouts and surges are not adequate to permit a credible analysis of the control center's financial and economic benefits. The additional electricity which could be sold after installation of the control center can not be estimated at this time. However, it is felt that the control center is a technically essential component to the efficient distribution of electricity given the size and complexity of Alexandria's distribution system. The financial and economic merit of such an investment is presumed on the basis that less complex systems in the U.S. which are operated for profit have invested in such centers and found them to be profitable. Their criteria included the following:-
1. Increased network reliability through early detection and correction of overload or insecure operating situations.
 2. Increased equipment safety and reduced outage times through the ability to detect and disconnect overloaded or malfunctioning elements of the network.
 3. Reduced operating costs, permitting less labor at stations with centralized monitoring and control.
 4. Improved monitoring and record keeping of both normal and abnormal conditions as an aid to the management of short-and long-term operations and network expansions.

5. Reduced or deferred capital investment in transmission capacity through better utilization of network capacity and improved allocation of operating margins.
 6. Increased revenues through reduction in outages and faster restoration of service in the event of outages.
 7. Reduced energy losses in power transmission facilities through better electricity management.
 8. Increased reliability of electrical power to the consumer base in the zone. 2/
- 6.66 Outages that might not be significantly reduced with the introduction of the new control center include:
1. Automatic load shedding due to below normal system frequency.
 2. Planned load shedding due to potential overloads.
 3. Planned outages for maintenance/construction. 3/

2/ See SCADA feasibility study report for the Alexandria Regional Control Center, Annex H, 1987.

3/ Ibid

7.0 REQUIREMENTS AND COVENANTS

A. Requirements Precedent to Disbursement

- 7.01 Prior to the disbursement or to the issuance of any commitment documents under the Grant, the Cooperating Country shall furnish to AID, in form and substance satisfactory to AID:
- (1) A statement of the names of the persons authorized to represent the Cooperating Country for Project purposes together with a specimen signature of each such person.
 - (2) Evidence that the proceeds from the grant have been made available to the Alexandria Electric Distribution Company (AEDC) and the Egyptian Electricity Authority (EEA) on terms and conditions mutually agreeable to the GOE and the AEDC and the EEA except for the funds used to finance consulting services which we recommend be made available as a grant.
 - (3) Evidence that the local currency required for the Project has been budgeted by the GOE and will be available for timely expenditure by the AEDC and the EEA.

B. 7.02. Prior to the disbursement or to the issuance of any commitment documents under the Grant for financing project-related distribution work, the Cooperating Country shall furnish to AID, in form and substance satisfactory to AID:

- (1) Evidence that the positions of Chairman and Deputy Chairman for Operations of the AEDC have been filled.
- (2) Evidence that the Alexandria Electric Distribution Company has been granted the necessary authority to implement independently the rehabilitation of the distribution component of the project including procurement document review, approving contract awards, invoices and other managerial actions related to the project.

- (3) Evidence that the AEDC has established and staffed a management team fully authorized to make all decisions to implement the distribution component of the project.

C. 7.03. Prior to the disbursement or to the issuance of any commitment documents under the Grant for financing the dispatch control center, the Cooperating Country shall furnish to AID, in form and substance satisfactory to AID:

- (1) Evidence that the EEA has acquired land necessary for implementation of this Project component.
- (2) Evidence that the EEA has established and staffed a management team fully authorized to make all decisions necessary to implement the dispatch control center.
- (3) Evidence that the necessary radio frequencies have been allocated for the communications system to be associated with the dispatch control center.

D. 7.04. Prior to the disbursement or to the issuance of any commitment documents under the Grant for financing of particular contracts for goods or services, the Grantee shall present to AID, in form and substance satisfactory to AID, executed copies of such contracts.

E. Covenants

7.05 The cooperating country shall covenant substantially as follows:

- (1) Exemption from Decennial Liability Law: Contractors, architects, consultants and subcontractors, regardless of nationality, working on the Project shall be exempt from the application of Egyptian Law related to decennial liability.
- (2) Any social insurance assessments and any taxes on expatriates arising under Grant financed contracts will be paid directly or reimbursed in a timely manner by the Cooperating country from its own resources.

- (3) That the AEDC and the EEA will select qualified personnel for training in a timely manner.
- (4) That the work order procedure, specifications, procurement documents to the extent they are applicable, and the stores and warehousing inventory procedures established under the Urban Electric Distribution Project will continue to be used for the distribution work related to the Project.
- (5) That AEDC and EEA will provide AID, on a quarterly basis, with copies of their accounting records on local currency and in-kind contributions provided for the project.
- (6) That AEDC and EEA will provide AID, at such times and in such detail as AID may reasonably specify, monthly operating reports covering system operation, performance and management.
- (7) That within one year of the effective date of the consulting services contract for distribution system improvements, per Requirements Precedent (D), above, Alexandria Electric Distribution Company will develop for USAID approval an implementation plan to transfer to its personnel all implementation responsibility for the Project by an agreed date.
- (8) That the Alexandria Electric Distribution Company will continuously review the reactive power loading of all 11 KV feeders and will provide appropriate capacitor compensation as required to maintain a feeder power factor of 95 percent.
- (9) At the present time, the Project does not provide for salary supplement or incentives to employees of the Grantee out of Grant funds or Special Account funds. If, at some future time, the parties agree that Grant proceeds or funds derived from the Special Account may be used to pay such supplements and incentives, such payments will be made only in accordance with mutually agreed guidelines.

ACTION: AID 4 INFO: DCM ECON /6

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SUBJECT: ALEXANDRIA ELECTRICAL NETWORK MODERNIZATION
 PROJECT (263-0215) - PID

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1. THE PROJECT REVIEW COMMITTEE (PRC) MET MARCH 17, 1989 TO REVIEW THE SUBJECT PID. AFTER REVIEW, BUREAU STAFF RECOMMENDED APPROVAL OF PID WITHOUT FORMAL ANEAC REVIEW. PPC REPRESENTATIVES VOICED STRONG DOUBTS ABOUT PROJECT MERITS IN TERMS OF ECONOMIC EFFICIENCY, EXPECTED RATE OF RETURN AND SUSTAINABILITY, ALTHOUGH PPC AGREED NOT TO WITHHOLD PID CLEARANCE. AA/ANE HAS DECIDED TO AUTHORIZE MISSION TO PROCEED WITH PROJECT PAPER PREPARATION IN ACCORDANCE WITH GUIDANCE SET FORTH BELOW AND TO PROCEED WITH SUBSEQUENT AUTHORIZATION/DELEGATION OF PROJECT PURSUANT TO DELEGATED AUTHORITIES AND FUNDING AVAILABILITIES.

2. BUREAU CONCURS WITH MISSION'S POSITION THAT THE ALEXANDRIA ELECTRICAL NETWORK MODERNIZATION PROJECT WILL IMPROVE THE TECHNICAL EFFICIENCY OF THE DISTRIBUTION SYSTEM AND ALLOW FOR EXPANSION OF THE SYSTEM TO SERVE A LARGER NUMBER OF BENEFICIARIES. ANE HAS CONCLUDED THAT THIS PROJECT IS WORTHY OF FINANCING, TAKING INTO

ACCOUNT, INTER ALIA, RECENT ELECTRICITY PRICE INCREASES AND COMMITMENT TO PARITY WITH WORLD ENERGY PRICES. FUTURE ELECTRICITY DISTRIBUTION PROJECT PROPOSALS, IF ANY, WILL BE JUDGED ON A CASE-BY-CASE BASIS. MISSION SHOULD BE AWARE THAT PPC REPRESENTATIVES DID NOT SUPPORT THE PRC MAJORITY VIEWPOINT ON THE INTRINSIC BENEFITS OF THE PROJECT, AS FURTHER EXPRESSED BY THE RECENT PRICE INCREASES. PPC BELIEVES THAT WITHOUT LARGER PRICE INCREASES, THE ELECTRIC POWER SECTOR'S UNECONOMICALLY LOW USER PRICES AND CRITICAL LINKAGES WITH THE ECONOMIC STRUCTURE AND THE DOMESTIC BUDGET DEFICIT COULD DISTORT ECONOMIC DECISION-MAKING, ENCOURAGE EXCESSIVE ENERGY CONSUMPTION, ESPECIALLY IN LARGE SCALE ENERGY-INTENSIVE MANUFACTURING, CONTRIBUTE TO RISING DOMESTIC BUDGET AND FOREIGN TRADE DEFICITS, DISCOURAGE SECTORAL AND MACROECONOMIC REFORMS, BLOCK POSITIVE STRUCTURAL SHIFTS AND HINDER LONG-RUN DEVELOPMENT EFFORTS. GOV'S RECENT PROCLAMATION RAISING ELECTRICITY PRICES BY 32 PERCENT IN

PFC'S VIEW EARLY COVERED THE PAST YEAR'S INFLATIONARY IMPACT ON ELECTRICITY PRICES AND LEFT SOME RATES AT A SMALL FRACTION OF LEVELS CONSISTENT WITH ECONOMIC EFFICIENCY AND SUSTAINABILITY.

3. ANE'S DECISION TO APPROVE PID IS BASED--IN ADDITION TO RECENT GCE MOVES ON PRICING--ON THE NEED FOR THE PROJECT TO INCORPORATE SIGNIFICANT ELEMENTS AIMED AT STRENGTHENING THE INTERNAL INSTITUTIONAL VIABILITY OF AEDC AND MAXIMIZING TECHNICALLY EFFICIENT DISTRIBUTION AND USE OF ELECTRIC POWER, WHICH WILL REQUIRE DETAILED DEVELOPMENT IN THE PP. SPECIFICALLY:

A. PP SHOULD DESCRIBE THE EXISTING CAPABILITIES AND DEFICIENCIES OF THE AEDC AND WHAT STEPS ARE TO BE TAKEN BY USAID OR OTHERS TO ASSURE THAT THE REHABILITATION INVESTMENT DOES NOT SIMPLY DETERIORATE OVER TIME BECAUSE OF INHERENT OPERATIONAL DEFICIENCIES, E.G., LACK OF ON-GOING MAINTENANCE CAPABILITY, INADEQUATE FUNDS FOR MAINTENANCE, LACK OF ENFORCEMENT OR THEFT, ETC. THE PP SHOULD FOCUS ON THE PERSONNEL AND MANAGEMENT STRENGTHENING REQUIRED, INCLUDING THE NEEDED DEGREE OF AUTONOMY REQUIRED FOR AEDC TO OPERATE PROPERLY. IN THIS REGARD, THE PRC FELT A SISTER RELATIONSHIP WITH A U.S. UTILITY MIGHT BE A USEFUL TOOL.

B. THE PID SECTION ON FINANCIAL CONSIDERATIONS FOCUSES ON THE CAPABILITY OF THE AEDC TO CARRY OUT PROCUREMENT, ACCOUNTING AND CONTRACTING. THERE IS NO MENTION OF THE FINANCIAL STATUS OF AEDC AS AN OPERATING ENTITY. THE PP

DEVELOP THE FINANCIAL STATUS AND PROSPECTS OF THE AEDC, INCLUDING HOW BY REDUCING LOAD LOSSES AND INCREASING SYSTEM TECHNICAL EFFICIENCY THE PROJECT WILL DIRECTLY IMPROVE THE ECONOMIC AND FINANCIAL VIABILITY OF THE AEDC AND HOW EXPANSION TO NEW AREAS UNDER VARIOUS TARIFF LEVEL/STRUCTURE SCENARIOS WILL AFFECT FINANCIAL HEALTH OF AEDC AND ECONOMIC VITALITY OF THE WHOLE ELECTRIC POWER SYSTEM. THE ECONOMIC ANALYSIS SHOULD LOOK AT THE WHOLE ELECTRIC POWER SYSTEM AND INCLUDE THE ECONOMIC, NOT JUST FINANCIAL, COSTS OF ELECTRICITY GENERATION. THE ANALYSIS SHOULD DESCRIBE THE SYSTEM'S, INCLUDING AEDC'S, ECONOMIC EFFICIENCY AND SUSTAINABILITY.

C. THE PRC RECOMMENDS THAT THE PP EXAMINE ENERGY DEMAND MANAGEMENT ALTERNATIVES THAT AEDC COULD INITIATE. THE PP SHOULD EXPLORE VIABILITY OF AEDC TAKING THE INITIATIVE TO FOSTER THE INSTALLATION OF INDUSTRIAL AND BUILDING COGENERATION SYSTEMS AT LEAST ON A DEMONSTRATION BASIS, WHICH MIGHT BE MORE EFFICIENT THAN PURCHASED CENTRAL GENERATION AND WOULD HAVE A MORE POSITIVE ECONOMIC IMPACT THAN THE EXPANSION OF A HEAVILY

SUBSIDIZED SYSTEM. THE MISSION IS ENCOURAGED TO PRESS FOR OTHER DEMAND MANAGEMENT MEASURES WHICH HAVE BEEN SHOWN TO HAVE SUBSTANTIAL BENEFITS BOTH FOR UTILITIES AND ECONOMY AS A WHOLE, INCLUDING MEDIA AND PUBLIC EDUCATION CAMPAIGNS ON EFFICIENT POWER USE, METERING FOR OFF-PEAK HOME USE, ETC.

4. BUREAU CONCURS THAT THE PROPOSED PROJECT IS CONSISTENT WITH THE CESS QUOTE LEAST COST QUOTE ENERGY STRATEGY EMPHASIZING REHABILITATION, CONSERVATION, TRAINING AND PLANNING. HOWEVER, THE PID IS SILENT ON HOW THIS PROJECT CONTRIBUTES TO A RATIONALIZED ENERGY POLICY INTEGRATED WITH NATIONAL ECONOMIC POLICIES AND GOALS. MISSION REPRESENTATIVES ADVISED THAT A ONE YEAR QUOTE COST OF SERVICE QUOTE STUDY IS UNDERWAY AND FINANCING FOR A QUOTE LOSS REDUCTION QUOTE STUDY IS INCLUDED IN THE POWER SECTOR SUPPORT PROJECT SHOULD IT PROCEED. THE EFFECTS OF REDUCING LINE LOSSES AND IMPROVING AEDC FINANCIAL RETURNS THROUGH PROVIDING HIGH QUALITY SERVICE ARE BEING DESIGNED INTO THE PROJECT, AS WELL AS MANAGEMENT AND OPERATOR TRAINING. ALL SHOULD BE DEALT WITH FULLY IN THE PROJECT PAPER.

5. THE IRC RECOMMENDS THAT THE COMPONENT THAT INCLUDES GPID EXPANSION BE SPECIFICALLY ANALYZED AND FULLY JUSTIFIED BOTH FINANCIALLY AND ECONOMICALLY IN THE PROJECT PAPER AND A STRONG CASE MADE THAT IT DOES NOT

UNDERMINE THE CESS OBJECTIVES OR THE FINANCIAL STATUS OF THE ORGANIZATIONS INVOLVED.

6. THE PID ASSUMED THAT SINCE THIS PROJECT IS, IN EFFECT, AN EXTENSION OF THE URBAN ELECTRIC DISTRIBUTION PROJECT (262-2233), WHICH INCLUDED AN INITIAL ENVIRONMENTAL EXAMINATION (IEE) HAVING A NEGATIVE DETERMINATION, A NEGATIVE DETERMINATION WOULD PERTAIN TO THIS EXTENSION PROJECT. HOWEVER, THE IRC HAS CONCLUDED THAT A NEW IEE SHOULD BE PREPARED AND APPROVED BY THE AID/W ENVIRONMENTAL COORDINATOR SINCE A PORTION OF THE PROJECT WILL EXPAND TO NEW LANDS TO THE WEST OF THE CITY OF ALEXANDRIA AND THE EFFECTS OF THE PROJECT ON LAND USE AND THE RATE OF POPULATION GROWTH INTO THE AREA WILL NEED TO BE ASSESSED. THE IEE SHOULD ALSO ADDRESS THE ENVIRONMENTALLY SAFE DISPOSAL OF OLD CABLE, WHICH UNDOUBTEDLY HAS A HIGH LEAD CONTENT, AND PCB TRANSFORMERS MADE SURPLUS BY THE REHABILITATION PORTION OF THE PROJECT.

7. FINALLY, FOR YOUR INFORMATION, THERE HAVE BEEN SEVERAL RECENT STUDIES, ALTHOUGH NOT CONCLUSIVE, WHICH INDICATE A POSSIBLE ASSOCIATION BETWEEN CANCER INCIDENCE, PARTICULARLY AMONG CHILDREN, FROM MAGNETIC FIELDS GENERATED BY ELECTRICAL TRANSMISSION. BECAUSE MANY LOW-VOLTAGE DISTRIBUTION LINES AND APPLIANCES HAVE RELATIVELY HIGH CURRENT FLOW, THE POTENTIAL PROBLEM OF MAGNETIC FIELDS IS NOT RESTRICTED TO HIGH-VOLTAGE TRANSMISSION SYSTEMS. AID/W WILL FORWARD AVAILABLE INFORMATION ON THE SUBJECT TO THE MISSION FOR ITS

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STATE 137130/02

ANNEX A
Page 4 of 9

CONSIDERATION. PA# ER

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STATE 137130/02

Reference and brief description of response to State Cable #137130 of May 3, 1989 which authorized Mission to proceed with project paper preparation are set forth below:

CABLE ISSUE

3.A. PP should describe the existing capabilities and deficiencies of the AEDC and what steps are to be taken by USAID or others to assure that the rehabilitation investment does not simply deteriorate over time because of inherent operational deficiencies, e.g., lack of on-going maintenance capability, inadequate funds for maintenance, lack of enforcement or theft, etc. The PP should focus on the personnel and management strengthening required, including the needed degree of autonomy required for AEDC to operate properly. In this regard, the PRC felt a sister relationship with a U.S. utility might be a useful tool.

REFERENCE AND RESPONSE

The PP addressed this issue in Section 6.0 A. The existing operation and maintenance procedures of AEDC were updated and standardized under the Urban Electric Distribution (Project No. 263-0033), and are being utilized by AEDC crew to operate and maintain their electrical network. These procedures include engineering design and application which includes voltage drop calculations, feeder sizing, circuit breaker setting, transformer loadings and inventory control procedures.

Implementation of these procedures will assure a proper utilization of the network thereby extending the life of the distribution materials and improving the reliability and efficiency of the network.

The benefits of establishing a "sister" relationship between AEDC and a U.S. utility is addressed in the Section 6.1 of PP and has been discussed with AEDC. It was concluded that the idea may have merit to AEDC but required further investigation.

AEDC and EEA personnel have assisted in managing many projects financed by AID. The mission is financing an energy manpower development project No. 263-0140.04 of 1988. The project will provide AEDC and EEA with better trained professionals to improve AEDC's and EEA's performance and to increase productivity.

61

3B. The PID section of financial considerations focuses on the capability of the AEDC to carry out procurement, accounting and contracting. There is no mention of the financial status of AEDC as an operating entity. The PP should develop the financial status and prospects of the AEDC, including how by reducing load losses and increasing system technical efficiency the project will directly improve the economic and financial viability of the AEDC and how expansion to new areas under various tariff level/structure scenarios will affect financial health of AEDC and economic vitality of the whole electric power system. The economic analysis should look at the whole electric power system and include the economic, not just financial, costs of electricity generation. The analysis should describe the system's including AEDC's, economic efficiency and sustainability.

AEDC's financial status over the past three years (i.e. 85/86, 86/87 and 87/88) indicates that AEDC is a revenue producing company. Rehabilitating the Alexandria network will reduce the rate of power interruption and increase AEDC's revenue.

The project design has changed since the PID stage, and will not expand the Egyptian electricity network.

Though the PP presents a general overview of the major economic considerations facing the power sector in Egypt, a detailed economic analysis of the electric power system was not fully addressed in the Project Paper since USAID/Cairo is working on financing an Electricity Pricing Strategy Study and implementation plan for Egypt in conjunction with the EEA. This study will include a detailed economic analysis of the whole electric power system including generation, transmission and distribution.

This study will pave the way for future reforms in the power sector which will include tariff restructuring and reorganization of various functions with EEA.

Neither EEA nor AEDC have control of the tariff structure which is imposed on them by GOE. Both EEA and AEDC are public sector companies which pass their profits and/or losses directly to the GOE. Increased

6/2

electricity tariffs will reduce the GOE subsidy to the sector. The corporate organization of the generation and distribution of electricity coupled with the EEA's direct link to the GOE budget ensure that the GOE budget is ultimately responsible for the financial obligations of the entire system. The economic analysis (section 6.0 E) explains this more fully.

3C. The PRC recommends that the PP examine energy demand management alternatives that AEDC could initiate. The PP should explore viability of AEDC taking the initiative to foster the installation of industrial and building cogeneration systems at least on a demonstration basis, which might be more efficient than purchased central generation and would have a more positive economic impact than the expansion of a heavily subsidized system. The Mission is encouraged to press for other demand management measures which have been shown to have substantial benefits both for utilities and economy as a whole, including media and public education campaigns on efficient power use, metering for off-peak home use, etc.

Section 6.0 A of the PP address the energy demand management alternatives that AEDC has initiated. Introducing solar water heaters, imposing penalties on customers having low power factor loads, encouraging customers to conserve energy, charging substantial fees for installing large quantity service and charging inspection fees for handling requests for new loads all constitute various forms of demand management.

AEDC does not serve any industries that utilize large amounts of heat for which cogeneration might be considered.

EEA is the only legal entity within Egypt authorized to produce electric energy for sale. EEA initiated a demand management study for selected large customers to identify opportunities to implement demand management during peak demand periods and to consider "time of day" rates. EEA has implemented demand management with cement plants.

4. BUREAU concurs that the proposed project is consistent with the CDSS QUOTE least cost UNQUOTE energy strategy emphasizing rehabilitation, conservation, training and planning. However, the PID is silent on how this project contributes to a rationalized energy policy integrated with national economic policies and goals. Mission representatives advised that a one year QUOTE cost of service UNQUOTE study is included in the power sector support project should it proceed. The effects of reducing line losses and improving AEDC financial returns through providing high quality service are being designed into the project, as well as management and operator training. All should be dealt with fully in the project paper.

Section 3.0 of the PP addressed this issue which identified the recent increases in electricity tariff that took place in March 1989. GOE is working on a plan with USAID to rationalize energy pricing to reach world energy prices over a reasonable period of time. Pricing energy at its economic value will contribute to a more efficient and rational allocation of resources throughout the economy and will have a positive impact on Egypt's budget deficit.

Energy policy dialogue, which will lead to further reduction in the subsidies for the power sector, is anticipated for at least the next five years. Policy discussions will be conducted primarily in the context of future IMF standby agreements, IERD structural adjustment and energy sector loans and USAID's Power Sector Support Project.

The financial benefits used in determining the IRR of the distribution component of the project were addressed in section 6.0 E of the PP. This project will replace components of the system which contribute to energy losses and poor service quality. As a result, the system will have a lower operating cost and which will result in an increase in revenue to the utility. Reduction in losses is one goal of the GOE's economic policy.

64

5. The PRC recommends that the component that includes grid expansion be specifically analyzed and fully justified both financially and economically in the project paper and a strong case made that it does not undermine the CDSS objectives or the financial status of the organizations involved.

6. The PID assumed that since this project is, in effect, an extension of the Urban Electric Distribution Project (263-0033), which included an initial environmental examination (IEE) having a negative determination, a negative determination would pertain to this extension project. However, the PRC has concluded that a new IEE should be prepared and approved by the AID/W environmental coordinator since a portion of the project will expand to new lands to the west of the city of Alexandria and the effects of the project on land use and the rate of population growth into the area will need to be assessed. The IEE should also address the environmentally safe disposal of old cable, which undoubtedly has a high lead content, and PCB transformers made surplus by the rehabilitation portion of the project.

After further review of the area west of Alexandria, it was determined, that AID funded equipment and materials were not required (see page 2 of Annex E). The distribution consultant will assist AEDC only in the design of the 20 KV distribution network.

The Mission prepared an IEE for this project. The IEE indicated no environmental impact on the atmosphere, water quality, land use, natural resources or health. The ANE Bureau Environmental Coordinator concurred in the negative determination as stated in Section 6.0 C of the PP and Annex G.

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project: 89
From FY _____ to FY 97
Total U. S. Funding \$50 million
Date Prepared: 7/30/1989

Project Title & Number: ALEXANDRIA ELECTRICAL NETWORK MODERNIZATION Project 263-0194

| NARRATIVE SUMMARY | OBJECTIVELY VERIFIABLE INDICATORS | MEANS OF VERIFICATION | IMPORTANT ASSUMPTIONS | | | | | | | | | | | | | | | | | | | | | |
|--|--|--|--|----------|------------------------|--|--|-----------|-------|-------|--|---------|--------|--|---------|-------|----------------|---------|--|--------------------------|---------|--|--|---|
| <p>Program or Sector Goal: The broader objective to which this project contributes: (A-1)</p> <p>To improve productivity and general welfare of the five to seven million people residing and working in the Alexandria Governorate.</p> | <p>Measures of Goal Achievement: (A-2)</p> <ol style="list-style-type: none"> Reduction in productivity losses and inefficient practices in commercial and small-scale industrial establishments Time and labor savings attributable to reliable performance of household electrical appliances used in housekeeping, nutrition and leisure activities. Improved reliability of public and essential services. | <p>(A-3)</p> <p>Conducts before and after surveys to assess quality of life and productivity improvements.</p> | <p>Assumptions for achieving goal targets: (A-4)</p> <ol style="list-style-type: none"> Reliable service will reduce outage-related losses from spoiled products and idle factors of production. Reliable service will reduce the purchase and use of standby generating equipment. | | | | | | | | | | | | | | | | | | | | | |
| <p>Project Purpose: (B-1)</p> <p>To improve and modernize the electrical network serving Alexandria thereby reducing energy losses and enhancing the productivity of the network.</p> | <p>Conditions that will indicate purpose has been achieved: End-of-Project status (B-2)</p> <ol style="list-style-type: none"> Annual energy losses reduced by 3% Number of unplanned power outages reduced by 7% annually from the inception of the project. An additional 12% of primary project beneficiaries receive nominal standard voltage each year. Average duration of power outages reduced. Reduce system operating expenses per kilowatt hour of electricity sold. | <p>(B-3)</p> <ol style="list-style-type: none"> Review voltage charts made at selected consumers before and after work is done. Inspection of Renovated service points show no evidence of fire or exposed wiring. Site visits. AEDC operating reports. Consultants reports. Base line survey to determine the number and duration of unplanned power outages. | <p>Assumptions for achieving purpose: (B-4)</p> <ol style="list-style-type: none"> Rehabilitation of facilities will improve the reliability of service. Electrical equipment to be purchased and installed will improve system efficiency. Collection and display of network operating data will result in more effective management of the systems and result in more reliable and efficient operation Adequately trained personnel operating the system. Power factor is maintained at a reasonable level. No significant increase in the cost of energy sold by EEA to AEDC. | | | | | | | | | | | | | | | | | | | | | |
| <p>Project Outputs: (C-1)</p> <ol style="list-style-type: none"> 11-KV distribution points and feeders installed. 11-KV - 220/380 V transformer points with associated 220/380 V overhead conductors installed. 220/380 V underground service points modernized. Dispatch Control Center installed. Consulting services provided. | <p>Implementation Target (Type and Quantity) (D-2)</p> <ol style="list-style-type: none"> Twenty 11-KV distribution points. 600 transformer points with associated 220/380 volt overhead circuits. 17,000 service points modernized. One control center. Consulting services provide. Number of Personnel trained. | <p>(C-3)</p> <ol style="list-style-type: none"> Review of reports. Contractor reports and invoices. Review of disbursements. Field visits and inspections. | <p>Assumptions for achieving outputs: (C-4)</p> <ol style="list-style-type: none"> Adequate funds continue to be available. Project Schedules met. Deliveries on schedule at contract costs. Permits or land available per schedule. Studies do not indicate a need for capacitors to be financed from the AID Grant. The need to import materials to improve the rural villages for the western sector of AEDC's service area is small. Customs clearance causes no delay. | | | | | | | | | | | | | | | | | | | | | |
| <p>Project Inputs: (D-1)</p> <ol style="list-style-type: none"> \$50 million from USAID. LE. 64.5 million from GOE. | <p>IMPLEMENTATION TARGET (TYPE AND QUANTITY) D-2:</p> <table border="1"> <thead> <tr> <th></th> <th>millions</th> <th>millions</th> </tr> </thead> <tbody> <tr> <td>1. Consulting Services</td> <td></td> <td></td> </tr> <tr> <td>Contracts</td> <td>\$6.8</td> <td>LE6.8</td> </tr> <tr> <td>2. Contracts materials equipment, supplies for distribution system</td> <td>\$13.60</td> <td>LE51.7</td> </tr> <tr> <td>3. Contract supply, install, test Dispatch Control Centers</td> <td>\$24.00</td> <td>LE6.0</td> </tr> <tr> <td>4. Contingency</td> <td>\$ 5.35</td> <td></td> </tr> <tr> <td>5. Audits and evaluation</td> <td>\$ 0.25</td> <td></td> </tr> </tbody> </table> | | millions | millions | 1. Consulting Services | | | Contracts | \$6.8 | LE6.8 | 2. Contracts materials equipment, supplies for distribution system | \$13.60 | LE51.7 | 3. Contract supply, install, test Dispatch Control Centers | \$24.00 | LE6.0 | 4. Contingency | \$ 5.35 | | 5. Audits and evaluation | \$ 0.25 | | <p>(D-3)</p> <ol style="list-style-type: none"> Contracts awarded and approved. Letters of Commitment issued. Progress Reports. | <p>Assumptions for providing inputs: (D-4)</p> <ol style="list-style-type: none"> Requirements precedent to disbursement met within 90 days of signing Project Agreement. Qualified consulting firms and suppliers are available at reasonable prices. Covenants included in the Project Agreement are complied with in a timely manner. |
| | millions | millions | | | | | | | | | | | | | | | | | | | | | | |
| 1. Consulting Services | | | | | | | | | | | | | | | | | | | | | | | | |
| Contracts | \$6.8 | LE6.8 | | | | | | | | | | | | | | | | | | | | | | |
| 2. Contracts materials equipment, supplies for distribution system | \$13.60 | LE51.7 | | | | | | | | | | | | | | | | | | | | | | |
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| 5. Audits and evaluation | \$ 0.25 | | | | | | | | | | | | | | | | | | | | | | | |

Listed below are statutory criteria applicable to projects. This section is divided into two parts. Part A includes criteria applicable to projects funded from specific sources only; B(1) applies to all projects funded with Development Assistance; B(2) applies to projects funded with Development Assistance loans; and B(3) applies to projects funded from ESF..

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

A. GENERAL CRITERIA FOR PROJECT

1. FY 1989 Appropriations Act Sec. 523; FAA Sec. 634A. If money is sought to be obligated for an activity not previously justified to Congress, or for an amount in excess of an amount previously justified to Congress, has Congress been properly notified? Normal Congressional Notification procedures will be satisfied prior to obligation of funds.
2. FAA Sec. 611(a)(1). Prior to obligation in excess of \$500,000, will there be (a) engineering, financial or other plans necessary to carry out the assistance, and (b) a reasonably firm estimate of the cost to the U.S. of the assistance? Yes.
3. FAA Sec. 611(a)(2). If 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 such action is required.
4. FAA Sec. 611(b); FY 1989 Appropriations Act Sec. 501. If project is for water or water-related land resource construction, have benefits and costs been computed to the extent practicable in accordance with the principles, standards, and procedures established pursuant to the Water Resources Planning Act (42 U.S.C. 1962, et seq.)? (See A.I.D. Handbook 3 for guidelines.) Not such a project.

61

5. FAA Sec. 611(e). If project is capital assistance (e.g., construction), and total U.S. assistance for it will exceed \$1 million, has the Mission Director certified and the Regional Assistant Administrator taken into consideration the country's capability to maintain and utilize the project effectively? Yes.
6. FAA Sec. 209. Is project susceptible to 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. Not such a project.
7. FAA Sec. 601(a). Information and conclusions on 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. Since this is a public sector project, it will have no significant impact in these areas.
8. FAA Sec. 601(b). Information and conclusions 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). Both services and equipment contracts will be competitively let in the U.S.
9. FAA Secs. 612(b), 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 in lieu of dollars. Egypt will contribute substantially to the local currency costs of the project. U.S.-owned Egyptian currency is not available specifically for this project.

10. FAA Sec. 612(d). Does the U.S. own excess foreign currency of the country and, if so, what arrangements have been made for its release? No.
11. FY 1989 Appropriations Act Sec. 521. If assistance is for the production of any commodity for export, is the commodity likely to be in surplus on world markets at the time the resulting productive capacity becomes operative, and is such assistance likely to cause substantial injury to U.S. producers of the same, similar or competing commodity? N/A.
12. FY 1989 Appropriations Act Sec. 549. Will the assistance (except for programs in Caribbean Basin Initiative countries under U.S. Tariff Schedule "Section 807," which allows reduced tariffs on articles assembled abroad from U.S.-made components) be used directly to procure feasibility studies, prefeasibility studies, or project profiles of potential investment in, or to assist the establishment of facilities specifically designed for, the manufacture for export to the United States or to third country markets in direct competition with U.S. exports, of textiles, apparel, footwear, handbags, flat goods (such as wallets or coin purses worn on the person), work gloves or leather wearing apparel? No.
13. FAA Sec. 119(g)(4)-(6) & (10). Will the assistance (a) support training and education efforts which improve the capacity of recipient countries to prevent loss of biological diversity; (b) be provided under a long-term agreement in which the recipient country agrees to protect ecosystems or other wildlife habitats; (c) support efforts to identify and survey ecosystems in recipient countries worthy of protection; or (d) by any direct or indirect means significantly degrade national parks or similar protected areas or introduce exotic plants or animals into such areas? "No" to all questions.

14. FAA 121(d). If a Sahel project, has a determination been made that the host government has an adequate system for accounting for and controlling receipt and expenditure of project funds (either dollars or local currency generated therefrom)? N/A.
15. FY 1989 Appropriations Act. If assistance is to be made to a United States PVO (other than a cooperative development organization), does it obtain at least 20 percent of its total annual funding for international activities from sources other than the United States Government? N/A.
16. FY 1989 Appropriations Act Sec. 538. If assistance is being made available to a PVO, has that organization provided upon timely request any document, file, or record necessary to the auditing requirements of A.I.D., and is the PVO registered with A.I.D.? N/A.
17. FY 1989 Appropriations Act Sec. 514. If funds are being obligated under an appropriation account to which they were not appropriated, has prior approval of the Appropriations Committees of Congress been obtained? N/A.
18. State Authorization Sec. 139 (as interpreted by conference report). Has confirmation of the date of signing of the project agreement, including the amount involved, been cabled to State L/T and A.I.D. LEG within 60 days of the agreement's entry into force with respect to the United States, and has the full text of the same agreement been pouched to those same offices? (See Handbook 3, Appendix 6G for agreements covered by this provision). Case-Zablocki Act reporting procedures will be followed with respect to this project.
- B. Economic Support Fund Project Criteria
- a. FAA Sec. 531(a). Will this assistance promote economic and political stability? To the maximum extent feasible, is this assistance consistent with the policy directions, purposes, and programs of Part I of the FAA? Yes; to both questions.

- b. FAA Sec. 531(e). Will this assistance be used for military or paramilitary purposes? No.
- c. FAA Sec. 609. If commodities are to be granted so that sale proceeds will accrue to the recipient country, have Special Account (counterpart) arrangements been made? N/A.

5C(3) - STANDARD ITEM CHECKLIST

Listed below are the 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 imposing limits on certain uses of funds.

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

A. PROCUREMENT

1. FAA Sec. 602(a). Are there arrangements to permit U.S. small business to participate equitably in the furnishing of commodities and services financed? Yes.
2. FAA Sec. 604(a). Will all procurement 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 marine insurance companies authorized to do business in the U.S., will commodities be insured in the United States against marine risk with such a company? Egypt does not so discriminate.
4. FAA Sec. 604(e); ISDCA of 1980 Sec. 705(a). If non-U.S. procurement of agricultural commodity or product thereof is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity? (Exception where commodity financed could not reasonably be procured in U.S.) N/A.
5. FAA Sec. 604(g). Will construction or engineering services be procured from firms of advanced developing countries which are otherwise eligible under Code 941 and which have attained a competitive capability in international markets in Egypt and the U.S. will be the only eligible sources under the project.

12

one of these areas? (Exception for those countries which receive direct economic assistance under the FAA and permit United States firms to compete for construction or engineering services financed from assistance programs of these countries.)

- 6. FAA Sec. 603. Is the shipping excluded from compliance with the requirement in section 901(b) of the Merchant Marine Act of 1936, as amended, that at least 50 percent 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 such vessels are available at fair and reasonable rates? 50/50 shipping rules will apply to this project.

- 7. FAA Sec. 621(a). If technical assistance is financed, will such assistance be furnished by private enterprise on a contract basis to the fullest extent practicable? Will the facilities and resources of other Federal agencies be utilized, when they are particularly suitable, not competitive with private enterprise, and made available without undue interference with domestic programs? "Yes" to the first question. As to the second, U.S. private firms are expected to be the sole provider of services.

- 8. International Air Transportation Fair Competitive Practices Act, 1974. If air transportation of persons or property is financed on grant basis, will U.S. carriers be used to the extent such service is available? Yes.

- 9. FY 1989 Appropriations Act Sec. 504. If the U.S. Government is a party to a contract for procurement, does the contract contain a provision authorizing termination of such contract for the convenience of the United States? Yes.

- 10. FY 1989 Appropriations Act Sec. 524. If assistance is for a consulting service through a procurement contract pursuant to 5 U.S.C. 3109, are contract expenditures a matter of public record? Yes

17

and available for public inspection
(unless otherwise provided by law or
Executive order)?

B. CONSTRUCTION

1. FAA Sec. 601(d). If capital (e.g., construction) project, will U.S. engineering and professional services be used? 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 (except for productive enterprises in Egypt that were described in the CP), or does assistance have the express approval of Congress? N/A.

C. OTHER RESTRICTIONS

1. FAA Sec. 122(b). If development loan repayable in dollars, is interest rate at least 2 percent per annum during a grace period which is not to exceed ten years, and at least 3 percent per annum thereafter? N/A.
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? N/A.
3. FAA Sec. 620(h). Do arrangements exist to ensure that United States foreign aid is not used in a manner which, contrary to the best interests of the United States, promotes or assists the foreign aid projects or activities of the Communist-bloc countries? Yes.
4. Will arrangements preclude use of financing:

- a. FAA Sec. 104(f); FY 1989 Appropriations Act Secs. 525, 536. (1) To pay for performance of abortions as a method of family planning or to motivate or coerce persons to practice abortions; (2) to pay for performance of involuntary sterilization as method of family planning, or to coerce or provide financial incentive to any person to undergo sterilization; (3) to pay for any biomedical research which relates, in whole or part, to methods or the performance of abortions or involuntary sterilizations as a means of family planning; or (4) to lobby for abortion? Yes.
- b. FAA Sec. 483. To make reimbursements, in the form of cash payments, to persons whose illicit drug crops are eradicated? Yes.
- c. FAA Sec. 620(g). To compensate owners for expropriated or nationalized property, except to compensate foreign nationals in accordance with a land reform program certified by the President? Yes.
- d. FAA Sec. 660. To provide training, advice, or any financial support for police, prisons, or other law enforcement forces, except for narcotics programs? Yes.
- e. FAA Sec. 662. For CIA activities? Yes.
- f. FAA Sec. 636(i). For purchase, sale, long-term lease, exchange or guaranty of the sale of motor vehicles manufactured outside U.S., unless a waiver is obtained? Yes.
- g. FY 1989 Appropriations Act Sec. 503. To pay pensions, annuities, retirement pay, or adjusted service compensation for military personnel? Yes.
- h. FY 1989 Appropriations Act Sec. 505. To pay U.N. assessments, arrearages or dues? Yes.

- i. FY 1989 Appropriations Act Sec. 506. Yes.
To carry out provisions of FAA Section 209(d) (transfer of FAA funds to multilateral organizations for lending)
- j. FY 1989 Appropriations Act Sec. 510. Yes.
To finance the export of nuclear equipment, fuel, or technology?
- k. FY 1989 Appropriations Act Sec. 511. Yes.
For the purpose of aiding the efforts of the government of such country to repress the legitimate rights of the population of such country contrary to the Universal Declaration of Human Rights ?
1. FY 1989 Appropriations Act Sec. 516; State Authorization Section 109. Yes.
To be used for publicity or propaganda purposes designed to support or defeat legislation pending before Congress to influence in any way the outcome of a political election in the United States or for any publicity or propaganda purposes not authorized by Congress?
5. FY 1989 Appropriations Act Sec. 584. Yes.
Will any A.I.D. contract and solicitation, and subcontract entered into under such contract, include a clause requiring that U.S. marine insurance companies have a fair opportunity to bid for marine insurance when such insurance is necessary or appropriate?



MINISTRY OF ELECTRICITY & ENERGY
 OFFICE OF THE MINISTER
 NASR-CITY, ABBASSIA, CAIRO, EGYPT.

Tel. : 832643 -- 831204
 FAX : 83097 POWER LIN

820858

827-1
 12-9-1988

Mr. Marshall Brown,
 Director,
 U.S. Agency for International Development,
 5, Latin America Street
 Garden City
 CAIRO,
 EGYPT.

Walt *Dir*
DD
PD5
 DATE 9/22
 12/3/88

Dear Mr. Brown,

I am pleased to attach herewith a copy of a letter of Eng. Ahmed Samir Aboul Seoud, Chairman of Alexandria Electric Distribution Company to your goodselves concerning request for Urban and Suburban Electrical Distribution Rehabilitation Funding including a New Energy Management Center.

I would be grateful for your assistance and supporting his request for financing Alexandria Electric Distribution Company to allocate a grant of an amount of \$ 61 960 000 for the completion of rehabilitation, expansion of Alexandria Electric Distribution Network, and construction of a control center for the electrical network. This amount will be over and above the amount allocated for the generation for EEA. As known, the US/AID had started this project since 1977, which had a great effect for the stability of feeding the city with electric energy. The Alexandria Electric Distribution Company will bear an amount of LE 18 711 800 for construction costs, labours, digging and others.

Your early reply will be highly appreciated.

With my best regards.

Yours sincerely,

Maher Abaza
 Eng. Maher Abaza

Minister of Electricity and Energy

Encl.:



MINISTRY OF ELECTRICITY & ENERGY
 OFFICE OF THE MINISTER
 NASR-CITY, ABBASSIA, CAIRO, EGYPT.
 Tel. : 832643 - 831204
 Telex : 92097 POWER UN

00557

557/1
 4/6/1989

Cairo, 4th June 1989.

Mr. Marshall Brown
 Director, US/AID
 CAIRO,
 EGYPT.

PDS
 FM
 DR

| | | |
|--------------|----|-------------|
| ACTION TO | DR | DIR |
| ACTION TAKEN | | DATE - 6/19 |
| NAB | | INITIALS |

Dear Mr. Brown,

With reference to my recent letter concerning the financing of the regional control center in Alexandria, I would like to inform you that such project is included in the approved five year plan of EEA under Code No. 038024.

So you are kindly requested to allocate the financing of the control center in Alexandria to EEA, and include this in the financing agreement.

EEA appreciates your forward step towards the funding of the project by US AID.

With my best regards.

Yours sincerely,

Eng. Maher Abaza
 Minister of Electricity & Energy

Handwritten notes and date: 6/8

TECHNICAL ANALYSIS

A. GENERAL:

Consumers of electric energy in the Alexandria Governorate are served by the Egyptian Electricity Authority (EEA) and by the Alexandria Electric Distribution Company (AEDC) and by a few privately owned generating units. EEA operates and maintains the Egyptian Unified Power System (UPS) which includes generation of electrical energy at 50 Hertz and a national transmission and subtransmission system. In Alexandria, EEA serves industrial users at voltage levels of 33 KV (33,000 volts) and above and sells energy to AEDC at 20 KV and 11 KV. AEDC distributes energy throughout Alexandria at 11 KV and serves a few consumers at 11 KV (mostly large commercial establishments). The largest number of AEDC's customers are residential, followed by commercial and small to light industries which are served by reducing the 11 KV at transformer points to utilization voltages. The standard utilization voltages in Egypt are 220/380 volts and all household appliances and motors (except large motors) are readily available for these voltages. However, some consumers are still served using two phases of a 127/220 volt 3 phase wye system. To obtain 220 volt (utilization voltage) two wires both "hot" are used with no ground wire. This is potentially dangerous. The standard voltage 220/380 uses only one "hot" conductor and one neutral/ground conductor for a 220 Volt service.

AEDC's service area includes the Governorate of Alexandria and an area transferred from the Governorate of Behira west of Alexandria in July 1988. The new area extends from the old boundary west about 35 Kms along the Mediterranean coast.

The area transferred from the Behira Electric Distribution Company is mostly desert and sand beach front with virtually no agricultural potential. There are a few rural villages in the desert area receiving very poor service primarily because distribution transformer secondaries (low tension circuits) are excessively long and in poor condition. Adjacent to the beach, a large number of developments, directed toward attracting summer vacationers, are existing or in various stages of construction. One large complex due to open in the summer of 1989 has installed two 750-KVA diesel generating sets. The output of the generators will be stepped up to 20-KV and through a distribution point (switching station) will feed via

19

underground cable eight 500KVA 20-KV/220-380 volt transformer points. This system has been installed at the expense of the developer. All equipment in the system was produced/assembled in Egypt.

EEA supplies energy to AEDC at 15 existing substations. Six additional substations are under construction. Three of these are financed by AID from the Urban Electric Distribution (UED) Project and three are being financed by EEA. The AID financed substations are scheduled for completion early in 1990. The EEA financed substations are scheduled for completion July 1989, August 1989, and December 1990. EEA owns all substations from which AEDC obtains energy. EEA operates and maintains those substations which are connected to the 220 KV Unified Power System and controls all switching down to 66 KV. AEDC operates and maintains the existing substations supplied from the 66 KV system for the account of the EEA. There does not appear to be any problem between EEA and AEDC regarding operating practices.

A review of EEA's operating reports indicates that there is adequate transformer capacity supplying the 66 KV subtransmission system from EEA's 220 KV transmission grid. No obvious overload conditions were noted and additional load can be supplied. From a review of EEA and AEDC records and considering the six new substations under construction there appears to be adequate capacity to support the investments proposed for this project. However in a growing economy, the demands on an electric utility can change system requirements in a specific area dramatically in a very short period of time. Accordingly, the distribution system will be flexible to allow adequate expansion in small increments so as to meet changing load conditions with a minimum of modification and expense. This flexibility will permit keeping the system design parameters close to actual requirements and thus permit the most effective and efficient use of system investment. A review of 11 KV power transformer capacity should be undertaken in 1993 and, if appropriate, action taken to realize replacement of equipment approaching overloaded conditions.

The five existing generating plants owned and operated by EEA in the Alexandria Zone are connected to the 220 KV system which is a part of EEA's Unified Power System extending from Alexandria to Aswan and to which all of EEA's major generating plants including those in the northern region are connected. In recent years, generating capability has not kept pace with the growth in demand. Low water level in Lake Nasser, caused by seven years of drought in the Nile River water shed, reduced

the output of the major hydro generation plant at Aswan. However, with recently added capacity and return of a more normal water level in the lake EEA's capability to meet its demands has improved. With the planned additions to EEA's system there appears to be no reason why an investment by EEA should not be made to reduce losses, provide better service and to install a control center to substantially improve control and overall system efficiency.

B. DISTRIBUTION SYSTEM:

AEDC owns and operates approximately 4,100 kms of 11 KV (medium tension) underground cable circuits and about 140 kms open wire over head circuits. It owns and operates about 42 distribution points (11 KV switching points) which provides considerable operating flexibility to the system making it possible, in many cases, to switch load from one supply substation to the other as well as providing alternative feeds contributing to maintaining continuity of service during system disturbances. A typical 220/66/11 KV substation with circuits down to the standard 220/380V utilization voltage is shown on Page 9 of this Annex.

AEDC has identified the need to add new or replace 11 KV feeders from substations and add new 11 KV distribution points to relieve existing overload conditions. Approximately 250 kms of cables and 20 distribution points will be installed under the proposed project. The material required for this work is being produced in Egypt and no AID funds have been budgeted for its purchase.

AEDC owns and operates approximately 2,700 11 KV step-down transformer points which contain about 3,300 distribution transformers. Some of these transformers serve only one customer, but most supply overhead or underground secondary (low tension) distribution circuits. AEDC's system consists of about 6,100 kms. of overhead and 2,200 kms. of underground low tension networks.

Utilization voltages supplied by AEDC are nominally 220/380volts solidly grounded three-phase which is the standard service voltage in Egypt. Most residential and small commercial customers are supplied with a two wire 220 volts service. But in the older portions of the system, 220 volts service is provided from a three phase 127/220 volts system which does not provide a grounded service. AEDC plans to eliminate the old system which is an antiquated hazardous system.

There are about 2,700 transformer points of which approximately 1,800 serve residential and commercial customers. Of these, approximately 1,200 serve overhead distribution circuits and 600 serve underground distribution circuits. Under the UED Project approximately 600 of those serving overhead distribution circuits will have been renovated by the end of 1990 when all material financed from the UED Project is expected to have been installed. The proposed project aims at modernizing the remaining, approximately 600.

The underground 220/380 volt circuits are characterized by very poor connections at service points. Connections have been made by twisting wires together. This type of connection over time becomes loose causing heating and arcing resulting in further deterioration of the connection which results in interruption of service and fires. The service points have not been adequately protected from the public and there have been instances where exposure to the wiring has resulted in loss of life. There are about 40,000 service boxes in Alexandria of which about 23,000 will have been renovated under the UED Project. Connectors were imported under that project and fiber glass service boxes are manufactured locally. Approximately 17,000 boxes and connections will be renovated under the proposed project.

The cost estimate for the materials equipment and supplies for distribution system modernization under the proposed project has been based on installing approximately 250 Kms of 11 KV underground cable, 20 11 KV distribution points, renovating about 600 transformer points and their associated overhead circuits and renovation of 17,000 underground low tension service boxes.

AEDC crews carry out most of the work of installing the underground cable, transformer points, renovation of service connections and service boxes and other work required to change service connections to the renovated system. Coordination is required with each consumer to prevent damage to his equipment. AEDC crews also remove the old overhead conductors. Local contractors are used to install new overhead low tension cable. It is expected that this procedure will be followed for the proposed project.

EEA completed in August 1988 a 220/66/20 KV Substation at Borg El Arab to serve the area recently transferred to AEDC. At present the area is served at 11 KV utilizing emergency transportable equipment. No 20 KV circuits have been installed. The introduction of 20 KV as a distribution voltage

if

is consistent with practices of other utilities seeking the advantages/savings of higher distribution voltages, particularly in areas where distance to loads is a consideration.

Operation and maintenance procedures and practices for a 20 KV system are not significantly different from those for an 11 KV system. However, careful planning for converting 11-KV circuits to 20 KV is necessary. The distribution consultants who will be required for the proposed project will assist AEDC in planning the general improvements in the new area and in the design of improvements to the existing villages being served from Borg El Arab substation.

Materials necessary for improvements in this area may be available from Egypt except for a small amount of 220/380 volts cable and connectors. This small amount of material should be available from that proposed to be purchased.

System protection (i.e. sensing devices which operate equipment to isolate faults) is located in the substations, distribution points, transformer points and at each service connection. Lightning protection is also provided at substations and transformer points. However, because so much of the system is underground, exposure to damage from this source to the medium tension system is limited. System protection appears adequate.

Capacitors have been added by EEA to the 11 KV bus at selected supply substations and by AEDC under the UED Project at distribution points and selected transformer points. Power is derived from a power system when the current and voltage applied to a device are in phase. However, the nature of many devices distort this relationship requiring a larger current to supply the power. The larger current flowing through the resistance of the transmission and distribution lines causes energy losses as well as increased voltage drop from the supply point to the load. Because of load variations, some of these capacitors are equipped with sensing devices to automatically switch them in and out of the circuit as may be required to maximize their benefit. The benefits from the AID financed capacitors are not yet being realized because AEDC personnel have not been trained in the operating procedures and safety practices regarding this equipment which is new to AEDC personnel. Training will take place as a part of the UED Project and the capacitors energized by late 1989.

Funds are budgeted for additional capacitors. Since power factor correction has such a high return on investment because

of improved system efficiency, it is expected that AEDC and their consultant will monitor the impact of the capacitors which will soon be placed in operation. When necessary, action will be taken to install additional capacitors directed toward improving and/or maintaining a power factor of at least 95 percent. A covenant to this effect will be included in the project agreement.

Meters for measuring energy use are manufactured in Egypt, but not in the quantities needed. For the UED Project, imported meters not financed by AID have also been used. AEDC owns the meters on its system but the customer must pay for a new meter when a change from 220/127 volts "floating" neutral service to the standard service voltage takes place. Adequate supplies have been available for the UED Project and an adequate supply is expected to be available for the proposed project.

C. DISPATCH CONTROL CENTER:

The present dispatch center consists of a few telephone lines, a map board, and a radio system suitable for voice communication but not for the transmittal of data. This facility is certainly not adequate to effectively monitor and control a system of the complexity presently serving Alexandria. EEA and AEDC have no satisfactory means for displaying their system and its condition so that decisions can be efficiently made.

The proposed project will finance a center where EEA can monitor and control the 66 KV subtransmission and the distribution system down through the circuit breakers that control the medium tension (20 KV and 11 KV) circuits at the substation buses. The center will have three main functions. Very briefly stated they are: (1) collecting, instantaneously displaying and storing data regarding the operating condition of the system; (2) remote control of selected circuit breakers and switches, and (3) a communication system for transmitting data, operating instructions and verbal conversations between the center and maintenance personnel. The system will be designed so that district operating and maintenance personnel can be made aware of the condition and problems as they occur. This will permit initiating action to restore service rapidly. All substations are staffed with full-time operators of AEDC whom operates and maintains the substations for the account of EEA. AEDC reports difficulties in obtaining qualified operations personnel. It is expected that over time the number of personnel in selected substations will be reduced. However, even with staff in the stations, the ability to make

231

assessments and control the system from a central location will greatly reduce the total outage time for virtually all system disturbances.

The installation of such a center is technically feasible and will be similar to control centers installed and operated by other utilities around the world as a cost effective way of controlling their system, improving operating efficiency and storing data. A detailed statement of technical and system operating requirements by a well-qualified consultant will be obtained and reviewed by USAID prior to committing project funds for financing the contract for supply and installation. Also, prior to requesting proposals from potential contractors, assurances must be obtained that necessary radio frequencies have been authorized for the communication system required.

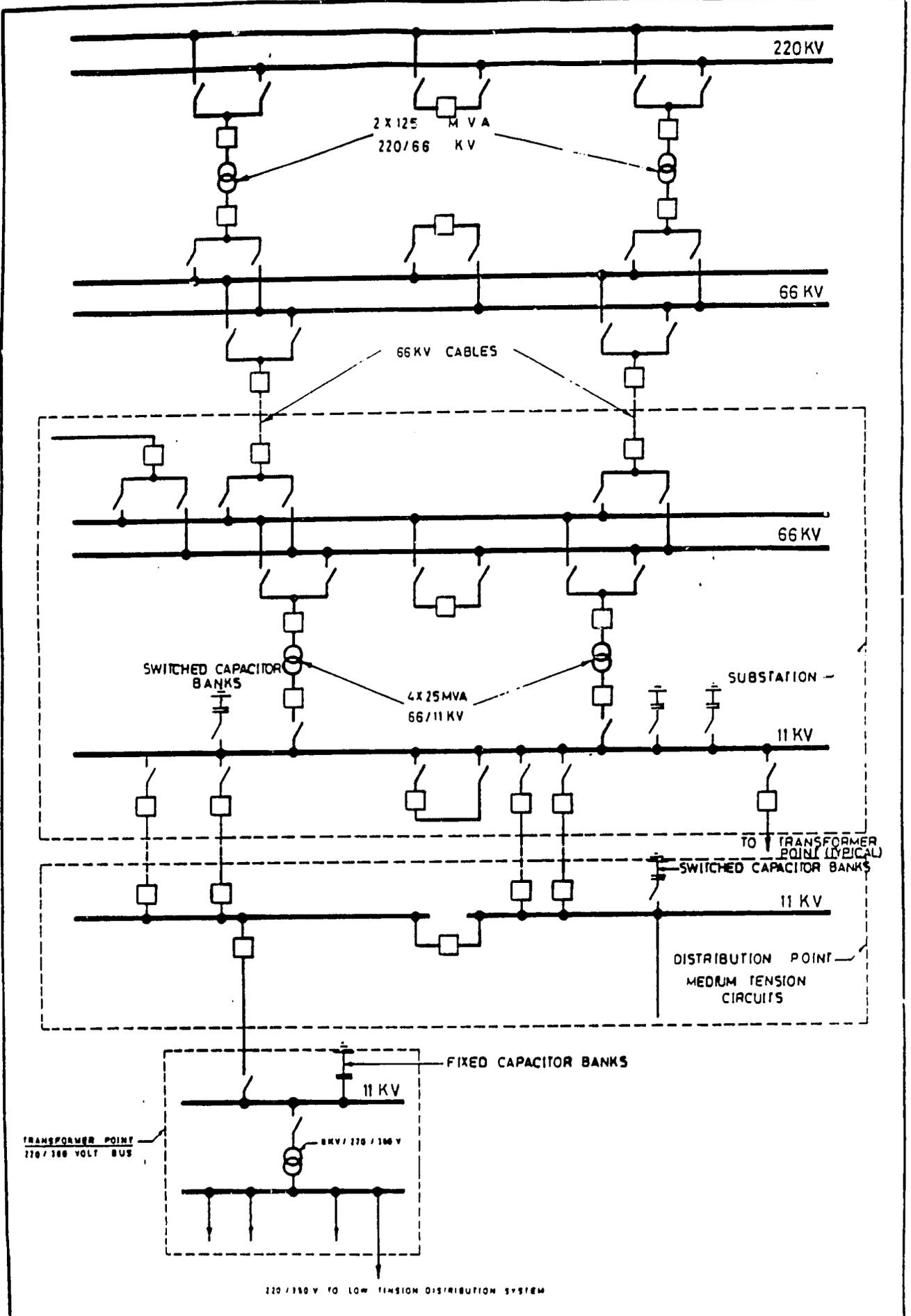
D. CONCLUSIONS:

Technically the proposed improvements to AEDC's distribution system and the installation of a supervisory control and data acquisition (SCADA) system in the proposed EEA dispatch control center are feasible and necessary for the development of an efficient electric distribution system to serve the people in Alexandria. System design parameters (e.g. voltage drop and circuit loading) have been established under the UED Project. Use of these parameters should be continued for developing lists of materials and equipment to be financed under this project. No unusual technology is being introduced in the distribution system, but introducing 20 KV as a medium tension distribution voltage requires different planning and design considerations from that used for the more familiar 11 KV. The reduction in losses resulting from maintaining a system power factor of 95 percent are very significant. While operation of capacitors is new to AEDC's staff it is important that a review of the impact of the capacitors installed by AEDC under the UED Project be reviewed and additional capacitors installed if necessary to maintain a high power factor. A covenant will be included in the project agreement requiring such a review.

It is not expected that new technology will be introduced in the design of the dispatch control center. The equipment to be installed will include a relatively sophisticated communication system and a computer (with appropriate software programs) for storing and analyzing data related to system operation. This equipment and software are not new to EEA personnel. However, a detailed statement of system requirements and operating parameters, including staffing requirements and training plans,

must be prepared by a consultant with extensive experience in planning, specifying, and installing similar systems and developing organizations for their operation and maintenance. Extensive training of EEA's personnel by the consultant and equipment suppliers will be required. A condition precedent to disbursement of funds for installing the dispatch control center will require such a detailed statement as well as assurances that necessary radio frequencies have been allocated.

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IMPLEMENTATION SCHEDULE DISTRIBUTION WORK

| CUMULATIVE TIME OF ACTIVITY (MONTHS) | PERIOD OF ACTIVITY (MONTHS) | ACTIVITY |
|--------------------------------------|-----------------------------|--|
| | 0/0/0 | -----AGREEMENT SIGNED. |
| | 3 | PREPARE SCOPE OF WORK AND ISSUE PREQUALIFICATION QUESTIONNAIRE AND REQUEST FOR PROPOSALS FOR CONSULTANT SHORT LIST PREQUALIFICATION FIRMS. |
| 3 | 2 | -----USAID APPROVE SIMPLIFIED FIRMS AND REQUEST FOR PROPOSALS TECHNICAL PROPOSALS. |
| 5 | | -----TECHNICAL PROPOSALS RECEIVED |
| | 5 | EVALUATE TECHNICAL PROPOSALS - USAID AND AERC APPROVE RANKING OF FIRMS AND USAID NEGOTIATE CONTRACT WITH FIRM SELECTED. |
| 10 | | -----USAID EXECUTE CONSULTING CONTRACT - OIR LICOM ISSUED. |
| | 3 | |
| 13 | | -----CONSULTING CONTRACTOR MOBILIZED. |
| | 4 | FAMILIARIZATION PERIOD WITH AERC PERSONNEL, EXISTING MATERIAL MATERIALS SPECIFICATIONS, WORK ORDER PROCESSES AND AREAS WHERE CONSTRUCTION WORK IS TO BE CARRIED OUT. |
| 17 | | ----- |
| | 3 | |
| 20 | | -----EXISTING IFR'S FOR 20K, 25K AND 11-KV EQUIPMENT NOTIFIED BY CONSULTANT/AERC REVIEWED AND APPROVED BY USAID. BIDS REQUESTED BY AERC. |
| | 5 | |
| 25 | | -----USAID APPROVES AERC SELECTED SUPPLIER CONTRACTS & OIR LICOM'S ISSUED. |
| | 10 | |
| 35 | | -----AERC REVIEW SUPPLY TRANSFORMER CAPACITY |
| | 2 | |
| 37 | | -----INITIAL ORDERS OF EQUIPMENT ARRIVES. INSTALLATION BEGINS |
| | 2 | |
| 39 | | -----AERC CREWS BEGIN DISCONNECTING CUSTOMERS FROM OLD NETWORK AND RECONNECTING TO NEW INSTALLING NEW METERS. |
| | 10 | |
| 49 | | -----IFB'S FOR REMAINING DISTRIBUTION MATERIALS TO BE PROCURED APPROVED BY USAID AND BIDS REQUESTED |
| | 5 | |
| 53 | | -----USAID APPROVES AERC SELECTED SUPPLIERS AND CONTRACTS. DIRECT LICOM'S ISSUED. |
| | 10 | |
| 63 | | -----FINAL SHIPMENT OF MAJOR ITEMS OF MATERIALS ARRIVE |
| | 20 | |
| 83 | | -----MAJOR PORTION OF MATERIALS PLACED WITH PROJECT FUNDS UTILIZED |
| | | |
| 76 | | -----P A C O |

IMPLEMENTATION SCHEDULE
DISPATCH CONTROL CENTER

| CUMULATIVE PERIOD MONTHS | PERIOD OF ACTIVITY | ACTIVITY |
|--------------------------|--------------------|--|
| | | AGREEMENT SIGNED |
| 3 | 3 | INITIAL CP'S SATISFIED |
| 6 | 3 | ISSUE PREQUALIFICATION QUESTIONNAIRE FOR CONSULTANT PREQUALIFICATION PAID RECEIVED DATA REVIEWED SHORT LIST OF FIRMS PREPARED |
| 9 | 3 | SHORT LIST APPROVED BY USAID. REQUEST FOR PROPOSALS ISSUED BY EEA |
| 11 | 2 | PROPOSALS RECEIVED |
| | 3 | EVALUATE PROPOSALS EEA NEGOTIATE CONTRACT |
| 16 | | CONTRACT APPROVED BY USAID AND LICOMM ISSUED |
| | 6 | CONTRACTOR VISITS SELECTED SITE REVIEWS AVAILABLE STUDIES COORDINATES WITH EEA'S NATIONAL ENERGY CONTROL CENTER AND PREPARES TECHNICAL STATEMENT OF REQUIREMENTS AND DOCUMENTS REQUIRED FOR CONTRACTING DETAIL DESIGN, SUPPLY, INSTALLATION TRAINING, TESTING AND PLACING EQUIPMENT IN OPERATION. CONFIDENTIAL COST ESTIMATE PREPARED. TWO ENVELOPE BIDDING PROCEDURE RECOMMENDED. |
| 22 | | 1ST COST SUPPLY & INSTALLATION DOCUMENT DOCUMENTS PREPARED. |
| | 1 | |
| 26 | 2 | PROCUREMENT DOCUMENTS REVIEWED BY EEA. COMMENTS DISCUSSED WITH USAID AND SUPPLIED TO CONSULTANT. PREQUALIFICATION QUESTIONNAIRE FOR SUPPLY AND INSTALLATION ISSUED BY EEA |
| 28 | 2 | PROCUREMENT DOCUMENTS REVISED BY CONSULTANT. FINAL REVIEW AND APPROVAL OF PROCUREMENT DOCUMENTS BY USAID |
| 30 | 2 | SHORTLIST OF FIRMS MADE BY EEA AND APPROVED BY USAID TECHNICAL PROPOSALS AND PRICES IN SEPARATE ENVELOPES REQUESTED FROM SHORTLISTED FIRMS BY EEA. |
| 34 | 4 | RESPONSES RECEIVED BY CONSULTANT AND EEA. ONLY TECHNICAL RESPONSES OPENED AND REVIEWED. |
| | 4 | |
| 38 | 3 | DISCUSSION OF TECHNICAL PROPOSALS WITH PROPOSERS INITIATED BY EEA TO ASSURE RESPONSES COMPLY WITH MINIMUM TECHNICAL REQUIREMENTS AS STATED IN REQUEST FOR PROPOSALS. |
| 41 | 3 | AGREEMENT REACHED THAT ALL TECHNICAL PROPOSALS MEET MINIMUM REQUIREMENTS. EEA WITH USAID APPROVAL REQUESTS FINAL PRICES. |
| | 3 | |
| 46 | | CONTRACT AWARDED APPROVED BY USAID. LICOMM ISSUED. |
| | 32 | SUPPLY INSTALLATION OF EQUIPMENT AND TRAINING OF EEA PERSONNEL WITH ALL ACTIVITIES MONITORED AND SUPERVISED BY EEA AND CONSULTANT |
| 78 | | INSTALLATION COMPLETE TESTING BEGINS |
| | 4 | |
| 82 | | TESTING COMPLETE OPERATION STARTED |
| | 12 | |
| 94 | | APPROVAL. FINAL PAYMENT TO CONTRACTORS |

81

AUTOMATIC FACSIMILE TRANSMISSION

DR

DATE: 5-

TO: Husam Ismail
(Name)
DR/UD
(Office Symbol)
USAID/Cairo
(Room, Building)
354-5211 X 3318
(Telephone)

FROM: Melly Khalil
(Name)
AME/PD/ENV
(Office Symbol)
3313 A N.S.
(Room, Building)
647-4933
(Telephone)

Destination Fax Telephone Number:

011-202-356-2932

Sender Fax Telephone Number:

(202) 647-4958

Total Pages (including this cover sheet): 2

MESSAGE: IEE Face Sheet with insurance for
Alex Elec. Network Mod # 263-0194
attached. Many thanks for revisions
Please give copy to Ken Lue Phany
Melly Khalil

INITIAL ENVIRONMENTAL EXAMINATION

Project Location : Egypt

Project Title and Number : Alexandria Electrical Network Modernization
263-0194

Funding : AID \$50 million grant and GOE

Life of Project : Eight years

ISE Prepared by : Thomas A. Pearson, P.S.C. and Hosam Ismail
USAID Project Officer

Signature _____

Date _____

Environmental Action Recommended : Negative Determination

Mission Environmental Officer's Concurrence : Signature _____

Date _____

Associate Mission Director's Concurrence : Signature _____

Date _____

Decision of Environmental Coordinator, Bureau for Asia and Near East : Approved M. B. K. ANE/PO/ENV

Disapproved _____

Date May 19, 1989

91

INITIAL ENVIRONMENTAL EXAMINATION

Project Location : Egypt
 Project Title and Number : Alexandria Electrical Network Modernization
 263-0194
 Funding : AID \$50 million grant and GOE
 Life of Project : Eight years
 IEE Prepared by : Thomas A. Pearson, P.S.C. and Hosain Ismail,
 USAID Project Officer

Signature

Thomas A. Pearson
Hosain G. Ismail

Date

4/27/89

Environmental Action Recommended : Negative Determination

Mission Environmental Officer's Concurrence

Signature

Roger L. Russell
 ROGER L. RUSSELL P.E.
 DR/PROJECT SUPPORT OFFICE

Date

7/27/89

Associate Mission Director's Concurrence

Signature

Date

Decision of Environmental Coordinator, Bureau for Asia and Near East

: Approved

Disapproved

Date

I. SUMMARY OF PROPOSED ACTION

Utilizing a \$50 million AID grant to the Government of Egypt and approximately LE 64 million the Alexandria Electric Distribution Company (AEDC) will make improvements to its distribution system and build an Energy Control Center for monitoring and controlling the system.

AEDC does not generate any of the energy it distributes. Energy is purchased from the Egyptian Electricity Authority (EEA) who owns and operates the Unified Power System (UPS) from which AEDC is supplied. No physical changes to the UPS are included in the proposed project with the very limited exception of coordination of data and control between the AEDC Energy Control Center and the EEA National Energy Control Center (NECC) from which the UPS is monitored and controlled.

Substations connected to the 50 hertz UPS system and 66-KV subtransmission system provide energy to AEDC at 11-KV. However in an area recently transferred to AEDC, EEA has provided a 20-KV supply source.

The project includes the rehabilitation of the 11-KV distribution system involving installation of underground cables, installing metal clad 11-KV circuit breakers in brick and concrete buildings, replacing and installing 11-KV-220/380 volt distribution transformers in either all metal enclosures or in brick and concrete buildings with steel louvered doors, replacing 220/380 volt underground cable connections, replacing or maintaining 220/380 volt overhead circuits, and connecting existing customers to the renovated system.

Qualified engineering services will be provided to assist AEDC in planning, designing, procuring and contracting for materials and equipment, and monitoring implementation progress. The services are intended to assist AEDC system-wide and will include the initial use by AEDC of 20-KV for medium tension distribution. The consultant will specifically assist AEDC in converting existing 11-KV circuits to 20-KV operation for improving service to the existing rural villages in the new service area.

An Energy Control Center for AEDC is included in the project which will include communication systems, distribution system monitoring facilities, graphic representation of system condition, data analyzing and storage facilities and have the ability to control selected system equipment from the center.

Qualified engineering services will be provided to assist AEDC to specify, procure, and monitor the installation of the center.

The project is specifically intended to improve AEDC's system and its operation, to make it more efficient, provide standard voltage to its consumers, reduce interruptions and outage time and reduce the possibility of contact with energized wires. It is not specifically intended, with the exception of engineering services, to provide for new services. However, renovation of the system will, because of prudent sizing of equipment, permit loads to be added.

II SURROUNDING ENVIRONMENT

AEDC's service area includes the city of Alexandria which is Egypt's major port, a major industrial center, and a major summer vacation resort for Egyptians as well as for other Arab countries. Its population has been estimated at five million (with an additional two million influx during the summer period) and is continuing to grow. Physically, it occupies a strip of land approximately 55 km long along the Mediterranean Sea on the North and to Lake Mariout and the desert 7-10 km to the south. Construction of high-rise apartment buildings in the urban center is continuing and industrial and commercial expansion is taking place in the desert.

In July 1988, AEDC's service area was extended by the transfer from the Beheria Distribution Company approximately 35 km west along the sea and south 3.5 km. It is a desert area with a few rural villages and resorts in various stages of development along the sand-duned sea coast.

Most of the consumers whose service will be directly improved as a result of the project will be residential, commercial, and small, light industry.

III PROBABLE ENVIRONMENTAL IMPACT

There will be no direct consumption of natural resources as a result of the project. To the extent that AEDC improves the efficiency of its system and its operation, a savings in resources will be realized. To the extent that increased load may be realized, the environmental aspects resulting from additional energy generation are not considered in this IEE. Those aspects are considerations for the generating facilities.

Installation of underground cable will require opening and closing trenches in both paved and unpaved streets which will create temporary inconveniences in the area and will require coordination with traffic authorities. AEDC has had extensive experience in this regard while carrying out the AID financial Urban Electric Distribution Project (UED). AEDC will take reasonable measures to avoid interference or damage to existing water and sewer lines during installation of underground cables through consultation with appropriate GOE authorities.

- 4 -

Lead covered underground cables have been used in the past on the 11-KV system but no lead covered cables have been installed during the past 5 years. AEDC has advised that the cost of removing unneeded cables, particularly those that have been in the ground for long periods of time, is more expensive than their scrap value. Only those cables are removed when the excavation for installing a new cable uncovers old cables. This situation is encountered very infrequently and therefore very little lead covered cable is removed from the ground. If and when such cables are removed, the lead is either stripped from the cable and reused, if needed, to cover splices or for terminating lead covered cable where such cable can be reused. If the lead is not needed, it is not stripped from the cable and is sold at auction in accordance with AEDC regulations. The sale is by lot and includes other items of scrap. No information is available on the amount of lead sold over any given time period but based on discussions with AEDC and the consultants about experience on the UED Project, very little, if any, lead covered cable will be removed during the implementation of the proposed project. AEDC, after the sale, has no control over the use of any lead included in the sale. Therefore the environmental aspects of the use of the lead sold by AEDC must be the concern of the purchaser. The reuse of the lead is not expected to have a negative impact on the environment since it would not be used near agricultural land or drinking water supplies.

Distribution transformers rated 11-KV/127-220 volts which will be removed from service, will be stored in AEDC warehouse as spare. They will be replaced with 11-KV-220/380 volt transformers. None of the removed or replaced transformers are filled with non-combustible oil, according to the UAD Project consultant. Therefore, no poly-chlorobiphenyl (PCB) containing liquid requires disposal or leakage consideration. The standard cooling medium used in Egypt is flammable oil. Oil from replaced transformers is filtered, dried and reused when tests indicate that it has the proper insulating value. If it is unsatisfactory for reuse it is placed in drums and sold at auction. Transformers will be installed in brick and concrete buildings with steel louvered doors or are enclosed in a metal housing at ground level in accordance with existing policies and practices. No oil fires have been experienced, according to the consultants for the UED Project, and the risk of fires causing extensive damage outside the enclosure is considered light.

The installation of new distribution transformers will require a space of about 25m² and 11-KV distribution points (circuit breaker switches) will require a space of about 39-40m². AEDC will purchase these areas under existing laws according to standard practice as has been done under the UED Project.

The renovation of the 220-380 volt underground system involves the replacement of inadequate service boxes and open service connections in which connections were made by twisting wires together. These unsafe, inefficient connections will be replaced with insulated compression connectors in fiberglass enclosures. There will be a temporary outage of the circuit while renovation work is being done but the result will be a more efficient connection protected from public access and also improved service.

45

A similar temporary interruption to service will be experienced while replacing the overhead circuits and changing or adding distribution transformers. The result will be improved service and a greatly reduced potential for accidental contact with a "live" wire while experiencing a proper service voltage.

There are no electro-static or electromagnetic effects expected from the project. The alternating current system included in the project does not exceed 20-KV. We have no information that indicates 20-KV, even at close, safe distances, creates an electro-static field sufficient to cause adverse effects to humans. Likewise, we have no information that the alternating current system under normal conditions produces magnetic fields of hazardous magnitudes. Even when low-resistant fault conditions occur, the time during which high currents flow is limited by a series of protective devices installed in various parts of the system and no adverse effects to humans by magnetic fields is expected.

It has been planned that the Energy Control Center will be housed in a building presently under construction at an existing substation site. Most of the equipment will therefore be housed in an existing building. There will, however, be some construction work required to make slight modifications to buildings and to erect towers for the communication system. The installation or operation of the control center is not expected to have a negative impact on the environment.

IV BENEFITS

Reactions during the implementation of the UED Project have indicated that the temporary interruptions to service required to carry out activities similar to those in the proposed project have been well tolerated. People who have experienced improvement in service have expressed support and those who have not yet been provided adequate service welcome the construction crews to their areas.

Construction of the distribution system will be carried out by AEDC crews and an Egyptian contractor. The supply and installation of the Energy Control Center will be done by a U.S. contractor. There will be temporary local employment under both contracts and a few permanent positions created at the Energy Control Center for which training will be provided.

V THRESHOLD DECISION

The initial examination of the project indicates that it will not have a significant negative impact on the environment. Overall, its impact is considered beneficial directly to the people residing in Alexandria. No significant impact on land use or change in water quality is expected as a result of the project. There will be no lasting additives to the atmosphere or increased use of natural resources. There will be an improvement in the supply of electric energy which will benefit consumers. No change or movement of population is expected as a direct result of the project.

There are no significant physical energy resources or conversion processes included in the proposed project. To the extent the project improves the efficiency of the distribution system and its operation, a reduction of the use of physical energy resources would be expected.

Based on the findings of this IEE, a negative determination is recommended for the proposed project.

THE EGYPTIAN ELECTRICITY AUTHORITY (EEA)
Analysis of Financial Statements
as of 06/30/87

1. Short Term Liquidity

EEA does not maintain a comfortable amount of working capital, a matter which generally limits a company's ability to meet its obligations, expand its volume and take advantage of opportunities.

EEA's current ratio (current assets divided by current liabilities) is 1.06:1, with a great proportion of current assets in inventory and accounts receivable.

The examination of trend of current ratio from 1984 to 1986 supports the above statement.

2. Revenue Realization

EEA's (Gross) operating margin of profit went down from 13.65% in FY 86 to 8.99% in FY 87.

Operating costs increased from 86.3% in FY 86 to 91.0% in FY 87.

Due to increase in FY 87 non operating revenues by approximately 343.0% EEA's net profit ratio increased from 1.8% in FY 86 to 2.54% in FY 87.

We note that no average percentages for company's conducting typical activities in Egypt are available for comparison with EEA's operating margin and net profit ratio from year to year.

3. Changes in Financial Position:

Changes in EEA's working capital as of 6/30/87 amounts to L.E. 130,797 million. The net change in working capital in the prior year ending 6/30/86 was L.E. 64,395 million. The FY 87 net change in working capital is reflected in the balance sheets for FY 86-87 in the form of extra cash, increased inventories and more accounts receivable.

We also note the increase in accrued expenses and tax due resulting from increased sales in FY 87.

Conclusion

EEA is the sole generator and supplier of Electricity power in Egypt through a number of Electric Distribution companies owned by the Government. EEA, being a public sector company, its result of operations both revenues and losses are subject to the Government's pricing and economic policies which often include subsidies.

The above facts impose limitations on the results of financial analysis of EEA financial statements and their indications.

Due to the special nature of this company and the vital importance of power supply to the Egyptian economy and the welfare of the Egyptian people, in spite of its financial weaknesses and difficulties, EEA's operations are likely to continue. However, it cannot be assumed that EEA or the Alexandria electric distribution company will benefit financially from the cost savings anticipated in the renewal of distribution equipment in Alexandria. This is because of the reasons stated above.

The Alexandria Electric Distribution Company
Analysis of Financial Statement
as of June 1988

Analysis of AEDC financial statements are subject to the same limitations as analysis of EEA's financial statements.

AEDC's excess revenues are primarily generated from connection and other service fees rather than from energy sales. The tariff structure dictates that any excess revenue be derived from sources other than energy sales.

As with EEA, inventories and accounts receivables represent a large portion of the current assets. AEDC's current ratio of 0.85:1 for the 87/88 fiscal year represents a decline from previous years.

AEDC's cash position has steadily been increasing. The increase indicates that AEDC will have the ability to pay its local currency obligation in a timely manner.

PROJECT DISBURSEMENT SCHEDULE
(X 1,000)

| | <u>FY90</u> | <u>FY91</u> | <u>FY92</u> | <u>FY93</u> | <u>FY94</u> | <u>FY95</u> | <u>FY96</u> | <u>FY97</u> | <u>FY98</u> | <u>TOTAL</u> |
|--|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| <u>Distribution:</u> | | | | | | | | | | |
| Consultants | 60 | 550 | 550 | 600 | 500 | 500 | 300 | 140 | | 3,200 |
| Materials equipment Supplies | | | 4,000 | 3,350 | 600 | 4,500 | 1,000 | 150 | | 13,600 |
| <u>Dispatch Control Center:</u> | | | | | | | | | | |
| Consultants | | 120 | 530 | 500 | 600 | 600 | 650 | 500 | 100 | 3,600 |
| Control Center Materials equipment Supply, Installation, training, etc. | | | | | 2,500 | 9,000 | 7,600 | 3,000 | 1,900 | 24,000 |
| <u>Contingency</u> | | | | | | 2,500 | 2,000 | 400 | 550 | 5,350 |
| <u>Audit & Evaluation:</u> | 15 | | | 60 | | 100 | | | 75 | 250 |
| T O T A L S | 75 | 670 | 5,080 | 4,510 | 4,200 | 17,250 | 11,550 | 4,190 | 2,625 | 50,000 |

PROJECT COST ESTIMATE

| | | \$000's | LE 000's |
|---|-----------|---------------|---------------|
| <u>DISTRIBUTION MATERIAL SUPPLIES AND SERVICES</u> | | | |
| 11-KV Underground l/c 400 mm ² | | | |
| XPLE cables and accessories | 250 km | | 7,500 |
| Installation | | | 1,250 |
| Escalation | | | 3,600 |
| 11-KV Distribution points, equipment, capacitors and supplies | 20 ea | 2,250 | 7,800 |
| Cost of property and buildings | | | 2,810 |
| Installation of equipment | | | 1,500 |
| Escalation | | 300 | 5,000 |
| 11-KV/220-380 Volt Transformer points, transformers, fuses and switches | 600 ea | | 7,200 |
| Escalation | | | 2,900 |
| 230-380 Volt overhead cable | | 6,400 | |
| Connectors, splices and accessories | | 1,650 | |
| Escalation | | 1,500 | |
| Underground cable risers, brackets and conduit | | | 3,300 |
| Escalation | | | 1,400 |
| Installation | | | 3,600 |
| Escalation | | | 1,500 |
| 220/380 Volt Underground System Service Points | 17,000 ea | | 1,700 |
| Escalation | | | 700 |
| Project O&M equipment vehicles, tools and supplies | | 1,200 | |
| Escalation | | 300 | |
| SUBTOTAL MATERIALS AND SUPPLIES | | <u>13,600</u> | <u>51,760</u> |
| Consulting services - including vehicles | | 2,700 | 4,000 |
| Escalation | | 500 | 1,600 |
| SUBTOTAL SERVICES | | <u>3,200</u> | <u>5,600</u> |
| TOTAL DISTRIBUTION MATERIALS AND SERVICES | | <u>16,800</u> | <u>57,360</u> |

PROJECT COST ESTIMATE (CONT'D)

| | \$000's | LE 000's |
|---|---------------|---------------|
| <u>DISPATCH CONTROL CENTER</u> | | |
| Control System | 8,700 | 700 |
| Communication System | 8,900 | 2,000 |
| Air conditioning, fire protection, and building modification | 500 | 750 |
| Training, transportation, etc. | 1,200 | 150 |
| Escalation | 4,700 | 2,410 |
| SUBTOTAL MATERIALS EQUIPMENT INSTALLATION | <u>24,000</u> | <u>6,010</u> |
| Consulting Services including vehicles | 3,100 | 900 |
| Escalation | 500 | 300 |
| SUBTOTAL SERVICES | <u>3,600</u> | <u>1,200</u> |
| SUBTOTAL DISPATCH CONTROL CENTER | <u>27,600</u> | <u>7,210</u> |
| CONTINGENCY | <u>5,350</u> | |
| AUDIT AND EVALUATION COSTS | <u>250</u> | |
| TOTAL PROJECT COST | <u>50,000</u> | <u>64,570</u> |

Note:
(LE 2.57 = \$ 1.00
as of 6/1/89)

ALEXANDRIA ELECTRIC NETWORK MODERNIZATION
PROJECT 263-0194

CERTIFICATION PURSUANT TO
GRAY AMENDMENT

As Director and Principal Officer of the Agency for International Development in Egypt, I certify that full consideration has been given to the potential involvement of small and/or economically and socially disadvantaged enterprises, historically black colleges and universities and minority controlled private and voluntary organizations covered by the Gray Amendment.

The attached Project Paper discusses the efforts that will be undertaken in connection with the procurement plan to maximize the participation of minority-owned and small and disadvantaged organizations. At the time of each procurement action, every effort will be made to encourage the participation of these organizations and draw upon their knowledge and expertise.

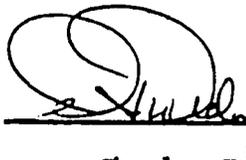

Charles P. Weden, Jr.
Acting Director

4/27/30
Date

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

As Director and Principal Officer of the Agency for International Development in Egypt, having taken into account, among other things, the maintenance and utilization of projects in Egypt previously financed or assisted by the United States, I 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 engineering consulting services, procurement of materials, supplies and equipment to carry out improvements to the electric distribution system in Alexandria and to construct, test, staff and place in operation an Energy Control Center for monitoring, controlling, and storing of data relating to the operation of the distribution system.

This judgment is based upon general considerations discussed in the Project Paper to which this certification is attached as Annex L.



Charles F. Weden, Jr.
Acting Director

8/24/61
Date

10/1