

FD-999-713  
ISN: 3581

UNCLASSIFIED

UNITED STATES INTERNATIONAL DEVELOPMENT COOPERATION AGENCY

AGENCY FOR INTERNATIONAL DEVELOPMENT

WASHINGTON, D.C. 20522

PROJECT DADDP

PROJECT NO. 263-0030

JANUARY 1964

EGYPT: SHOUBRAH EL KHEIMA THERMAL POWER PLANT - AMENDMENT 2

UNCLASSIFIED

AGENCY FOR INTERNATIONAL DEVELOPMENT <b>PROJECT DATA SHEET</b>				1. TRANSACTION CODE <input type="checkbox"/> A = Add <input type="checkbox"/> C = Change <input type="checkbox"/> D = Delete		Amendment Number <u>2</u>		DOCUMENT CODE <u>3</u>	
2. COUNTRY/ENTITY <u>Egypt</u>				3. PROJECT NUMBER <u>263-0030</u>					
4. BUREAU/OFFICE <u>NE</u>				5. PROJECT TITLE (maximum 40 characters) <u>Shoubrah El Kheima Thermal Power Plant</u>					
6. PROJECT ASSISTANCE COMPLETION DATE (PACD) MM DD YY <u>06 30 86</u>				7. ESTIMATED DATE OF OBLIGATION (Under "B" below, enter 1, 2, 3, or 4) A. Initial FY <u>79</u> B. Quarter <u>4</u> C. Final FY <u>84</u>					
8. COSTS (\$000 OR EQUIVALENT \$1 = )									
A. FUNDING SOURCE			FIRST FY			LIFE OF PROJECT			
			B. FX	C. L/C	D. Total	E. FX	F. L/C	G. Total	
All Appropriated Total			100,000		100,000	208,000		208,000	
(Grant)			(100,000)		(100,000)	(208,000)		(208,000)	
(Loan)									
Other U.S.									
1.									
2.									
Host Country				78,100	78,100		115,000	115,000	
Other Donor(s)			287,800		287,800	317,000		317,000	
<b>TOTALS</b>			387,000	78,100	465,900	535,000	115,000	640,900	
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		190,000		18,000		208,000	
(2)									
(3)									
(4)									
<b>TOTALS</b>		190,000		190,000		18,000		208,000	
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) <div style="border: 1px solid black; padding: 10px; margin: 10px 0;">To augment the electricity generating capacity of the Egyptian Electricity Authority to meet increasing energy requirements of consumers throughout Egypt.</div>									
14. SCHEDULED EVALUATIONS					15. SOURCE/ORIGIN OF GOODS AND SERVICES				
Interim		MM YY	MM YY	Final	MM YY				
					<u>3</u> <u>8</u> <u>7</u>	<input checked="" type="checkbox"/> 000	<input type="checkbox"/> 941	<input type="checkbox"/> Local	<input type="checkbox"/> Other (Specify)
16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of a _____ page PP Amendment.)  To assist in financing a portion of the foreign exchange costs of the 945 MW Shoubrah El Kheima Thermal Power Station.									
17. APPROVED BY		Signature <u>M. S. W. Stone</u>			18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION MM DD YY <u>01 31 84</u>				
		Title Director, USAID/Cairo							

EGYPT - SHOUBRA EL KHEIMA THERMAL POWER PLANT

AMENDMENT 2

TABLE OF CONTENTS

<u>TITLE</u>	<u>PAGE NUMBERS</u>
Project Data Sheet.....	i
Contents.....	1, 2
References, Currency Equivalentents, and Weights and Measures.....	3
Glossary of Abbreviations.....	4
Summary and Recommendations.....	5, 6
I Introduction.....	7 thru 12
II The Project.....	13 thru 18
III Technical Analysis.....	19 thru 25
A. General.....	19
B. Consulting Engineering and Management Services...19 thru 22	
C. Turbine Generator including Spare Parts.....	22
D. Condensers and Heaters including Spare Parts.....	22, 23
E. Pumps including Spare Parts.....	23
F. Panels and Controls including Spare Parts.....	23, 24
G. Contingency.....	24
H. 611(a) Requirements.....	25
IV Financial Analysis.....	26, 27, 28
A. General.....	26, 27, 28
B. Source of Funds.....	28
C. Disbursement Period.....	28

V	Economic Analysis.....	29, 30, 31
VI	Social Analysis.....	32
VII	Environmental Analysis.....	33, 34
VIII	Project Implementation.....	35
	A. Implementing Agency.....	35
	B. Implementation Plan.....	35
	C. Implementation Schedule.....	36
	D. AID Financing Procedures.....	37
	E. Terminal Dates.....	37
	F. Control and Monitoring.....	38
	G. Evaluation.....	38, 39
IX	Recommendations, Conditions and Covenants.....	40, 41
	A. Recommendations.....	40
	B. Conditions Precedent to Disbursement.....	40
	C. Covenants.....	41

ANNEXES

- A. Grant Application
- B. Draft Authorization
- C. Section 611(e) Certification
- D. Statutory Checklist
- E. Rate of Return Analysis
- F. Logical Framework

REFERENCES

1. AID Project Paper, "Egypt: Shoubrah El Kheima Thermal Power Plant, Project No. 263-0110", dated May 1979.
2. AID Project Paper, "Shoubrah El Kheima Thermal Power Plant, Amendment, Project No. 263-0030", dated June 1981.
3. World Bank Staff Appraisal Report, "Egypt, Shoubrah El Kheima Thermal Power Project, Report No. 2446-EGT", dated June 5, 1979.

CURRENCY EQUIVALENTS

Currency Unit: LE. = Egyptian Pound

Official Rate

LE 1 (or 1,000 milliemes)	=U.S. Dollars 1.43
LE 1,000	=U.S. Dollars 1,429
LE 1,000,000	=U.S. Dollars 1,428,600

Market Rate

LE 1 (or 1,000 milliemes)	=U.S. Dollars 1.22
LE 1,000	=U.S. Dollars 1,218
LE 1,000,000	=U.S. Dollars 1,218,000

WEIGHTS AND MEASURES

1 Kilowatt (kW)	= 1,000 Watts
1 Megawatt (MW)	= 1,000 Kilowatts
1 Kilowatt hour (kWh)	= 1,000 Watt hours
1 Gigawatt hour (GWh)	= 1,000,000 kWh

GLOSSARY OF ABBREVIATIONS

ADB	African Development Bank
AID	Agency for International Development (U.S.A.)
CIDA	Canadian International Development Agency
COFACE	Compagnie Francaise d'Assurance Pour Le Commerce Exterieur (France)
EEA	Egyptian Electricity Authority
EEC	European Economic Community
EIB	European Investment Bank
IBRD	International Bank for Reconstruction and Development (World Bank)
IDA	International Development Association
MEE	Ministry of Electricity and Energy
OBI	Overseas Bechtel, Incorporated
OECD	Overseas Economic Cooperation Fund (Japan)
S&P	Sanderson & Porter
UPS	Unified Power System

EGYPT: SHOUBRA EL KHEIMA THERMAL POWER PLANT

AMENDMENT

SUMMARY AND RECOMMENDATION

1. Grantee: The Arab Republic of Egypt. The grant application is attached as Annex A.
2. Grant Amount: U.S. \$18 million, increasing Grant No. 263-0030 from \$190 million to \$208 million.
3. Implementing Agency: The Egyptian Electricity Authority (EEA), a separate entity within the Ministry of Electricity.
4. Terms to the Implementing Agency: A loan to the Egyptian Electricity Authority on terms satisfactory to AID.
5. Project Amendment: To augment the electricity generating capacity of the EEA to meet increasing energy requirements of consumers throughout Egypt.
6. Project Description: Engineering and construction of a 945 MW thermal power plant to be located approximately five miles north of Cairo on the east bank of the Nile River, together with necessary transmission linkages and technical assistance.
7. Purpose of Grant Amendment: To provide financing for a portion of the foreign exchange financing shortfall. The total cost of the project, both foreign exchange and local currency is estimated at \$644 million, of which \$588 million has been provided from AID, IBRD, EEC, EIB, OCEF, ADB and EEA with a project funding shortfall of \$56 million. The funding shortfall for AID financed consultant services and equipment contracts is estimated at \$18 million. The balance of the financing to cover the funding shortfall will be provided by the OECF, EIB and IBRD or EEA.
8. Grant Application: The GOE has requested the additional \$18 million grant for the project in order to complete the foreign exchange financing required for the project. The application is attached as Annex A.
9. Source of U.S. Funds: Fiscal Year 1984 Economic Support Funds.

10. Statutory Requirements; All statutory criteria have been satisfied, see Annex D.
11. Recommendations; Approve the reloan terms to EEA and authorize an amendment to Grant 263-0030 to increase the Grant from \$190 million to \$208 million in accordance with the terms and conditions set forth in the draft Grant Authorization Amendment, attached as Annex B.
12. Project Committees:

USAID/Cairo

Project Officer:	John P. Hunt
Project Engineer:	Dean D. Moody
Legal Advisor:	Belinda K. Barrington
Economist:	David P. Dod

AID/Washington

## I. INTRODUCTION

1.01 On July 19, 1979, AID authorized a grant of \$100 million to the Government of Egypt to assist in financing the foreign exchange costs of engineering and constructing a 600 megawatt (MW) thermal power plant, expandable to 900 MW, to be located on a site at Shoubrah El Kheima in Cairo, Egypt. The agreement was signed on August 29, 1979. A detailed appraisal of the project is included in the Project Paper, "Egypt: Shoubrah El Kheima Thermal Power Plant, Project No. 263-0110, May 1979."

1.02 The World Bank Group (IBRD and IDA) and four other multilateral and bilateral donors are also providing financing for the project. They included the European Economic community (EEC), the European Investment Bank (EIB), the Japanese Overseas Economic Cooperation Fund (OECF) and the African Development Bank (ADB).

1.03 The implementing agency for the project is the Egyptian Electricity Authority (EEA), a separate entity of the Ministry of Electricity and Energy (MEE), responsible for the bulk supply of electricity to Egypt

1.04 The project is an important part of the GOE's power sector development program to meet the future demand for electricity. Supply and demand studies executed by EEA, confirmed by their consultant and reviewed independently by the World Bank, forecast an annual load growth of 12 to 15 percent over the next decade, and a serious deficit in power generation capability in the mid-1980's which could act as a brake on economic development.

1.05 The AID grant of \$100 million was based upon the project foreign exchange cost estimated at \$387.8 million and local currency cost of \$ 78.1 million. The anticipated sources of project funding are summarized in Table I.

TABLE I  
ANTICIPATED SOURCES OF FOREIGN EXCHANGE FINANCING  
FOR 2 UNIT 600 MW PLANT  
(Expressed in Equivalent U.S. Million Dollars)

	<u>FOREIGN EXCHANGE</u>	<u>LOCAL CURRENCY</u>	<u>TOTAL</u>
AID	\$100		\$100
IBRD	139		139
EEC	35		35
EIB	35		35
OPEC	10		10
OECE	25		25
EEA		\$78.1	78.1
Other Sources	<u>43.8</u>		<u>43.8</u>
	\$387.8	\$78.1	\$465.9

AID's portion of \$100 million was to be used to finance the dollar costs of consultant engineering services, for the design, engineering and supervision of construction of the project, and to finance major components of the power plant.

1.06 Following a prequalification of potential consultants and with the concurrence of AID and the other co-financers, EEA selected the U.S. consulting firm of Overseas Bechtel, Inc. (OBI) and negotiated a contract for engineering, procurement, construction management and training services for the project. The contract was signed in December 1979 and after amendment of certain terms and conditions to satisfy AID's requirements, the contract was approved by AID and subsequently by the Egyptian Council of State in May 1980.

1.07 OBI reviewed the feasibility study prepared by Sanderson & Porter (S&P) for a 600 MW thermal plant at the Shoubrah El Kheima site with ultimate development to 900 MW and confirmed that the plan was technically sound and feasible. OBI prepared a conceptual design of a 945 MW plant, consisting of three (3) 315 MW units, each of similar design, and a procurement packaging plan for plant equipment and services, with due regard for the different source and origin requirements of the various co-financiers of the project. In preparing its preliminary design, OBI made certain changes in the original plan in order to obtain the least-cost approach to constructing, operating and maintaining the plant. OBI's Preliminary Design Report was issued in August 1980.

1.08 Both S&P and OBI had projected a 68-month schedule to complete engineering, supply and construction of the first 315 MW unit. At a co-financiers' meeting in Cairo in September 1980, OBI presented a proposal which would reduce the schedule for the first unit to 58 months as well as significantly reducing the capital cost of the project. The shortened schedule required OBI to assume a larger engineering role than defined in their contract with EEA. OBI would perform some critical path detailed design and assume additional procurement responsibilities for certain items of major equipment permitting earlier procurement of equipment which would in turn lead to earlier design of the critical civil works items. All of the actions taken under the shortened schedule implementation approach were to be supportive of reducing lead time for procurement of plant machinery, compressing the construction period of the plant and hence advancing the project completion schedule.

1.09 OBI estimated the total cost of the 945 MW plant to be approximately \$640 million, not including interest during construction. The OBI Preliminary Design Report and cost estimate, based on the 58-month schedule and OBI's expanded engineering role was accepted by EEA and the co-financiers in September 1980. In October 1980, following discussions with EEA, OBI proposed to further reduce the schedule to 51 months. This "fast track" schedule was approved by the co-financiers and EEA provided OBI with a Letter of Intent to negotiate an amendment to OBI's contract to include the additional work-months of services required for the 51-month target for completing the first generating unit. The 51-month target runs from October 1980, the start of the drafting of commercial terms and conditions and technical specifications for the Contract Packages or Purchase Orders on the "fast-track"

schedule with unit 1 to be completed for commercial operation in January 1985. Completion of units 2 and 3 would follow the first unit by nine months and six months, respectively, i.e. Unit 2 in October 1985 and Unit 3 in April 1986.

1.10 In June 1981, the GOE requested AID to provide additional Grant funds in the amount of \$90 million to assist in financing the expanded scope of the project. A detailed appraisal of the expanded project is included in the paper "Shoubrah El Kheima Thermal Power Plant, Amendment, Project No. 263-0030, dated June 1981." On August 25, 1981 AID authorized an additional \$90 million grant to the GOE and the Grant Agreement was amended on August 29, 1981 to provide the additional foreign exchange financing for the expanded scope of OBI's services and finance major equipment packages for the expanded 945 MW plant. OBI's Contract with EEA was amended on April 1, 1982 and the amendment was approved by USAID on April 21, 1982.

1.11 The sources of project financing in mid-1981 are summarized in Table II.

TABLE II

SOURCES OF PROJECT FINANCING FOR 3 UNIT 945 MW PLANT - 1981  
(Expressed in Equivalent U.S. Million Dollars)

	<u>FOREIGN EXCHANGE</u>	<u>LOCAL CURRENCY</u>	<u>TOTAL</u>
<u>Estimated Cost</u>	\$535	\$105	\$640
<u>Funding Provided</u>			
AID	190		190
IBRD/IDA	182		182
COFACE	50		50
EEC	35		35
EIB	32		32
OCEF	23		23
ADB	8		8
EEA		105	105
<u>Total Funding Provided</u>	<u>\$520</u>	<u>\$105</u>	<u>\$625</u>
<u>Anticipated Funding Shortfall</u>	<u>\$15</u>	<u>0</u>	<u>\$15</u>

1.12 A total of 49 Contract Packages and Purchase Orders have been awarded for equipment, material and services required for the construction of the plant. Foreign exchange funding for these Contract Packages and Purchase Orders, has been provided by six (6) multi-lateral and bi-lateral donor agencies. EEA has provided local currency funding for those contracts and orders requiring local currency.

1.13 OBI's most recent project cost reviews forecast a total project cost of \$644 million, (including \$9.0 million for interconnect services), \$529 million in foreign exchange financing and \$115 million in local currency financing. The French financing of \$50 million was withdrawn when no equipment packages of significance was available for French financing. The financing from the EEC and EIB was composed of several European currencies and were used to fund fixed priced equipment contracts payable in U.S. dollars. The loss of French funding and European currency devaluations have resulted in a project funding shortfall of \$83 million. The sources of project financing in late 1983 are summarized in Table III.

1.14 The OECF have agreed to provide additional \$10 million in project funding, the EIB have agreed to transfer to the Project \$8 million from their \$40 million pledge to the Shoubrah Interconnection and IBRD has transferred \$9 million from another EEA loan to reduce the funding shortfall for non-AID funded contracts and purchase orders to \$38 million. Discussions between the GOE and IBRD for an additional \$38 million in project funding are continuing. The GOE has committed to cover any foreign exchange shortfall in IBRD funding. In order to complete the foreign exchange funding shortfall associated with the contracts funded by AID, the GOE has requested that AID increase the grant for the Shoubrah El Kheima Thermal Power Plant Project by \$18 million, from \$190 million to \$208 million. All local currency needs, forecast at \$115 million, will be provided by GOE.

TABLE III

SOURCES OF PROJECT FINANCING FOR 3 UNIT 945 MW PLANT - 1983  
(Expressed in Equivalent U.S. Million Dollars)

	<u>FOREIGN EXCHANGE</u>	<u>LOCAL CURRENCY</u>	<u>TOTAL</u>
Estimated Cost	\$529	115	\$640
Funding Provided			
AID	208a		208a
IBRD	189		189
EEC	25		25
EIB	29		29
OCEF	29		29
ADB	11		11
EEA	<u>--</u>	<u>\$115</u>	<u>115</u>
Total	\$491	\$115	\$491
Short fall	\$ 38b	0	\$ 38b

a Includes \$9.0 million for OBI's Interconnection Engineering Services.

b Without \$18 million AID Amendment, shortfall is \$56 million.

## II THE PROJECT

### A. Project Scope

2.01 The project scope provides for complete engineering, procurement, construction, and commissioning for a thermal power generating plant rated 945 MW (3x315MW).

### B. Project Features

2.02 The project is located in the Shoubrah El Kheima district of Cairo, 6 miles north of downtown Cairo. The plant is sited on the East bank of the Nile River. Nile River water is utilized for plant cooling.

2.03 Plant facilities include:

- Three 315 MW turbine generators.
- Three outdoor steam generators, natural gas fired, pressurized design. Burners are dual fuel type which can utilize Mazout (No. 6 fuel oil) as a back up fuel.
- Intake and discharge structures for condensing water from and to the Nile River.
- Fuel facilities include metering stations and fuel storage tanks.
- Ancillary buildings are comprised of Administration, Fire House, Warehouse, and Shop buildings.
- Environmental monitoring system.

### C. Fuel Supply

2.04 The primary fuel for the three 315 MW units will be natural gas. Mazout (heavy fuel oil) will be used as a secondary, back-up source of fuel. The GOE will take action to allocate a supply of

associated or non-associated natural gas trunk lines to be completed in time to ensure that the plant will be able to receive the gas by the scheduled completion date of each of the generating units.

D. Water Supply

2.05 Condensing water will be taken from the Nile River and returned without further treatment. Plant wastewater will be passed through a wastewater treatment plant before entering the river. The wastewater treatment plant will be designed to provide an effluent of a quality equal to or better than the U.S. EPA requirements.

E. Transmission

2.06 The S&P feasibility study for the project did not provide an in-depth study of the plant interconnection to the UPS. EEA and AID recognized this deficiency and included updating of the interconnection study in the OBI Contract. The OBI study recommended a far more extensive interconnection of the plant to the UPS than specified in the S&P report and included substantial rehabilitation of the EEA network. Since transmission rehabilitation was not foreseen in the various project Grant or Loan agreements, the co-financiers agreed that the Transmission System Interconnection should be considered a separate project with the exception of OBI's services which are being funded by AID as part of the Plant Consultant Engineering Services contract. The Plant interconnection consists of the 500 KV and 220 KV transmission lines and substation facilities necessary to connect the Shoubrah El Kheima Power Plant to the UPS. OBI is providing the conceptual design, construction management, procurement services and project management as required to design, furnish and install the transmission facilities.

2.07 These facilities include:

220 KV underground transmission lines necessary to connect the Shoubrah El Kheima Plant to New Substation, Saptia and Cairo North Substation, including pipe only circuits to New Substation and Metro Substation.

220 KV overhead transmission line additions and modifications necessary to connect New Substation to the EEA Transmission System.

220 KV Substation Facilities for the addition of New Substation and the necessary modifications to existing substations.

500 KV transmission line from New Substation to Cairo 500 Substation.

500 KV Substation Facilities addition at the New Substation and the necessary modifications at Cairo 500 Substation.

Replacement/Modification of existing 500 KV, 220 KV and 132 KV power circuit breakers located at various substations that require an increase in rating.

2.08 The Shoubrah El Kheima Interconnection, being implemented by OBI, includes the first 4 of the 6 facilities listed in paragraph 2.07. They have been combined into the following 3 contracts:

A) 220 KV Underground Transmission

This contract has been awarded to Canada Wire for \$52 million. \$37 million in foreign exchange is funded by a CEDA loan; \$5 million in foreign exchange and \$10 million local currency is funded by EEA.

B) 220 KV and 500 KV Overhead Transmission

This contract has been awarded to Costruzione Metalliche Finsider, S.P.A., (Livorio, Italy), for \$18 million. \$12 million in foreign exchange will be provided by the ADB. The ADB had made a \$23 million commitment to finance this contract. EEA is providing \$6 million local currency.

C) 220 KV Substation

This contract has been awarded to Cogalex for \$36 million. Cogalex is a joint venture of Cgee Alstom/Alstom Atlantique/Les Cables de Lyon. \$31 million foreign exchange is being provided by COFACE. EEA is providing \$6 million local currency.

No construction contracts have been awarded on the other two facilities listed in paragraph 2.07. The 500 KV substation is being developed by Montreal Engineering, not OEI and EEA plans to use Canadian financing which is available thru CEDA. The breaker replacement effort is not yet underway, however, the EIB has reserved \$30 million to fund foreign exchange requirements for the breaker replacements.

F. Project Financing

2.09 The financing of the Shoubrah El Kheima project is currently based on funding from six multi-lateral or bi-lateral sources in

addition to funds by the Grantee. Financing of equipment and material for the Transmission System Interconnection is being funded under separate agreements from multi-lateral or bi-lateral sources.

2.10 AID financing is being utilized for the U.S. dollar costs of procurement of:

(1) U.S. management and consulting engineering services for the planning and engineering of all facilities including the Transmission System Interconnection; preparation of tender documents and procurement services related to plant and equipment, materials and related civil works construction services; supervision of installation, erection and civil works construction services; acceptance testing and start up of plant; and assistance and training during initial commercial operation;

(2) design, supply and erection of major equipment packages from U.S. firms for the turbine generators, boiler feeder pumps, condensers and heaters, and control panels.

#### G. Project Implementation

2.11 The Egyptian Electricity Authority (EEA) has prime responsibility for the overall management of the project. The EEA established a special project team, reporting directly to the Chairman of EEA, which has full authority to approve all contracts, change orders, and payments to contractors and make final decisions on all project-related matters. This unit consists of a project director, electrical engineer, civil engineer, accountant, financial analyst, contract specialist and legal counsel.

#### H. Project Cost Estimate

2.12 The project cost estimate was prepared by OBI employed under contract to EEA to provide engineering, procurement, construction management and training services related to the Project. It is based on the "fast-track" schedule with a target of 51 months from the start of the drafting of technical specifications by OBI for the procurement of equipment packages (October 1980) to commercial operation of the first unit (January 1985). Commercial operation of the second unit is scheduled for six months after commercial operation of Unit 1, and the commercial operation of the third unit twelve months after the commercial operation of Unit 1.

2.13 The cost estimates stated herein are based upon the April 1983 Project Financial Review and subsequently updated in November 1983.

I. Project Financial Plan

2.14 The overall Project Financial Plan is summarized in Table V.

TABLE V

PROJECT FINANCIAL PLAN  
SHOUBRAH EL KHEIMA THERMAL POWER PLANT  
(Expressed in Equivalent Millions U.S. Dollars)

	<u>Foreign</u> <u>Exchange</u>	<u>Local</u>	<u>Total</u>
<b>Contract Packages</b>			
Committed	\$382	\$83	\$465
In Process	26	9	35
Uncommitted	<u>24</u>	<u>4</u>	<u>28</u>
Subtotal	\$432	\$96	\$528
Engineering Services	65	12	77
Contingency	<u>32</u>	<u>7</u>	<u>39</u>
Total	\$529	\$115	\$644
Funding Available	<u>473</u>	115	588
Shortfall	\$ 56	0	\$ 56
Shortfall Funding			
OCEF	0	0	0
EIB	0	0	0
USAID	18	0	10
IBRD or EEA	<u>38</u>	<u>0</u>	<u>38</u>
Total Shortfall funding	\$ 56	0	\$ 56

2.14 The AID Project Financial Plan is summarized in Table VI

TABLE VI

AID FINANCIAL PLAN

SHOUBRAH EL KHEIMA THERMAL POWER PLANT  
(Expressed in Equivalent U.S. Million Dollars)

	<u>Planned</u>	<u>Forecast</u>	<u>Shortfall</u>
Contract Packages Committed	\$122.0	\$122.0	\$ -0-
Engineering Services	61.9	78.8	16.9
Contingency/Uncommitted	<u>6.1</u>	<u>7.2</u>	<u>1.1</u>
Total	\$190.0	\$208.0	\$18.0

III TECHNICAL ANALYSIS

A. General

3.01 The \$190 million AID grant has financed the consulting engineering and management services contract and four (4) major equipment packages for the three (3) 315 MW generating units. The forecast of each contract as amended to include additional consultant services or spare parts is summarized in Table VII below:

TABLE VII  
ALLOCATION OF AID FUNDS  
(Expressed in U.S. Thousand Dollars)

<u>Contracts/Purchase Orders</u>	<u>Committed</u>	<u>Forecast</u>
Consulting Engineering and Management Services	\$ 61,887	\$ 78,826
Turbine Generators including Spare Parts	77,577*	80,331
Condensers and Heaters including Spare Parts	16,100*	16,312
Pumps including Spare Parts	12,489*	14,200
Panels and Controls including Spare Parts	10,297*	11,100
Contingency		7,231
Uncommitted (Spare Parts and Services)	<u>11,650</u>	<u>          </u>
Total	\$ 190,000	\$208,000
Shortfall		\$ 18,000

\* Excludes Spare Parts

3.02 Individual contracts financed by the AID Grant and the forecast financing shortfall are discussed in more detail in the following paragraphs:

B. Overseas Bechtel, Incorporated Contract

3.03 Overseas Bechtel, Inc. was selected by EEA to provide consultant engineering services for design, procurement, construction management and training services following

prequalifications of potential consultants and submission and evaluation of proposals. The contract including Amendment No's 1 and 2 was signed on April 15, 1980 and approved by the Egyptian Council of State in May 1980. The contract provided for 2,202 work-months of services by expatriate OBI personnel, 187 work-months of services by EEA personnel on loan to OBI working in the USA and 1,189 work-months by local employees. Total contract cost was \$29,500,000, \$23,901,000 was financed by AID, \$1,208,000 was financed by IBRD and LE 3,074,000 was financed by EEA.

3.04 Amendment No. 4 to the contract, executed in June 1982, increased the scope of services to accomplish the "fast track" implementation plan and to accommodate the additional engineering design and project supervision services required by the addition of the third 315 MW unit to the project. The amended contract provided for 4,299 work-months of services by expatriate OBI personnel, 198 work-months of services by EEA personnel on loan to OBI working in the USA and 1,523 work months of services by local employees. The amended contract cost was \$54,827,000, \$47,369,000 financed by AID, \$1,432,000 financed by IBRD and LE 4,218,000 financed by EEA.

3.05 Amendment No. 4A to the contract was signed in July 1983 and provided for an additional \$7,200,000 in funding from AID and LE 1,540,000 in funding from EEA to cover estimated costs of escalation of unit prices. The amended contract cost was \$65,620,000, \$54,569,000 financed by AID, \$1,432,000 financed by IBRD and LE 6,733,000 financed by EEA.

3.06 Amendment No's 3, 3A, 3B and 5 resulted in either no change in contract costs or increased costs which would be financed by either IBRD or EEA.

3.07 Finally in July 1983, Amendment No. 6 to the contract was signed and provided additional consulting services for the Transmission System Interconnection of the Shoubrah El Kheima plant to the UPS. The amendment provided for 580 work-months of services by expatriate OBI personnel and 258 work-month of services by local employees at a cost of \$8,650,000, \$7,318,000 financed by AID and LE 932,000 financed by EEA. This Fixed Price amendment increased the OBI contract cost to \$74,922 \$61,887,000 financed by AID, \$1,775,000 financed by IBRD and LE 7,882,000 financed by EEA

3.08 The Shoubrab El Khcima Power Project has from its inception, undergone a series of transformations necessitated by financial constraints, physical modifications to the plant and changes to the assumptions made in the preliminary and final design of the project. As a result, extensive repackaging of contracts for the supply, delivery, erection and installation of materials and equipment to match available funding from the various donors coupled with additional efforts in engineering and construction management was undertaken in order to minimize the impacts of the changing conditions. These additional efforts have resulted in not only minimizing the impact of the constraints but also to achieve a substantial decrease in the original Capital Costs and reduction in the original schedule. These changes and optimization of cost and schedule have resulted in increases in OBI's estimated services and costs.

3.09 The increased level of effort which has been essential to preserve the "fast track" schedule and assure the Capital Costs benefits of the schedule have resulted in increased staff work-months in the Bechtel offices in the United States and in Cairo over and above the estimated staffing anticipated in Amendment No. 4. Furthermore, the delays in award of Contracts created a shift in the center of gravity of the staffing in the Gaithersburg offices and consequently the levels of staffing continued for a longer period of time. In the same context, staffing had to be brought earlier than anticipated to Cairo in order to be able to recover the time lost in Contract awards. It became necessary to start certain areas of work ahead of Contractor mobilization with the consequent increase in levels of supervision by OBI. Once the preservation of the "fast track" schedule was achieved, the levels of expatriate staffing in Cairo as well as Gaithersburg began to decrease dramatically.

3.10 In addition, due to the large number of scope changes and the associated increases in level of effort, there has been a substantial increase in reimbursable costs which are directly associated with the work-months expended. The reimbursable cost also has increased in the areas where extra business trips were required due to the increased level of effort. Publication of unforeseen Bid Documents further increased the reimbursable costs.

3.11 OBI has recently completed a project budget review and has estimated the level of additional services by expatriate OBI personnel to be 2278 work-months and the level of services by local employees to be 210 work months above the Amendment No. 4 levels requiring an additional \$19,595,000, \$16,939,000 financed by AID and LE 1,859,000 financed by EEA with the IBRD financing reduced by \$1,225,000. This would increase the OBI contract cost to \$94,517,000, \$78,826,000 financed by AID, \$1,775,000 financed by IBRD and LE9,741,000 financed by EEA.

3.12 OBI has prepared Amendment No. 7 to the contract for the additional services associated with the Power Plant and Transmission System Interconnection for 2273 work-months of expatriate OBI personnel and 210 work-months of local employees at a cost of \$16,939,000 and LE 1,859,000.

#### C. Steam Turbine Generator Contract

3.13 The contract for the Steam Turbine Generators was competitively bid and awarded to Westinghouse International Power Systems Company in 1981. The contract provided for the design, supply and delivery to the plant site of three (3) 315 MW steam turbine generators and accessories; the furnishing of all construction equipment and labor for their erection; testing; and the supply of operational spare parts for the initial five years of commercial operation of the first unit. The total contract price, excluding operational spare parts, was \$77,577,121 and LE 2,088,587 and included a provisional sum of \$500,000 and LE 200,000 for changes within the scope of the contract. The owner's generic list of recommended Operational Spare Parts were priced at \$1,118,477. The Westinghouse recommended Operational Spare Parts were priced at \$2,174,586. OBI has reviewed the operational spare parts requirements and extra ordinary parts requirements to maintain these units in Egypt and the effect on unit outage duration posed by overseas transportation. OBI has recommended an expanded operational spare parts inventory in the total amount \$2.7 million.

#### D. Condenser, Accessories and Heaters Contract

3.14 The contract for the Condensers, Accessories and Heaters was competitively bid and awarded to Southwestern Engineering Company in 1982. The contract provided for the

design, fabrication, testing and delivery to the plant site of three (3) Surface Condensers, twelve (12) Low Pressure and six (6) High Pressure Feedwater Heaters and three (3) Dearthating Feedwater Heaters and accessories; engineering supervision during erection; and the supply of start-up and operational spare parts for the initial five years of commercial operation of the first unit. The total contract price, excluding start-up and operational spare parts, was \$16,100,000 and LE 405,500 and included a provisional sum of \$25,000 for changes within the scope of the contract. The owner's generic list of recommended Operational Spare Parts were priced at \$328,885. The Southwestern Engineering Company recommended start-up and operational Spare Parts were priced at \$546,230. EEA and OBI have reviewed the Operational Spare Parts requirements considering extraordinary requirements posed by overseas transportation and have approved an expanded Operational Spare Parts listing with a total price of \$357,462. USAID has reviewed the spare parts requirements and have concurred in the spare parts request after excluding items classified as Consumables with an adjusted Spare Parts price of \$237,462.

#### E. Pumps Contract

3.15 The contract for Pumps was competitively bid and awarded to Transamerica De Laval in 1981. The contract provided for the design, engineering, furnishing, fabricating, testing and delivery of six Feed Pumps and Turbine Drives, Accessories and Auxiliary Equipment; three (3) Feed Pump and Electric Motor Drives, Accessories and Auxiliary Equipment; six (6) Vertical Circulating Water Pumps, Accessories and Auxiliary Equipment; engineering supervision during startup of each unit; the supply of Start-up and Operational Spare Parts; and off-shore training. The total contract price, excluding Start-up and Operational Spare Parts, was \$12,489,480 and LE 64,714 and included a provisional sum of \$25,000 for changes within the scope of the contract. The owner's generic list of recommended Operational Spare Parts were priced at \$1,697,658.62. Transamerica De Laval recommended Start-up and Operational Spare Parts were priced at \$692,386.05. OBI has recommended and EEA has approved spare parts in the total amount of \$1,710,942.

#### F. Panels and Controls Contract

3.16 The contract for Panels and Controls was competitively bid and awarded to Westinghouse Electric Corporation in 1982. The contract provided for the design, furnishing, fabrication,

testing and delivery to the plant site of Main Boiler Turbine-Generator Control Boards, Data Acquisition Systems, Annunciator Equipment Cabinets, Switchyard Annunciator Equipment Cabinets, Major Electronic Instrumentation Equipment Cabinets, Auxiliary Facilities Main Control Boards Auxiliary Control Boards, Programmable Controllers Processor Equipment and Module Cabinets, Protective Relay Panels, Batteries, Battery Chargers and Control Panels, Coordinated Boiler Turbine-Generator Control Equipment Cabinets, Distribution Panels; Special Tools; engineering supervision during startup of the panels and controls, off-shore training; and the supply of Operational Spare Parts. The total contract price, excluding Operational Spare Parts, was \$10,297,043 and LE 113,940 and included a provisional sum of \$500,000 for changes within the scope of the contract. The owner's generic list of recommended Operational Spare Parts were priced at \$613,358 and LE 4,116. The Westinghouse recommended Operational Spare Parts were priced at \$765,725 and LE 5,366. OBI estimates the spare parts requirements to be \$800,000.

G. Contingency

3.17 OBI has recommended a \$7.2 million - 3.6 percent physical contingency allowance for those contracts or purchase orders financed by AID to finance unforeseen foreign exchange costs over the next three years for:

- a. training of EEA operators and technicians in the United States;
- b. technical assistance exceeding the contract scope for manufactures services during startup of plant equipment
- c. consultant services for emergencies during startup and operations;

It is our judgement that the recommended contingency allowance is reasonable based upon the present status of equipment installation and personnel training and recent startup experiences on similar power plants and equipment.

H. Section 611(a) Requirements

3.18 It is the conclusion of the Project Committee that the requirements of Section 611(a) of the Foreign Assistance Act of 1961, as amended, have been satisfied. The project is based upon sound engineering analysis initially performed by Sanderson & Porter, Inc., and reviewed, confirmed thru detailed design, procurement assistance, construction management and construction supervision by Overseas Bechtel, Incorporated, the Consulting Engineer and Project Manager for the Project. The Mission has reviewed the proposals for additional consultant services, spare parts and other plans and finds them to be acceptable and has reviewed the estimated costs and finds them to be reasonably firm within the meaning of the statutory requirements.

#### IV. FINANCIAL ANALYSIS

##### A. General

4.01 EEA is an operational organization within the Ministry of Electricity and Energy, and its finances form a part of, and are comingled with the Ministry's. As such, EEA's financial statements are essentially a listing of cash flow transactions that have occurred during one year, although it does own assets, has incurred liabilities and has a stated capital.

4.02 Previous Grant Agreements provided that EEA would prepare and submit to AID by November 1 of each year, a provisional forecast of operating revenues, operating expenses and rate of return for the next succeeding year, a statement of the tariffs and assumptions underlying the forecasts, a report of accounts receivable from major accounts, and a statement of the measures proposed, if any, to produce the annual return forecast, and to furnish to AID all such details as AID may reasonably request. Commencing in 1980, the EEA fiscal year was changed from January through December to July through June. The Covenant should be amended to provide for submission of this financial data on May 1 of each year, two months in advance of the beginning of the Fiscal Year.

4.03 Since its formation in 1976, EEA has prepared its own annual budget and 5-year plans which are submitted through the Ministry of Electricity and Energy for approval by GOE. With the formation of Distribution Companies, EEA's budget is prepared separately from those of the Distribution Companies. EEA's 5-year plan is updated annually. Inclusion of a project in the 5-year plan represents the GOE's approval and agreement in principle to provide funds over the 5-year period without prescribing specific amounts for each year of the plan.

4.04 The most recent income statement and balance sheets prepared by EEA for FY 80/81 and 81/82 show that EEA earned a modest LE 5 million in FY 80/81 but lost nearly LE 1 million in FY 81/82. These results have produced rates of return, based on revalued assets of less than 1% in FY 80/81 and a negative return in FY 81/82. EEA has embarked on a series of rate increases beginning in 1982 which are expected to continue on a frequent basis and to lead to improvement in EEA's net income position. EEA's tariff increases of January, 1984 appear to have brought its rate-of-return on revalued assets above 5 percent as required by covenants in Amendment 1 to the Project Agreement.

4.05 EEA has always had difficulties in collecting its electricity supply bills from entities in the public sector such as Municipalities, Public Utilities, Government buildings and Government industrial companies. Failure to pay is often the result of a genuine lack of funds due to the prices of their goods and services being controlled by the GOE at uneconomic levels. Over the past several years, EEA and the GOE have worked to reduce the accounts receivable to a more manageable level and as of March 31, 1983 the accounts receivable were equivalent to 3.9 months of sales with the accounts receivable from Very-High Voltage customer equivalent to 2.7 months of sales.

4.06 Recent electricity tariff increases have been made to all classes of customers served from the Unified Power System. The tariff increases are summarized in Table VIII.

TABLE VIII

AVERAGE TARIFFS BY CUSTOMER CLASSE, 1976 - 1984  
(Piasters per KWHR)

<u>Customer Class</u>	<u>1976</u>	<u>1981</u>	<u>Dec. 1982</u>	<u>Dec. 1983</u>	<u>Jan. 1984</u>
Industry		0.78	0.85	0.98	1.03
Aluminum Co.	0.26	0.26	0.44	0.49	0.56
Kima	0.11	0.34	0.54	0.54	0.64
Other	1.21	1.09	1.09	1.27	1.32
Residential/ commercial	1.35	1.71	1.81	1.95*	2.10*
Public Utilities	1.06	1.31	1.46	1.76*	2.12*
Agriculture	0.73	0.92	0.92	0.99	1.19
Government & Other	n.a.	1.76	1.81	1.06*	1.27*
Average Tariff**	0.87	1.12	1.20	1.30	1.48

Indices of Average Tariffs (1976 = Base Year)

Ave. Index	100	129	138	155	170
Industrial Only	100	95	104	120	126
Res/Comm Only	100	127	134	144	156

\* Customer classification changed from earlier years

\*\* Weighted for 1976 - 82 by shares of each customer class in 1981/1982 EEA revenue and subsequently by shares of EEA projected revenue for 1983/84.

4.07 While these increases are a significant first step toward increasing revenue to EEA, other improvements to EEA's revenue base will be needed for EEA to meet its energy expansion requirements and maintain appropriate expenditures for operating expenses and debt service obligations. Higher prices for future fuel inputs will require EEA to make corresponding additional increases in electricity tariffs as provided in EEA covenants to its earlier project agreements for Shoubrah El Kheima. To bring EEA electricity tariffs in line with the long term marginal cost of electrical energy requires a 400% increase to the average rate of January, 1984. These improvements have been discussed with the GOE and EEA by both the World Bank and A.I.D. over the past year recognizing that political factors influence both the timing and magnitude of tariff increases. Nevertheless, the GOE recognizes the importance of and need for further substantial price increases in electricity and other forms of energy.

B. Source of Funds

4.09 The U.S. dollar cost of the project will be provided to the GOE as a Grant with the amount reloaned to the EEA on terms satisfactory to AID.

4.10 The Grant Agreement will contain a Condition Precedent to Disbursement requiring evidence that local currency financing for the Amended Project has been budgeted by the GOE and will be available for expenditure by EEA on the Project pursuant to a cost estimate made by the consulting engineer and approved by EEA. Another Condition Precedent will require assurance by the GOE of the availability of foreign exchange funds to finance any shortfall beyond that provided by this amendment.

C. Disbursement Period

4.11 Disbursement for construction and installation will extend over three years, from Grant Agreement signing to commercial operation of Unit 3 and completion of the one-year warranty period.

4.12 Grant funding under this Amendment will raise total Project funding to \$208,000,000 provided by A.I.D.

## V. ECONOMIC ANALYSIS

5.01 The original project justification of 1979 for the Shoubrah El Kheima power project was based upon an analysis of system load forecasts, least-cost alternatives for meeting the expanded demand, and an estimated economic rate of return for the project and associated infrastructure. The projection of increased load is now somewhat higher than it had been in 1979. EEA's current main load forecast is for a peak load of 7000 MW in 1986 and 9620 MW in 1990 (vs. 8093 MW in 1990, as projected in June 1979). Taking together the present installed generating capacity, all capacity under construction in 1983 (including Shoubrah El Kheima), and all planned expansions of capacity through rehabilitation during 1984-86, total installed generating capacity of EEA will amount to about 8060 MW by 1986, of which an average of about 7400-7500 MW would be available for service. Thus, the available reserve capacity in 1986 would be only about 6-7 percent of peak load -- well below prudent levels of reserve capacity expected of electric utilities in the United States.

5.02 If revised today, the evaluation conducted by the World Bank in 1979 on least-cost alternatives for meeting system demand would tip even more decisively in favor of the fuel-efficient Shoubrah El Kheima project. The opportunity cost of the fuel for all thermal power plants has risen substantially while capital costs of the Shoubrah El Kheima plant have not. As indicated by the World Bank's analysis in 1979, the advantage of Shoubrah El Kheima over alternative power plants was directly related to the opportunity cost of fuel.

5.03 Given system demand, a reliable supply of electric power has strong direct economic benefits to industrial, agricultural, commercial, household and business activities. Availability and reliability of residential electric service also have important direct and indirect effects on the quality of life. Although economic benefits of power projects are normally based on projected tariff revenue from additional energy sales, this approach does not yield a positive economic rate of return in Egypt under the current, extremely low tariff structure applied by EEA. However, the current and near-term tariff revenue of EEA would understate substantially both the

economic value of electric power in Egypt and the willingness of EEA customers to pay. Since the normal approach of evaluating economic benefits on the basis of projected revenue is not appropriate in Egypt, one must follow an alternative approach. The approach followed here was to determine a future tariff structure that would generate a minimum acceptable internal rate of return for the project (para 5.04 below), to assume that decisions will be taken by the government to achieve that tariff structure, and to project the future demand for energy under the new tariff structure (para 5.05). (An alternative approach examined in the World Bank's project appraisal in 1979 is to estimate directly the economic benefits, or savings from reduced use of alternate fuels, of prospective customers in different customer classes.)

5.04 To determine targets for future tariff levels, Annex E presents a revised cost-benefit analysis for the Shoubrah El Kheima Thermal Power Plant and the associated transmission project. As shown in Annex E, an average tariff of LE 0.0615/kwh (\$0.0513) or LE 0.0670/kwh (\$0.0558) would be needed in order to cover the capital costs of generation and transmission and to yield an internal rate of return 8 percent or 12 percent per annum, respectively.<sup>1/</sup> Taking account of the current and capital costs relating to the distribution system and to system energy losses (probably varying from less than 0.5 to more than 2.0 piasters per kwh, depending on type of customer), an average tariff reflecting the economic cost of electricity delivered from the Shoubrah El Kheima Project would be about 8.0 piasters per kilowatt hour.

---

<sup>1/</sup> The 12 percent internal rate of return is selected to represent the typical minimum economic return required for capital projects in developing countries. The 8 percent rate of return is selected to provide comparability to the World Bank project appraisal for Shoubrah El Kheima of 1979, which estimated the internal rate of return on the basis of direct economic benefits to be provided to different customer classes and on the basis of financial tariffs recommended by an EEA consultant's study.

5.05 During the second half of 1983, officials of the Government of Egypt announced their intention to raise the domestic prices of energy products to world market levels over a period of ten years. On this basis it can be projected that by 1993 the tariffs for electric power and the prices of competing fuels will reflect their full economic costs, determined by the opportunity cost of oil exports. For the cost-benefit analysis presented in Annex E, it is assumed that system demands for 1986 and beyond will require continuous use of the capacity available from Shoubrah El Kheima and from all other currently existing power plants having variable costs equal to or less than the capital and current costs of the Shoubrah El Kheima plant. This assumption appears to be valid even through the proposed adjustments of domestic energy demand in Egypt appear to fall substantially below the trend growth of demand associated with current low prices. In particular, it is reasonable to forecast that peak demand on the UPS during the late 1980's will rise above the total capacity projected to be available to EEA by 1986 (7400-7500 MW) and that peak demand will remain above that level throughout the 1990s. The main factors supporting this forecast are the trend growth in household and industrial demand due to expansion of Egypt's economy and the long lags that are likely to affect the process of price-induced conservation of energy.<sup>2/</sup> Thus, there appears to be negligible risk that completion of the project and other generating projects scheduled for completion through 1986 would create capacity exceeding normal reserve requirements.

<sup>2/</sup> A World Bank review of four empirical studies of aggregate demand for energy in developing countries found estimates for the income elasticity of demand ranging between 0.9 and 1.9, with many estimates of about 1.3-1.4. Estimates for long-run price elasticities of demand ranged from - 0.28 to - 0.38. See Energy Pricing in Developing Countries: A Review of the Literature (October 1981). Recent studies of energy charges in industrial countries have estimated cumulative lags in pricing changes extending over periods of 8 to 10 years.

VI. SOCIAL ANALYSIS

6.01 The May 1979 Project Paper and June 1981 Project Paper Amendment contain detailed social analysis.

6.02 The social analysis notes that the most significant effect of the project will result from the long term impact of adequate electricity on the Egyptian economy as a whole.

## VII. ENVIRONMENTAL ANALYSIS

7.01 As indicated in the May 1979 Project Paper and June 1981 Project Paper Amendment, an environmental assessment was prepared by the feasibility study contractor, Sanderson & Porter and was submitted as an appendix to the feasibility study report. The major concern relative to plant operations on the environment dealt with air quality and the burning of mazout to fuel the plant.

7.02 Since that time extensive discussions have been held between OBI, IBRD, and GOE in an effort to give particular attention to cost effective methods which would help reduce air pollution from the plant. The GOE has determined that the steam generator provided at Shoubrah El Kheima will be of pressurized design, burning natural gas as primary fuel and mazout as secondary fuel (emergency only). All flue gases will be discharged to the atmosphere through a 135 meter concrete stack provided for each unit.

7.03 In the case of clean-burning natural gas, stack emissions of concern are primarily oxides of nitrogen. There is no ambient air quality standard set forth by the World Bank for these pollutants. Egyptian air quality standard for  $\text{NO}_x$  is 200ug/cubic meter (24 hour average concentration). Based on a preliminary air quality analysis, the contribution of  $\text{NO}_x$  emissions from the proposed plant will result in an  $\text{NO}_x$  ground level concentration well below the Egyptian standard. Consequently, the proposed plant design is considered adequate to meet the environmental requirements of Section 4.1(2) of the AID Grant Agreement.

7.04 Under emergency conditions when mazout is burning, primary emissions from the stacks will be sulfur dioxide, nitrogen oxides, and particulates. Proper design of stack parameters such as effluent exit velocity and temperature combined with stack height will ensure that ground level concentrations of pollutants will not exceed the applicable World Bank standards. The stacks are designed and constructed to avoid excessive concentrations of any emitted pollutant in the immediate vicinity of the plant as a result of aerodynamic downwash which may be created by the stack itself or nearby structures. To achieve this goal, the minimum stack height was

determined according to the Technical Support Document for Determination of Good Engineering Practice Stack Height, U.S. Environmental Protection Agency (1978).

7.05 In addition, as part of the project and to develop EEA capacity to adequately monitor background air quality at the site and in its immediate vicinity, an environmental monitoring system will be established. The environmental system will include three mobile air quality monitoring stations which will be provided with sulfur dioxide (SO<sub>2</sub>), oxides of nitrogen (NO-NO<sub>2</sub>-NO<sub>x</sub>) and ozone (O<sub>3</sub>) Analyzers, Particulate Mass Analyzers and appropriate Calibration and Test Equipment; a meteorological station consisting of a 25 meter instrumented tower and an acoustic sounder system to measure wind speed, wind direction and horizontal wind variance, ambient and dewpoint temperatures and mixing height; and a Data Acquisition System. The contractor will initially operate and maintain the monitoring equipment and train EEA personnel in the operation and maintenance of the equipment and analysis and interpretation of the data. The contractor will conduct two (2) independent audits at three month intervals after successful program operation and issuance of the Taking Over and Acceptance Certificate.

## VIII. PROJECT IMPLEMENTATION

### A. Implementing Agency

8.01 The EEA will continue to have prime responsibility for overall management of the project and for providing direction to the Consulting Engineer, Overseas Bechtel, Inc. (OBI). EEA has assigned a special project team with authority to make day-to-day decisions and approvals. The team is made up of a Project Manager, Project Engineer, Procurement Specialist, Financial Manager and Legal Advisor, who work full time on the Shoubrab El Kheima Power Project.

### B. Implementation Plan

8.02 Consulting Engineer. OBI under contract to EEA will provide professional services consisting of preliminary engineering and engineering review, procurement assistance, monitoring of construction, project management (to include management of initial operations) and training related services.

8.03 OBI has administered the various contracts and monitors the expediting functions and surveillance/inspection of contractor shop activities. They are assisting EEA by performing construction management services, a function which has helped to coordinate and provide adequate monitoring of site construction activities to ensure the continuous efficient progress of the work. As consultant, OBI will provide startup services and arrange for training of EEA personnel utilizing both on-the-job and classroom procedures related to this training effort. During the period of initial plant operations, OBI will provide the services of operational personnel.

8.04 Based upon the recommendations contained in the Preliminary Design Report, approved by EEA and the co-financers, EEA prepared 15 Contract Packages which included 29 Contracts for equipment and services and 20 Purchase Orders for equipment and materials, issued these documents for bidding based upon financing source, AID, IBRD, OECF etc, evaluated the bids, recommended awards and upon EEA and co-financer approval, assisted EEA in contract execution. Table IX summarizes the major Contract Packages, award schedule and actual date of award.

**TABLE IX**

**SUMMARY OF MAJOR POWER PLANT PROCUREMENT AWARDS**

<b><u>Contract Package</u></b>	<b><u>Scheduled</u></b>	<b><u>Actual</u></b>
Geo Technical	December 1980	February 1981
Surveying	December 1980	February 1981
Salvage Demolition	February 1981	December 1981
Insurance	April 1981	March 1981
Turbine Generator	May 1981	November 1981
Steam Generator	June 1981	November 1981
General Services	June 1981	March 1982
Structural Piling	July 1981	February 1982
Civil Work	August 1981	June 1982
Shore Line Development	October 1981	October 1982
Tanks	March 1982	April 1982
Mechanical & Piping	May 1982	December 1982
Electrical & Instrumentation	August 1982	December 1982
Switchyard	August 1982	April 1983
Miscellaneous Buildings	December 1983	---

**C. Implementation Schedule**

8.05 Fast-track Approach. OBI recommended and EEA accepted, a fast-track approach to project implementation, reducing the projected schedule from a 68-month period for commercial operation of the first unit, to a 51-month schedule. The most significant advantage of this approach is the schedule reduction and the associated savings in escalation costs. It has been estimated that escalation can be reduced from approximately 34 percent of the project cost to 26 percent under this new approach.

8.06 The project implementation schedule as set forth in the Table below is based upon OBI's fast-track implementation schedule. Principal or milestone dates of this schedule are summarized in Table X:

**TABLE X**  
**IMPLEMENTATION SCHEDULE**

<u>Milestone</u>	<u>Planned</u>	<u>Actual</u>
Demolition	April 1981	April 1981
Start Structural Concrete	April 1982	April 1982
Start Boiler Steel Erection (Unit 1)	September 1982	October 1982
Start Boiler Steel Erection (Unit 2)	March 1983	March 1983
Start Boiler Steel Erection (Unit 3)	September 1983	September 1983
Set Turbine Generator Casing (Unit 1)	June 1983	August 1983
Set Turbine Generator Casing (Unit 2)	November 1983	
Set Turbine Generator Casing (Unit 3)	May 1984	
Energize Unit 1	June 1984	
Turbine Roll Unit 1	December 1984	
Commercial Operator Unit 1	January 1985	
Energize Unit 2	March 1985	
Turbine Roll Unit 2	September 1985	
Commercial Operaiton Unit 2	October 1985	
Energize Unit 3	September 1985	
Turbine Roll Unit 3	March 1986	
Commercial Operation Unit 3	April 1986	

D. AID Financing Procedures

8.07 All procurements of services and materials financed by this Grant will be financed by Letters of Commitment (L/Comm). Upon receipt of a request from EEA, AID will amend L/Comms and EEA, as appropriate, will amend Letters of Credit.

E. Terminal Dates

8.08 Condition Precedent. The terminal date for meeting the Conditions Precedent to Disbursement for the additional funds will be 30 days from the date of Grant signing, being the date when funds will be needed to finance project services and equipment contracts.

8.09 Project Assistance Completion Date. The project assistance completion date (PACD) will remain June 30, 1986.

8.10 Disbursement. The terminal date for disbursements will remain June 30, 1987, twelve months after the PACD to allow for final payments after the warranty period has been completed.

## **F. Control and Monitoring**

8.11 Throughout the life of the project, Overseas Bechtel, Inc. will monitor the project, bringing all routine problems, together with recommended solutions, to the attention of EEA and USAID in the form of the monthly progress report. In addition, monthly implementation review sessions are held between OBI, EEA and USAID staff to closely monitor project implementation. More serious problems, those requiring immediate action, are monitored by the USAID Project Officer and Project Engineer, through frequent and timely visits to the project site, attendance at meetings with EEA principals and site personnel, co-financiers, and others. Regular quarterly reviews of progress are also be conducted by the USAID Missions top management staff. Substantive meetings on project problems are held with EEA senior management staff and responsible representatives of other lenders/donor, when applicable.

## **E. Evaluation**

8.12 USAID conducted a financial evaluation of the project in May 1983, twelve months after award of the civil works construction contract. Other evaluations have been directed to construction progress according to schedule and project cost control. Additional evaluations will be primarily based on routine monitoring procedures, including monthly reports, disbursement records, and normal site visit reports.

8.13 Upon completion of construction and commencement of commercial operation of the third 315 MW unit, a more comprehensive, detailed evaluation will be performed which will summarize how actual project performance parameters compare to those projected or estimated, i.e., was the project completed in accordance with the technical criteria and plans originally formulated, was the project completed within the projected schedule, was the project completed within the estimated budgets. Where significant discrepancies are apparent between the actual and planned parameters, the evaluation shall attempt to establish the reasons for such differences, and to set forth those lessons to be learned from this project which may be applicable to subsequent projects.

8.14 One year after completion of construction and commercial operation, a second comprehensive project evaluation will be conducted to assess the management, performance and maintenance functions relative to the plant. This evaluation

will include evaluation of the annual kilowatt-hour production of the plant with respect to the load demands existing during the operational year, the actual staffing by EEA to comply with the plant's organizational structure during the year, the costs of operation and maintenance compared with similar projected or expected costs, etc. As necessary, and as resources permit, this final evaluation of this project will be conducted by an independent AID task force, composed of individuals not previously involved in project management, or by an independent consulting firm.

**IX. RECOMMENDATION, CONDITIONS AND COVENANTS**

**A. Recommendation**

9.01 All Conditions and Covenants contained in the original Project Paper and first Amendment to the Project Paper have been accepted by the GOE and incorporated into the Grant Agreement. Subject to the following additional Conditions Precedent, we recommend that AID's Grant to the GOE be increased from \$190 million to \$208 million, an increase of \$18 million.

9.02 We further recommend that the Government of Egypt relend the funds to the Egyptian Electricity Authority at an annual interest rate satisfactory to AID with the principal to be repaid on terms satisfactory to AID.

9.03 This additional funding will be utilized to eliminate a shortfall in funding for equipment and services of United States source and origin.

**B. Condition Precedent to Disbursement**

9.04 Prior to disbursement and amendment of Letters of Commitment of the additional Grant funds available under this Amendment, the GOE shall furnish to AID in form and substance satisfactory to AID:

a. Evidence that the Grant proceeds will be reloaned to the Egyptian Electricity Authority on terms satisfactory to AID.

b. Evidence that the Grantee will fund any shortfall not covered by the IBRD/IDA.

c. Evidence that local currency financing for the remainder of the Project has been budgeted by the Grantee and will be available for expenditure by EEA on the Project pursuant to a cost estimate made by the consulting engineer and approved by EEA.

C. Covenant

9.05 We recommend that the covenant entitled "Financial Reports" be amended to read as follows:

The Cooperating Country shall covenant that EEA shall prepare and submit to AID by May 1 of each year, a provisional forecast of operating revenues, operating expenses and rate of return for the next succeeding fiscal year, a statement of the tariff, revenue and other assumptions underlying the forecasts, a report of accounts receivable from major accounts, and a statement of the measures proposed, if any, to produce the annual return provided for above, and to furnish to AID all such detail as AID may reasonably request. The forecast will be further supported by a 10-year projection of annual system peak demand and available or planned system generating capacity.



MINISTRY OF INVESTMENT AND  
INTERNATIONAL COOPERATION

FM INDEX A  
DPPE

ACTION TO <u>DIR</u>	<u>DRPS</u>
ACTION TAKEN _____	DATE <u>4/10</u>
NAME _____	INITIALS _____

March, 29, 1984

Mr. Michael Stone -  
AID Director  
U.S.A.I.D.  
Cairo, Egypt.

Dear Mr. Stone:

We kindly like to inform you that we have received a request from Eng. Maher Abaza; Minister of Electricity & Energy to finance the following two projects:

1. Rehabilitation and Expansion of Alexandria distribution system, total funds required \$ 41 million, of which \$ 20 million through fiscal year program 1984.
2. Shoubra Power Station, Additional \$ 18 million needed to cover the costs of the project.

In the meantime Dr. Hussein Abdalla, Undersecretary, Ministry of Petroleum informs us with the need to allocate an additional \$ 2.5 million for Energy Policy Activity (AID project No. 263-0123-1).

Ministry of Investment Affairs & International Cooperation approves to allocate the required amounts through fiscal year program 1984 due to the importance of the said projects.

It will be much appreciated if you take the necessary action in this respect.

Thank you in advance for your cooperation.

Sincerely yours,

Ahmad Abdel Salam  
Ahmad Abdel Salam Zaki  
Administrator

**SECOND AMENDMENT**

**TO**

**PROJECT AUTHORIZATION**

Name of Country: Arab Republic of Egypt      Name of Project: Shoubrah El Kheima Thermal Power Plant

Number of Project: 263-0030

Pursuant to Sections 531 and 532 of the Foreign Assistance Act of 1961, as amended, the Shoubrah El Kheima Thermal Power Plant Project for the Arab Republic of Egypt was authorized on July 19, 1979, and that authorization was amended on August 25, 1981. That authorization, as amended, is hereby amended as follows:

1. The first two unnumbered paragraphs of the original project authorization and the first numbered paragraph of the first amendment to that project authorization are hereby deleted and the following is substituted therefor:

"1. Pursuant to Sections 531 and 532 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Shoubrah El Kheima Power Plant Project (the "Project") for the Arab Republic of Egypt ("the Cooperating Country") involving planned obligations of not to exceed Two Hundred Eight Million Dollars (\$208,000,000) in grant funds over an eight year period from the date of initial authorization in 1979, subject to the availability of funds in accordance with the AID OYB/allotment process, to help in financing foreign exchange costs for the Project. The planned life of the Project from the date of initial obligation is six (6) years and ten (10) months.

"2. The Project consists of engineering and construction of a 945 megawatt thermal power plant to be located on a site at Shoubrah El Kheima in Cairo, Egypt (hereinafter referred to as the 'Project'). When completed, the plant will include three steam generating units, each capable of producing 315 megawatts (net) under normal operating conditions, together with the necessary auxiliary equipment. The funds authorized herein will be made available to the Egyptian Electricity Authority (EEA) to carry out the project."

2. The Project Agreement Amendment, which may be negotiated and executed by the officer 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.

3. a. Source and Origin of Commodities, Nationality of Services

Commodities financed by A.I.D. with funds added by this second amendment shall have their source and origin in the United States, except as A.I.D. may otherwise agree in writing. Except for ocean shipping, the suppliers of commodities or services shall have the United States as their place of nationality, except as A.I.D. may otherwise agree in writing. Ocean shipping, except as A.I.D. may otherwise agree in writing, may be financed only on flag vessels of the United States.

b. Conditions Precedent to Disbursement

Prior to disbursement, or the issuance of any commitment document, under the Project Agreement Amendment to complete the financing of services and equipment for the Project the Cooperating Country shall furnish, except as A.I.D. may otherwise agree in writing, in form and substance satisfactory to A.I.D.:

(1) Evidence that funds added by this amendment (\$18,000,000) will be lent by the Cooperating Country to the Egyptian Electricity Authority (EEA) on terms and conditions acceptable to A.I.D.; and

(2) Evidence that local currency financing for the remainder of the Project has been budgeted by the Cooperating Country and will be available for expenditure by EEA pursuant to a cost estimate made by the consulting engineer and approved by EEA.

These Conditions Precedent shall be fulfilled within thirty days of the execution of the Grant Agreement Amendment, unless otherwise agreed to by A.I.D. in writing.

c. Covenants

(1) The Cooperating Country shall continue to agree, unless A.I.D. shall otherwise agree in writing, to those covenants contained in the Grant Agreement dated August 29, 1979, as amended on August 29, 1981, except the covenant entitled "Financial Reports";

(2) The Cooperating Country shall assure that adequate funds are made available and that EEA will complete all interconnection facilities and other required system changes to deliver the full output of the Shoubrah El Kheima Power Plant to the national unified power system; and

(3) The Cooperating Country shall covenant that EEA shall prepare and submit to A.I.D. by May 1 of each year a provisional forecast of operating revenues, operating expenses and rate of return for the next succeeding fiscal year, a statement of the tariff, revenue and other assumptions underlying the forecasts, a report of accounts receivable from major accounts, and a statement of the measures proposed, if any, to produce the annual return provided for above, and to furnish to A.I.D. all such detail as A.I.D. may reasonably request. The forecast will be further supported by a 10-year projection of annual system peak demand and available or planned system generating capacity.

*Frank B. McPherson*  
\_\_\_\_\_  
Sgt. M. Peter McPherson

*April 17, 1984*  
\_\_\_\_\_  
Date

Clearances:  
GC:HFry *1/11/84* \_\_\_\_\_ Date *7/11/84*  
AA/NE:WAFord \_\_\_\_\_ Date *9 APR 1984*  
AA/PPC:RDerham *J RD* \_\_\_\_\_ Date *4/11/84*

-4-

ANNEX C

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

I, Michael P. Stone, Director 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, do hereby certify that in my judgment Egypt has both the financial capability and human resources capability effectively to maintain and utilize the capital assistance to be provided for the 945 MW Shoubrah El Kheima Thermal Power Plant in the city of Cairo, Egypt.

M.P.W. Stone

M.P.W. Stone  
Director

1-23-84

Date

5C(1) - COUNTRY CHECKLIST

Listed below are statutory criteria applicable generally to FAA funds, and criteria applicable to individual fund sources: Development Assistance and Economic Support Fund.

A. GENERAL CRITERIA FOR COUNTRY ELIGIBILITY

1. FAA Sec. 481, FY 1984 Continuing Resolution. Has it been determined or certified to the Congress by the President that the government of the recipient country has failed to take adequate measures or steps to prevent narcotic and psychotropic drugs or other controlled substances (as listed in the schedules in section 202 of the Comprehensive Drug Abuse and Prevention Control Act of 1971) which are cultivated, produced or processed illicitly, in whole or in part, in such country or transported through such country, from being sold illegally within the jurisdiction of such country to United States Government personnel or their dependents or from entering the United States unlawfully?

No

2. FAA Sec. 620(c). If assistance is to a government, is the government liable as debtor or unconditional guarantor on any debt to a U.S. citizen for goods or services furnished or ordered where (a) such citizen has exhausted available legal remedies and (b) the debt is not denied or contested by such government?

No

3. FAA Sec. 620(e)(1). If assistance is to a government, has it (including government agencies or subdivisions) taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities? No
  
4. FAA Sec. 532(c), 620(a), 620(f), 620D; FY 1982 Appropriation Act Secs. 512 and 513. Is recipient country a Communist country? Will assistance be provided to Angola, Cambodia, Cuba, Laos, Vietnam, Syria, Libya, Iraq, or South Yemen? Will assistance be provided to Afghanistan or Mozambique without a waiver? No  
No  
No
  
5. ISDCA of 1981 Secs. 724, 727 and 730. For specific restrictions on assistance to Nicaragua, see Sec. 724 of the ISDCA of 1981. For specific restrictions on assistance to El Salvador, see Secs. 727, 728 and 730 of the ISDCA of 1981. N/A
  
6. FAA Sec. 620(j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction by mob action of U.S. property? No

7. FAA Sec. 620(k). Does the program furnish assistance in excess of \$100,000,000 for the construction of a productive enterprise, except for productive enterprises in Egypt that were described in the Congressional Presentation materials? No
8. FAA Sec. 620(l). Has the country failed to enter into an agreement with OPIC? Egypt has reactivated an OPIC Agreement with the U.S.
9. FAA Sec. 620(o); Fishermen's Protective Act of 1967, as amended, Sec. 5. (a) Has the country seized, or imposed any penalty or sanction against, any U.S. fishing activities in international waters? a. There is no known instance of such acts.
- (b) If so, has any deduction required by the Fishermen's Protective Act been made? b. N/A
10. FAA Sec. 620(q); FY 1982 Appropriation Act Sec. 517. (a) Has the government of the recipient country been in default for more than six months on interest or principal of any AID loan to the country? (b) Has the country been in default for more than one year on interest or principal on any U.S. loan under a program for which the appropriation bill appropriates funds? a. No  
b. No
11. FAA Sec. 620(s). If contemplated assistance is development loan or from Economic Support Fund, has Yes

the Administrator taken into account the amount of foreign exchange or other resources which the country has spent on military equipment?

(Reference may be made to the annual "Taking into Consideration" memo: "Yes, taken into account by the Administrator at time of approval of Agency OYB."

This approval by the Administrator of the Operational Year Budget can be the basis for an affirmative answer during the fiscal year unless significant changes in circumstances occur.)

12. FAA Sec. 620(t). Has the country severed diplomatic relations with the United States? If so, have they been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption?

No

13. FAA Sec. 620(u). What is the payment status of the country's U.S. obligations? If the country is in arrears, were such arrearages taken into account by the AID Operational Year Budget? (Reference may be made to the Taking into Consideration memo.)

Not in arrears.

14. FAA Sec. 620A; FY 1982 Appropriation Act Sec. 520. Has the country aided or abetted, by granting sanctuary from prosecution

There is no known instance.

- to, any individual or group which has committed an act of international terrorism? Has the country aided or abetted, by granting sanctuary from prosecution to, any individual or group which has committed a war crime? No
15. FAA Sec. 666. Does the country object, on the basis of race, religion, national origin or sex, to the presence of any officer or employee of the U.S. who is present in such country to carry out economic development programs under the FAA? No
16. FAA Sec. 669, 670. Has the country, after August 3, 1977, delivered or received nuclear enrichment or reprocessing equipment, materials, or technology, without specified arrangements or safeguards? Has it transferred a nuclear explosive device to a non-nuclear weapon state, or if such a state, either received or detonated a nuclear explosive device, after August 3, 1977? (FAA Sec. 620E permits a special waiver of Sec. 669 for Pakistan.) No
17. ISDCA of 1981 Sec. 720. Was the country represented at the Meeting of Ministers of Foreign Affairs and Heads of Delegations of the Non-Aligned Countries to the 36th General Session of the General Assembly of the U.S. No

of Sept. 25 and 28, 1981, and failed to disassociate itself from the communique issued? If so, has the President taken it into account? (Reference may be made to the Taking into Consideration memo.)

- 18. FY 1984 Continuing Resolution. Has the recipient country been determined by the President to have engaged in a consistent pattern of opposition to the foreign policy of the United States?

No

1. FUNDING SOURCE CRITERIA FOR COUNTRY ELIGIBILITY

- 1. Development Assistance Country Criteria.

- a. FAA Sec. 116. Has the Department of State determined that this government has engaged in a consistent pattern of gross violations of internationally recognized human rights? If so, can it be demonstrated that contemplated assistance will directly benefit the needy?

No

N/A

- 2. Economic Support Fund Country Criteria

- a. FAA Sec. 502B. Has it been determined that the country has engaged in a consistent pattern of gross violations of internationally recognized human rights? If so, has the country made such significant improvements in its human rights record that furnishing such assistance is in the national interest?

No

N/A

b. FAA Sec. 620B. If ESF is to be furnished to Argentina, has the President certified that (1) the Govt. of Argentina has made significant progress in human rights; and (2) that the provision of such assistance is in the national interests of the U.S.?

N/A

c. ISDCA of 1981, Sec. 725(b). If ESF is to be furnished to Argentina, has the President certified that (1) the Govt. of Argentina has made significant progress in human rights; and (2) that the provision of such assistance is in the national interests of the U.S.?

N/A

d. ISDCA of 1981, Sec. 726(b). If ESF assistance is to be furnished to Chile, has the President certified that (1) the Govt. of Chile has made significant progress in human rights; (2) it is in the national interest of the U.S.; and (3) the Govt. of Chile is not aiding international terrorism and has taken steps to bring to justice those indicted in connection with the murder of Orlando Letelier?

N/A

5C(2) PROJECT CHECKLIST

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

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

A. GENERAL CRITERIA FOR PROJECT

1. FY 1982 Appropriation Act Sec. 523; FAA Sec. 634A; Sec. 653(b).

(a) Describe how authorizing and appropriations committees of Senate and House have been or will be notified concerning the project; (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than \$1 million over that amount)?

a. Congressional notification will be submitted.

b. The intended obligation is within the level of funds appropriated for Egypt for FY 84.

2. FAA Sec. 611(a)(1). Prior to obligation in excess of \$100,000, will there be (a) engineering, financial or other plans necessary to

The necessary planning and cost estimate have been completed.

carry out the assistance and  
(b) a reasonably firm  
estimate of the cost to the  
U.S. of the assistance?

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

No further legislative action is required.

4. FAA Sec. 611(b); FY 1982 Appropriation Act Sec. 501. If for water or water-related land resource construction, has project met the standards and criteria as set forth in the Principles and Standards for Planning Water and Related Land Resources, dated October 25, 1973? (See AID Handbook 3 for new guidelines.)

N/A

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

The Mission Director has so certified, see Annex C.

6. FAA Sec. 209. Is project susceptible to execution as part of regional or multilateral project? If so, why is project not so

The project is not susceptible to execution as part of a regional project. It is being jointly funded by the IBRD, EEC, EIB, OECF, and ADB.

executed? Information and conclusion whether assistance will encourage regional development programs.

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

The grant amendment will together with the original grant, increase the flow of international trade and improve technical efficiency of industry, agriculture and commerce, and foster private initiative and competition. It will not have any apparent effect on encouraging cooperative credit unions and savings and loan associations, nor monopolistic practices, nor free labor unions.

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).

All funds expended will be for goods and services from private U.S. concerns.

9. FAA Sec. 612(b), 636(h); FY 1982 Appropriation Act Sec. 507. 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.

The Original Project Grant Agreement so provided and the GOE has certified that all local currency funds required will be provided by GOE.

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. FAA Sec. 601(e). Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise? Yes
  
12. FY 1982 Appropriation 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
  
13. FAA 118(c) and (d). Does the project comply with the environmental procedures set forth in AID Regulation 16? c. Yes  
Does the project or program take into consideration the problem of the destruction of tropical forests? d. N/A
  
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 (dollars or local currency generated therefrom)? N/A

**B. FUNDING CRITERIA FOR PROJECT**

**1. Development Assistance  
Project Criteria**

a. FAA Sec. 102(b), 111, 113, 281(a). Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production and the use of appropriate technology, spreading investment out from cities to small towns and rural areas, and insuring wide participation of the poor in the benefits of development on a sustained basis, using the appropriate U.S. institutions; (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and (c) utilize and encourage regional cooperation by developing countries?

N/A

b. FAA Sec. 103, 103A, 104, 105, 106. Does the project fit the criteria for the type of funds (functional account) being used?

N/A

c. FAA Sec. 107. Is emphasis on use of appropriate technology (relatively smaller, cost-saving, labor-using technologies that are generally most appropriate

N/A

for the small farms, small businesses, and small incomes of the poor)?

d. FAA Sec. 110(a). Will the recipient country provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or is the latter cost-sharing requirement being waived for a "relatively least developed" country)?

N/A

e. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing, or is the recipient country "relatively least developed"? (M.O. 1232.1 defined a capital project as "the construction, expansion, equipping or alteration of a physical facility or facilities financed by AID dollar assistance of not less than \$100,000, including related advisory, managerial and training services, and not undertaken as part of a project of a predominantly technical assistance character."

N/A

f. FAA Sec. 122(b). Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase

N/A

of productive capacities and self-sustaining economic growth?

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

N/A

2. Development Assistance Project Criteria (Loans Only)

a. FAA Sec. 122(b). Information and conclusion on capacity of the country to repay the loan, at a reasonable rate of interest.

N/A

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

N/A

c. ISDCA of 1981, Sec. 724 (c) and (d). If for Nicaragua, does the loan agreement require that the funds be

N/A

used to the maximum extent possible for the private sector? Does the project provide for monitoring under FAA Sec. 624(g)?

N/A

3. Economic Support Fund Project Criteria

a. FAA Sec. 531(a). Will this assistance promote economic or political stability? To the extent possible, does it reflect the policy directions of FAA Section 102?

Will enhance ability of GOE to sustain economic growth and recovery which will have positive political results. To the extent rural areas will be served, policy direction of Section 102 will be reflected.

b. FAA Sec. 531(c). Will assistance under this chapter be used for military, or paramilitary activities?

No

c. FAA Sec. 534. Will ESF funds be used to finance the construction of the operation or maintenance of, or the supplying of fuel for a nuclear facility? If so, has the President certified that such use of funds is indispensable to nonproliferation objectives?

No

N/A

d. 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. Are there arrangements to permit U.S. small business to participate equitably in the furnishing of commodities and services financed?
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?
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?
4. FAA Sec. 604(e); ISDCA of 1980 Sec. 705(a). If offshore procurement of agricultural commodity or product is to be financed, is there provision against such

Procurement of commodities and services will be pursuant to established AID regulations.

Yes

Yes

There will be no such procurement.

procurement when the domestic price of such commodity is less than parity? (Exception where commodity financed could not reasonably be procured in U.S.)

5. FAA Sec. 604(g). Will construction or engineering services be procured from firms of countries otherwise eligible under Code 941, but which have attained a competitive capability in international markets in one of these areas? No
  
6. FAA Sec. 603. Is the shipping excluded from compliance with requirement in section 901(b) of the Merchant Marine Act of 1936, as amended, that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed shall be transported on privately owned U.S. flag commercial vessels to the extent that such vessels are available at fair and reasonable rates? No
  
7. FAA Sec. 621. If technical assistance is financed, will such assistance be furnished by private enterprise on a contract basis to the fullest extent practicable? If the facilities of other Federal agencies will be utilized, are they particularly suitable, not competitive with private enterprise, and Yes  
N/A

made available without undue interference with domestic programs?

8. International Air Transport. 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 1982 Appropriation 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?

Contract will so provide.

B. Construction

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

Yes

Yes

Yes, but FAA Section 620(k) provides exception for Egypt.

**C. Other Restrictions**

1. **FAA Sec. 122(b)**. If development loan, is interest rate at least 2% per annum during grace period and at least 3% 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 insure 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 1982 Appropriation Act Sec. 525.**
    1. To pay for performance of abortions as a method of family planning or to motivate or coerce persons to practice abortions; 1. Yes
    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; 2. Yes
    3. To pay for any biomedical research which relates, in whole or part, to 3. Yes

- methods or the performance of abortions or involuntary sterilizations as a means of family planning; (4) to lobby for abortion? 4. Yes
- b. FAA Sec. 620(g). To compensate owners for expropriated nationalized property? Yes
- c. FAA Sec. 660. To provide training or advice or provide any financial support for police, prisons, or other law enforcement forces, except for narcotics programs? Yes
- d. FAA Sec. 662. For CIA activities? Yes
- e. FAA Sec. 636(1). 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
- f. FY 1982 Appropriation Act, Sec. 503. To pay pensions, annuities, retirement pay, or adjusted service compensation for military personnel? Yes
- g. FY 1982 Appropriation Act, Sec. 505. To pay U.S. assessments, arrearages or dues? Yes
- h. FY 1982 Appropriation Act, Sec. 506. To carry out provisions of FAA Section 209(d) (Transfer of FAA funds to multilateral organizations for lending)? Yes

**i. FY 1982 Appropriation Act, Sec. 510. To finance the export of nuclear equipment, fuel, or technology or to train foreign nationals in nuclear fields?**

**Yes**

**j. FY 1982 Appropriation Act, Sec. 511. Will assistance be provided 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?**

**Yes**

**k. FY 1982 Appropriation Act, Sec. 515. To be used for publicity or propaganda purposes within U.S. not authorized by Congress?**

**Yes**

-22-

EGYPT  
**EGYPTIAN ELECTRIC AUTHORITY**  
**SHOUBRA EL KHEIMA THERMAL POWER PROJECT**  
 (THOUSAND OF US DOLLARS) (1)

ANNEX E

**1. COSTS**

YEAR	CAPITAL COSTS				FUEL (3) TOTAL	O AND M COSTS			TOTAL COSTS	
	POWER STATION		TRANSMISSION			TOTAL	(4)			TOTAL
	LOCAL	FOREIGN	LOCAL	FOREIGN	GENERA.		TRANS.	LOCAL	LOCAL	
1980	0	3171	0	0	3171	0	0	0	0	3171
1981	5606	17251	0	0	22857	0	0	0	0	22857
1982	9124	56982	0	0	65206	0	0	0	0	65206
1983	20818	187614	1492	9532	219456	0	0	0	0	219456
1984	19040	194887	6201	49759	269887	0	0	0	0	269887
1985	7911	58119	4603	35102	105735	103245	6895	834	7731	216711
1986	1186	7376	424	4078	13064	227130	15170	1840	17010	257204
1987	0	0	0	0	0	247769	16549	2007	18556	266325
1988-98	0	0	0	0	0	247769	16549	2007	18556	266325
1999 (5)	-43306	-356660	-10303	-79762	-490031	247769	16549	2007	18556	-227701
TOTAL (1980-86)	63685	524500	12720	98471	699376					

**2. BENEFITS**

YEAR	BENEFITS UNDER ALTERNATIVE ASSUMPTIONS		MEMO: KWH GENERATED
	(A) LE 0.0615 PER KWH	(B) LE 0.067 PER KWH	
1980	0	0	0
1981	0	0	0
1982	0	0	0
1983	0	0	0
1984	0	0	0
1985	141431	154079	2.7596E9
1986	311134	338959	6.0709E9
1987	339406	369760	6.6226E9
1988-98	339406	369760	6.6226E9
1999	339406	369760	6.6226E9
DOLLAR EQUIV.	.05125	.0558333	
IRR	8%	12%	

- (1) LOCAL CURRENCY COSTS AND BENEFITS ARE TRANSLATED AT THE EXCHANGE RATE OF LE 1.20 PER DOLLAR FOR THE YEARS 1984 UNTIL 1999. FOR YEARS 1980 UNTIL 1983 THE EXCHANGE RATES THAT WERE LE 0.7965, 0.9015, 1.052 AND 1.15 PER DOLLAR RESPECTIVELY.
- (2) ACTUAL AND PROJECTED CAPITAL COSTS AS OF DECEMBER 1983 WERE PROVIDED BY THE PROJECT CONSULTANTS OVERSEAS BECHTEL INTERNATIONAL.
- (3) BASED ON AN OPPORTUNITY COST FOR RESIDUAL FUEL OIL OF \$177 PER TON, A PLANT OPERATING RATE OF 80%, AND A HEAT RATE FOR RESIDUAL FUEL OIL OF 4731 KWH/TON.
- (4) BASED ON IBRD STAFF ESTIMATES OF OPERATION AND MAINTENANCE EXPENSE FOR GENERATION AND TRANSMISSION (BUT NOT DISTRIBUTION) IN THE SHOUBRA EL KHEIMA PROJECT APPRAISAL REPORT OF JUNE 1975.
- (5) RESIDUAL VALUE, ASSUMING ECONOMIC LIFE OF 30 YEARS FOR POWER STATION, 40 YEARS FOR TRANSMISSION EQUIPMENT.

23  
EGYPTIAN ELECTRIC AUTHORITY  
SHOUBRA EL KHEIMA THERMAL POWER PROJECT  
(THOUSAND OF US DOLLARS) (1)

ANNEX E

1. COSTS

YEAR	CAPITAL COSTS				FUEL (3) TOTAL	O AND M COSTS		TOTAL COSTS		
	POWER STATION		TRANSMISSION			TOTAL	(4)			
	LOCAL	FOREIGN	LOCAL	FOREIGN			TOTAL		GENERA.	TRANS.
									LOCAL	LOCAL
1980	0	3171	0	0	3171	0	0	0	3171	
1981	5606	17251	0	0	22857	0	0	0	22857	
1982	9124	56082	0	0	65206	0	0	0	65206	
1983	20818	187614	1492	9532	219456	0	0	0	219456	
1984	19040	194887	6201	49759	269887	0	0	0	269887	
1985	7911	58119	4603	35102	105735	103245	6895	836	7731	
1986	1186	7376	424	4078	13064	227130	15170	1840	17010	
1987	0	0	0	0	0	247769	16549	2007	18556	
1988-98	0	0	0	0	0	247769	16549	2007	18556	
1999 (5)	-43306	-356660	-10303	-79762	-490031	247769	16549	2007	18556	
TOTAL (1980-86)	63685	524500	12720	98471	699376					

2. BENEFITS

YEAR	BENEFITS UNDER ALTERNATIVE ASSUMPTIONS		MEMO: KWH GENERATED
	(A) LE 0.0615 PER KWH	(B) LE 0.067 PER KWH	
1980	0	0	0
1981	0	0	0
1982	0	0	0
1983	0	0	0
1984	0	0	0
1985	141431	154079	2.7596E9
1986	311134	338959	6.0709E9
1987	339406	369760	6.6226E9
1988-98	339406	369760	6.6226E9
1999	339406	369760	6.6226E9
DOLLAR EQUIV.	.05125	.0558333	
IRR	8%	12%	

- (1) LOCAL CURRENCY COSTS AND BENEFITS ARE TRANSLATED AT THE EXCHANGE RATE OF LE 1.20 PER DOLLAR FOR THE YEARS 1984 UNTIL 1999. FOR YEARS 1980 UNTIL 1983 THE EXCHANGE RATES THAT WERE LE 0.7965, 0.9015, 1.052 AND 1.15 PER DOLLAR RESPECTIVELY.
- (2) ACTUAL AND PROJECTED CAPITAL COSTS AS OF DECEMBER 1983 WERE PROVIDED BY THE PROJECT CONSULTANTS OVERSEAS BECHTEL INTERNATIONAL.
- (3) BASED ON AN OPPORTUNITY COST FOR RESIDUAL FUEL OIL OF \$177 PER TON, A PLANT OPERATING RATE OF 80%, AND A HEAT RATE FOR RESIDUAL FUEL OIL OF 4731 KWH/TON.
- (4) BASED ON IRRD STAFF ESTIMATES OF OPERATION AND MAINTENANCE EXPENSE FOR GENERATION AND TRANSMISSION (BUT NOT DISTRIBUTION) IN THE SHOUBRA EL KHEIMA PROJECT APPRAISAL REPORT OF JUNE 1979.
- (5) RESIDUAL VALUE, ASSUMING ECONOMIC LIFE OF 30 YEARS FOR POWER STATION, 40 YEARS FOR TRANSMISSION EQUIPMENT.

PROJECT DESIGN SUMMARY  
LOGICAL FRAMEWORK

Life of Project  
From FY 72 to FY 87  
Total U.S. Funding, 208 Million  
Date Prepared: 12/29/83

Project Title & Number: Shoubrah El Kheima Thermal Power Plant Amendment No. 2, Project 263 - 0030

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>Program or Sector Goal: The broader objective to which this project contributes:</p> <ol style="list-style-type: none"> <li>To provide power needed for continuing industrial, commercial and residential expansion and economic growth.</li> <li>Improvement of rural and urban living conditions.</li> </ol>	<p>Measures of Goal Achievement:</p> <ol style="list-style-type: none"> <li>Increased industrial sector GDP.</li> <li>Increased industrial employment.</li> </ol>	<p>Government of Egypt Statistical Data.</p>	<p>Assumptions for achieving goal targets:</p> <ol style="list-style-type: none"> <li>The policies and actions of the Egyptian Government concerning fiscal and monetary policy, prices, and debt management that will foster continued growth.</li> <li>That the GOE will continue to move electricity pricing toward world pricing levels.</li> </ol>
<p>Project Purpose:</p> <p>To augment the capacity of the Egyptian Electricity Authority to meet increasing energy requirements of consumers throughout Egypt.</p>	<p>Conditions that will indicate purpose has been achieved: End-of-Project status.</p> <ol style="list-style-type: none"> <li>The three 315 MW generating units at Shoubrah El Kheima will be fully operational and will be delivering rated output to the UPS for supply to consumers.</li> <li>The plant will be staffed by trained operators and maintenance personnel.</li> </ol>	<p>Examination and inspection of the completed steam turbine generating plant.</p>	<p>Assumptions for achieving purpose:</p> <ol style="list-style-type: none"> <li>That required transmission lines and substation facilities required to connect the additional generation from the plant to the network will be completed by EEA in a timely fashion.</li> <li>That natural gas and mazout pipelines will be completed in a timely fashion.</li> </ol>
<p>Project Outputs:</p> <p>Construction of a 3 unit 945 MW steam turbine generating plant at Shoubrah El Kheima.</p>	<p>Magnitude of Outputs:</p> <ol style="list-style-type: none"> <li>Unit and plant Gross and Net Output in MW.</li> <li>Unit and Plant Gross and Net Generation in Kilowatt-hours</li> <li>Unit and Plant Heat Rate.</li> <li>Unit and Plant Availability.</li> </ol>	<ol style="list-style-type: none"> <li>Review and approval of contracts for Consultant Services and equipment.</li> <li>Contractor Reports.</li> <li>Consultant Monthly Reports.</li> <li>Review of disbursements made upon shipment of equipment</li> <li>Inspection and examination of the work.</li> </ol>	<p>Assumptions for achieving outputs</p> <ol style="list-style-type: none"> <li>That the GOE will provide all local currency required to carry out the project.</li> <li>That the GOE will continue to comply with project covenants.</li> <li>That the GOE will fund any short fall not covered by the IBRD or other donors.</li> </ol>
<p>Project Inputs:</p> <ol style="list-style-type: none"> <li>Contract amendment for consulting engineer to provide engineering, engineering administration, project scheduling and construction monitoring services.</li> <li>Equipment supply contracts amended for supply of spare parts.</li> </ol>	<p>Implementation Target (Type and Quantity)</p> <p>Commercial Operation of:</p> <p>Unit 1 - January 1985 Unit 2 - October 1985 Unit 3 - April 1986</p>	<ol style="list-style-type: none"> <li>Contract review.</li> <li>Comparison of cash flow to cash flow plan.</li> <li>Delivery schedules of equipment.</li> <li>Installation schedules of equipment.</li> <li>Construction progress in comparison to construction schedules.</li> </ol>	<p>Assumptions for providing inputs:</p> <ol style="list-style-type: none"> <li>That Conditions Precedent will be met within 30 days of Grant Agreement signing.</li> <li>That additional engineering services are required to assure completion of plant according to schedule due at expanded role of consultant.</li> <li>That spare parts for equipment being supplied will be negotiated.</li> </ol>

104