

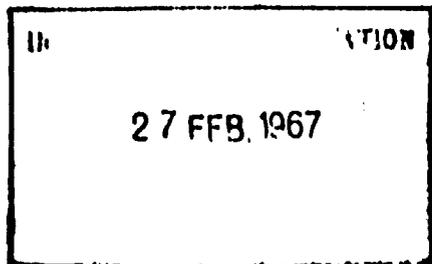
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UNITED ARAB REPUBLIC
CAIRO WEST POWER PROJECT
A.I.D. LOAN NO. 263-H-020

Final Report

Period

July 18, 1963 to July 18, 1966



Prepared by

Laramore, Douglass and Popham

for

U.A.R. Government
Ministry of Electricity
Egyptian Electricity Corporation

January 1967

UNITED ARAB REPUBLIC
CAIRO WEST POWER PROJECT

FINAL REPORT

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UNITED ARAB REPUBLIC
CAIRO WEST POWER PROJECT

FINAL REPORT

APPENDIX

- EXHIBIT I Copy of Agreement Between WEICO and EEC Concerning
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PURPOSE

SECTION I

This Final Report is being submitted in accordance with the requirements of the Consulting Engineering Agreement between the Egyptian Electricity Corporation and Laramore, Douglass and Popham, dated February 8, 1963. It summarizes the activities and conditions associated with the construction of the Cairo West Power Project (Cairo West Thermal Power Station).

All statements and statistics presented herein are based upon such information as was made available by the Contractor, Westinghouse Electric International Company (WEICO) and the Egyptian Electricity Corporation (Corporation) to Laramore, Douglass and Popham (LDP), the Consulting Engineer for the Corporation, and by LDP's Resident Engineer at the job site.

This Report covers mainly the time period of July 18, 1963 to July 18, 1966 which is the period of the LDP contract for consulting engineering services. Statements presented herein concerning activities at the job site subsequent to July 18, 1966 are based on information made available to the Consulting Engineer and not upon personal observation of the Consulting Engineer's Resident Engineer who left the job site on July 18th and returned to New York.

NARRATIVE

SECTION II

A. GENERAL

The Cairo West Thermal Power Station is the first power project and the largest capital development project in Egypt financed by the United States Agency for International Development.

1. Historical Background

An extensive series of programs proposed by the Government of the United Arab Republic to develop a greater agricultural and industrial economy, along with prospective land reclamation, emphasized the need for more power facilities.

The United Arab Republic formally solicited bids for the furnishing and construction of a power generating station in December 1961 based upon world-wide competition. Concurrently, conversations were held between the Embassies of the United States and the United Arab Republic concerning the possibilities of financing this project through the United States Agency for International Development (AID) who indicated a potential willingness to do so.

On March 13, 1962 the Ministry of Public Works of the United Arab Republic, under which the power industry at that time functioned, received a formal proposal from Westinghouse Electric International Company for furnishing a power generating facility.

Subsequently a meeting between Dr. A. Kaissouni, Minister of Planning and Treasury of the United Arab Republic, and the Commercial Counsellor of the United States Embassy, developed a tentative agreement concerning the method of financing. Such agreement was made public on March 29, 1962 in local newspapers, one of which was the English language newspaper, EGYPTIAN GAZETTE, published in Cairo.

Dr. Kaissouni advised WEICO of the decision of the United Arab Republic to enter into contract with them for the execution of the project.

Technical and economic experts were sent to Cairo to work with the United Arab Republic and United States Embassy authorities in the preparation of the required feasibility study and loan application.

The feasibility study was endorsed by Mr. John S. Badeau, the then American Ambassador to the United Arab Republic, who recommended consideration of the Loan Application. AID Washington, however, added a condition for its approval of such loan, that being the appointment of an independent Consulting Engineer by CEGA, with representation at the site, responsible only to the Borrower for design, contract and quality control. In conformance therewith CEGA selected Laramore, Douglass and Popham (LDP) as its Consulting Engineer.

A loan agreement was signed on February 20, 1962 and supplemented by a project agreement dated March 6, 1963 making funds available to CEGA for the execution of the project.

Subsequent to the execution of the contract, the United Arab Republic reorganized the electric power industry on a national scale placing it under the jurisdiction of one ministry. Such ministry thereupon established and appointed anew corporate body known as the General Organization for the Execution of Power Projects as the representative authority of the Loan Agreement. Later, however, another reorganization established and appointed the Egyptian Electricity Corporation as such representative whose authority is presently in effect.

2. In accordance with the terms established by the loan agreement, AID made available to CEGA \$30,600,000 U.S. and 4,200,000 Egyptian Pounds for the project. The original project agreement estimated these amounts to be \$30,546,000 U.S. and 4,166,784 Egyptian Pounds. Actual expenditures are a little less than these amounts and are shown in Exhibits II and III in the Appendix.

The United Arab Republic provided 2,659,149 Egyptian Pounds for the purchase of land for the site, site preparation, construction of access roads and rail spur and administrative expenses. This amount was later increased to approximately 5,800,000 Egyptian Pounds, see Exhibit IV.

3. Location and Description

The Cairo West Power Station is located on the west bank of the Nile River approximately ten kilometers (6.2 miles) north of Cairo. The station site is situated in a cove in the river bank and required placement of earth fill and construction of a suitable access road from Cairo before construction could be started.

The station occupies a site approximately 60 acres in area and has a total generating capability of 261 megawatts. This is equal to 70% of the total capability of all other stations in the Cairo system.

The station contains three reheat turbine driven generators each with a capacity of 87 megawatts operating at 1450 pounds per square inch steam pressure with 10CCF superheat and 1000F reheat steam conditions.

Each unit in the station is provided with an outdoor pressurized fuel oil fired reheat steam generator with a continuous rating of 650,000 pounds of steam per hour at 1500 pounds per square inch and 1010F from the superheater outlet and 565,000 pounds of 1005F steam per hour from the reheater outlet.

With the exception of the steam generators, the large transformers and switchyard equipment, all major equipment is housed in structural steel framed or reinforced concrete and brick structures, all of similar modern design. The major structures are:

- Power Station Building (structural steel frame)
- Water Intake Building
- Fuel Oil Transfer Pump House
- Auxiliary Boiler/Water Treatment Building
- Warehouse/Shops Building
- Hospital
- Garage
- Firehouse
- Security Building

A rail spur connects the track siding on the station site with a railroad main line.

Fuel oil can be delivered to the station via railroad tank car, by river barge or via an eight inch pipeline which connects to an existing pipeline on the east bank of the Nile.

Eight steel tanks for fuel oil storage are located in a tank farm to the south of the Power Station Building. Each tank has a storage capacity of 6250 tons. In addition, there are three 500 ton day tanks, one for each unit.

The site is enclosed by a reinforced concrete and brick wall erected on the north, south and west property lines. The east property line along the river edge consists of a sheet piling bulkhead capped by a reinforced concrete apron.

4. Administration

- a) Loan Administrator: United States Agency for International Development (AID)
Washington/Cairo

- b) Borrower's Representative: Egyptian Electricity Corporation (Corporation)
Formerly - General Organization for the Execution of Power Projects,
Formerly - Cairo Electricity and Gas Administration

- c) Contractor: Westinghouse Electric International Company (WEICO)
New York, U.S.A.

Subcontractors:

- 1) Design: Kuljian Corporation (Kuljian)
Philadelphia, Pa., U.S.A.

- 2) Performance:
 - Civil Work: Societe Egyptienne d'Enterprises (SEDE)
Cairo, U.A.R.

 - Erection: Engineering General Co. (EG)
Cairo, U.A.R.

- d) Consulting Engineer: Laramore, Douglass and Popham (LDP)
New York, U.S.A.

The principal administrative representative of the Contractor (WEICO) for the supervision and coordination of activities in

Cairo was the Project Director who was ably assisted by a group of American administrators and engineers selected by WEICO and acting as advisers to the subcontractor's forces. In addition, the suppliers of structural steel, piping and steam generators furnished representatives from their staff to advise in their particular field of endeavor. The maximum number of Americans at any one time was nineteen (19).

With the exception of the Project Director and his selected advisers, and the representative of the Consulting Engineer, all the personnel engaged in all activities on the Project in the United Arab Republic were Egyptians employed by the subcontractors. These employees included supervisors, engineers, clerks, secretarial staff, skilled and unskilled labor.

B. PROGRESS OF WORK

1. Work Performed by the Corporation

In accordance with terms of the contract, the Corporation agreed to fill in the land within the site boundaries to proper grade. The Corporation was also responsible for construction of a surfaced access road and a railroad spur to the site.

Material for filling was obtained by dredging operations carried on by the Corporation and from land areas made available to the Corporation's contractor's forces. Filling of the north portion of the site was completed in time to start work on the power house structure and complete the access road in June 1963.

The railroad siding was delayed because of difficulties encountered in land acquisition and was not completed until May 10, 1964. This was much later than the scheduled date but did not affect construction activities at the site.

In addition to the above, the Corporation was also expected to provide facilities for delivering fuel oil to the site and to provide the transmission line facilities for delivering power from the Cairo West Power Station into the Cairo electrical system.

The fuel oil facilities consisted of an eight inch pipeline to the site from an existing pipeline tap located on the east bank of the Nile approximately one half mile north of the Embaba Bridge. The Corporation also purchased five steel tank barges to supplement the fuel supply facilities.

Substations were constructed at Cairo North and Cairo South generating stations and a 220 kv steel tower transmission loop was constructed to interconnect these stations with Cairo West and to feed loads in the Cairo system.

All of these facilities were completed and in service in time for initial operation of the Cairo West generating units.

2. Work Performed by the Contractor (WEICO)

a) History

The Contractor's work on construction of the station started on June 25, 1963 with placement of the first group of piles for the Power House. All operations concerned with the construction proceeded continuously and activity interrupted only by local holidays.

The original construction schedule issued on July 26, 1963 called for initial operation of Unit No. 1 on July 11, 1965; Unit No. 2 - October 1, 1965; and Unit No. 3 - January 1, 1966.

Unfortunately, the progress of the construction was delayed by late deliveries of equipment and materials and other factors including a labor strike in the United States shipping industry. These delays resulted in placing individual units in operation as follows:

| | |
|------------|-------------------|
| Unit No. 1 | December 31, 1965 |
| Unit No. 2 | April 24, 1966 |
| Unit No. 3 | August 15, 1966 |

b) Administration

The Contractor's supervisory coordinating and advisory staff in Cairo consisted of the following:

| | <u>WEICO</u> | <u>Kellogg</u> | <u>Pittsburg Bridge & Iron</u> | <u>Babcock & Wilcox</u> | <u>Hungerford Terry Corp.</u> | <u>Hagen Corp.</u> |
|----------------------------|--------------|----------------|--|-------------------------------------|---------------------------------------|------------------------|
| Project Director | 1 | - | - | - | - | - |
| Deputy Project Director | 1 | - | - | - | - | - |
| Construction Supt. | 1 | - | - | - | - | - |
| Advisors: | | | | | | |
| Steel Erection | - | - | 1 | - | - | - |
| Electrical | 3 | - | - | - | - | - |
| Mechanical | 1 | - | - | - | 1 | - |
| Piping | - | 3 | - | - | - | - |
| Turbine/Gen. | 2 | - | - | - | - | - |
| Boiler | - | - | - | 3 | - | - |
| Elevators | 1 | - | - | - | - | - |
| Instrumentation | - | - | - | - | - | 2 |
| Operating (Startup) | 3 | - | - | - | - | - |

Four persons from the above list were to be selected to represent the Contractor at the site during the two year guarantee period in accordance with requirements of the Contract.

c) Performance

Civil Work. The civil work consisted of placement of piles; excavating and backfilling; placement of all concrete for foundations and structures; brickwork and plastering; wall and floor tiling; roofing; soundproofing; installation of doors and windows; installation of circulating water pipes and all plumbing; construction of roads within the site boundaries and the landscaping.

Excavating and placement of concrete was performed principally by hand labor. In spite of this rather primitive technique, the rate of progress of this work was remarkably good. However, mechanical mixers were employed for mixing concrete and a mechanical lift or crane transported mixed concrete to high elevations. The Subcontractor was very adept in improvising for the good placement of concrete, particularly where such placement was difficult because of the complex forming and reinforcing, as in the case of the intake chamber bottom and walls, and the turbine foundations and pedestals.

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The following is a completion record of the various phases of the civil work as of July 18, 1966:

| | <u>Started</u> | <u>Completed</u> | |
|-----------------------------|----------------|------------------|--------------------------|
| | | <u>Actual</u> | <u>Original Schedule</u> |
| Power House | 6/25/63 | 7/66 | 2/65 |
| Intake Structure | 11/63 | 4/66 | 1/66 |
| Discharge Tunnel | 12/63 | 7/65 | 8/65 |
| Aux.Bldg./Water Treat.Bldg. | 4/64 | 5/66 | 8/65 |
| Hospital | 3/64 | Incomplete | 12/64 |
| Warehouse/Shops | 8/63 | 5/66 | 3/65 |
| Firehouse/Police Station | 11/64 | 6/66 | Not scheduled |
| Security Bldg. | 12/64 | 6/66 | " " |
| Roads | 4/66 | Incomplete | 1/66 |
| Fence | 2/64 | 7/65 | 11/64 |
| Landscaping | 7/66 | Incomplete | 12/65 |

Mechanical and Electrical Work. The mechanical and electrical installation work consisted of structural steel erection, steel tank erection, placement and/or assembly of all mechanical and electrical operating equipment, piping, electrical conduits, switchgear, control boards, instrumentation, air conditioning and all fixtures, and painting of all structures and equipment.

The progress of this work was erratic. This was partially due to lack of skilled manpower and lack of sufficient intermediate supervisory personnel. In addition, the Subcontractor's forces had to be trained in the efficient use of certain labor saving devices which were furnished by the Contractor. Furthermore, the Subcontractor did not have a sufficient quantity of hand tools and precision instruments. This deficit was made up by the Contractor.

Personnel had to be trained and duly qualified for the high pressure pipe welding required in boiler erection and piping installation. This occupied considerably more time than was anticipated by the American advisors. However, when these problems were solved, the work was able to proceed at a steady pace without interruption.

The following is a completion record of the major phases of mechanical and electric erection work.

| | <u>Started</u> | <u>Completed</u> | |
|--|----------------|------------------|------------------|
| | | <u>Actual</u> | <u>Scheduled</u> |
| 1. Power House (Mechanical and Electrical) | 2/64 | 7/66 | 4/66 |
| <u>Steel Erection</u> | 3/64 | 7/64 | 7/64 |
| <u>Principal Operating Units</u> | | | |
| <u>Turbine Generator</u> | | | |
| Unit No. 1 | 6/64 | 12/65 | 6/65 |
| Unit No. 2 | 8/64 | 3/66 | 8/65 |
| Unit No. 3 | 1/65 | 6/66 | 10/65 |
| <u>Condenser</u> | | | |
| Unit No. 1 | 8/64 | 12/64 | 1/65 |
| Unit No. 2 | 9/64 | 3/65 | 3/65 |
| Unit No. 3 | 1/65 | 6/65 | 5/65 |
| <u>Steam Generator</u> | | | |
| Unit No. 1 | 2/64 | 12/65 | 6/65 |
| Unit No. 2 | 3/64 | 3/66 | 8/65 |
| Unit No. 3 | 9/64 | 5/66 | 10/65 |
| <u>HP and LP Heaters</u> | | | |
| <u>Deaerators, Evaporators</u> | | | |
| (Three Units) | 8/64 | 6/65 | 5/65 |
| <u>Boiler Feed Pumps</u> | | | |
| (Three Units) | 10/64 | 6/65 | 6/65 |
| 2. Intake | 4/65 | 3/66 | 9/65 |
| 3. Aux. Boiler/Water Treating | 4/65 | 3/66 | 7/65 |
| <u>Principal Operating Units</u> | | | |
| Aux. Steam Generator | 11/64 | 11/65 | 3/65 |
| Water Treatment Equip. | 5/65 | 11/65 | 11/65 |
| 4. Piping (Three Units) | 9/64 | 6/66 | 3/66 |
| 5. Electrical | | | |
| Conduit & Cable (entire system) | 8/64 | 7/66 | 9/65 |
| Power Transformers (Includes bus work) | 4/64 | 3/66 | 9/65 |
| Switchgear | 4/65 | 9/65 | 3/65 |

C. STATISTICS

Five thousand four hundred sixty (5,460) reinforced concrete piles were placed to an average depth of fourteen and one-half meters (14.5 M) for supporting all equipment foundations at grade level including the turbine-generator units; all buildings; discharge tunnel; all tanks and the perimeter wall.

Thirty-seven hundred (3700) tons of structural steel was erected for the Power House and support framing for the steam generators (boilers).

Forty thousand cubic meters (40,000 M³) of reinforced concrete (excluding piles) was used in the construction of all equipment foundations, tank foundations, wall base and pilasters, spherical sterilized water storage tank and supports, and the foundations, main columns and roofs of all buildings.

Ten thousand cubic meters (10,000M³) of plain concrete were used in equipment grouting, floor topping (excluding terrazo floor areas) and interior and exterior wall surfacing of all buildings and the fence.

Seventy-five hundred cubic meters (7500 M³) of masonry (brick/plaster) was used for interior and exterior walls of all buildings.

Twenty thousand square meters (20,000 M²) of macadam surfaced roadways were provided for station entrance and accessibility to all buildings, dock and outdoor storage areas.

All cement, sand, stone, gravel, miscellaneous steel, and reinforcing steel, with the exception of that used in the turbine generator foundation, was obtained locally.

All station operating equipment, piping, cable, insulation and certain architectural material was obtained from the United States.

The contract also provided for furnishing mobile cranes and other heavy construction equipment to the Subcontractors for their operations.

A daily personnel average of approximately eleven hundred (1100) were engaged in activities on the project at the site. This includes all American and Egyptian personnel.

FINANCIAL DATA

SECTION III

A. EXTRA COSTS

Changes in the scope of civil work brought about because of redesign resulted in additional costs in the Egyptian Pound portion of the loan money payable to the Contractor. These costs reflecting increases and reduction in the original scope were agreed upon between the Corporation, the Contractor and the Civil Works Subcontractor and certified by the Design Engineers and the Consulting Engineers. A copy of the agreement with back-up tabulations is included in the Appendix to this report as Exhibit No. I.

In addition to the above changes in scope, the Contractor purchased architectural material and sheet piling for the project which necessitated a readjustment of the U.S. Dollars and Egyptian Pound allocations in the Contract. These changes are also tabulated in Exhibit No. I.

B. FINANCIAL STATUS

Exhibits II, III and IV in the Appendix contain data on the status of AID loan funds in U.S. Dollars and Egyptian Pounds and the U.A.R. funds. These exhibits list the status of expenditures as of June 30, 1966 and estimated additional amounts which must be spent to finish the project.

DELAYS

SECTION IV

The most important item in causing delays in initial operating dates for the generating units was late delivery of equipment and materials to the site. The major factors contributing to the late delivery of equipment were:

1. Crowded port (Alexandria) prevented unloading on schedule.
2. Labor strike in U.S. shipping industry which stopped all deliveries of U.S. materials.
3. Difficulties in coordination of transportation facilities to site (Rail, Lorry or Barge).
4. Lengthy processing procedure in customs clearance.

SCHEDULE

SECTION V

Exhibit VI in the Appendix contains an "S" Curve representing the scheduled and actual completion of various phases of completion of the plant.

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OPERATION

SECTION VI

The following is a record of dates of startup activities of each generator unit.

A. UNIT NO. 1

December 7, 1965 to December 11, 1965

The turbine was placed in operation and the generator energized and synchronized with the Cairo network. Intermittent on-the-line operations were performed, (approximately five hours each day) during which periodic adjustments and/or corrections were made to principal control features.

December 11, 1965 to December 20, 1965

The Contractor's trial run (shakedown run) was performed. Upon its conclusion the work involving removal of strainers and the final adjustments to all controls was performed.

December 31, 1965

The unit again placed in on-line operation which constituted initial operation and the required 30 day reliability test run was started.

January 30, 1966

The 30 day reliability test run was concluded whereupon the supervision of the operation of this unit was assumed by the Egyptian Electricity Corporation.

B. UNIT NO. 2

March 29, 1966 to April 1, 1966

The turbine was placed in operation thus permitting adjustments to controls.

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April 1, 1966 to April 10, 1966

The generator was energized and synchronized with the Cairo System. The Contractor's trial run (shakedown) was performed. Upon its conclusion the work involving removal of strainers and the final adjustments to all controls was performed.

April 24, 1966 to May 26, 1966

The unit again placed in on-line operation which constituted initial operation and the required 30 day reliability test run was started.

May 26, 1966

The 30 day reliability test run was concluded whereupon the supervision of the operation of this unit was assumed by the Egyptian Electricity Corporation.

C. UNIT NO. 3

July 25, 1966

The generator was energized and synchronized with the Cairo System. The Contractor's trial run was performed and upon conclusion of this run the final adjustments were made and strainers were removed from the steam lines.

August 15, 1966

The unit was placed in operation which constituted initial operation and the 30 day reliability test run was started.

September 14, 1966

The 30 day reliability test run was concluded, whereupon the supervision of the operation of this unit was assumed by the Egyptian Electricity Corporation.

CONCLUSION

SECTION VII

The construction of the entire Cairo West Thermal Power Station was performed in accordance with the contract design drawings and any supplemental manufacturer's drawings associated therewith, and in strict conformity with conditions stipulated in the contract specifications. This was duly affirmed by the Consulting Engineer's representative at the site.

The Station is impressive in appearance and its operation presently satisfactory and economical.

ENGINEER'S CERTIFICATION OF FINAL REPORT

SECTION VIII

This Report has been prepared by Laramore, Douglass and Popham of New York Inc., consulting engineer for the U.A.R. Government, Egyptian Electricity Corporation, and is based on information submitted by the following:

- a. Egyptian Electricity Corporation, Execution Branch,
U.A.R. Government.
- b. Westinghouse Electric International Corporation, Inc.
- c. The Kuljian Corporation
- d. The Resident Engineer - Laramore, Douglass and Popham of
New York, Inc. - Cairo Office

It is hereby certified that the facts and statements presented in this final report have been reviewed by us and we concur therewith.

LARAMORE, DOUGLASS AND POPHAM
OF NEW YORK, INC.

By



J. E. Reuter, Project Manager

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A G R E E M E N T

During the discussions in the office of Westinghouse Electric International Company in New York from June 1 to June 10, 1966 between the representatives of The Egyptian Electricity Corporation (hereinafter referred to as EEC), Westinghouse Electric International Company (hereinafter referred to as WEICO) and Societe Egyptienne d'Entreprises ex Moukhtar Ibrahim (hereinafter referred to as SEDE) with the participation of the representative of The Kuljian Corporation, the following was agreed upon:

A. Sheet Piling

1. According to the main contract and to the civil work Subcontract WEICO supplied for Cairo West Power Station sheet piling listed in WEICO's letter of December 17, 1963 as per attached copy (Encl. 1).

It is understood that this portion of the sheet piling, which was temporarily used by SEDE for their construction work belongs to SEDE. Sheet piling used in intake structure is not considered as temporary sheet piling.

2. The cost of the transportation of this portion of the sheet piling from Alexandria to the Site as well as the custom duties paid by EEC will be deducted from the Egyptian Pound portion of the contract price as set forth in Art. 37 of the main contract.

The price to be paid by WEICO to SEDE for the civil work will be reduced by an equal amount.

B. Architectural Material

1. WEICO informed EEC that the actual cost to WEICO of the Architectural Material required for SEDE plus the cost of ocean freight and insurance amounts to \$191,215.65 as per attached list (encl. 2).
2. To this amount shall be added the cost to WEICO of paints supplied by WEICO and used by The Engineering General Company. The settlement of this item will be subject to a separate agreement.
3. The cost of the inland transportation of this material from Alexandria to the Site as well as the custom duties paid by EEC for this material will be deducted from the Egyptian Pounds portion of the contract price as set forth in Art. 37 of the main contract.
4. The Architectural Material will be handed over by EEC to SEDE as their property. However EEC has the right to purchase from SEDE the unused balance of the architectural material, or a portion thereof, at cost prices in Egyptian Pounds.

C. Changes of Scope of the Civil Work

1. The Egyptian Pound portion payable to WEICO by EEC, as well as the price of the civil work subcontract shall be revised to reflect the following increments and reductions in actual scope of the civil works as compared with the original scope of the civil work subcontract:

Increase of Scope:

| <u>Item</u> | <u>Description</u> | <u>Est. Amount in L.E.</u> |
|-------------|--|----------------------------|
| 1. | Ground Floor beams vs slabs in the buildings | 83,200 |
| 2. | Transformer transfer tracks | 15,200 |
| 3. | Auxiliary boiler building | 22,000 |
| 4. | Additional foundation work for the fuel oil and condensate tanks | 55,000 |
| 5. | Additional roads | 17,000 |
| 6. | Additional reinforcement for the concrete piles (see Note 5) | 41,000 |
| 7. | Furnishings and accessories | 10,000 |
| 8. | Additional concrete piles | <u>17,000</u> |
| | <u>Est. Subtotal L.E.</u> | <u>260,400</u> |

Reduction of Scope

| | | |
|-----|---|----------------|
| 1. | Underground Storage Tank | 43,000 |
| 2. | Sheet Piling | 37,500 |
| 2a. | Inland Transportation of the sheet piling | 800 |
| 2b. | Custom duties for the sheet piling | 4,700 |
| 3. | Architectural Material | 83,700 |
| 3a. | Inland Transportation of the architectural material | 1,600 |
| 3b. | Custom duties for the architectural material | 10,000 |
| 4. | Reduction in lengths of the discharge tunnel | 5,000 |
| 5. | Reduction in length for the fence | <u>3,000</u> |
| | <u>Est. Subtotal L.E.</u> | <u>189,300</u> |

2. The estimated subtotal for reductions of scope shall be increased by the amount of Egyptian Pounds equivalent to the dollar cost of paints plus 5% as per paragraph B. 2.

3. The above listed items of increments and reductions of the scope of the Civil Work is considered to be complete.

WEICO and the Kuljian Corporation will compile for EEC a set of previous documentation in the form of letters, conference notes, etc. to substantiate these changes.

4. The amounts of increases and reductions of the scope of the civil work as shown above are estimated.

SEDE will submit to WEICO itemized back-up sheets for each item of change after obtaining approval of these sheets by EEC. The amounts shown in these approved back-up sheets shall be considered as final settlement of the changes of scope of the civil work.

5. The use of additional reinforcement for the concrete piles as per Item 6 of the Increase of Scope is subject to a detailed explanation by WEICO and The Kuljian Corporation which will be reviewed by EEC.

6. The price for the civil work as set in Art. III of the civil work contract is changed to reflect the changes as stipulated above.

The Egyptian Pound portion of the main contract price, as set forth in Art. 37 of the contract between EEC and WEICO, is changed by the same amount.

The Egyptian Electricity Corporation (subject to confirmation by the appropriate authorities of EEC)

By *A. Sultan Ismail*
A. Sultan Ismail

Westinghouse Electric International Company

By *T. G. Evans* *J. Drobot*
T. G. Evans J. Drobot

Societe Egyptienne d'Entreprises ex Moukhtar Ibrahim

By *H. Moukhtar* *F. Hanna*
H. Moukhtar F. Hanna

Certified

The Kuljian Corporation

By *D.S. Eiler*
D.S. Eiler

Certified

Laramore, Douglass and Popham

By *J. E. Reuter*



Westinghouse Electric International Company

100 Park Avenue
New York 17, N. Y., U.S.A.
Cable: WEMCOEXPO
Telephone: 691-3111

December 17, 1963

W-CA-31

The Cairo Electricity and Gas
Administration
53, 26th July Street
Cairo, U. A. R.

Attention: Director General

SUBJECT: FE-20097
Cairo West Power Station
Sheet Piling

Gentlemen:

In accordance with Annex No. 2 to the contract for Cairo West Power Station, Westinghouse Electric International Company has purchased and shipped to you sheet piles and accessories required for the execution of the construction works.

The enclosed three (3) copies of the reconciliation sheets give all the data (specifications, quantities and prices) for this material.

In this connection, we request you kindly to increase the letter of credit by the amount of \$267,511.67 (Two hundred sixty seven thousand, five hundred eleven and 67/100).

The Egyptian pound price of L. E. 3,966,784 shall be reduced by L. E. 37,500 (Thirty Seven thousand five hundred) i. e., by the same amount by which the price for the civil work has been reduced by The Civil Work Sub-contractor, Societe Egyptienne d'Entreprises, Ci-devant Moukhtar Ibrahim.

Very truly yours,

A handwritten signature in cursive script, appearing to read 'J. Drobot'.

J. Drobot,
Project Engineer

JD/ta

CAIRO WEST POWER STATION - FE-20097SHEET PILINGRECONCILIATION OF QUANTITIES AND PRICES

| <u>ITEM</u> | <u>SPECS. NO.</u> | <u>DESCRIPTION AND SIZE</u> | <u>PIECES</u> | <u>POUNDS</u> | <u>UNIT PRICE PER 100 LBS. \$</u> | <u>VALUE \$</u> |
|-----------------------|-----------------------|-------------------------------------|---------------|---------------|---------------------------------------|---------------------|
| <u>A. SHEET PILES</u> | | | | | | |
| 1 | 4BC-2-1 | ZP 27 x 60' | 43 | 104,490 | 8.30 | 8,672.67 |
| 2 | 4BC-2-2 | ZP 27 x 56' | 197 | 446,796 | 8.30 | 37,084.08 |
| 3 | 4BC-2-3 | ZP 27 x 48' | 202 | 392,688 | 8.25 | 32,396.76 |
| 4 | 4BC-2-4 | ZP 27 x 44' | 430 | 766,260 | 8.25 | 63,216.45 |
| 5 | 4BC-2-5 | DP 2 x 36' | 521 | 675,216 | 7.60 | 51,316.42 |
| 6 | 4BC-2-6 | SP 4 x 36' 0" Fingers in | 2 | 2,210 | 9.20 | 203.32 |
| 7 | 4BC-2-7 | SP 4 x 36' 0" Fingers out | 2 | 2,210 | 9.20 | 203.32 |
| 8 | 4BC-2-8 | ZC 23 x 60' 0" | 4 | 17,138 | 15.80 | 2,707.81 |
| 9 | 4BC-2-9 | Special tees x 56' 0" | 11 | 3,585 | 15.80 | 566.43 |
| 10 | 4BC-2-10 | Special corners x 56' 0" | 2 | 4,564 | 15.80 | 721.11 |
| 11 | 4BC-2-11 | Special corners x 56' 0" | 1 | 2,173 | 15.80 | 343.33 |
| 12 | 4BC-2-13 | Fabricated Piling Ft 40/41 x 36' 0" | 2 | 4,718 | 14.20 | 669.96 |
| 13 | 4BC-2-13A | Special tee x 36' | 1 | 2,014 | 15.80 | 318.21 |
| 14 | 4BC-2-13B | Special tee x 36' | 1 | 2,146 | 15.45 | 331.56 |
| 15 | 4BC-2-13C | Special tee x 44' | 1 | 2,554 | 15.40 | 393.32 |

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| <u>ITEM</u> | <u>SPECS. NO.</u> | <u>DESCRIPTION AND SIZE</u> | <u>PIECES</u> | <u>POUNDS</u> | <u>UNIT PRICE PER 100 LBS \$</u> | <u>VALUE \$</u> | |
|----------------------------------|-------------------|--|---------------------|---------------|----------------------------------|-----------------|-------------------|
| A. SHEET PILES, (Cont'd.) | | | | | | | |
| | | | <u>SUBTOTAL ...</u> | 1410 | <u>2,426,552</u> (1103 mt) | - | <u>199,144.75</u> |
| B. ACCESSORIES | | | | | | | |
| 16 | 4BC-2-14 | Tie Rod Assemblies 3" Dia. | 62 | 110,973 | 16.80 | 18,643.46 | |
| 17 | 4BC-2-15 | Tie Rod Assemblies 2 1/2" Dia. | 72 | 52,270 | 13.25 | 6,925.78 | |
| 18 | 4BC-2-16 | Approx. 982 lineal ft. 12 in. double-channel wales and accessories | - | 57,431 | 11.45 | 6,575.86 | |
| 19 | 4BC-2-17 | Clip Angles 2"x2"x1/2"x0-3" | 1360 | 1,088 | 14.65 | 159.39 | |
| 20 | 4BC-2-18 | Galvanized bolts | 22 | 153 | 20.65 | 31.59 | |
| | | | <u>SUBTOTAL ...</u> | 1516 | <u>221,915</u> (100 mt) | - | <u>32,336.08</u> |
| C. STRUTS AND BRACING | | | | | | | |
| 21 | 4BC2-1-S | BLOB x 5 1/2"/ft. x 32'0" | 38 | 65,664 | 6.43 | 4,222.20 | |
| 22 | 4BC2-2-S | BLOB x 8 9/16"/ft. x 28'6" | 76 | 192,774 | 6.53 | 12,588.14 | |
| 23 | 4BC2-3-S | BLOB x 7 3/8"/ft x 33'6" | 42 | 101,178 | 6.38 | 6,455.16 | |
| 24 | 4BC2-4-S | BLOB x 42.7#/ft. x 33'0" | 118 | 166,274 | 6.63 | 11,023.97 | |
| 25 | 4BC2-5-S | BLOB x 18#/ft. x 33'0" | 42 | 24,948 | 6.98 | 1,741.37 | |
| | | | <u>SUBTOTAL ...</u> | 316 | <u>550,838</u> (250 mt) | - | <u>36,030.84</u> |

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| <u>ITEM</u> | <u>SPECS. NO.</u> | <u>DESCRIPTION AND SIZE</u> | <u>PIECES</u> | <u>POUNDS</u> | <u>UNIT PRICE PER 100 LBS \$</u> | <u>VALUE \$</u> |
|----------------|-------------------|-----------------------------|---------------|------------------|----------------------------------|-------------------|
| <u>SUMMARY</u> | | | | | | |
| | | | | | <u>METRIC TONS</u> | |
| A. | | Sheet Piles | 1410 | 2,426,552 | 1103 | 199,144.75 |
| B. | | Accessories | 1516 | 221,915 | 100 | 32,336.08 |
| C. | | Strust and Bracing | 316 | 550,838 | 250 | 36,030.84 |
| | | | <u>3242</u> | <u>3,199,305</u> | <u>1453</u> | <u>267,511.67</u> |

REMARKS

- 1) Total pieces exclude wales and accessories, Item 18, Specs. No. 4BC-2-16.
- 2) All material has been shipped.

J. Drobot
 J. Drobot,
 Project Engineer

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Westinghouse Electric International Company

200 Park Avenue
New York 17, N. Y., U.S.A.
Cable: WEMCOEXPO
Telephone: 692-3222

December 17, 1963

W-MI-26

Societe Egyptienne d'Entreprises
Ci-devant Moukhar Ibrahim
8, Rue Champollion
Cairo, Egypt, U. A. R.

Attention: Director General

SUBJECT: FE-20097
Cairo West Power Station
Sheet Piling

Gentlemen:

We would like to inform you that we have completed the shipment of the sheet piling material required for Cairo West Power Station.

In this connection and according to Article I, Paragraph 19 of the Civil Work Contract, the price for the civil work will be reduced by L. E. 37,500.

Very truly yours,

A handwritten signature in dark ink, appearing to read 'J. Drobot'.

J. Drobot
Project Engineer

New York, May 31, 1966

LIST OF ARCHITECTURAL MATERIAL
SHIPPED FOR CAIRO WEST POWER STATION

| <u>ITEM</u> | <u>SPEC. NO.</u> | <u>DESCRIPTION</u> | <u>SUPPLIER</u> | <u>S NO.</u> | <u>COST \$</u> | <u>REMARKS</u> |
|-------------|------------------|-----------------------------|-----------------------------|--------------------------|----------------------------|----------------|
| 1 | 3BC1 | Reinforced Steel | Bethlehem Steel | 11 CN4 & 6 | 33,858.68 | |
| 2 | 3BC1 | Liquid Floor Hardener | Everseal | 111A C/N 1 | 550.00 | |
| 3 | 3BC1 | Premolded Expansion Joints | Everseal | 111A C/N 1 | 234.00 | |
| 4 | 3BC1 | Dovetail Anchors | Everseal | 111A C/N 1 | 540.00 | |
| 5 | 3BC1 | Sisalkraft | Everseal | 111A C/N 1 | 195.00 | |
| 6 | 3BC1 | Abrasive Grits | Everseal | 111A C/N 1 | 47.50 | |
| 7 | 3BC | Water Stops | U.S. Rubber | 36 | 4,090.00 | |
| 7A | 3BC | Cement for Water Stops | U.S. Rubber | 36 CN | 70.00 | |
| 8 | 6BC | Flashing | Long Island Tinsmith Supply | 170A | 7,737.16 | |
| 9 | 8BC | Roof Coating and Insulation | Everseal | 111A CN 2 402A | 10,880.85 39,615.00 | |
| 10 | 13BC | Calking | Everseal | 111A CN 3 | 148.65 61.98 | |
| 11 | 10BC | Hollow Metal Doors & Frames | Pioneer | 125 | 5,247.00 | |

| ITEM | SPEC. NO. | DESCRIPTION | SUPPLIER | S NO. | COST \$ | REMARKS |
|------|-----------|----------------------------------|-------------------------|--------------|----------------------|--|
| 12 | 11BC | Aluminum Doors & Frames | Kawneer | 105A | 3,895.00 | |
| 13 | 11BC | Aluminum Frames for Control Room | Kawneer | 105 | 1,000.00 | Total Cost of S105 is = \$2,233.65 |
| 14 | 12BC | Aluminum & Steel Windows | Republic Steel | 98 | 10,125.00 | |
| 15 | 14BC1 | Rolling Doors | Walter Balfour | 93 | 2,705.00 | Total Cost of S93 is \$3,705.00 Cost of Motor Oper. Door is \$1,000. |
| 16 | 14BC2 | Overhead Doors | Rowe Mfg. | 93CN1 218 | 2,517.00 2,370.20 | |
| 17 | 15BC | Corrugated Glass | Pittsburg Plate & Glass | 128A | 34,742.47 | |
| 18 | 18BC2 | Ceramic Tile | Branin & Kelly | 177A | 5,385.44 | |
| 19 | 18BC4 | Resilient Flooring | Armstrong | 151A | 2,259.15 | |
| 20 | 20BC | Finish Hardware | Yale & Towne | 129A | 5,585.28 | |
| 21 | 19BC1 | Accoustical Ceilings | Fiberglass | 222A | 5,980.00 | |
| 22 | 24BC | Folding Door for Hospital | Paul Harsh | 210 | 391.72 | |
| 23 | 27BC | Fencing | Anchor Fence | 154 | 4,605.34 | |
| 24 | 30BC | Plumbing & Drainage | Mueller Brass | 97 97CN1 | 1,660.00 | |

| Item | Spec. No. | Description | Supplier | S Number | Cost \$ | Remarks |
|------|-----------|--------------|--------------|----------|------------|------------------------------------|
| 25 | 30BC | Floor Drains | Dayton Price | 157 | 767.38 | |
| 26 | 30BC | Hangers | Grinnell | 96 | 41.00 | |
| 27 | 24BC | Accessories | | | 5,000.00 | |
| 28 | 14B | Paints | Everseal | | | for Engineering General Company |
| | | | | | Total Cost | 192,215.65 |
| | | | | | 5% | 9,610.78 |
| | | | | | Total | <u>201,826.43</u> |

FINANCIAL STATUS REPORT - A.I.D. FUNDS
(U.S. DOLLAR ALLOCATION)
CAIRO WEST THERMAL POWER PROJECT
 June 30, 1966

| <u>ITEM DESCRIPTION</u> | <u>ITEM TOTAL</u> | <u>COMPLETED TO DATE</u> | <u>ESTIMATED TO COMPLETE</u> |
|---|----------------------------|------------------------------|----------------------------------|
| Soils Investigation and Test Piles..... | \$ 2,000 | \$ 2,000 | --- |
| Steam Generation Equipment... | 9,733,549 | 9,733,549 | --- |
| Turbine Room Equipment..... | 10,648,895 | 10,648,895 | --- |
| Electrical Equipment..... | 4,811,798 | 4,811,798 | --- |
| Maintenance Shops & Equipment | 164,572 | 164,572 | --- |
| Building Construction Mat'l.. | 896,888 | 896,888 | --- |
| Plant Service Equipment and Material..... | 118,825 | 118,825 | --- |
| Supervisory Erection Personnel | 750,000 | 747,000 | 3,000 |
| Spare Parts..... | 1,000,000 | 895,000 | 105,000 |
| Sheet Piling..... | 267,511 | 267,511 | --- |
| Freight & Insurance..... | 1,640,000* | 1,628,000* | 12,000* |
| Construction Cable..... | 64,620 | 64,620 | --- |
| Equipment for Hospital..... | 61,260 | 61,260 | --- |
| Additional Construction Equip- ment & Material, such as Electrodes, Tools, Ind. | | | |
| X-Ray, etc..... | 74,608 | 74,608 | --- |
| Training of Egyptian Personnel | 300,000 | 300,000 | --- |
| TOTALS..... | <u>\$30,534,526</u> | <u>\$30,414,526</u> | <u>\$120,000</u> |

NOTE: * The original contingency \$1,600,000 for freight and insurance is as increased to \$1,640,000.

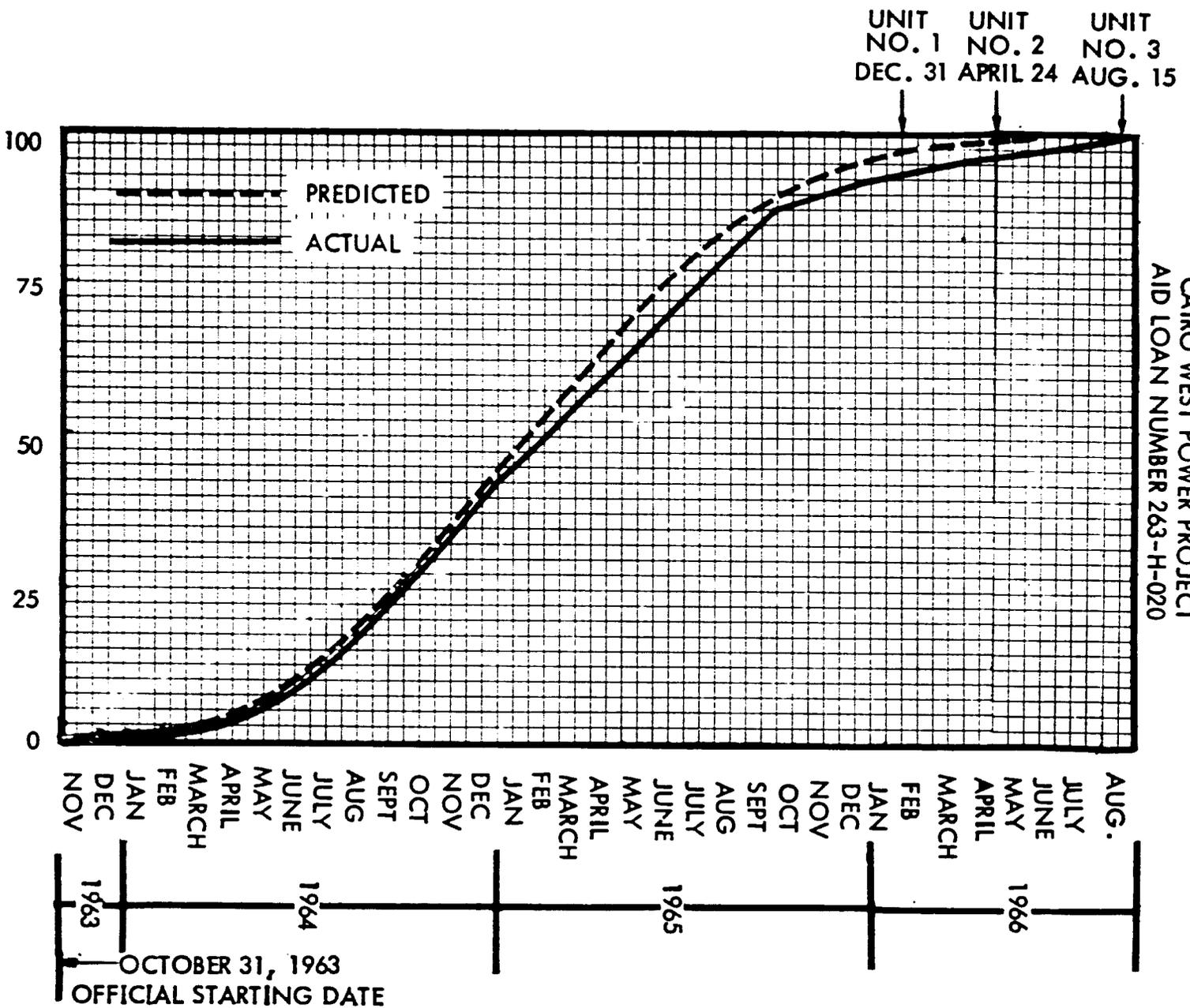
FINANCIAL STATUS REPORT - A.I.D. FUNDS
 (EGYPTIAN POUND ALLOCATION)
 CAIRO WEST THERMAL POWER PROJECT
 June 30, 1966

| ITEM NO. | ITEM TOTAL L.E. MILL | COMPLETED TO DATE L.E. MILL |
|---|-------------------------|-----------------------------------|
| 1. Civil Work..... | 1,910,984.000 | 1,656,899.974 |
| 2. Mechanical and Electrical Erection..... | 1,525,000.000 | 1,409,494.405 |
| 3. Fuel Tanks..... | 280,800.000 | 264,409.980 |
| 4. Local Transportation of Equipment..... | 250,000.000 | 240,644.521 |
| 5. LDP Contract Expenses..... | 2,082.778 | 2,082.778 |
| 6. Revolving Funds..... | --- | <u>300,000.000</u> |
| TOTALS..... | 3,968,866.778 | 3,873,531.658 |
| Contingency Funds..... | <u>231,133.222</u> | ===== |
| TOTAL LOAN..... | <u>4,200,000.000</u> | |

FINANCIAL STATUS REPORT - U.A.R. FUNDS
CAIRO WEST THERMAL POWER PROJECT
 June 30, 1966

| | ITEM TOTAL | | COMPLETED TO DATE | |
|---------------------------------|----------------------|-------------|----------------------|-------------|
| | <u>L.E.</u> | <u>M111</u> | <u>L.E.</u> | <u>M111</u> |
| Land Cost (Station & Colony). | 95,000.000 | | 85,862.922 | |
| Site Fill (Station & Colony). | 150,000.000 | | 112,796.983 | |
| Access Road..... | 200,000.000 | | 182,166.397 | |
| Access Railroad..... | 80,000.000 | | 72,109.928 | |
| Station Staff Colony Bldgs... | 500,000.000 | | 125,112.267 | |
| Miscellaneous Civil Work..... | 45,000.000 | | 20,934.234 | |
| Customs Charges-Imported Mat. | 1,900,000.000 | | 1,416,890.657 | |
| Bank Charges..... | 150,000.000 | | 142,310.335 | |
| Duties & Taxes on WEICO & LDP | | | | |
| Contracts..... | 50,000.000 | | 3,733.984 | |
| Misc. Mechanical & Elec.Work. | 50,000.000 | | 8,334.069 | |
| Personnel Transport..... | 25,000.000 | | 34,770.000 | |
| Fuel System (Pipeline & Barges) | 400,000.000 | | 26,552.800 | |
| Staff Wages & Salaries..... | 250,000.000 | | 28,538.656 | |
| Staff Bonus..... | 50,000.000 | | --- | |
| Staff Training Expenses..... | 50,000.000 | | 43,873.487 | |
| LDP Contract Charges..... | 15,000.000 | | --- | |
| Experts Expenses..... | 5,000.000 | | --- | |
| Administrative Expenses..... | 32,000.000 | | 13,384.706 | |
| 4th Unit Foundations..... | 150,000.000 | | 92,008.174 | |
| Loan Interest (Estimated) | | | | |
| During Construction Period. | <u>1,600,000.000</u> | | <u>947,357.139</u> | |
| TOTALS..... | 5,797,000.000 | | 3,356,736.738 | |

UNITED ARAB REPUBLIC
CAIRO WEST POWER PROJECT
AID LOAN NUMBER 263-H-020



"S" CURVE ACTUAL vs. SCHEDULED PROGRESS

LARAMORE, DOUGLASS AND POPHAM

PHOTOGRAPHS