

PERUSAHAAN

UMUM

LISTRIK

NEGARA

JAKARTA, INDONESIA

MAIN  
ENGINEER

CHAST MAIN INTERNATIONAL INC

BOSTON BANDUNG JAKARTA SEMARANG

PERUSAHAAN UMUM LISTRIK NEGARA  
JAKARTA , INDONESIA

WEST JAVA  
ELECTRIC TRANSMISSION PROJECTS

QUARTERLY REPORT  
JULY - SEPTEMBER 1981

WEST JAVA I AND II PROJECTS  
CONTRACTS  
Pj. 013/PST/74 and Pj. 023/PST/75  
AID LOANS 497-H-028 & 497-W-032



**CHAS. T. MAIN INTERNATIONAL, INC.**

BOSTON MASSACHUSETTS U.S.A.

BANDUNG , INDONESIA

**MAIN**  
*Engineers*

**PERUSAHAAN UMUM LISTRIK NEGARA CONSULTANT**  
**CHAS. T. MAIN INTERNATIONAL, INC.**

BANDUNG - TROMOLPOS 69. TEL. 56869 JL. PROGO 32  
JAKARTA - P.O. BOX 100. KBT KEBAYORAN TIMUR. TEL. 776925 JL. WIJAYA 1/61  
SEMARANG - P.O. BOX 26. TEL. 311702 JL. SLAMET 1

14 November 1981

Letter No. B - 5078

Ir. R. Semiawan  
Perusahaan Umum Listrik Negara  
Proyek Induk Jaringan Jawa Barat & Jakarta Raya  
Jl. Cililitan Besar 1  
Jakarta.

Subject : West Java I and II Projects  
Quarterly Report

Dear Ir. Semiawan :

In accordance with Article 7.1 of the West Java I Contract No.  
Pj.013/PST/74 and Appendix V of the West Java II Contract No.  
Pj.023/PST/75, enclosed are three (3) copies of Engineer's  
Quarterly Report for the period 1 July 1981 through 30 September 1981.

Very truly yours,  
CHAS. T. MAIN INTERNATIONAL INC.

*R.W. Malchow*

R.W. Malchow

Project Manager

RWM/ns.-

cc. : DIRBANG - PLN Pusat (1)  
USAID - JKT (4) ✓  
MAIN - BSN (1)

WEST JAVA ELECTRIC TRANSMISSION PROJECTS  
QUARTERLY PROGRESS REPORT  
FOR THE QUARTER 1 JULY 1981 - 30 SEPTEMBER 1981

SECTION I  
PROJECT INFORMATION

A. Objectives of the Projects

The West Java Electric Transmission Projects were established to provide a reliable and economical electric power system from Tegal to Bandung (West Java I Project) and from Bandung to Jakarta (West Java II Project). The objectives of the Projects include establishing the basic engineering criteria, standards and specifications by which future extensions of the system can be readily coordinated with the newly constructed system. Also included is the training of Perusahaan Umum Listrik Negara (PLN) personnel so that they may continue performance in engineering design and construction management for future extensions of the system. The Projects are closely associated with other electric power projects currently being implemented in West Java.

B. Description of the Projects

The Projects cover the engineering design, material and equipment procurement, construction and construction supervision, technical and managerial assistance and training required in connection with :

1. New 150 KV double circuit transmission lines.
  - a. West Java I Project - 187 Km connecting Tegal, Cirebon and Bandung.
  - b. West Java II Project - 170 Km connecting Bandung, Bogor and Jakarta.

2. New 150/70/20 KV Substations.
  - a. West Java I Project - Ujungberung (Bandung) and switching facilities at Tegal.
  - b. West Java II Project - Bandung North (Bandung) and Bogor.
3. Installation of adequate system protection for all transmission lines and substations.
4. Provision of vehicles, tools and service equipment for system operation and maintenance.
5. Furnish PLN with a library of technical books and periodicals related to the electric power industry.

C. Funding of the Projects

To finance the reasonable foreign exchange cost of imported capital equipment, related engineering, construction and training services, the United States Agency for International Development (USAID) entered into the following Loan Agreements with the Government of Indonesia for relending to PLN.

1. West Java I Project - USAID Loan No. 497-H-028 US \$ 17,200,000.
2. West Java II Project - USAID Loan No. 497-W-032 US \$ 19,700,000.

To meet local currency expenditures, the Government of Indonesia agreed to provide Rupiah in the estimated equivalent of US \$ 5,800,000 for the West Java I Project and US \$ 3,900,000 for the West Java II Project. This total of US \$ 9,700,000 has since been increased to some US \$ 22,700,000 equivalent.

D. Consulting Services

In accordance with the above Loan Agreements and with USAID concurrence, PLN and Chas. T. Main International, Inc. (MAIN), Boston, Massachusetts, USA, entered into the following Contracts :

1. West Java I Project - Contract No. Pj. 013/PST/74, dated 16 February 1974. Duration of Contract, as amended, 19 June 1974 to 30 June 1982.
2. West Java II Project - Contract No. Pj. 023/PST/75, dated 27 January 1975. Duration of Contract, as amended, 29 August 1975 to 30 June 1982.

E. Scope of Services

The Scope of Services to be provided by MAIN under the Contracts include but are not limited to the following items

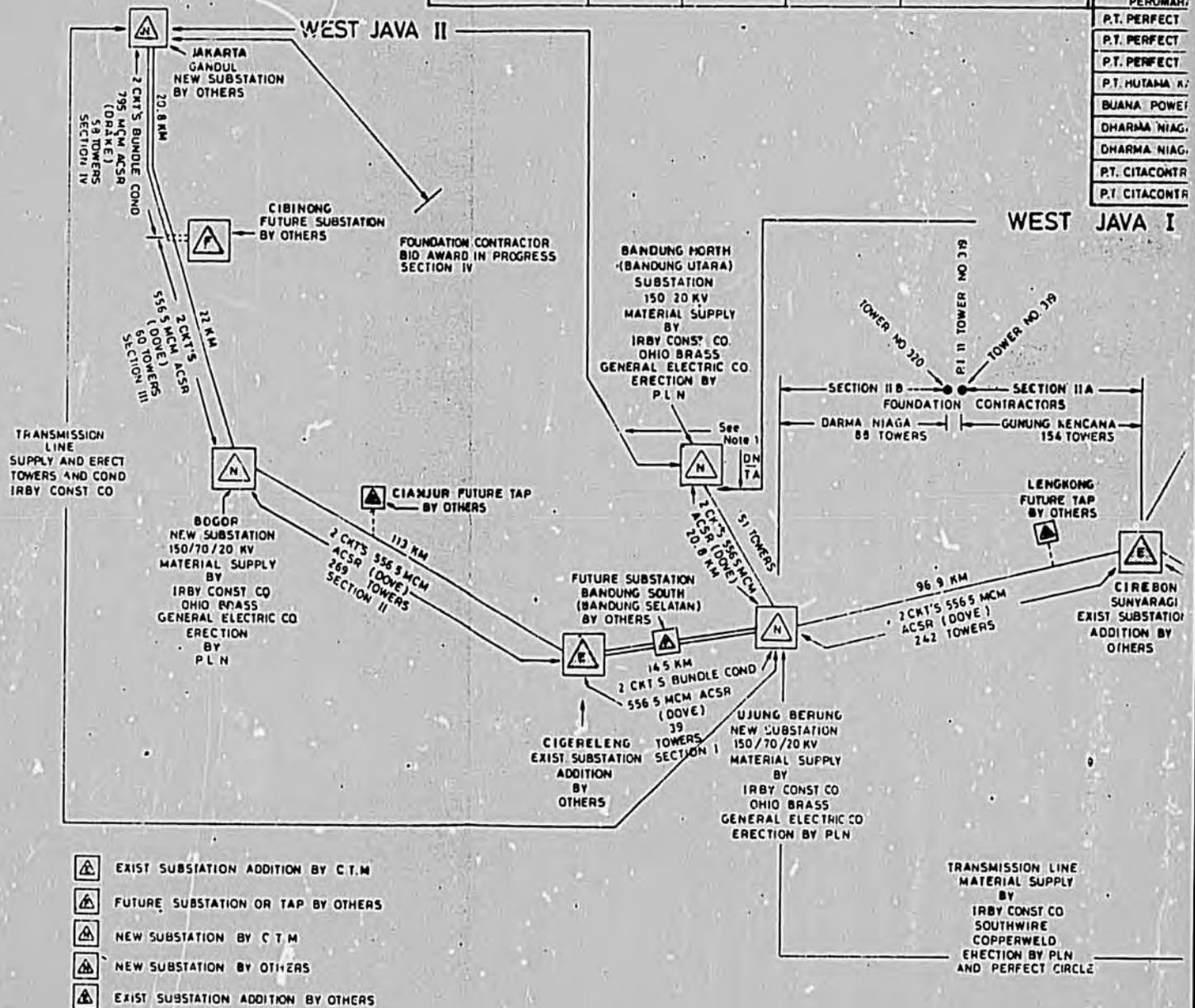
1. General Services
2. Engineering and Design Services
3. Procurement Services
4. Construction Planning and Pre-contracting Services
5. Engineering Supervision and Inspection Services
6. Construction Project Management and Supervision Services
7. Initial Operation and Testing
8. Training

F. Project Block Diagram

The following page is the Block Diagram for the West Java I and II Projects. The Diagram shows the major parts of the system being installed and the pertinent parameters. Also included are the Supply and Construction contractors.

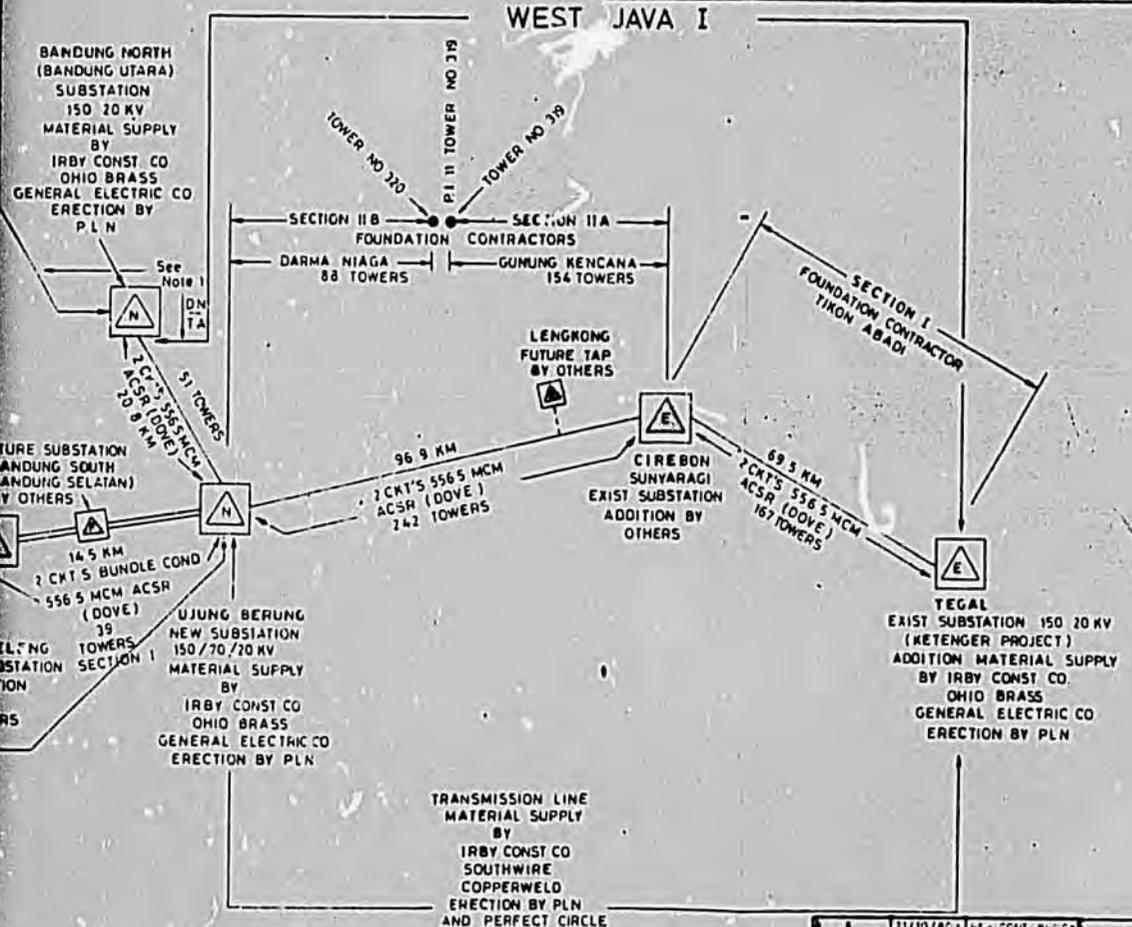
# WEST JAVA CONTRACT

CONTRACTOR	CONTRACT NO	LOCATION	FUNCTION	DESCRIPTION	CONTRACTOR
COPPERWELD	PJ 202/P51/77	WEST JAVA I	SUPPLY	SHIELD WIRE	TIKON ABADI
IRBY CONST CO	PJ 153/P51/77	WEST JAVA I	SUPPLY	STEEL HARDWARE	GUNUNG KEN
IRBY CONST CO	PJ 052/P51/77	WEST JAVA I II	SUPPLY	SUBSTATION EQUIPMENT	DHARMA NIAG
IRBY CONST CO	PJ 052/P51/77	WEST JAVA I	SUPPLY	TOOLS EQUIPMENT	CITAC LTD
IRBY CONST CO	PJ 151/P51/77	WEST JAVA II	SUPPLY ERECT	TOWERS HARDWARE COND	CITAC LTD
GENERAL ELECTRIC CO	PJ 053/P51/77	WEST JAVA I II	SUPPLY	CIR. BKR SW-GEAR	PERFECT CIR
MOTOROLA	PJ 087/P51/78	WEST JAVA I II	SUPPLY	MOBILE RADIO SYSTEM	SANTRACO RA
OHIO BRASS	PJ 051/P51/77	WEST JAVA I II	SUPPLY	LIGHTNING ARRESTERS	SIGMA TIRTA
SOUTHWIRE	PJ 203/P51/77	WEST JAVA I	SUPPLY	ALUM. COND.	CITAC LTD
TENSION STRINGING INC	PJ 050/P51/77	WEST JAVA I II	SUPPLY	TENSION STRINGING EQUIP	CITAC LTD
SUMBER JAYA	SPJ 016/PLN/P-RING / 77	WEST JAVA I & II	SUPPLY	GROUNDING MATERIAL	CITAC LTD.
P.T. ARCON	SPJ 017/PLN/P-RING / 77	WEST JAVA I & II	SUPPLY	STUB ANGLES	SILKAR NATIC
SAHABAT AGUNG	SPJ 017/PLN/P-RING / 79-80	WEST JAVA II	SUPPLY	STUB ANGLES	P.T. ERSES
AMARTA KARYA	SPJ 018/PLN/P-RING / 79-80	WEST JAVA II	CONSTRUCT.	FOUNDATIONS SEC. IV B	P.T. ERSES



## WEST JAVA CONTRACTORS

CONTRACT NO	LOCATION	FUNCTION	DESCRIPTION	CONTRACTOR	CONTRACT NO	LOCATION	FUNCTION	DESCRIPTION
PJ 202/PST/77	WEST JAVA I	SUPPLY	SHIELD WIRE	TIKON ABADI	SPJ 022/PLN/PI RING / 77	WEST JAVA I	CONSTRUCT.	FOUNDATIONS SEC I
PJ 153/PST/77	WEST JAVA I	SUPPLY	STEEL HARDWARE	GUNUNG KENCANA	SPJ 023/PLN/PI RING / 77	WEST JAVA I	CONSTRUCT	FOUNDATIONS SEC IIA
PJ 052/PST/77	WEST JAVA I II	SUPPLY	SUBSTATION EQUIPMENT	CHARMA NIAGA	SPJ 024/PLN/PI RING / 77	WEST JAVA I	CONSTRUCT	FOUNDATIONS SEC. IIB & III
PJ 052/PST/77	WEST JAVA I	SUPPLY	TOOLS EQUIPMENT	CITAC LTD	SPJ 001/PLN/PI RING / 77-78	WEST JAVA II	CONSTRUCT.	FOUNDATIONS SEC II & III
PJ 152/PST/77	WEST JAVA II	SUPPLY ERECT	TOWERS HARDWARE COND	CITAC LTD	SPJ 003/PLN/PI RING / 78-79	WEST JAVA II	CONSTRUCT.	FOUNDATIONS SEC. I
PJ 053/PST/77	WEST JAVA I II	SUPPLY	CIR BKR SW-GEAR	PERFECT CIRCLE	SPJ 010/PLN/PI RING / 78-79	WEST JAVA I	ERECT	TOWERS
PJ 087/PST/78	WEST JAVA I II	SUPPLY	MOBILE RADIO SYSTEM	SANTRACO RAYA	SPJ 065A/SP/PI RING JATEMG/78-79	WEST JAVA I	CIVIL WORK	TEGAL SUBSTATION
PJ 051/PST/77	WEST JAVA I II	SUPPLY	LIGHTNING ARRESTERS	SIGMA TIRTA	SPJ 017/SP/PI RING JATEMG/78-79	WEST JAVA I	ERECT	TEGAL SUBSTATION
PJ 203/PST/77	WEST JAVA I	SUPPLY	ALUM. COND	CITAC LTD	SPJ 009/PLN/PI RING / 79-80	WEST JAVA II	CONSTRUCTION	FOUNDATIONS IV C
PJ 050/PST/77	WEST JAVA I II	SUPPLY	TENSION STRINGING EQUIP	CITAC LTD	SPJ 010/PLN/PI RING / 79-80	WEST JAVA II	CONSTRUCTION	FOUNDATIONS IV A
SPJ 016/PLN/PI RING / 77	WEST JAVA I & II	SUPPLY	GROUNDING MATERIAL	CITAC LTD.	SPJ 017/PLN/PI RING / 79-80	WEST JAVA I	STRINGING	CONDUCTOR SEC. III
SPJ 017/PLN/PI RING / 77	WEST JAVA I & II	SUPPLY	STUB ANGLES	SILKAR NATIONAL	SPJ 027/PLN/PI RING / 79-80	WEST JAVA I	STRINGING	CONDUCTOR SEC. I
SPJ 017/PLN/PI RING / 79-80	WEST JAVA II	SUPPLY	STUB ANGLES	P.T. ERSES	SPJ 001/PLN/PI RING / 80-81	WEST JAVA I	CIVIL WORK	UJUNG BERUNG SUBSTATION
SPJ 017/PLN/PI RING / 79-80	WEST JAVA II	CONSTRUCT	FOUNDATIONS SEC. IV B	P.T. ERSES	SPJ 002/PLN/PI RING / 80-81	WEST JAVA I	CONTROL HOUSE	UJUNG BERUNG SUBSTATION
				P.T. PEMBANGUNAN PERUMAHAN	SPJ 008/PLN/PI RING / 80-81	WEST JAVA II	CIVIL WORK	BANDUNG UTARA SUBSTATION
				P.T. PERFECT CIRCLE	SPJ 008/PLN/PI RING / 80-81	WEST JAVA II	CONTROL HOUSE	BANDUNG UTARA SUBSTATION
				P.T. PERFECT CIRCLE	SPJ 007/PLN/PI RING / 80-81	WEST JAVA II	CIVIL WORK	BOGOR SUBSTATION
				P.T. PERFECT CIRCLE	SPJ 007/PLN/PI RING / 80-81	WEST JAVA II	CONTROL HOUSE	BOGOR SUBSTATION
				P.T. MUTAMA KARYA	SPJ 010/PLN/PI RING / 79-80	WEST JAVA II	ACCESS ROAD	BANDUNG UTARA SUBSTATION
				BUANA POWER	SPJ 017/PLN/PI RING / 80-81	WEST JAVA II	ACCESS ROAD	BOGOR SUBSTATION
				DHARMA NIAGA	SPJ 017/PLN/PI RING / 80-81	WEST JAVA I	CONSTRUCTION	UJUNG BERUNG SUBSTATION TRANSMISSION LINE BY-PASS
				DHARMA NIAGA	SPJ 017/PLN/PI RING / 80-81	WEST JAVA II	CONSTRUCTION	BOGOR SUBSTATION TRANSMISSION LINE BY-PASS
				P.T. CITACONTRAC	SPJ 007/PLN/PI RING / 80-81	WEST JAVA I	CONSTRUCTION	TOWER CAISSON
				P.T. CITACONTRAC	SPJ 003/PLN/PI RING / 81	WEST JAVA I	ERECTION	RELOCATE TOWERS



- Notes:**
- Bandung North Substation material in West Java II contract. Transmission line from Ujung Berung to Bandung North in West Java I contract.

REV NO	DATE	ISSUED FOR
1	17/4/78	CONTR NO
2	4/5/79	LINE INFO.
3	22/3/79	LINE INFO.
4	8/1/79	REV. CONT. BLOCK
5	26/7/80	REV. CONT. BLOCK
6	18/4/80	REV. CONT. BLOCK
7	17/8/80	REV. CONT. BLOCK

**BLOCK DIAGRAM WEST JAVA I-II**

PERUSAHAAN JUMUM LISTRIK NEGARA  
PROYEK INDIR JARINGAN JAWA BARAT DAN JAKARTA RAYA

**MAIN**

CHAS I HAIB INTERNATIONAL INC  
CHARLOTTE NORTH CAROLINA USA

GARRUNG  
INDONESIA

SCALE NONE  
CTM-SK 001

SECTION II  
FINANCE AND ADMINISTRATION

A. FINANCE INFORMATION

1. US Dollar Costs

Invoices in the amount of US \$ 3,774,016.14 (WJ I) and US \$ 2,509,792.89 (WJ II) have been submitted to PLN Pusat. Appended as Exhibits IA and IIA are Financial Plans and Cash Flow by Project Quarters. Categories by Work Item and Cash Flow by Project Quarters are based on the revised Scope of Work embodied in the latest Amendments to the Contracts. These data will be updated as necessary. Statistical data in chart form for the Progress Schedules are appended as Exhibits IB and IIB.

2. Indonesian Rupiah Costs

Invoices in the amount of Rp. 299.087.703,50 (WJ I) and Rp. 278.787.402,10 (WJ II) for local costs incurred have been submitted to PLN. Exhibits IC and IIC, Financial Plans and Cash Flow, and Exhibits ID and IID, Progress Schedules, are appended. These data are also based on the latest Amendments to the Contracts and will be updated as necessary.

3. US Dollar Costs to be paid in Rupiah

Additional invoices in the amount of US \$ 201,973.98 (WJ I) and US \$ 347,979.54 (WJ II) have also been submitted. As authorized in Amendments Number 4 to the PLN/MAIN Engineering Services Contracts, these are costs incurred in US Dollars but payable by PLN in Indonesian Rupiah.

4. Invoices Submitted and Payments Received

These data are appended as Exhibit G.

B. ADMINISTRATIVE INFORMATION

1. Amendment Number 2 to the PLN/Irby Substation Equipment Contract was approved by PLN and AID. Formal processing is underway. The Amendment provides for the purchase of additional control cable, watt-hour meters, tools and spare parts.
2. Amendment Number 5 to the PLN/Irby West Java II Transmission Line Contract was approved by PLN and AID. Formal processing is underway. The Amendment provides for the purchase by PLN of materials presently in the Irby Construction Company Stores and for the transfer to PLN of equipment and vehicles imported duty-free by Irby under OR-23.
3. Amendments to one (1) Letter of Commitment and one (1) Letter of Credit were completed during the period.

C. TERMINAL DATES

1. TDDA - Terminal Date Disbursement Authorization - (Last day that USAID Loan Funds can be committed) - 30 June 1981.

Final Commitment of USAID Loan Funds :

	<u>West Java I</u>	<u>West Java II</u>
USAID Loan	\$ 17,200,000.00	\$ 19,700,000.00
Commitment	\$ 17,197,632.86	\$ 19,699,990.40

2. TDD - Terminal Disbursement Date - (Last day that payments can be made from USAID Loan Funds) - 31 March 1982.
3. Scheduled Final Substation Energization - 31 December 1981.
4. Scheduled Completion of Engineering Services - 30 June 1982.

D. WEST JAVA I CONTRACT DATA

1.	No. Pj. 013/PST/74 Chas. T. Main International, Inc. Engineering Services	16 Feb. '74	US\$ 3,824,009.00 Rp. 555.096.119,-
2.	No. Pj. 153/PST/77 Irby Construction Company Tower Steel, Insulators and Accessories	5 Sep. '77	US\$ 2,902,946.03
3.	No. Pj. 202/PST/77 Copperweld Industries Shieldwire	28 Nov. '77	US\$ 294,739.06
4.	No. Pj. 203/PST/77 Southwire Company Conductor	28 Nov. '77	US\$ 1,991,843.83
5.	No. Pj. 050/PST/78 Tension Stringing Equipment Co. Wire Stringing Equipment	10 Mar. '78	US\$ 400,636.37
6.	No. Pj. 051/PST/78 Ohio Brass Company Lightning Arresters	10 Mar. '78	US\$ 87,852.00

7.	No. Pj. 052/PST/78 Irby Construction Company Substation Equipment Tools and Equipment	11 Mar. '78	US\$	4,547,414.46
8.	No. Pj. 053/PST/78 General Electric Company Substation Equipment	11 Mar. '78	US\$	2,532,800.59
9.	No. Pj. 087/PST/78 Motorola, Inc. Radio Equipment	11 May '78	US\$	395,819.20
10.	No. Spj.022/PLN/PI RING/77 P.T. Tikon Abadi Foundations - Section I	22 Oct. '77	Rp.	199.278.000,-
11.	No. Spj.023/PLN/PI RING/77 P.T. Gunung Kencana Foundations - Section IIA	27 Oct. '77	Rp.	153.445.000,-
12.	No. Spj.024/PLN/PI RING/77 P.T. Dharma Niaga Foundations - Section IIB	27 Oct. '77	Rp.	164.789.000,-
13.	No. Spj.010/PLN/PI RING/78-79 P.T. Perfect Circle Tower Erection	8 Dec. '78	Rp.	132.894.300,-
14.	No. Spj.065A/SPP/PI RING JATENG/78-79 P.T. Santraco Raya Tegal Substation Civil Work	21 Apr. '79	Rp.	50.278.000,-

- |     |  |                       |
|-----|--|-----------------------|
| 15. | No. Spj.072/SPP/PI RING JATENG/78-79<br>P.T. Sigma Tirta                      17 Oct. '79<br>Tegal Substation Structure Erection                                   | Rp.     25.966.000,-  |
| 16. | No. Spj.017/PLN/PI RING/79-80<br>P.T. Silkar National                      22 Jan. '80<br>Conductor Stringing - Section I  | Rp.     127.790.850,- |
| 17. | No. Spj.019/PLN/PI RING/79-80<br>P.T. Citac Ltd.                              2 Feb. '80<br>Conductor Stringing - Section III                                      | Rp.     164.364.000,- |
| 18. | No. Spj.001/PLN/PI RING/80-81<br>P.T. Erses                                      3 Apr. '80<br>Ujungberung Substation Civil Work                                   | Rp.     464.500.000,- |
| 19. | No. Spj.002/PLN/PI RING/80-81<br>P.T. Erses                                      3 Apr. '80<br>Ujungberung Substation Control House                                | Rp.     199.989.000,- |
| 20. | No. Spj.013/PLN/PI RING/80-81<br>P.T. Dharma Niaga                              6 Jul. '80<br>Ujungberung Substation Temporary 150 KV<br>Transmission Line By-Pass | Rp.     18.860.000,-  |
| 21. | No. Spj.007/PLN/PI RING/80-81<br>P.T. Citacontrac                              3 Jun. '80<br>Caisson for Tower No. 278   | Rp.     33.234.000,-  |
| 22. | No. Spk.003/PLN/PI RING/81<br>P.T. Citacontrac                              26 Mar. '81<br>Relocate Towers 317 and 319   | Rp.     19.823.000,-  |

E. WEST JAVA II CONTRACT DATA

1.	No. Pj. 023/PST/75 Chas. T. Main International, Inc. Engineering Services	25 Jan. '75	US\$ 2,509,793.00 Rp. 718.743.035,-
2.	No. Pj. 152/PST/77 Irby Construction Company Transmission Line Supply and Construction	5 Sep. '77	US\$ 8,199,107.37 Rp. 645.466.917,-
3.	No. Pj. 051/PST/78 Ohio Brass Company Lightning Arresters	10 Mar. '78	US\$ 87,852.00
4.	No. Pj. 052/PST/78 Irby Construction Company Substation Equipment	11 Mar. '78	US\$ 4,981,321.52
5.	No. Pj. 053/PST/78 General Electric Company Substation Equipment	11 Mar. '78	US\$ 3,974,100.16
6.	No. Spj.001/PLN/PI RING/77-78 P.T. Citac Ltd. Foundations - Sections II and III	5 Jun. '78	Rp. 329.553.000,-
7.	No. Spj.002/PLN/PI RING/78-79 P.T. Citac Ltd. Foundations - Ujungberung - Cigereleng	9 Aug. '79	Rp. 175.128.000,-
8.	No. Spj.022/PLN/PI RING/79-80 P.T. Sahabat Agung Cibinong - Gandul Stub Angles	4 Dec. '79	Rp. 10.618.000,-



- |     |  |            |                  |
|-----|--|------------|------------------|
| 17. | No. Spj.009B/PLN/PI RING/81-82<br>P.T. Buana Power<br>Bogor Substation Access Road                                   | 29 May '81 | Rp. 64.700.000,- |
| 18. | No. Spj.013/PLN/PI RING/80-81<br>P.T. Dharma Niaga<br>Bogor Substation Temporary 150 KV<br>Transmission Line By-Pass | 6 Jul. '80 | Rp. 10.608.000,- |

F. WEST JAVA I AND II CONTRACT DATA

- |    |  |             |                  |
|----|--|-------------|------------------|
| 1. | No. Spj.016/PLN/PI RING/77<br>P.T. Sumber Jaya<br>Grounding Material | 4 Jul. '77  | Rp. 54.245.000,- |
| 2. | No. Spj.017/PLN/PI RING/77<br>P.T. Arcon<br>Stub Angles              | 13 Aug. '77 | Rp. 40.100.000,- |

SECTION III  
GENERAL INFORMATION

A. CONFERENCES AND EVENTS

1. Twenty-nine (29) Construction Meetings were held during the period.
2. Energization of equipment
  - a. Bogor Substation 150 KV bus.  
Energized 23 September 1981.
  - b. Bogor Substation 70 KV bus.  
Energized 26 September 1981.

B. PROBLEM AREAS AND TENTATIVE SOLUTIONS

1. The Ujungberung Switchyard remains several months behind the original schedule. Responsibility for the Switchyard civil works construction has been taken away from P.T. Erses and the work will be completed by PLN. Due to monetary problems, PLN has not mobilized fully. A contractor has been retained to install the conduit, grounding and yard lighting. Another contractor has been retained for the electrical installation. PLN is presently arranging provisions for additional funds. Delays in the remaining civil works should not delay energization of the substation.
2. The Bandung Utara Switchyard Contractor is approximately ten (10) months behind his original schedule. The contractor must install the cable racks to permit installation of cables. This is expected to be completed in sufficient time so as not to cause any delay in the energization of the substation.
3. Negotiations are continuing for the transport of the 60 MVA transformer. It appears, however, that the 60 MVA transformer will not be on site before January 1, 1981. Ujungberung Substation may not be completed until the end of January 1982.

## SECTION IV

### PERSONNEL

#### A. ENGINEER

1. On 25 March, MAIN requested from PLN the approval of Mr. T.L. Jones for temporary assignment as Substation Engineer on the Projects to assist in erection and testing of the Substations. On 27 April, PLN approved Mr. Jones and he arrived in Indonesia on 3 July .
2. Mr. C.L. Crume, Substation Construction Engineer, West Java I & II, completed his assignment and left Indonesia on 30 July.
3. Mr. N. Hansen, RTE/ASEA Field Engineer, arrived at the Bogor Substation on 6 July to begin assembly and testing of the power and grounding transformers. He completed his work at Bogor Substation and left Indonesia on 2 August. Mr. Hansen is expected to return in October to set-up and test the Ujungberung and Bandung Utara transformers.
4. Mr. A. Tan, General Electric Field Engineer, arrived at Bogor Substation on 7 July to begin assembly and testing of 70 and 150 KV OCB's and 20 KV Switchgear. Mr. Tan expects to complete his work at Bogor in three months. At that time Mr. Tan will begin work in Bandung. A second General Electric Field Engineer, Mr. Alei, arrived in Indonesia on 3 August to begin assembly and testing of 70 and 150 KV OCB's and 20 KV Switchgear at Ujungberung Substation. Mr. Alei departed Indonesia on 2 September due to prior commitments. He was replaced by Mr. J. Klessig.

5. Mr. J.C. Harkey, Substation Engineer, West Java I and II departed Indonesia on 23 August for scheduled Home Leave and returned to Indonesia on 28 September.
6. Mr. Z. Saur, Surveyor, West Java I and II completed his work with the Projects on 26 September.
7. End of the period strength was as follows

<u>NAME</u>	<u>TITLE</u>	<u>ARRIVAL DATE</u>
<u>West Java I and II</u>		
R.W. Malchow	Project Manager	24 Oct. 1978
C.J. Whitby	Manager of Administration	10 Sep. 1974
J.C. Harkey	Substation Eng./Constr. Mgr.	15 Oct. 1977
H. Gunawan	Administrative Assistant	13 Aug. 1979
T.L. Jones	Substation Engineer	3 Jul. 1981
A. Tan	General Electric Field Engineer	7 Jul. 1981
J. Klessig	General Electric Field Engineer	15 Sep. 1981

B. PLN

1. End of the period strength was as follows :

<u>JOB TITLE</u>	<u>NUMBER</u>
Logistics Coordinator	1
Secretaries	3
Draftsmen	4
Accounting Clerks	2
Reproduction Personnel	2
Drivers	10.

2. In addition to the above Staff, approximately 60 PLN Counterpart and field personnel were assigned to the Projects throughout the period.

C. PERSONNEL MANMONTHS

1. MAIN and PLN Personnel Manmonths expended on the Projects to date are shown on the appended Exhibit H.

D. BUDGET

1. Comparison of Budget vs. Actual Manmonths and Salaries expended on the Projects to date are appended as Exhibits IE, IF, IIE and IIF.

SECTION V  
DESIGN AND FIELD PROGRESS

A. WEST JAVA I TRANSMISSION

1. Tower Site Procurement
  - a. All tower sites have been procured.
2. Foundation Construction
  - a. All foundations have been installed.
3. Tower Erection
  - a. All towers have been erected and accepted.
4. ROW Procurement and Clearing
  - a. All ROW Procurement and Clearing are completed.
5. Conductor and Shieldwire Stringing
  - a. All conductor and shieldwire have been installed.
6. Tower Movement
  - a. Towers No. 317 and 319 were monitored during the period and a downhill movement of 2.5 cm was detected. Measurements will continue to be taken during the following months.
7. Material Supply
  - a. All material has been received.

B. WEST JAVA II TRANSMISSION

1. Tower Site Procurement
  - a. All tower sites have been procured.
2. Foundation Construction
  - a. All foundations have been installed.
3. Tower Erection
  - a. All towers have been erected and accepted.
4. ROW Procurement and Clearing
  - a. All ROW Procurement and Clearing are completed.
5. Conductor and Shieldwire Stringing
  - a. All conductor and shieldwire have been installed.
6. Material Supply
  - a. All material has been received.

C. SUBSTATIONS

1. Tegal Substation
  - a. All work is completed and the line and station addition have been energized.
2. Ujungberung Substation
  - a. Switchyard Civil Work

The following items were completed during the period :

20 KV distribution cable trenches  
Supply of material for above-ground grounding  
Supply of material for above-ground conduit  
Supply of material for yard lighting

Installation of catch basins and drop inlets  
Installation of underground conduit

Work continued on the chain link fence, below-ground grounding system, and cable trench. The work is over eleven (11) months behind the original schedule. PLN has terminated the contract and undertook to do the work. Monetary problems have prevented completion of the work. PLN is in the process of solving this problem.

b. Control House

The Control House is complete. Final touch-up will be done after the electrical crews have completed their work.

c. Erection, Wiring and Testing

The following items were completed during the period :

Installation of 150 KV switches  
Set up of 150 KV OCB's  
Preliminary set up of 150/20 KV transformers  
Conduit installation  
Installation of 6.6. KV fuses and switches

Contractor forces continued installation of the above-ground grounding material, yard lighting, junction boxes and 20 KV switchgear. PLN forces have begun the 150 KV and 70 KV switch adjustments and are continuing installation of the 150 KV insulators and connectors and work on the 150 KV and 70 KV buses.

3. Bandung Utara Substation  
a. Switchyard Civil Work

The following items were completed during the period :

- Installation of below-ground grounding system and conduit system
- Supply of material for yard lighting
- Installation of yard drainage piping, catch basins and drop inlets
- 20 KV distribution cable trenches
- Road Sub-base and top surface
- Supply of material for above-ground grounding system

Work continued on installing substation rock cover, chain link fence, cable trench, supply of above-ground conduit and the drainage canal.

The Contractor is now approximately ten (10) months behind his original schedule. It is now estimated that the Switchyard work will be completed by the end of October.

b. Control House

The following items were completed during the period :

- Installation of stairs, doors, tile floors and sanitary system
- Installation of electrical conduit and conductor, step-down transformer and lightning arresters
- Installation of fire protection system, rain water drainage, water pumps, water pipes and fire hose
- Installation of windows and kitchen cupboards
- Installation of cable rack and hand rails
- Installation of air conditioning

The Contractor is approximately six (6) months behind the original schedule. It is estimated that the work will be completed by the middle of October.

c.. Access Road

The Access Road was completed during the period.

d. Erection, Wiring and Testing

The following work was completed during the period :

Set-up of 150 KV OCB's  
Preliminary set-up of power transformers  
Installation of relay and control panels

Work started on the installation of the above-ground conduit and continued on the installation of the 20 KV switchgear.

4. Bogor Substation

a. Switchyard Civil Work

The following items were completed during the period

20 KV distribution cable trenches  
Installation of conduit clamps on 70 KV CCVT structures  
Supply of material for above-ground grounding  
Supply of material for yard lighting  
Installation of transformer oil containment pit pumps  
Repairs to substation fence  
Removal of construction buildings

The Contractor is approximately seven (7) months behind schedule but work remaining is not critical. It is now estimated that the work will be finished by the middle of October.

b. Control House

The following items were completed during the period :

Installation of doors, windows, hand rails, stairs and floor tile

Installation of sanitary system and drainage pipes

Installation of fire protection system

Installation and testing of air conditioning

Installation of yard lighting contactors and photo electric cells

Installation of battery room fan exhaust louvers

Installation of 240/120 V step-down auto-transformers

The Contractor is approximately four (4) months behind schedule. It is estimated that the work will be completed by the middle of October. None of the work remaining will hinder energization of the substation.

c. Access Road

Work was completed on the permanent entrance road during the period. The kampung road between the substation entrance road and the main road is now undergoing improvement.

d. Erection, Wiring and Testing

The following items were completed during the period :

Installation of 150 KV and 70 KV insulators  
Installation of 150 KV and 70 KV bus and connectors  
Installation of 150 KV switches, 6.6 KV fuses and switches  
Installation of battery charger, power panel and yard panels  
Installation and testing of grounding and power transformers  
and station service transformers  
Installation of station batteries  
Installation of above-ground conduit and above-ground  
grounding

During September PLN energized the 150 KV and 70 KV buses.  
One 150 to 70 KV and one 150 to 20 KV transformer remains  
to be energized.

Work continued on the installation of the 20 KV switchgear  
and began on the installation of the 20 KV Power Cable.  
Testing of the 20 KV Vacuum-Break switches should begin in  
October. It is expected that the 20 KV bus will be  
energized during October.

5. Material Supply

All material is presently in Indonesia. The grounding transformer  
should be moved to Bandung during October. The 60 MVA power  
transformer is now scheduled to be moved to Bandung during December.

D. MOBILE RADIO

1. The fixed station at Bandung Utara will be installed when  
electric power is available.

E. MATERIAL SHIPMENTS

1. The status of Material Shipments through 30 September 1981 is shown on the following page.

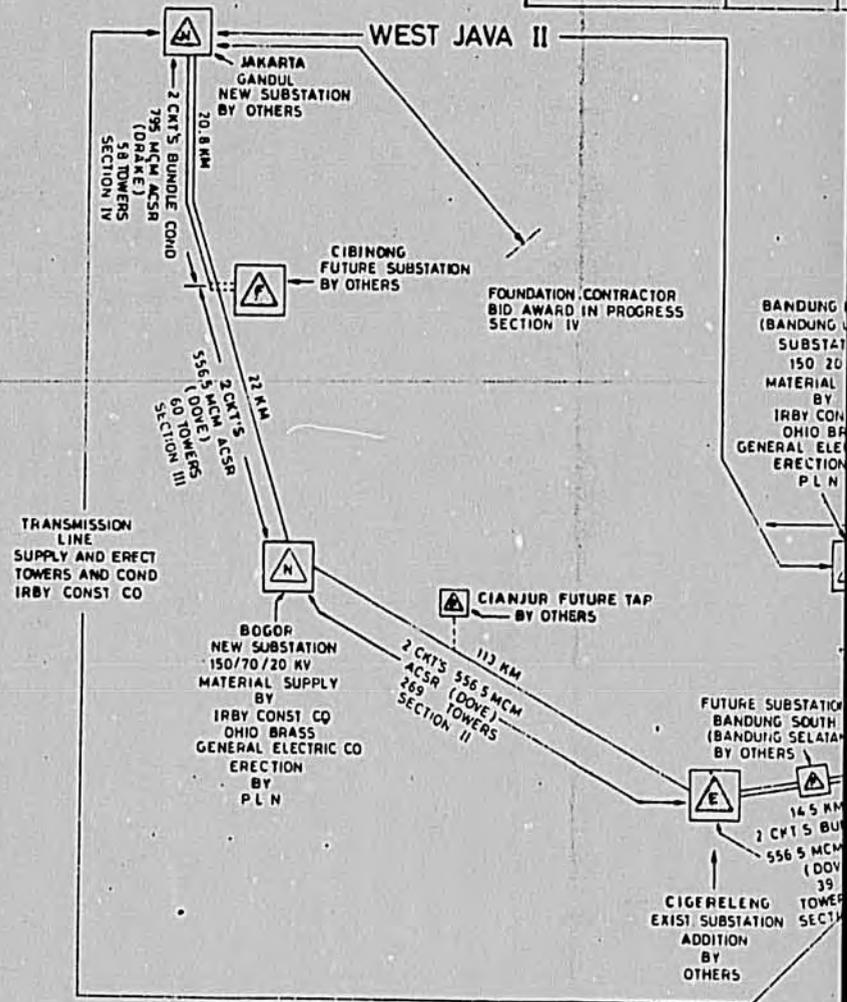
### Status of Material Shipments

<u>Contract Number</u>	<u>Contractor/ Supplier</u>	<u>US \$ Value of Material</u>		<u>Percent of Total</u>
		<u>Total Material</u>	<u>Received through 30 Sep. '81</u>	
Pj. 152/PST/77	Irby	6,464,590.34	6,464,577.34	100 %
Pj. 153/PST/77	Irby	2,902,946.03	2,902,946.03	100 %
Pj. 202/PST/77	Copperweld	294,739.06	294,732.90	100 %
Pj. 203/PST/77	Southwire	1,991,843.83	1,991,843.83	100 %
Pj. 050/PST/78	Tension Stringing	400,636.37	400,636.37	100 %
Pj. 051/PST/78	Ohio Brass	175,704.00	175,704.00	100 %
Pj. 052/PST/78	Irby	9,528,735.98	9,460,168.54	99 %
Pj. 053/PST/78	General Electric	6,467,900.75	6,467,900.75	100 %
Pj. 087/PST/78	Motorola	369,186.55	369,186.55	100 %

SECTION VI  
TRAINING ACTIVITIES

1. PLN Substation personnel continue to be trained in the installation and adjustment of substation electrical equipment.

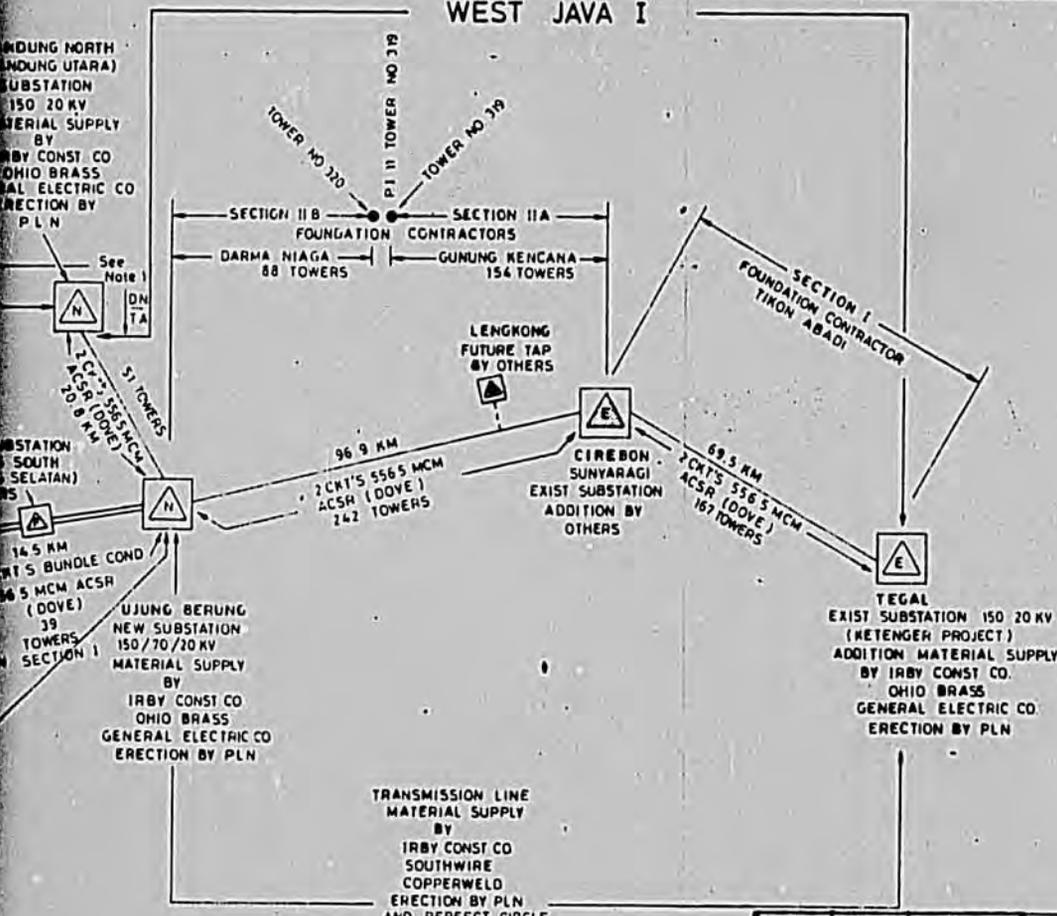
CONTRACTOR	CONTRACT NO.
COPPERWELD	PJ 202/PS1/77
IRBY CONST CO	PJ 153/PS1/77
IRBY CONST CO	PJ 052/PS1/77
IRBY CONST CO	PJ 052/PS1/77
IRBY CONST CO	PJ 152/PS1/77
GENERAL ELECTRIC CO	PJ 053/PS1/77
MOTOROLA	PJ 087/PS1/78
OHIO BRASS	PJ 051/PS1/77
SOUTHWIRE	PJ 203/PS1/77
TENSION STRINGING INC.	PJ 050/PS1/77
SUMBER JAYA	SPJ 016/PLN/P1-RING/77
P.T. ARCON	SPJ 017/PLN/P1-RING/77
SAHABAT AGUNG	SPJ 017/PLN/P1-RING/79-80
AMARTA KARYA	SPJ 018/PLN/P1-RING/79-80



-  EXIST SUBSTATION ADDITION BY C.T.M.
-  FUTURE SUBSTATION OR TAP BY OTHERS
-  NEW SUBSTATION BY C.T.M.
-  NEW SUBSTATION BY OTHERS
-  EXIST SUBSTATION ADDITION BY OTHERS

## WEST JAVA CONTRACTORS

ACT NO	LOCATION	FUNCTION	DESCRIPTION	CONTRACTOR	CONTRACT NO	LOCATION	FUNCTION	DESCRIPTION
ST/77	WEST JAVA I	SUPPLY	SHIELD WIRE	TINON ABADI	SPJ 002/PLN/PI RING / 77	WEST JAVA I	CONSTRUCT.	FOUNDATIONS SEC I
ST/77	WEST JAVA I	SUPPLY	STEEL HARDWARE	GUNUNG KENCANA	SPJ 003/PLN/PI RING / 77	WEST JAVA I	CONSTRUCT.	FOUNDATIONS SEC IIA
ST/77	WEST JAVA I II	SUPPLY	SUBSTATION EQUIPMENT	DHARMA NIAGA	SPJ 004/PLN/PI RING / 77	WEST JAVA I	CONSTRUCT.	FOUNDATIONS SEC. IIB & III
ST/77	WEST JAVA I	SUPPLY	TOOLS EQUIPMENT	CITAC LTD	SPJ 005/PLN/PI RING / 77-78	WEST JAVA II	CONSTRUCT.	FOUNDATIONS SEC II & III
ST/77	WEST JAVA II	SUPPLY ERECT	TOWERS HARDWARE COND	CITAC LTD	SPJ 006/PLN/PI RING / 78-79	WEST JAVA II	CONSTRUCT.	FOUNDATIONS SEC I
ST/77	WEST JAVA I II	SUPPLY	CIR. BKR SW-GEAR	PERFECT CIRCLE	SPJ 007/PLN/PI RING / 78-79	WEST JAVA I	ERECT	TOWERS
ST/78	WEST JAVA I II	SUPPLY	MOBILE RADIO SYSTEM	SANTRACO RAYA	SPJ 065/SP/PI-RING/ATEHG/78-79	WEST JAVA I	CIVIL WORK	TEGAL SUBSTATION
ST/77	WEST JAVA I II	SUPPLY	LIGHTNING ARRESTERS	SIGMA TIRTA	SPJ 022/SP/PI-RING/ATEHG/78-79	WEST JAVA I	ERECT	TEGAL SUBSTATION
ST/77	WEST JAVA I	SUPPLY	ALUM. COND	CITAC LTD	SPJ 009/PLN/PI RING / 79-80	WEST JAVA II	CONSTRUCTION	FOUNDATIONS IV C
ST/77	WEST JAVA I II	SUPPLY	TENSION STRINGING EQUIP	CITAC LTD	SPJ 010/PLN/PI RING / 79-80	WEST JAVA II	CONSTRUCTION	FOUNDATIONS IV A
PLN/PI	WEST JAVA I & II	SUPPLY	GROUNDING MATERIAL	CITAC LTD	SPJ 011/PLN/PI RING / 79-80	WEST JAVA I	STRINGING	CONDUCTOR SEC. III
PLN/PI	WEST JAVA I & II	SUPPLY	STUB ANGLES	SILKAR NATIONAL	SPJ 012/PLN/PI RING / 79-80	WEST JAVA I	STRINGING	CONDUCTOR SEC. I
PLN/PI	WEST JAVA II	SUPPLY	STUB ANGLES	P.T. ERSES	SPJ 001/PLN/PI RING / 79-80	WEST JAVA I	CIVIL WORK	UJUNGBERUNG SUBSTATION
PLN/PI	WEST JAVA II	CONSTRUCT.	FOUNDATIONS SEC. IV B	P.T. ERSES	SPJ 008/PLN/PI RING / 80-81	WEST JAVA I	CONTROL HOUSE	UJUNGBERUNG SUBSTATION
				P.T. PEMBANGUNAN PERUMAHAN	SPJ 008/PLN/PI RING / 80-81	WEST JAVA II	CIVIL WORK	BANDUNG UTARA SUBSTATION
				P.T. PERFECT CIRCLE	SPJ 004/PLN/PI RING / 80-81	WEST JAVA II	CONTROL HOUSE	BANDUNG UTARA SUBSTATION
				P.T. PERFECT CIRCLE	SPJ 007/PLN/PI RING / 80-81	WEST JAVA II	CIVIL WORK	BOGOR SUBSTATION
				P.T. PERFECT CIRCLE	SPJ 007/PLN/PI RING / 80-81	WEST JAVA II	CONTROL HOUSE	BOGOR SUBSTATION
				P.T. HUTAMA KARYA	SPJ 037/PLN/PI RING / 79-80	WEST JAVA II	ACCESS ROAD	BANDUNG UTARA SUBSTATION
				BUANA POWER	SPJ 017/PLN/PI RING /	WEST JAVA II	ACCESS ROAD	BOGOR SUBSTATION
				DHARMA NIAGA	SPJ 013/PLN/PI RING / 80-81	WEST JAVA I	CONSTRUCTION	UJUNGBERUNG SUBSTATION TRANSMISSION LINE BY-PASS
				DHARMA NIAGA	SPJ 013/PLN/PI RING / 80-81	WEST JAVA II	CONSTRUCTION	BOGOR SUBSTATION TRANSMISSION LINE BY-PASS
				P.T. CITACONTRAC	SPJ 007/PLN/PI RING / 80-81	WEST JAVA I	CONSTRUCTION	TOWER CAISSON
				P.T. CITACONTRAC	SPJ 003/PLN/PI RING / 81	WEST JAVA I	ERECTION	RELOCATE TOWERS



- Notes:**
- Bandung North Substation material in West Java II contract. Transmission line from Ujung Berung to Bandung North in West Java I contract.

REV NO	DATE	REASON FOR	SCALE
1	1977/01	REV. COMT BLOC	SCALE NONE
2	1977/01	REV. COMT BLOC	SCALE NONE
3	1977/01	REV. COMT BLOC	SCALE NONE
4	1977/01	REV. COMT BLOC	SCALE NONE
5	1977/01	REV. COMT BLOC	SCALE NONE
6	1977/01	REV. COMT BLOC	SCALE NONE
7	1977/01	REV. COMT BLOC	SCALE NONE
8	1977/01	REV. COMT BLOC	SCALE NONE
9	1977/01	REV. COMT BLOC	SCALE NONE

**BLOCK DIAGRAM WEST JAVA I-II**

PERUSAHAAN UMUM LISTRIK NEGARA  
PROYEK INDIK JARINGAN JAWA BARAT DAN JAKARTA RAYA

**MAIN**

CHAS I MAIN INTERNATIONAL INC  
CHARLOTTE GABORNA  
ROBIN CAROLINA USA

SCALE NONE  
**CTM-SK 001**

NO.	WORK ITEM	(A) ALLOCATION OF FUNDS	THRU 1976	1977		
				1	2	3
	TOTAL	17,198	1089	127	130	128
1	150 KV TRANSMISSION SUPPLY	-				
1A	CONDUCTOR	2,004				
1B	SHIELD WIRE	297				
1C	TOWERS AND ACCESSORIES	2,920				
2	150 KV SUBSTATION SUPPLY	-				
2A	TRANSFORMERS AND DESIGN	3,229				
2B	CIRCUIT BREAKERS AND SWITCHGEAR	2,541				
2C	LIGHTNING ARRESTERS	88				
3	TOOLS AND EQUIPMENT SUPPLY	-				
3A	VEHICLES AND TOOLS	1,474				
3B	TENSIONING EQUIPMENT	402				
4	MOBILE RADIO SUPPLY	397				
5	CONST. MANAGEMENT SERVICES	3,846	1089	127	130	128

(A) INCLUDES FUNDS COMMITTED, IN PROCESS OF BEING COMMITTED and BANK CHARGES UNCOMMITTED  
TOTAL LOAN

**WEST JAVA I PROJECT  
FINANCIAL PLAN AND CASH FLOW  
U.S. DOLLARS (000)**

	(A) ALLOCATION OF FUNDS	FUNDS REQUIRED TO COMPLETE																
		THRU 1975	1977				1978				1979				1980			
			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	
	17,198	1089	127	130	128	214	202	553	1661	3165	5450	1708	919	437	362	175	22	
	-																	
	2,004									506	1005	394	-	-	88	-		
	297							282	-	-	-	-	15					
	2,920									1081	417	992	57	172	-	15	16	
	-																	
	3,229									588	1390	828	100	-	-	23	50	
	2,541								72	1144	1197	-	-	-	-	40	5	
	88												88					
	-																	
	1,474								243	-	299	244	350	235	93	10		
	402										317	-	-	53	28	-		
	397									288	63	-	24	-	-	5		
ES	3,846	1089	127	130	128	214	202	271	265	222	187	185	170	149	138	81	12	

AMOUNT OF FUNDS REQUIRED TO BE COMMITTED and BANK CHARGES	\$ 17,198	SPENT TO DATE	\$ 17,146
UNCOMMITTED	2	NEED TO COMPLETE	52
TOTAL LOAN	<u>\$ 17,200</u>	UNCOMMITTED	2
		TOTAL LOAN	<u>\$ 17,200</u>

PROJECT  
AND CASH FLOW  
\$ (000)

EXHIBIT 1A

FUNDS REQUIRED TO COMPLETE PROJECT																		
1978			1979				1980				1981				1982			
2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
553	1661	3165	5450	1708	919	437	362	175	225	370	216	15	-	47	5	-	-	-
		506	1005	394	-	-	88	-	-	11								
282	-	-	-	-	15													
	1081	417	992	57	172	-	15	16	-	-	170							
		588	1390	828	100	-	-	23	50	250								
72	1144	1197	-	-	-	-	-	40	54	34								
				88														
	243	-	299	244	350	235	93	10										
			317	-	-	53	28	-	-	-	4							
		288	63	-	24	-	-	5	-	-	-	15	-	2				
271	265	222	187	185	170	149	138	81	121	75	42	-	-	45	5	-	-	-

SPENT TO DATE \$ 17, 146  
 NEED TO COMPLETE 52  
 UNCOMMITTED 2  
 TOTAL LOAN \$ 17, 200

CHAS. T. MAIN INTERNATIONAL, INC.

No.	WORK ITEM	WEIGHTED PERCENT OF PROJECT	ITEM PERCENT COMPLETED	PROJECT PERCENT COMPLETED	THRU 1976	1977		
						1	2	3
	<b>TOTAL</b>	<b>100.0</b>	<b>-</b>	<b>99.7</b>				
1A	CONDUCTOR	11.7	100.0	11.7				
1B	SHIELD WIRE	1.7	100.0	1.7				
1C	TOWERS AND ACCESSORIES	17.0	100.0	17.0				
2A	TRANSFORMERS & DESIGN	18.8	100.0	18.8				
2B	CIRCUIT BREAKERS SWITCHGEAR	14.8	100.0	14.8				
2C	LIGHTNING ARRESTERS	0.5	100.0	0.5				
3A	VEHICLES AND TOOLS	8.5	100.0	8.5				
3B	TENSIONING EQUIPMENT	2.3	100.0	2.3				
4	MOBILE RADIO	2.3	99.5	2.3				
5	CONST. MANAGEMENT	22.4	98.7	22.1				

----- SCHEDULED

————— ACTUAL

←----- SCHEDULED -----→

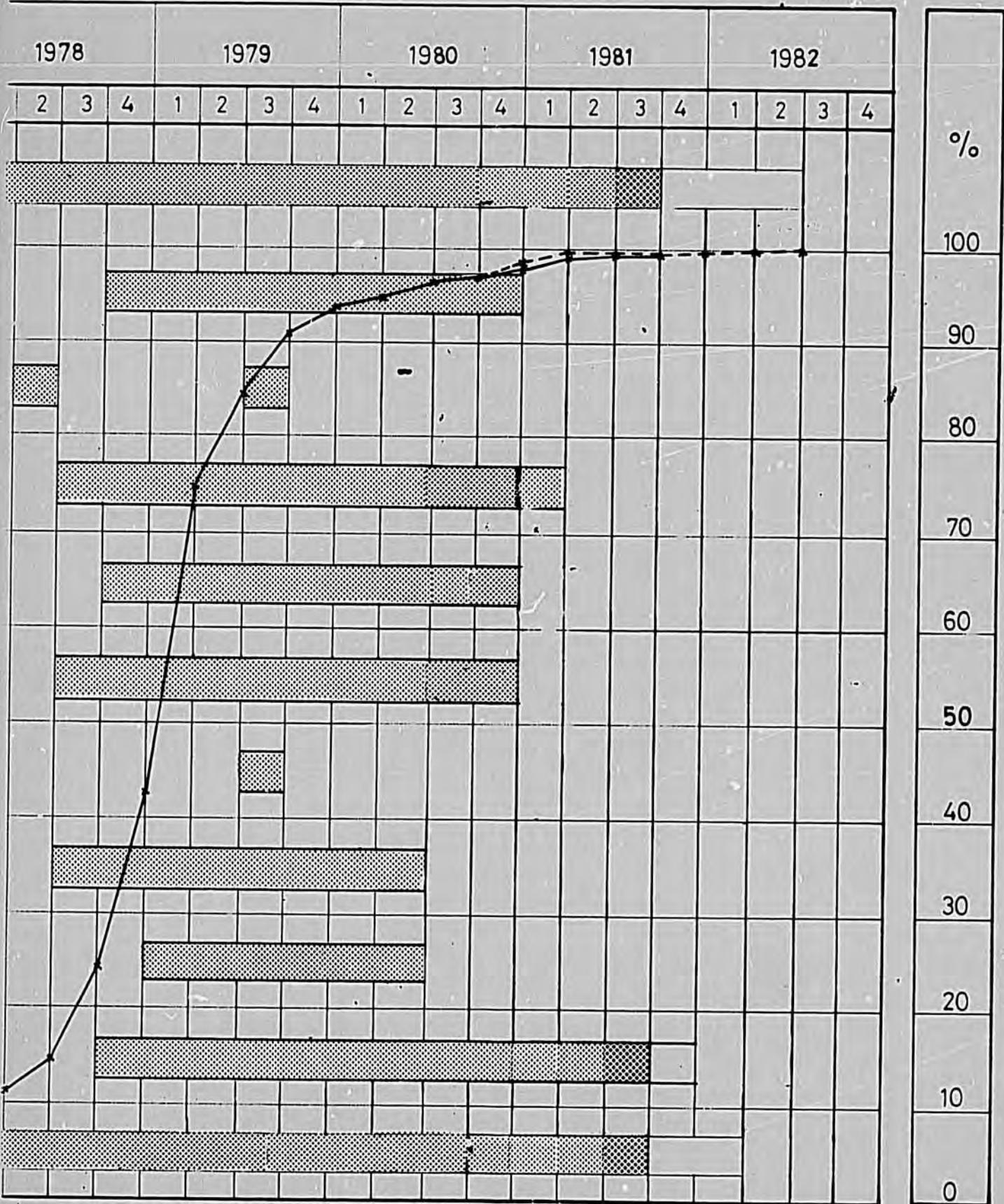


←----- ACTUAL -----→



# I PROJECT SCHEDULE LARS

EXHIBIT 1B



NO.	WORK ITEM	ALLOCATION OF FUNDS	THRU 1976	1977		
				1	2	3
	TOTAL	2.577	78	7	10	9
1	150 KV TRANSMISSION	-				
1A	FOUNDATIONS	570				
1B	TOWER ERECTION	133				
1C	WIRE STRINGING	292				
2	150 KV SUBSTATIONS	-				
2A	CIVIL WORK	515				
2B	CONTROL BUILDINGS	200				
2C	STRUCTURE ERECTION	26				
3	MOBILE RADIO	5				
4	WAREHOUSE AND STOREYARD	262				
5	TEMPORARY - BY PASS	19				
6	CONSTRUCTION MGT. SERVICES	555	78	7	10	9

**WEST JAVA I PROJECT  
FINANCIAL PLAN AND CASH FLOW  
INDONESIAN RUPIAH (000.000)**

N	FUNDS REQUIRED TO COMPLETE															
	THRU 1976	1977				1978				1979				1980		
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3
	78	7	10	9	9	206	237	207	16	171	13	126	42	232	222	20
						127	121	101	-	103	-	65	12	41		
										53	-	50	3	15	12	
														105	145	4
														50	50	4
																64
													13	12	1	
													2	3		
						62	100	100								
	78	7	10	9	9	17	16	6	16	15	13	11	12	6	14	4

From

PROJECT  
 ID CASH FLOW  
 (000,000)

EXHIBIT 1C

FUNDS REQUIRED TO COMPLETE PROJECT

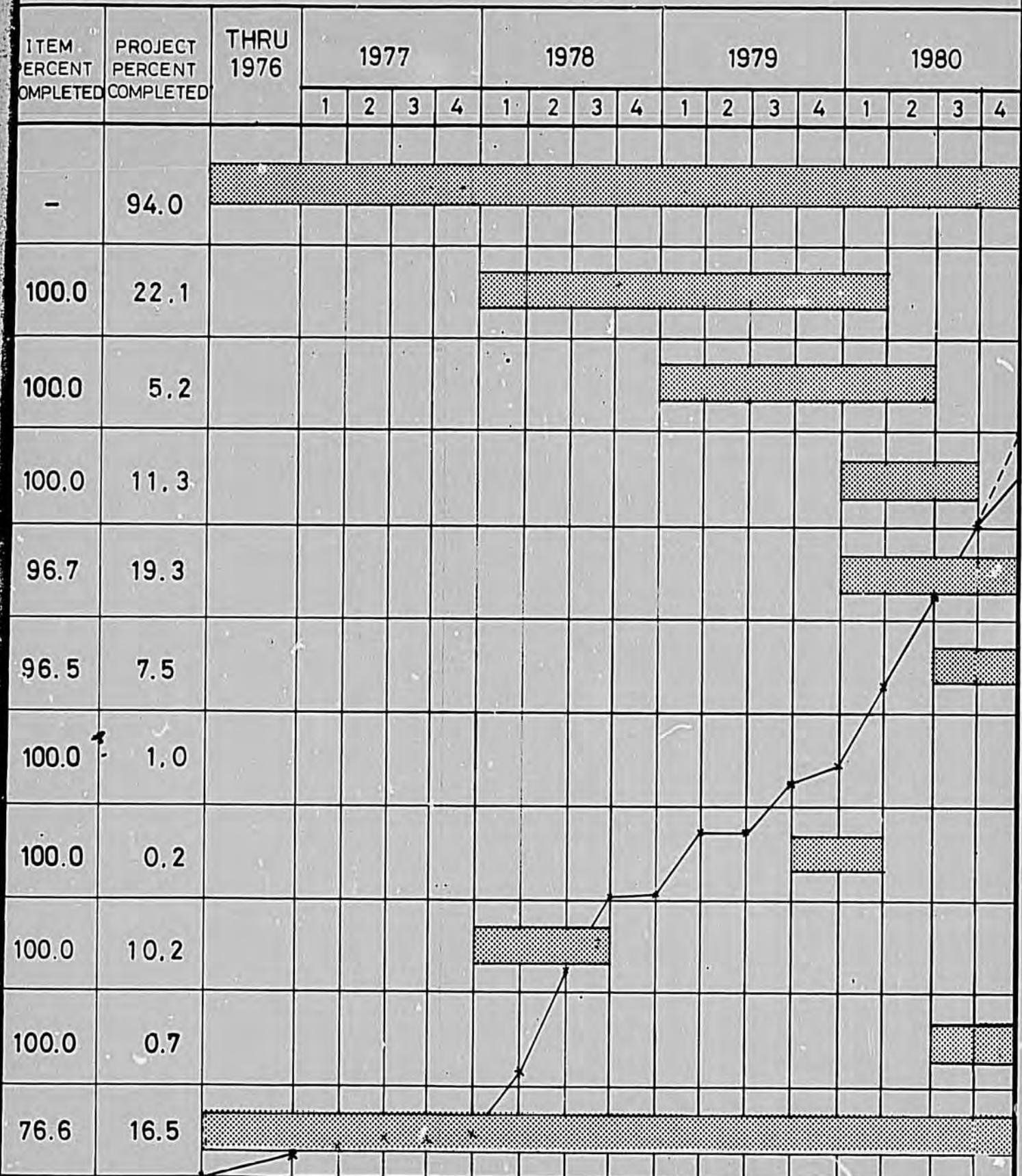
1978			1979				1980				1981				1982			
2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
237	207	16	171	13	126	42	232	222	209	162	247	140	80	99	37	18		
121	101	-	103	-	65	12	41											
			53	-	50	3	15	12										
							105	145	42									
							50	50	49	111	148	70	20	17				
									64	24	48	32	25	7				
						13	12	1										
						2	3											
100	100																	
									6		13							
16	6	16	15	13	11	12	6	14	48	27	38	38	35	75	37	18		

No.	WORK ITEM	WEIGHTED PERCENT OF PROJECT	ITEM PERCENT COMPLETED	PROJECT PERCENT COMPLETED	THRU 1976	1977		
						1	2	3
	<b>TOTAL</b>	100.0	-	94.0				
1A	FOUNDATIONS	22.1	100.0	22.1				
1B	TOWER ERECTION	5.2	100.0	5.2				
1C	WIRE STRINGING	11.3	100.0	11.3				
2A	CIVIL WORK	20.0	96.7	19.3				
2B	CONTROL BUILDINGS	7.8	96.5	7.5				
2C	STRUCTURE ERECTION	1.0	100.0	1.0				
3	MOBILE RADIO	0.2	100.0	0.2				
4	WAREHOUSE & STOREYARD	10.2	100.0	10.2				
5	TEMPORARY BY-PASS	0.7	100.0	0.7				
6	CONST. MANAGEMENT	21.5	76.6	16.5				

----- SCHEDULED  
 \_\_\_\_\_ ACTUAL



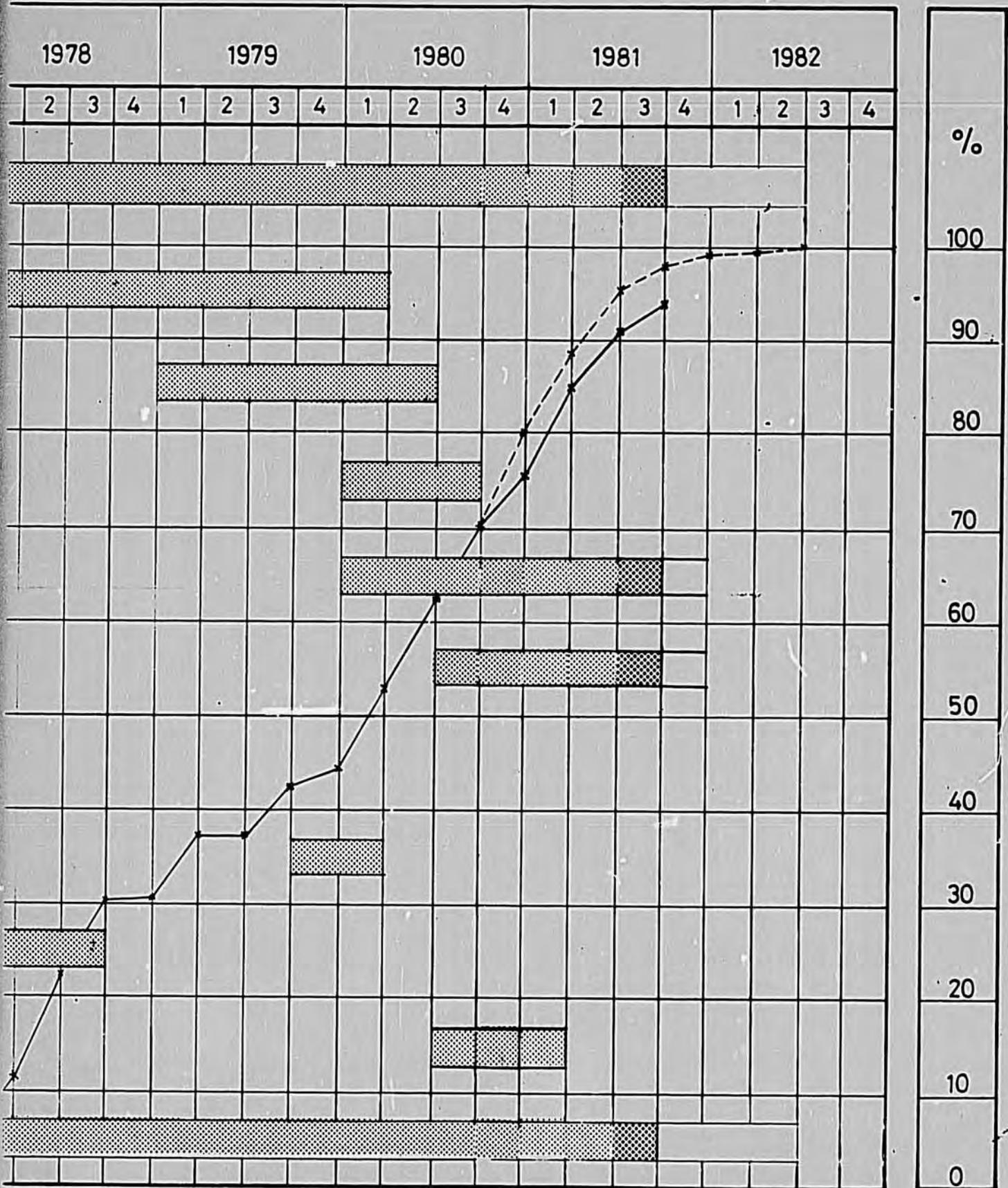
# WEST JAVA I PROJECT PROGRESS SCHEDULE INDONESIAN RUPIAH



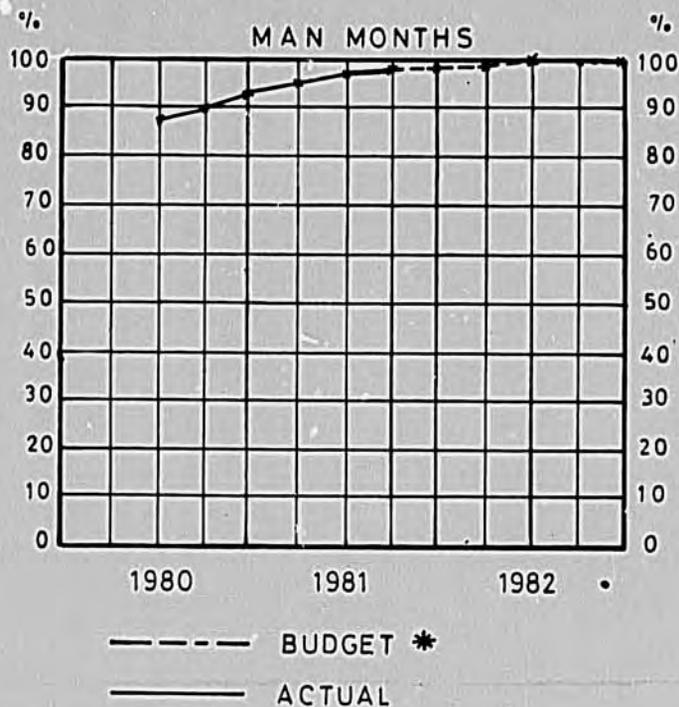
SCHEDULED

# I PROJECT SCHEDULE N RUPIAH

EXHIBIT ID

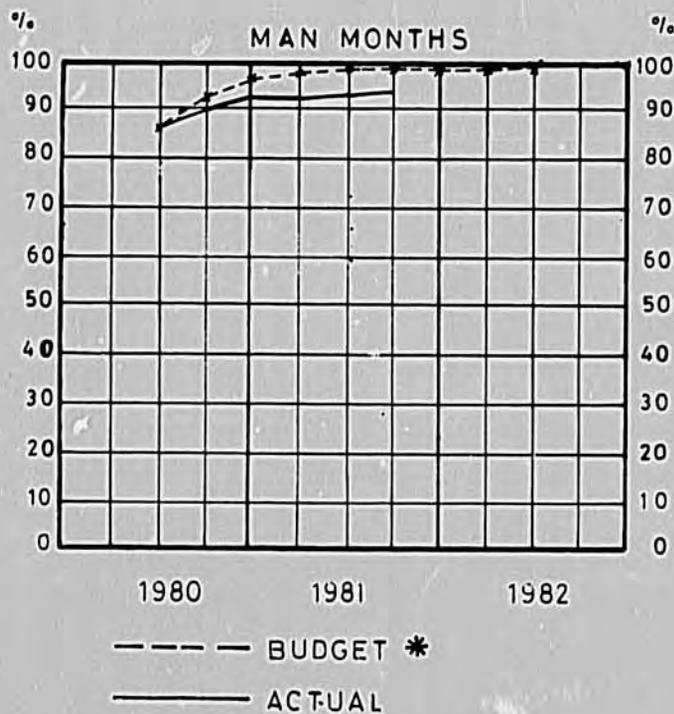


TOTAL FIELD STAFF



	MAN MONTHS			SALARIES	
	BUD	ACT	%	BUD	ACT
PREVIOUS	465	463	100	1033	1015
THIS PERIOD	6	9	150	19	23
TOTAL TO DATE	471	472	100	1052	1038
TOTAL CONTRACT	480	472	98	1083	1038

ENGINEERING ONLY



	MAN MONTHS			SALARIES	
	BUD	ACT	%	BUD	ACT
PREVIOUS	116	110	95	261	245
THIS PERIOD	1	1	100	4	3
TOTAL TO DATE	117	111	95	265	248
TOTAL CONTRACT	118	111	94	269	248

# WEST JAVA I FIELD STAFF MAN MONTHS & SALARIES BUDGET VS ACTUAL

AS OF 10 SEPTEMBER 1981

## FIELD STAFF

## CONSTRU

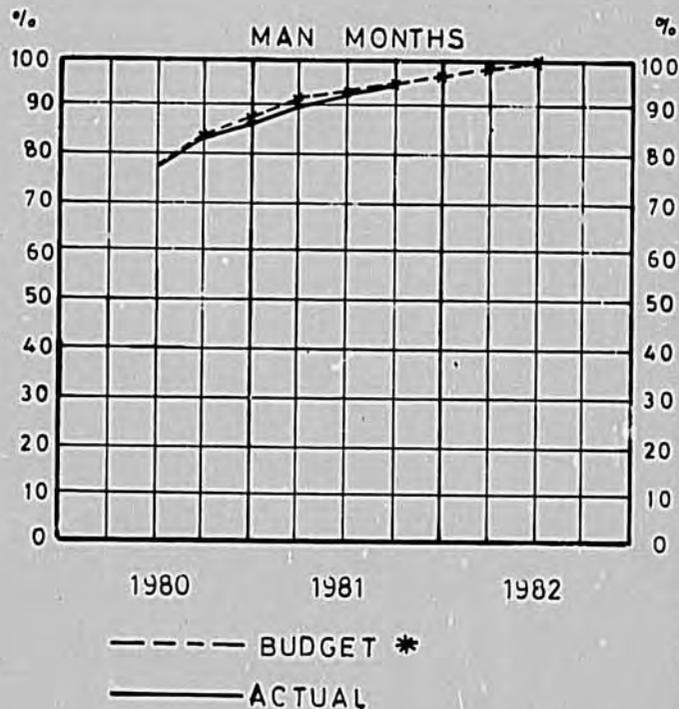
	MAN MONTHS			SALARIES (000)		
	BUD	ACT	%	BUD	ACT	%
PREVIOUS	465	463	100	1033	1015	98
THIS PERIOD	6	9	150	19	23	121
TOTAL TO DATE	471	472	100	1052	1038	99
TOTAL CONTRACT	480	472	98	1083	1038	96



## ENGINEERING ONLY

## ADMINI

	MAN MONTHS			SALARIES (000)		
	BUD	ACT	%	BUD	ACT	%
PREVIOUS	116	110	95	261	245	94
THIS PERIOD	1	1	100	4	3	75
TOTAL TO DATE	117	111	95	265	248	94
TOTAL CONTRACT	118	111	94	269	248	92



# T JAVA I AN MONTHS & SALARIES VS ACTUAL

EXHIBIT I E

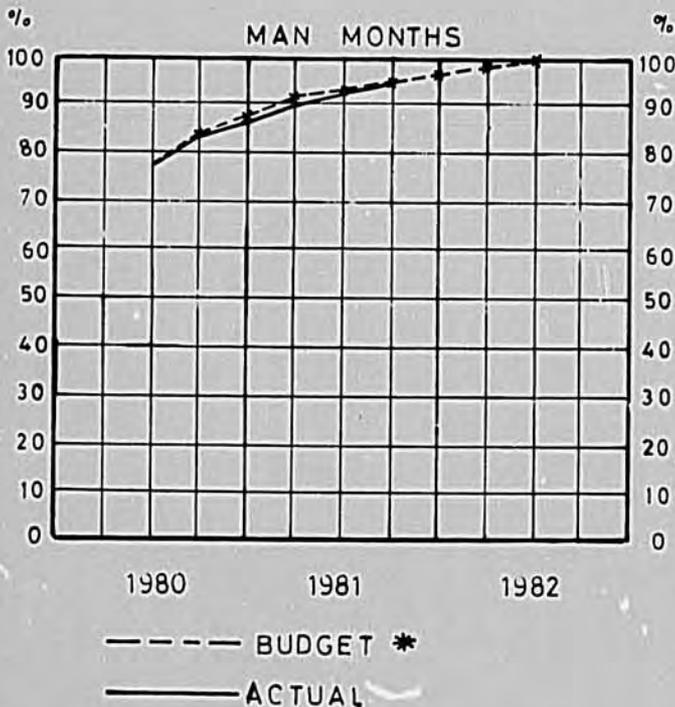
10 SEPTEMBER 1981

## CONSTRUCTION ONLY



	MAN MONTHS			SALARIES (000)		
	BUD	ACT	%	BUD	ACT	%
PREVIOUS	255	260	102	516	524	102
THIS PERIOD	2	6	300	6	15	250
TOTAL TO DATE	257	266	104	522	539	103
TOTAL CONTRACT	261	266	102	535	539	101

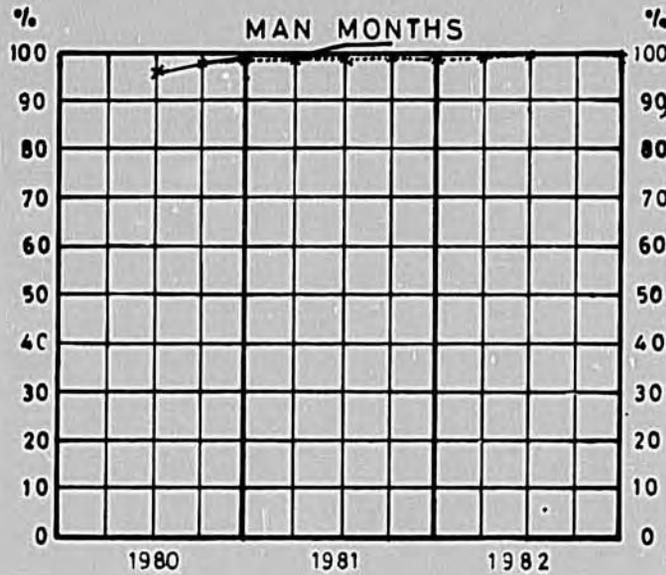
## ADMINISTRATION ONLY



	MAN MONTHS			SALARIES (000)		
	BUD	ACT	%	BUD	ACT	%
PREVIOUS	94	93	99	256	246	96
THIS PERIOD	3	2	67	9	5	56
TOTAL TO DATE	97	95	98	265	251	95
TOTAL CONTRACT	101	95	94	279	251	90

\* BUDGET DATA REVISED JULY 1, 1980

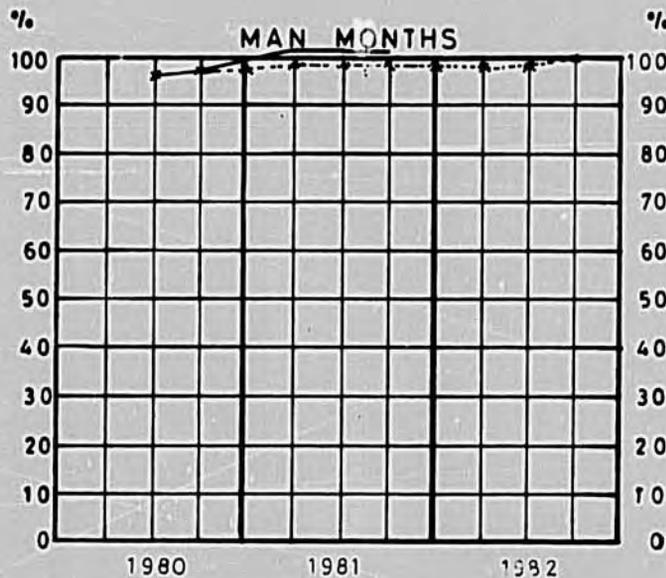
TOTAL HOME OFFICE



	MAN MONTHS			SALARIES	
	BUD	ACT	%	BUD	ACT
PREVIOUS	281	284	101	474	481
THIS PERIOD	1	1	100	2	2
TOTAL TO DATE	282	285	101	476	483
TOTAL CONTRACT	283	285	101	479	483

----- BUDGET \*  
————— ACTUAL

ENGINEERING ONLY



	MAN MONTHS			SALARIES	
	BUD	ACT	%	BUD	ACT
PREVIOUS	141	142	101	261	264
THIS PERIOD	-	-	-	-	-
TOTAL TO DATE	141	142	101	261	264
TOTAL CONTRACT	141	142	101	261	264

----- BUDGET \*  
————— ACTUAL

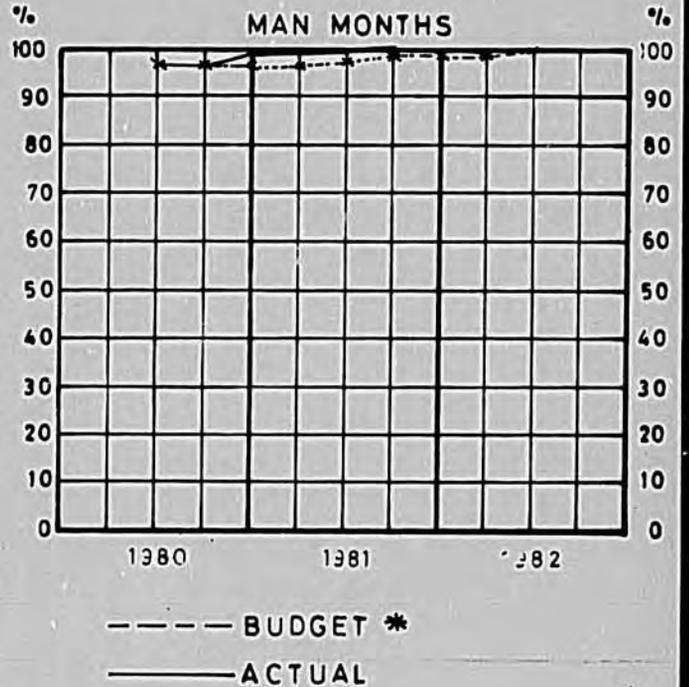
# WEST JAVA I HOME OFFICE MAN MONTHS & SALARIES BUDGET VS ACTUAL

AS OF 10 SEPTEMBER 1981

## HOME OFFICE

	MAN MONTHS			SALARIES(000)		
	BUD	ACT	%	BUD	ACT	%
PREVIOUS PERIOD	281	284	101	474	481	101
THIS PERIOD	1	1	100	2	2	100
TOTAL TO DATE	282	285	101	476	483	101
TOTAL CONTRACT	283	285	101	479	483	101

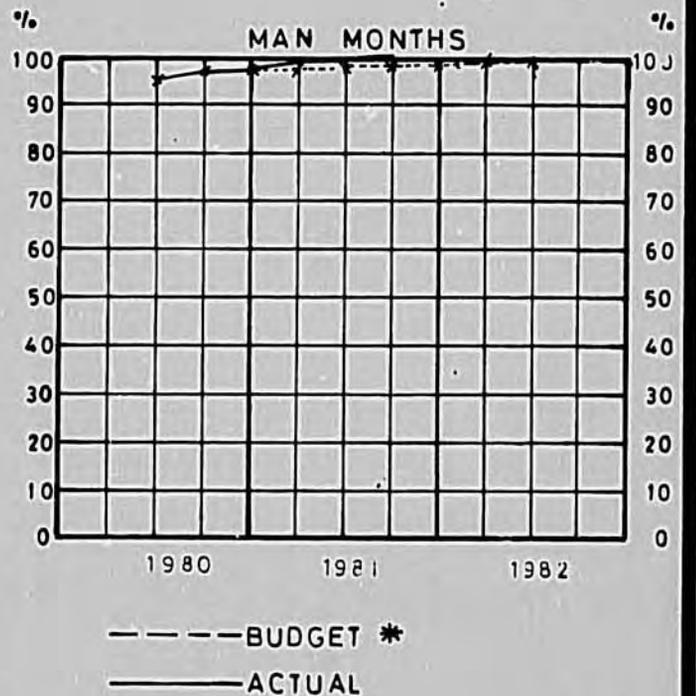
## SUPERVISOR



## TRAINING ONLY

	MAN MONTHS			SALARIES(000)		
	BUD	ACT	%	BUD	ACT	%
PREVIOUS PERIOD	141	142	101	261	264	101
THIS PERIOD	-	-	-	-	-	-
TOTAL TO DATE	141	142	101	261	264	101
TOTAL CONTRACT	141	142	101	261	264	101

## ADMINISTRATIVE

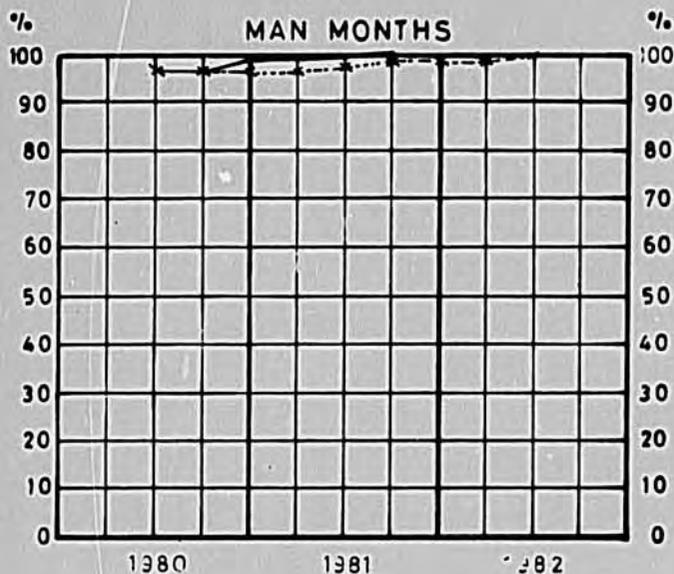


# T JAVA I AN MONTHS & SALARIES VS ACTUAL

EXHIBIT I F

10 SEPTEMBER 1981

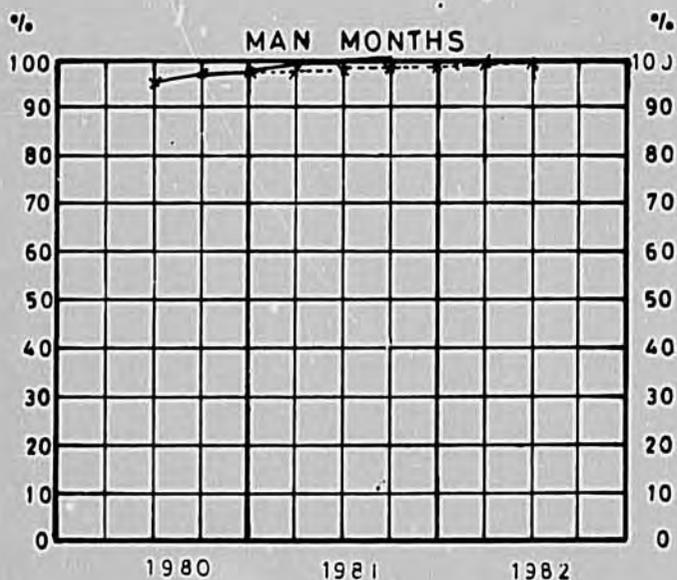
## SUPERVISION ONLY



	MAN MONTHS			SALARIES(000)		
	BUD	ACT	%	BUD	ACT	%
PREVIOUS	32	32	100	69	70	101
THIS PERIOD	-	-	-	-	-	-
TOTAL TO DATE	32	32	100	69	70	101
TOTAL CONTRACT	32	32	100	69	70	101

----- BUDGET \*  
————— ACTUAL

## ADMINISTRATION ONLY



	MAN MONTHS			SALARIES(000)		
	BUD	ACT	%	BUD	ACT	%
PREVIOUS	108	110	102	144	147	102
THIS PERIOD	1	1	100	2	2	100
TOTAL TO DATE	109	111	102	146	149	102
TOTAL CONTRACT	110	111	101	149	149	100

----- BUDGET \*  
————— ACTUAL

\* BUDGET DATA REVISED JULY 1, 1980

NO.	WORK ITEM	( A ) ALLOCATION OF FUNDS	THRU	
			1977	
	TOTAL	19,700	948	1
1	150 KV TRANSMISSION CONSTRUCTION			
1A	UJUNG - BERUNG TO CIGERELENG	1,323		
1B	CIGERELENG TO BOGOR	4,511		
1C	BOGOR TO CIBINONG	877		
1D	CIBINONG TO GANDUL	1,537		
2	150 KV SUBSTATION SUPPLY			
2A	TRANSFORMERS AND DESIGN	4,855		
2B	CIRCUIT BREAKERS AND SWITCHGEAR	3,986		
2C	LIGHTNING ARRESTERS	88		
3	ENGINEERING SERVICES	2,523	948	1

(A) INCLUDES FUNDS COMMITTED, IN PROCESS OF BEING COMMITTED and BANK OF INDONESIA UNCOMMITTED TOTAL



PROJECT  
CASH FLOW  
(000 )

EXHIBIT II A

FUNDS REQUIRED TO COMPLETE PROJECT

	1979				1980				1981				1982				
	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
08	1822	4462	1783	1712	1158	1444	458	990	280	3	45	26	19				
				512	358	453											
02	344	770	28	90	77												
2	67	50	-	23	40	30	45										
				593	416	299	126	53	47	3							
	153	2643	530	254	129	122	261	505	207		45	6					
	1048	869	1077	-	14	437	-	379	26			20	19				
				88													
7	210	130	148	152	124	103	26	53									

\$ 19,700

SPENT TO DATE

\$ 19,681

NEED TO COMPLETE

19

\$ 19,700

UNCOMMITTED

-

TOTAL LOAN

\$ 19,700

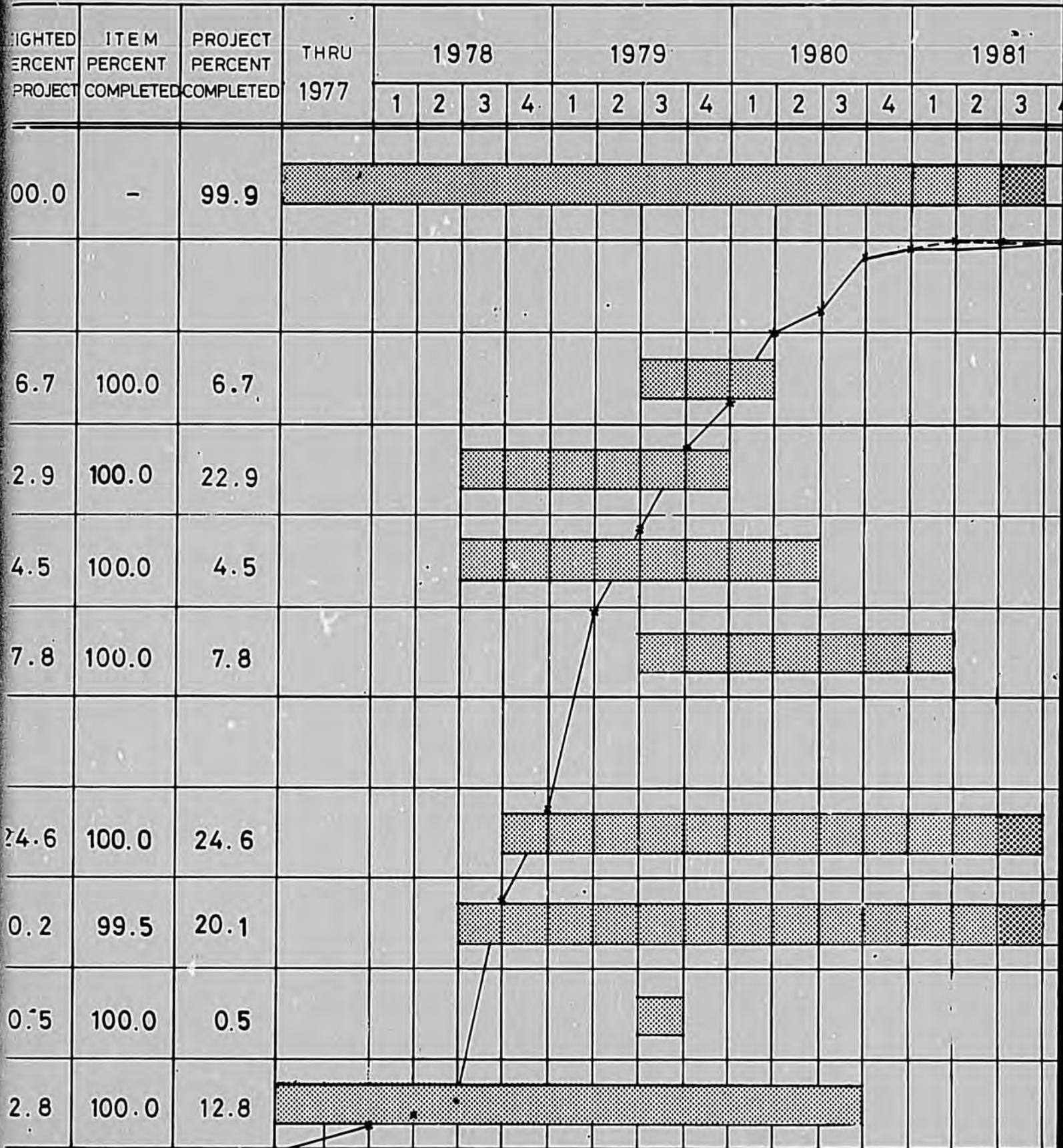
CHAS. T. MAIN INTERNATIONAL, INC.

NO.	WORK ITEM	WEIGHTED PERCENT OF PROJECT	ITEM PERCENT COMPLETED	PROJECT PERCENT COMPLETED	THRU 1977	197	
						1	2
	TOTAL	100.0	-	99.9			
1	150KV. TRANSMISSION CONSTRUCTION						
1A	UJUNGBERUNG TO CIGERELENG	6.7	100.0	6.7			
1B	CIGERELENG TO BOGOR	22.9	100.0	22.9			
1C	BOGOR TO CIBINONG	4.5	100.0	4.5			
1D	CIBINONG TO GANDUL	7.8	100.0	7.8			
2	150KV. SUBSTATION SUPPLY						
2A	TRANSFORMERS AND DESIGN	24.6	100.0	24.6			
2B	CIRCUIT BREAKERS AND SWITCHGEAR	20.2	99.5	20.1			
2C	LIGHTNING ARRESTERS	0.5	100.0	0.5			
3	ENGINEERING SERVICES	12.8	100.0	12.8			

----- SCHEDULED  
 \_\_\_\_\_ ACTUAL

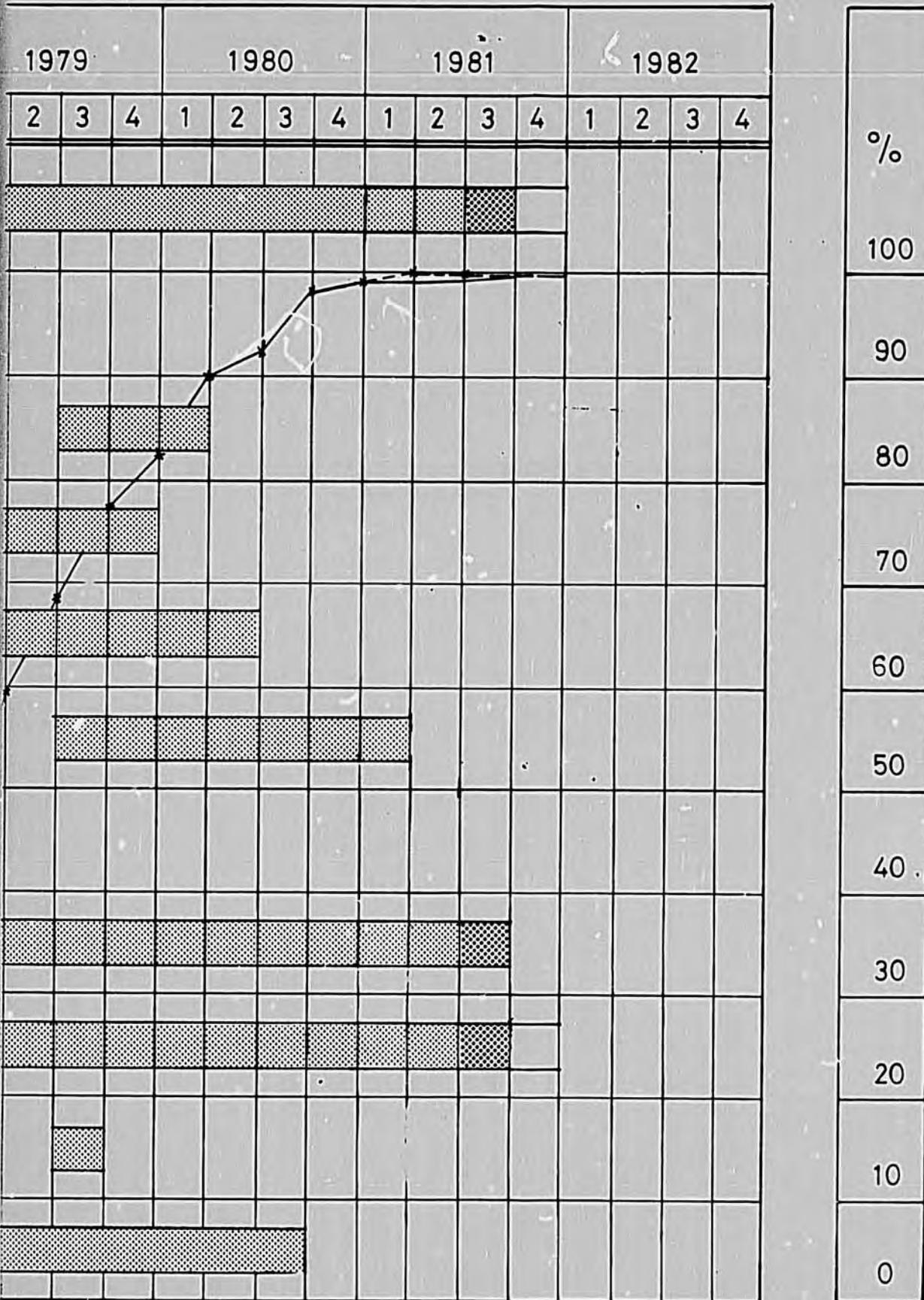
← SCHEDULED →  
  
 ← ACTUAL →

# WEST JAVA II PROJECT PROGRESS SCHEDULE US DOLLARS



- SCHEDULED →  
 [Shaded box] [White box]  
 TUAL →

I PROJECT  
 SCHEDULE  
 DOLLARS



NO.	WORK ITEM	ALLOCATION OF FUNDS	THRU
			1977
	<b>TOTAL</b>	<b>3,177</b>	<b>63</b>
1	150 KV TRANSMISSION		
1A	FOUNDATIONS UJUNG BERUNG TO CIGERELENG	175	
1B	FOUNDATIONS CIGERELENG TO BOGOR	269	
1C	FOUNDATIONS BOGOR TO CIBINONG	60	
1D	FOUNDATIONS CIBINONG TO GANDUL	174	
1E	LINE CONSTRUCTION	469	
2	150 KV SUBSTATIONS	-	
2A	CIVIL WORK	852	
2B	CONTROL BUILDINGS	443	
3	MOBILE RADIO	5	
4	ENGINEERING SERVICES	719	63
5	TEMPORARY BY-PASS	11	



II PROJECT  
AND CASH FLOW  
RUPIAH (000,000)

EXHIBIT IIC

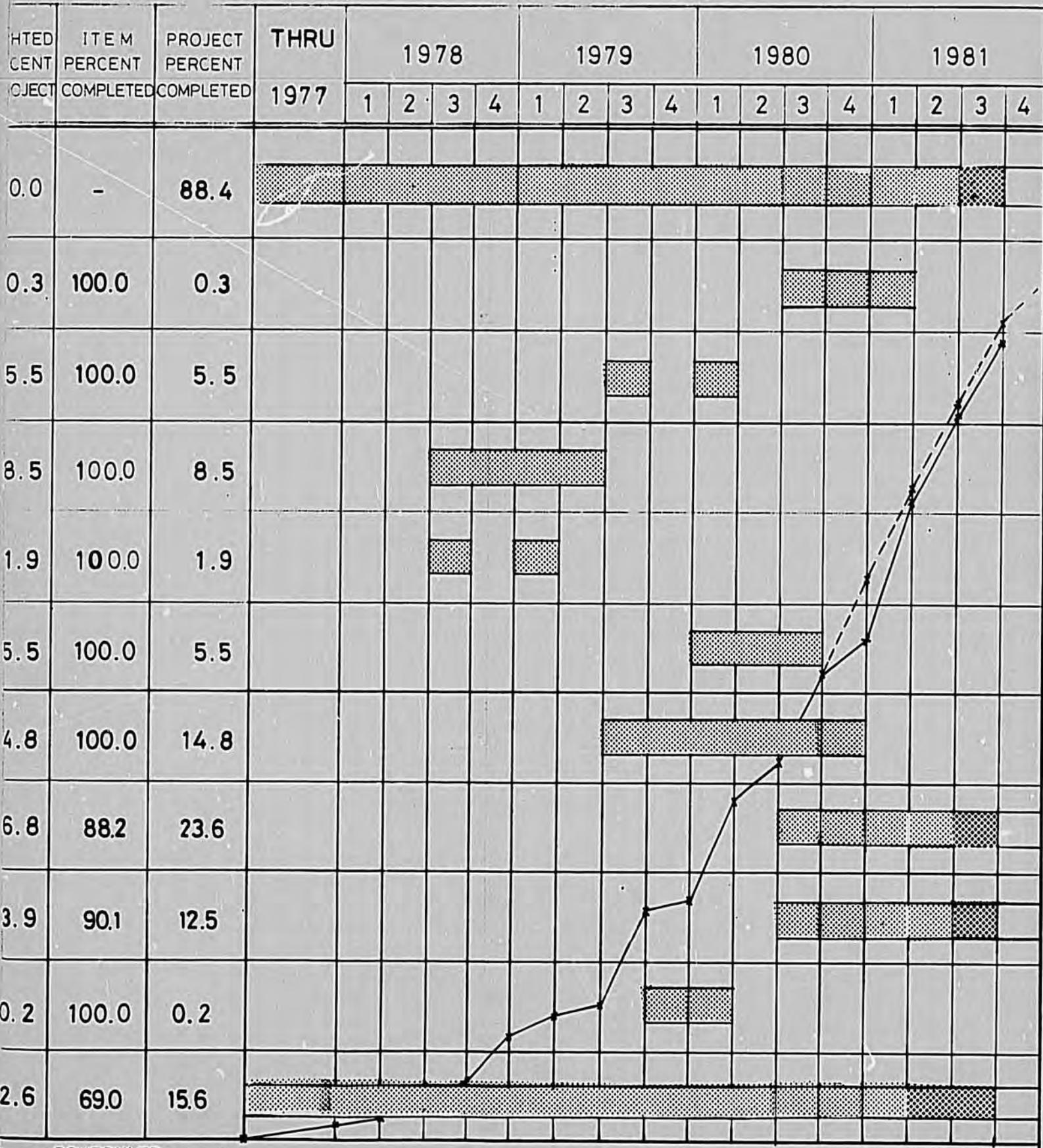
FUNDS REQUIRED TO COMPLETE PROJECT

		1979				1980				1981				1982			
3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
3	178	47	30	347	60	319	118	326	137	498	285	243	235	75	57		
				166	-	9											
2	169	12	16														
3	-	27															
						139	24	11									
				164	49	153	84	16	3								
								164	52	333	103	100	100				
								89	-	75	130	105	44				
					2	3											
8	9	8	14	17	9	15	10	37	82	90	50	38	91	75	57		
								9			2						

NO.	WORK ITEM	WEIGHTED PERCENT OF PROJECT	ITEM PERCENT COMPLETED	PROJECT PERCENT COMPLETED	THRU 1977	1978		
						1	2	3
	TOTAL	100.0	-	88.4				
5.	TEMPORARY BY-PASS	0.3	100.0	0.3				
1A	FOUNDATIONS UJUNGBERUNG TO CIGERELENG	5.5	100.0	5.5				
1B	FOUNDATIONS CIGERELENG TO BOGOR	8.5	100.0	8.5				
1C	FOUNDATIONS BOGOR TO CIBINONG	1.9	100.0	1.9				
1D	FOUNDATIONS CIBINONG TO GANDUL	5.5	100.0	5.5				
1E	LINE CONSTRUCTION	14.8	100.0	14.8				
2A	SUBSTATION CIVIL WORK	26.8	88.2	23.6				
2B	SUBSTATION CONTROL BUILDINGS	13.9	90.1	12.5				
3	MOBILE RADIO	0.2	100.0	0.2				
4	ENGINEERING SERVICES	22.6	69.0	15.6				



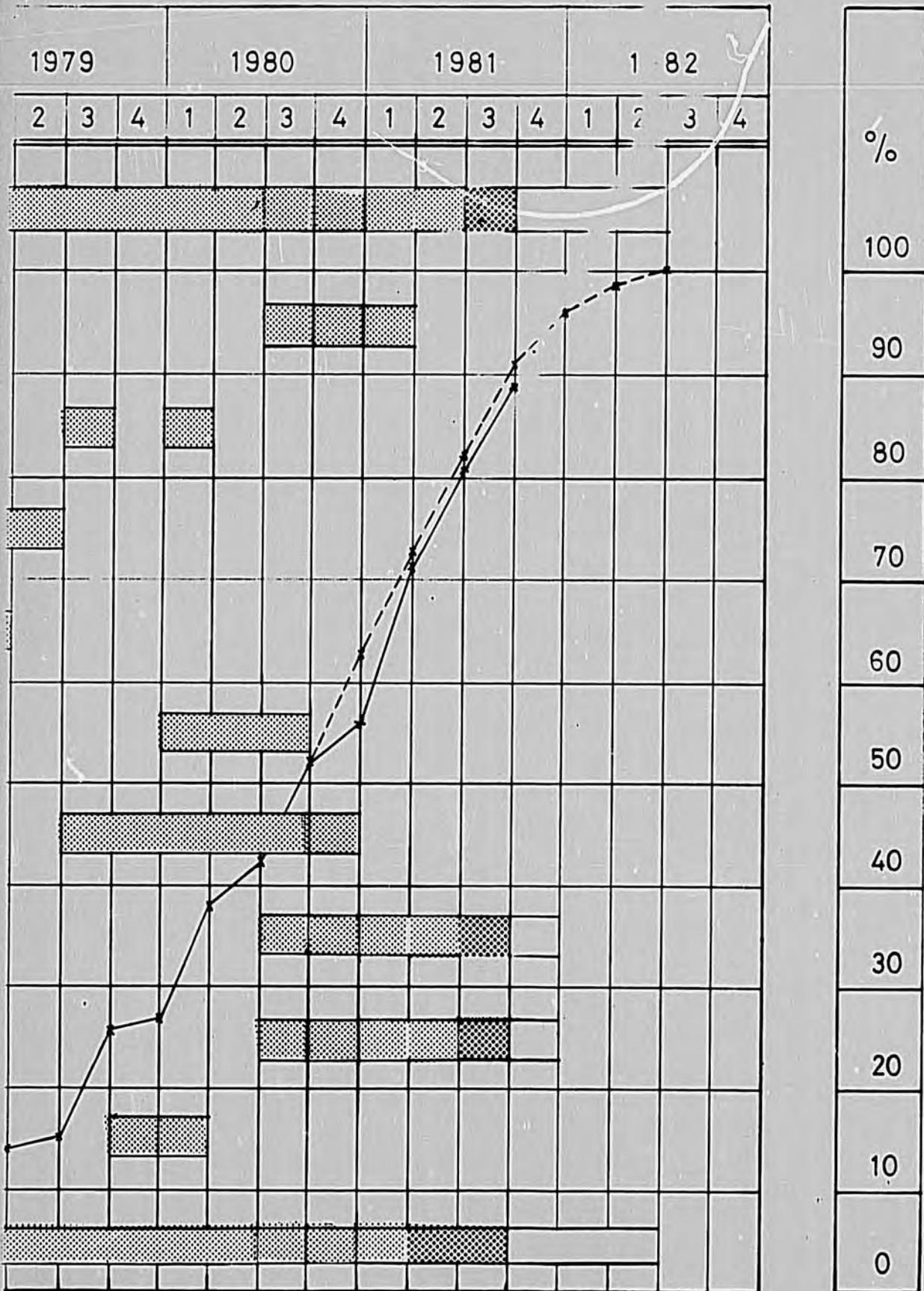
# WEST JAVA II PROJECT PROGRESS SCHEDULE INDONESIAN RUPIAH



← SCHEDULED →  
 ← ACTUAL →

# I PROJECT SCHEDULE RUPIAH

EXHIBIT IID

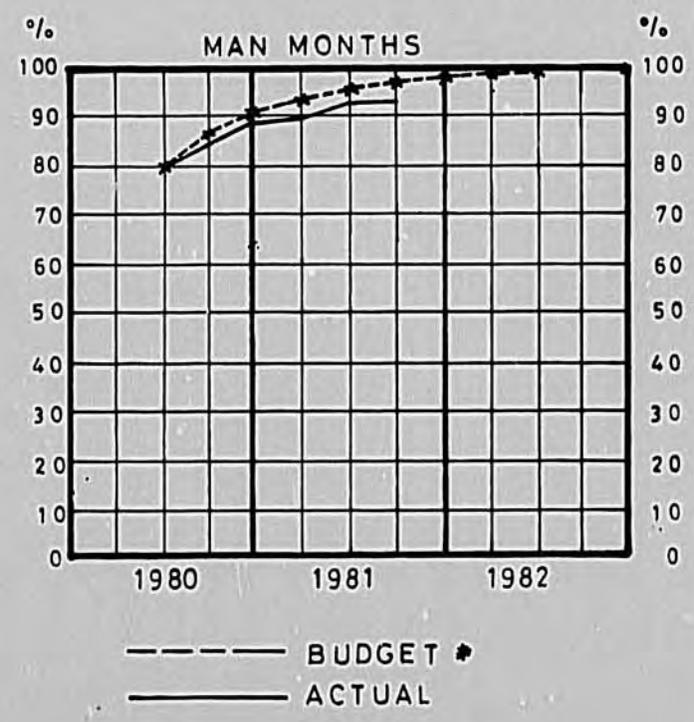


### TOTAL FIELD STAFF



	MAN MONTHS			SALARIES (000)		
	BUD	ACT	%	BUD	ACT	%
PREVIOUS	313	312	100-	732	712	97
THIS PERIOD	6	7	117	19	17	89
TOTAL TO DATE	319	319	100-	751	729	97
TOTAL CONTRACT	335	319	95	801	729	91

### ENGINEERING ONLY



	MAN MONTHS			SALARIES (000)		
	BUD	ACT	%	BUD	ACT	%
PREVIOUS	72	68	94	174	161	93
THIS PERIOD	1	1	100	3	3	100
TOTAL TO DATE	73	69	95	177	164	93
TOTAL CONTRACT	75	69	92	183	164	90

# WEST JAVA II

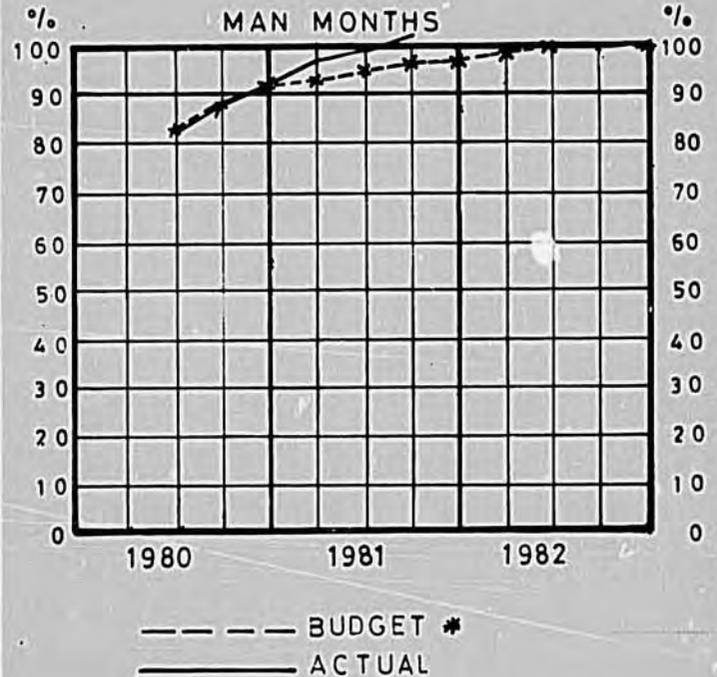
## FIELD STAFF MAN MONTHS & SALARIES BUDGET VS ACTUAL

AS OF 10 SEPTEMBER 1981

### FIELD STAFF

	MAN MONTHS			SALARIES (000)		
	BUD	ACT	%	BUD	ACT	%
PREVIOUS	313	312	100-	732	712	97
THIS PERIOD	6	7	117	19	17	89
TOTAL TO DATE	319	319	100-	751	729	97
TOTAL CONTRACT	335	319	95	801	729	91

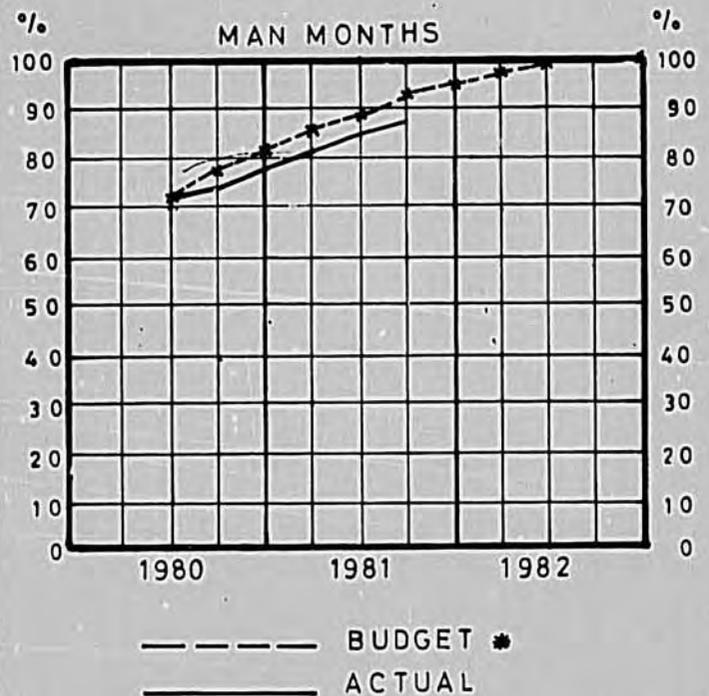
### CONSTRUCTION



### OPERATING ONLY

	MAN MONTHS			SALARIES (000)		
	BUD	ACT	%	BUD	ACT	%
PREVIOUS	72	68	94	174	161	93
THIS PERIOD	1	1	100	3	3	100
TOTAL TO DATE	73	69	95	177	164	93
TOTAL CONTRACT	75	69	92	183	164	90

### ADMINISTRATIVE

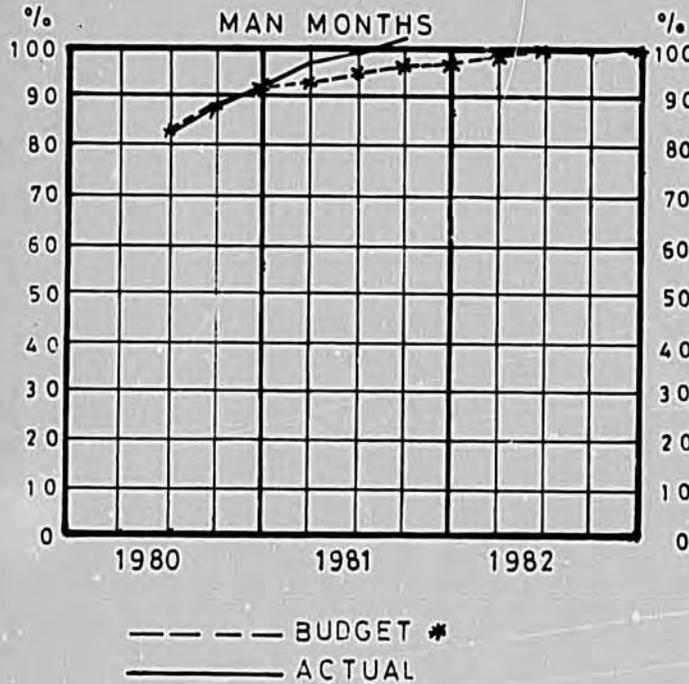


# JAVA II N MONTHS & SALARIES VS ACTUAL

EXHIBIT IIE

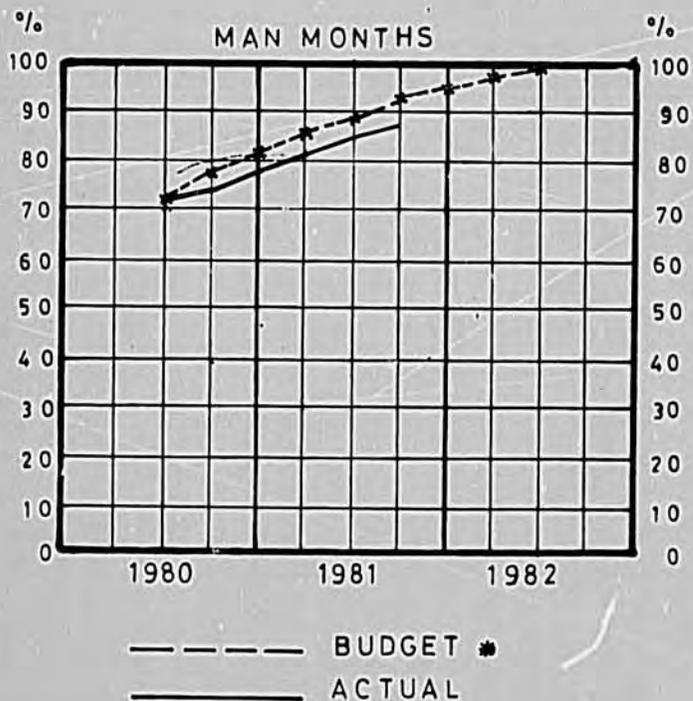
10 SEPTEMBER 1981

## CONSTRUCTION ONLY



	MAN MONTHS			SALARIES (000)		
	BUD	ACT	%	BUD	ACT	%
PREVIOUS	152	160	105	322	340	106
THIS PERIOD	2	4	200	6	8	133
TOTAL TO DATE	154	164	106	328	348	106
TOTAL CONTRACT	160	164	103	346	348	101

## ADMINISTRATION ONLY

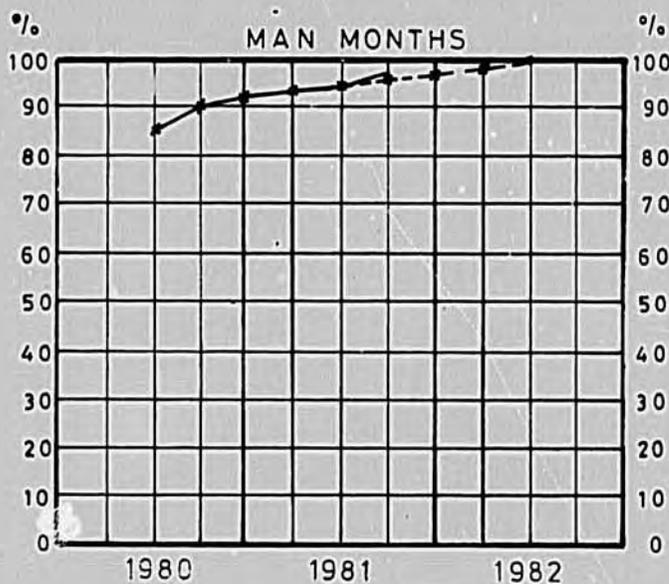


	MAN MONTHS			SALARIES (000)		
	BUD	ACT	%	BUD	ACT	%
PREVIOUS	89	84	94	236	211	89
THIS PERIOD	3	2	67	10	6	60
TOTAL TO DATE	92	86	93	246	217	88
TOTAL CONTRACT	100	86	86	272	217	80

\* Budget Data revised 1 July 1980

CHAS. T. MAIN INTERNATIONAL INC.

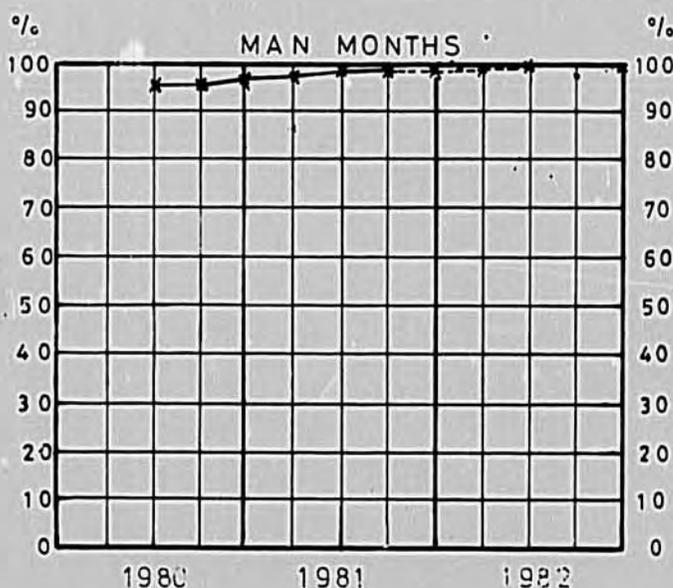
TOTAL HOME OFFICE



	MAN MONTHS			SALARY	
	BUD	ACT	%	BUD	ACT
PREVIOUS	164	164	100	299	300
THIS PERIOD	1	2	200	3	5
TOTAL TO DATE	165	166	101	302	305
TOTAL CONTRACT	170	166	98	317	305

----- BUDGET \*  
————— ACTUAL

ENGINEERING ONLY



	MAN MONTHS			SALARY	
	BUD	ACT	%	BUD	ACT
PREVIOUS	75	73	97	159	157
THIS PERIOD	1	1	100	3	2
TOTAL TO DATE	76	74	97	162	159
TOTAL CONTRACT	77	74	96	165	159

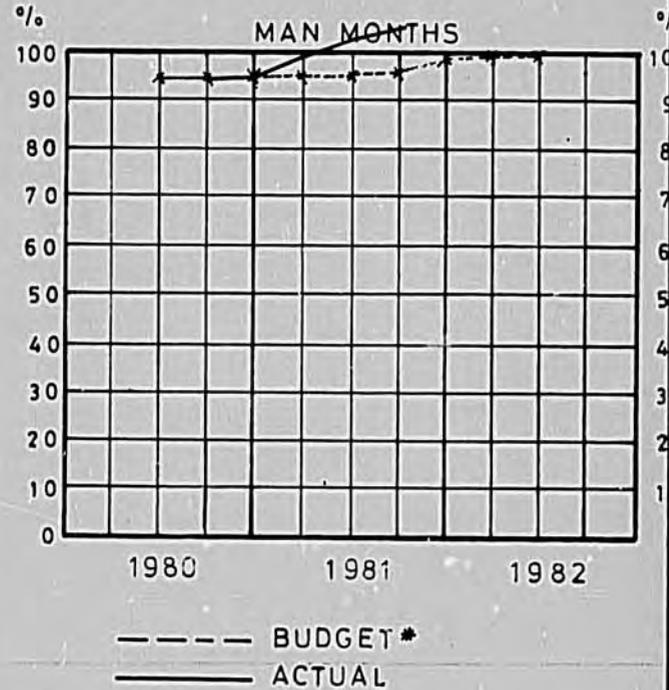
----- BUDGET \*  
————— ACTUAL

# WEST JAVA II HOME OFFICE MAN MONTHS & SALARIES BUDGET VS ACTUAL

AS OF 10 SEPTEMBER 1981

## AL HOME OFFICE

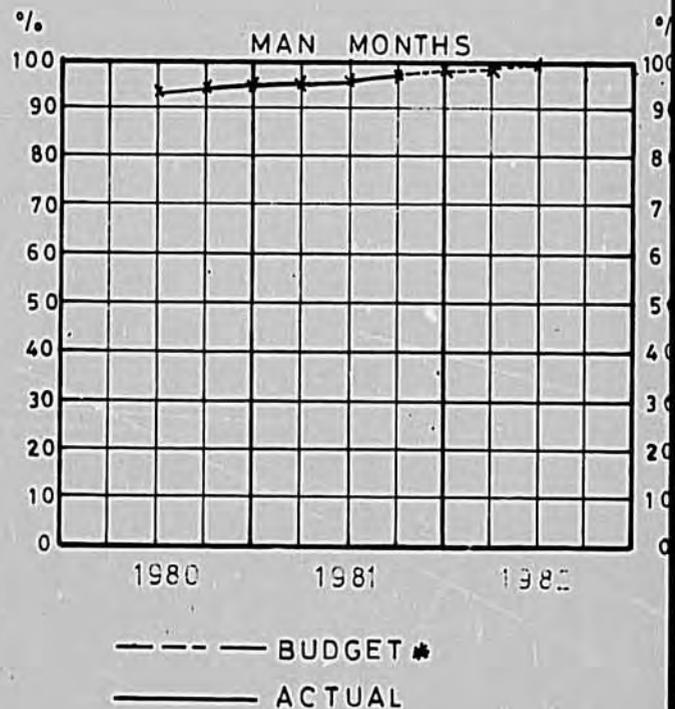
	MAN MONTHS			SALARIES(000)		
	BUD	ACT	%	BUD	ACT	%
PREVIOUS	164	164	100	299	301	100+
THIS PERIOD.	1	2	200	3	5	167
TOTAL TO DATE	165	166	101	302	306	101
TOTAL CONTRACT	170	166	98	317	306	97



## SUPERVISOR

## ENGINEERING ONLY

	MAN MONTHS			SALARIES(000)		
	BUD	ACT	%	BUD	ACT	%
PREVIOUS	75	73	97	159	157	99
THIS PERIOD	1	1	100	3	2	67
TOTAL TO DATE	76	74	97	162	159	98
TOTAL CONTRACT	77	74	96	165	159	96



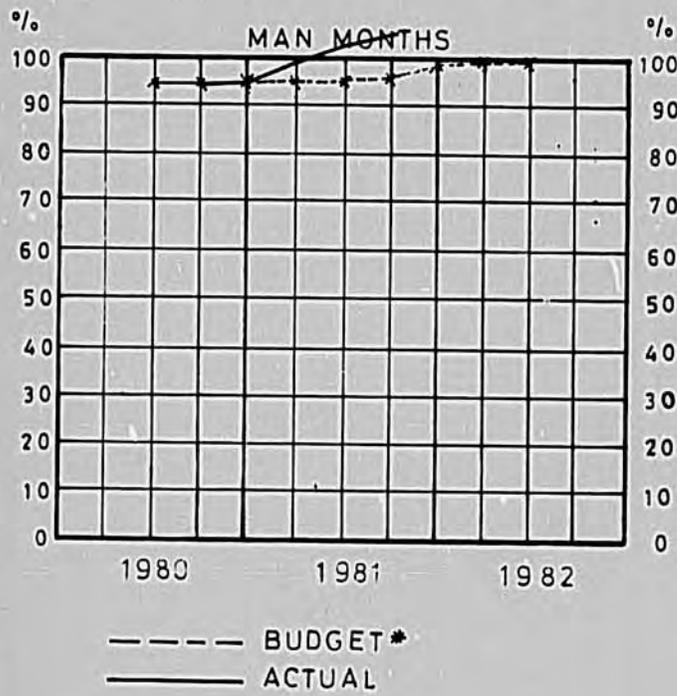
## ADMINISTRATIVE

# ST JAVA II MAN MONTHS & SALARIES VS ACTUAL

EXHIBIT II F

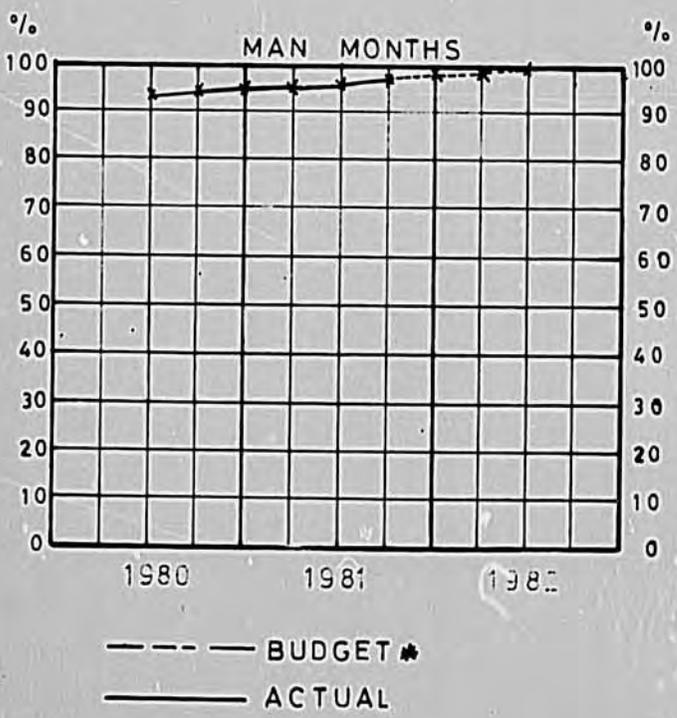
10 SEPTEMBER 1981

## SUPERVISION ONLY



	MAN MONTHS			SALARIES(000)		
	BUD	ACT	%	BUD	ACT	%
PREVIOUS	21	23	110	54	59	109
THIS PERIOD	-	1	-	-	3	-
TOTAL TO DATE	21	24	114	54	62	115
TOTAL CONTRACT	22	24	109	54	62	115

## ADMINISTRATION ONLY



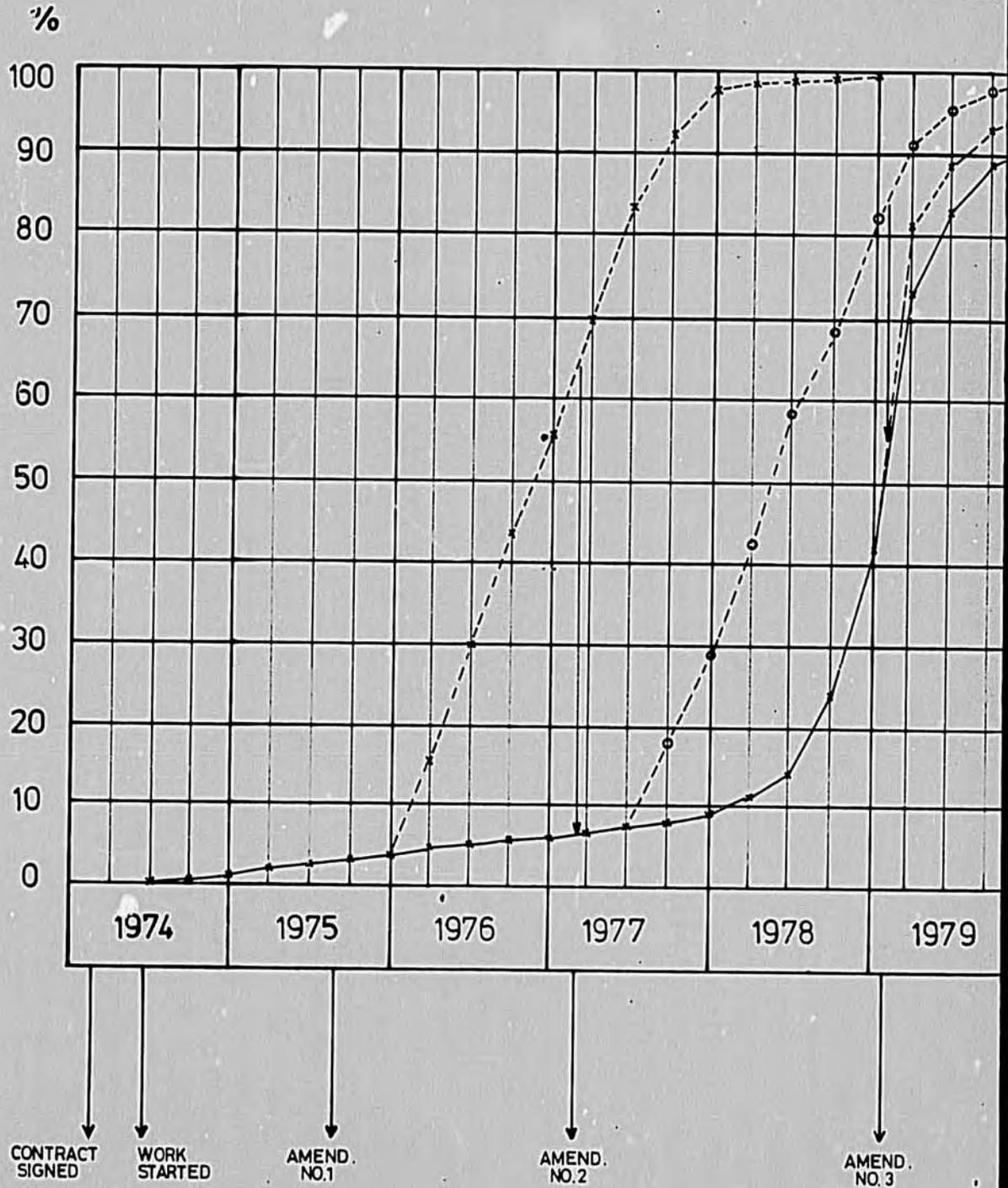
	MAN MONTHS			SALARIES(000)		
	BUD	ACT	%	BUD	ACT	%
PREVIOUS	68	68	100	86	85	99
THIS PERIOD	-	-	-	-	-	-
TOTAL TO DATE	68	68	100	86	85	99
TOTAL CONTRACT	71	68	96	95	85	89

\* Budget Data revised 1 July 1980

# WEST JAVA I

SO

CUMULAT



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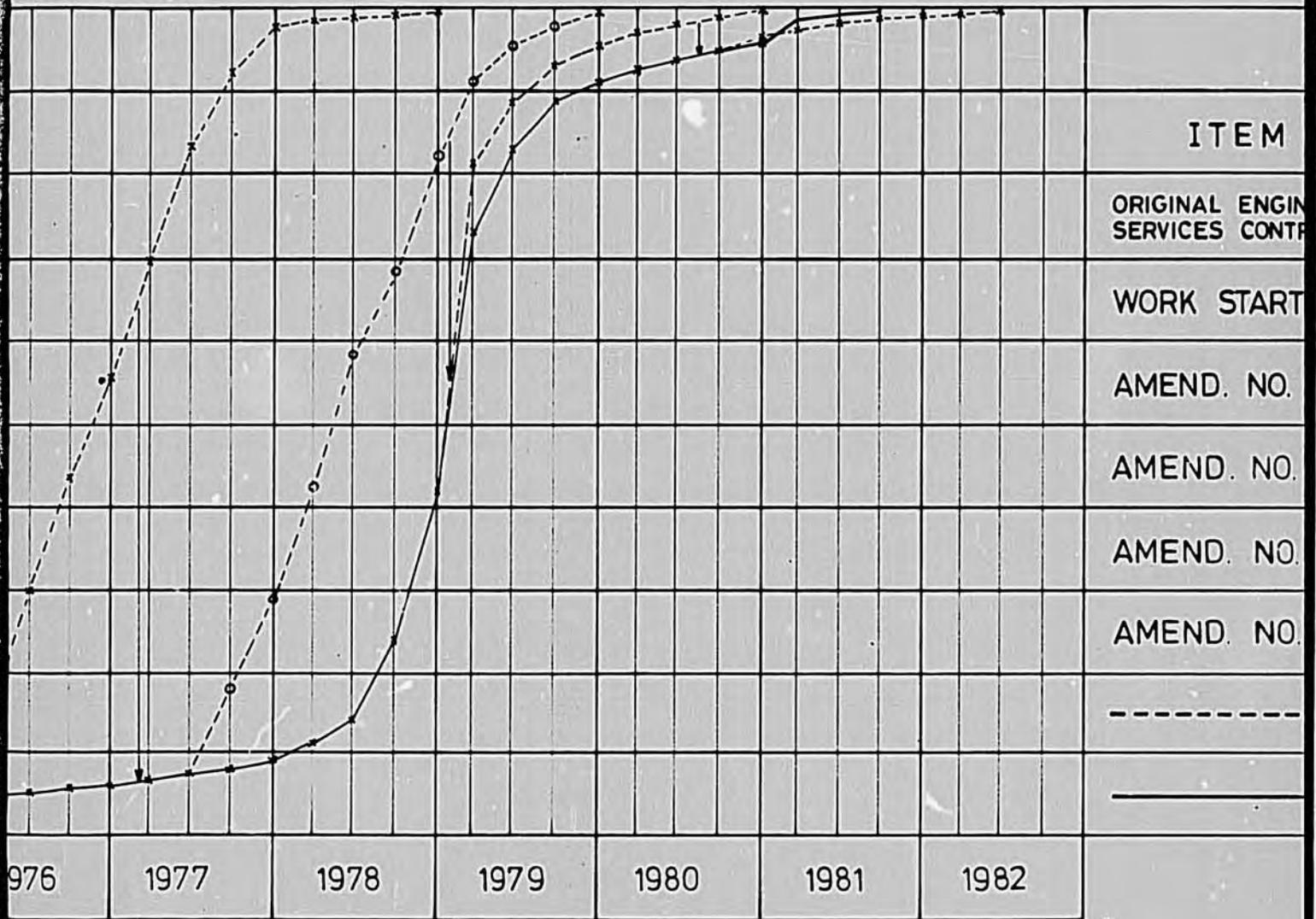
# WEST JAVA I TRANSMISSION AND SUBSTATION P

## U.S. \$ CASH FLOW

( TOTAL LOAN FUNDS )

### SCHEDULED VS. ACTUAL

### CUMULATIVE PERCENTAGE BY QUARTER



AMEND.  
NO. 2

AMEND.  
NO. 3

AMEND.  
NO. 4

CHAS.

# MISSION AND SUBSTATION PROJECT

## \$ CASH FLOW

TOTAL LOAN FUNDS )

SCHEDULED VS. ACTUAL

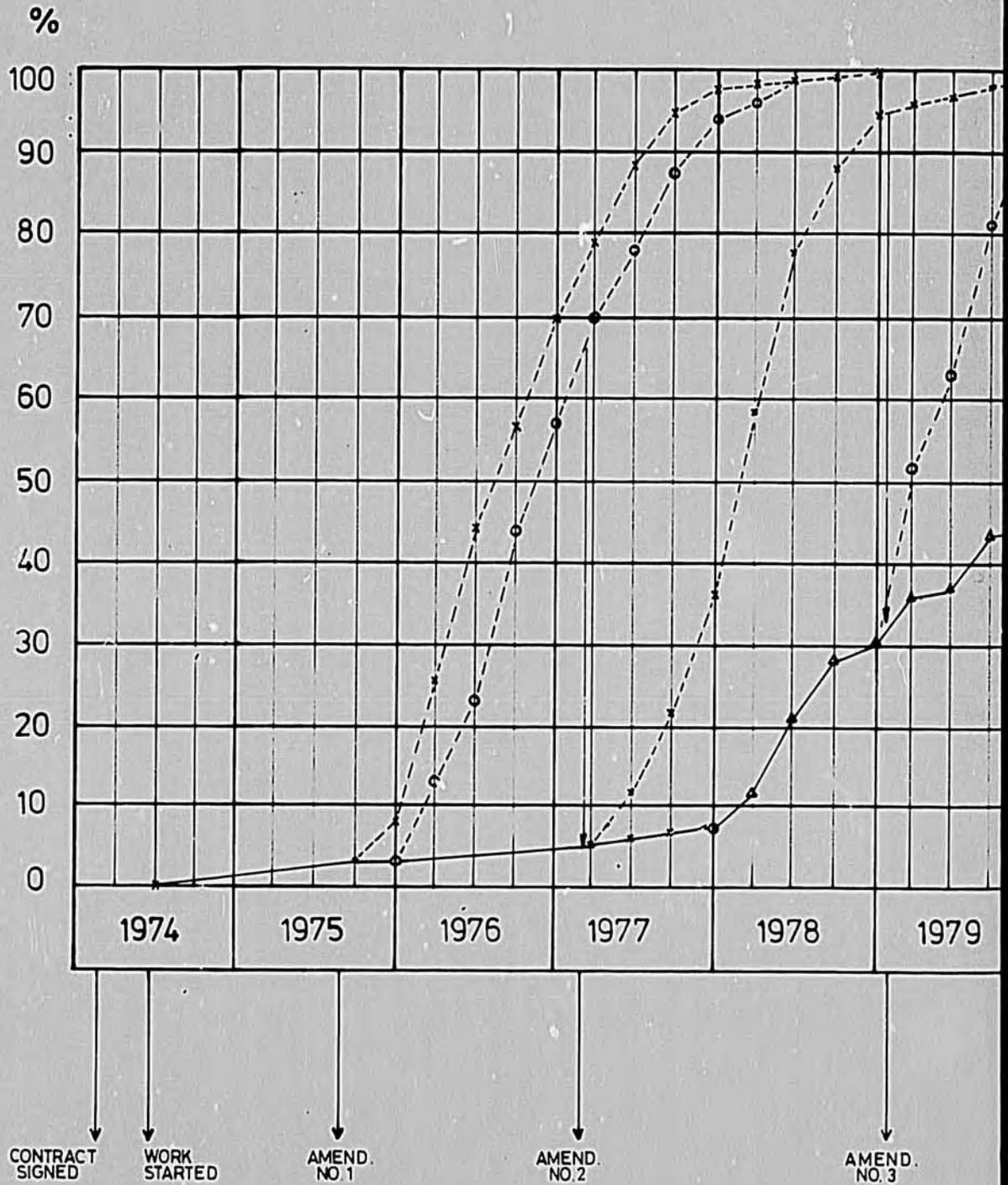
PERCENTAGE BY QUARTER

												NOTES		
												ITEM	DATE	SCHEDULED CONTRACT COMPLETION
												ORIGINAL ENGINEERING SERVICES CONTRACT	16 FEB. 1974	31 DEC. 1978
												WORK STARTED	19 JUN. 1974	31 DEC. 1978
												AMEND. NO. 1	2 SEP. 1975	31 DEC. 1978
												AMEND. NO. 2	12 MAR. 1977	31 DEC. 1979
												AMEND. NO. 3	10 JAN. 1979	31 DEC. 1980
												AMEND. NO. 4	29 AUG. 1980	30 JUN. 1982
												-----	SCHEDULED	
												_____	ACTUAL	
30	1981				1982									

AMEND. NO. 4

# WEST JAVA I

( TOTAL P  
SO  
CUMULAT



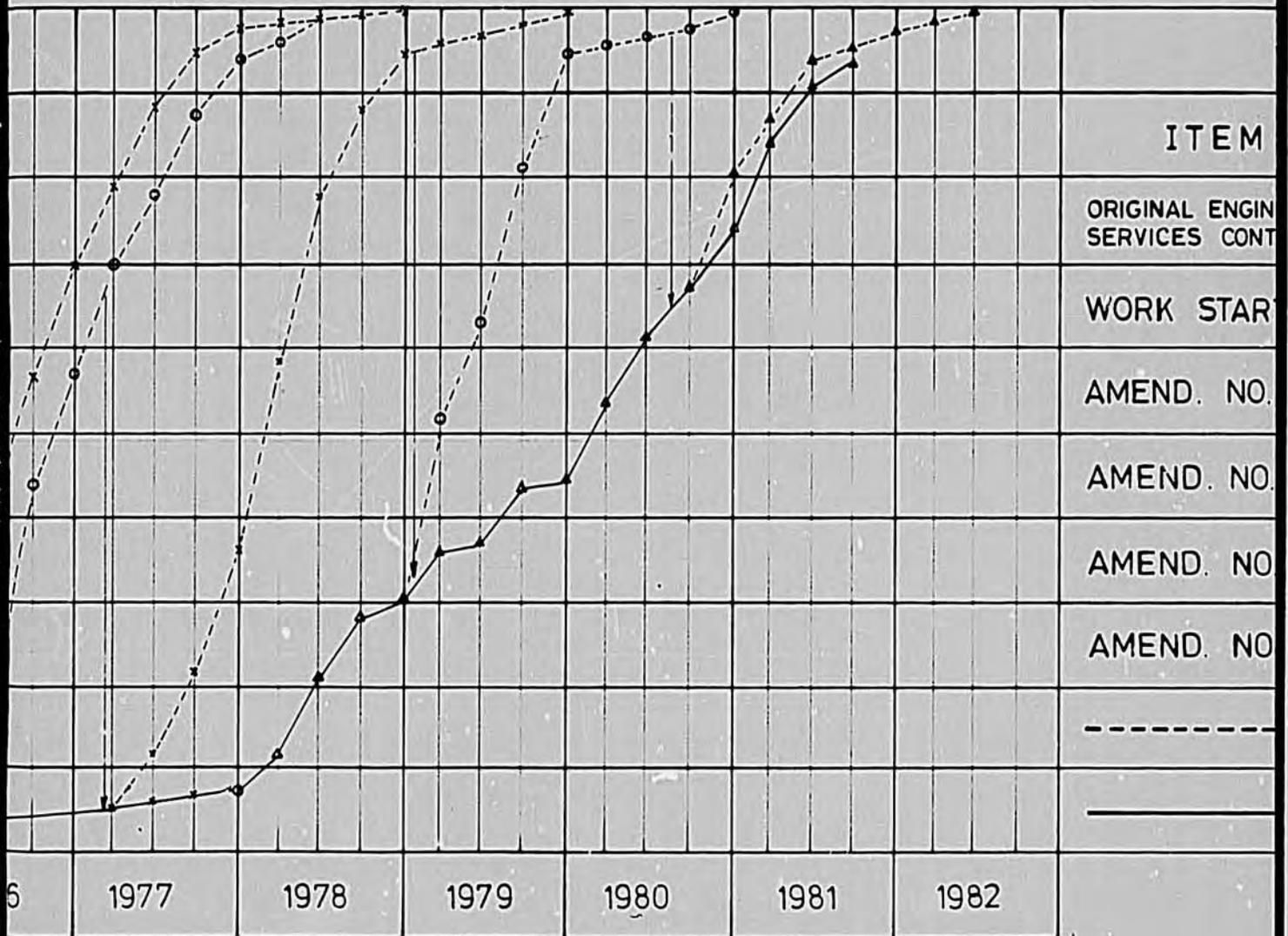
# WEST JAVA I TRANSMISSION AND SUBSTATION

## RUPIAH CASH FLOW

( TOTAL PROJECT RUPIAH EXPENDITURES )

### SCHEDULED VS. ACTUAL

### CUMULATIVE PERCENTAGE BY QUARTER



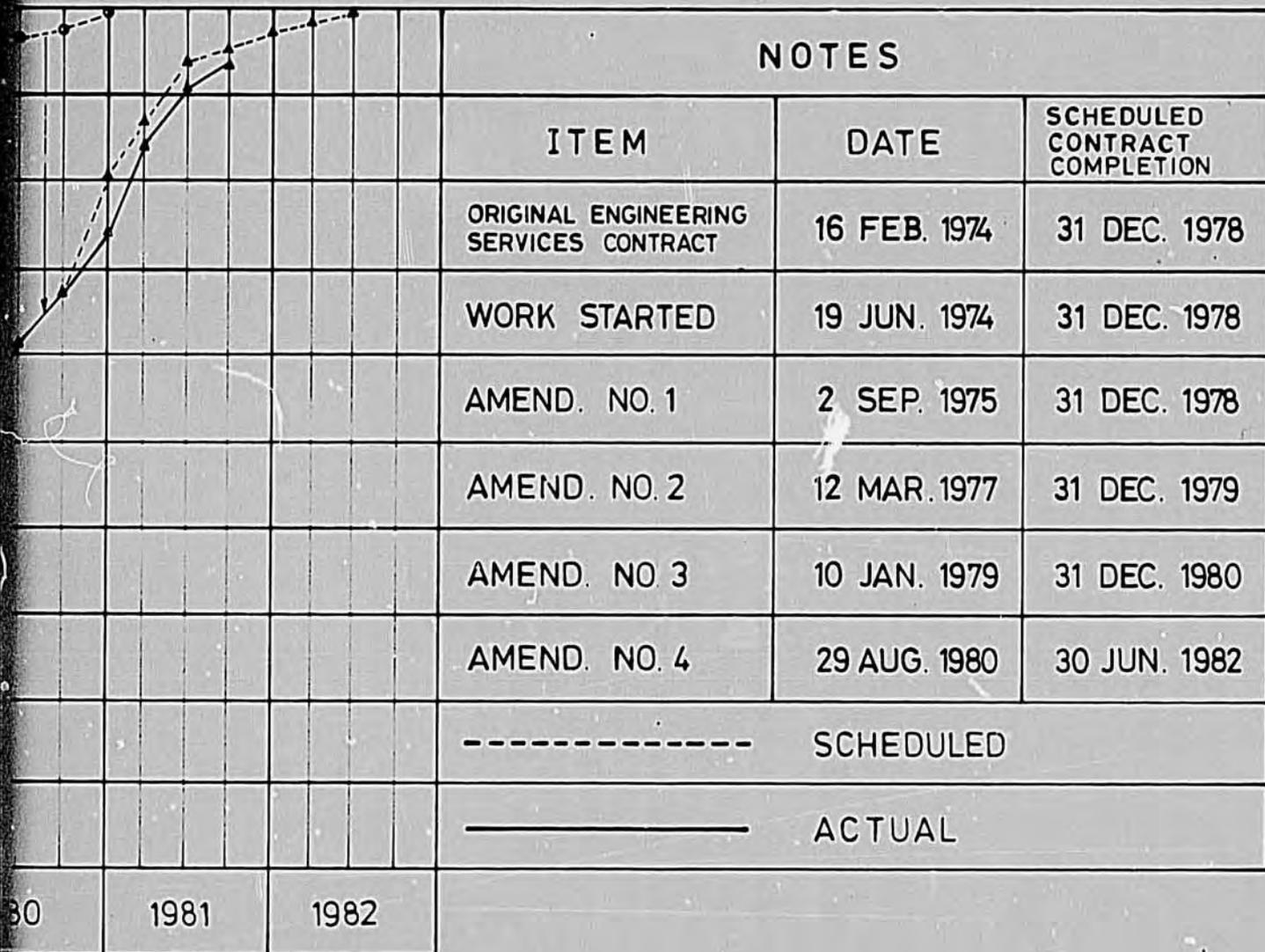
6

1977      1978      1979      1980      1981      1982

AMEND. NO. 2      AMEND. NO. 3      AMEND. NO. 4

CHAS.

TRANSMISSION AND SUBSTATION PROJECT  
 CASH FLOW  
 (IN RUPIAH EXPENDITURES )  
 SCHEDULED VS. ACTUAL  
 PERCENTAGE BY QUARTER

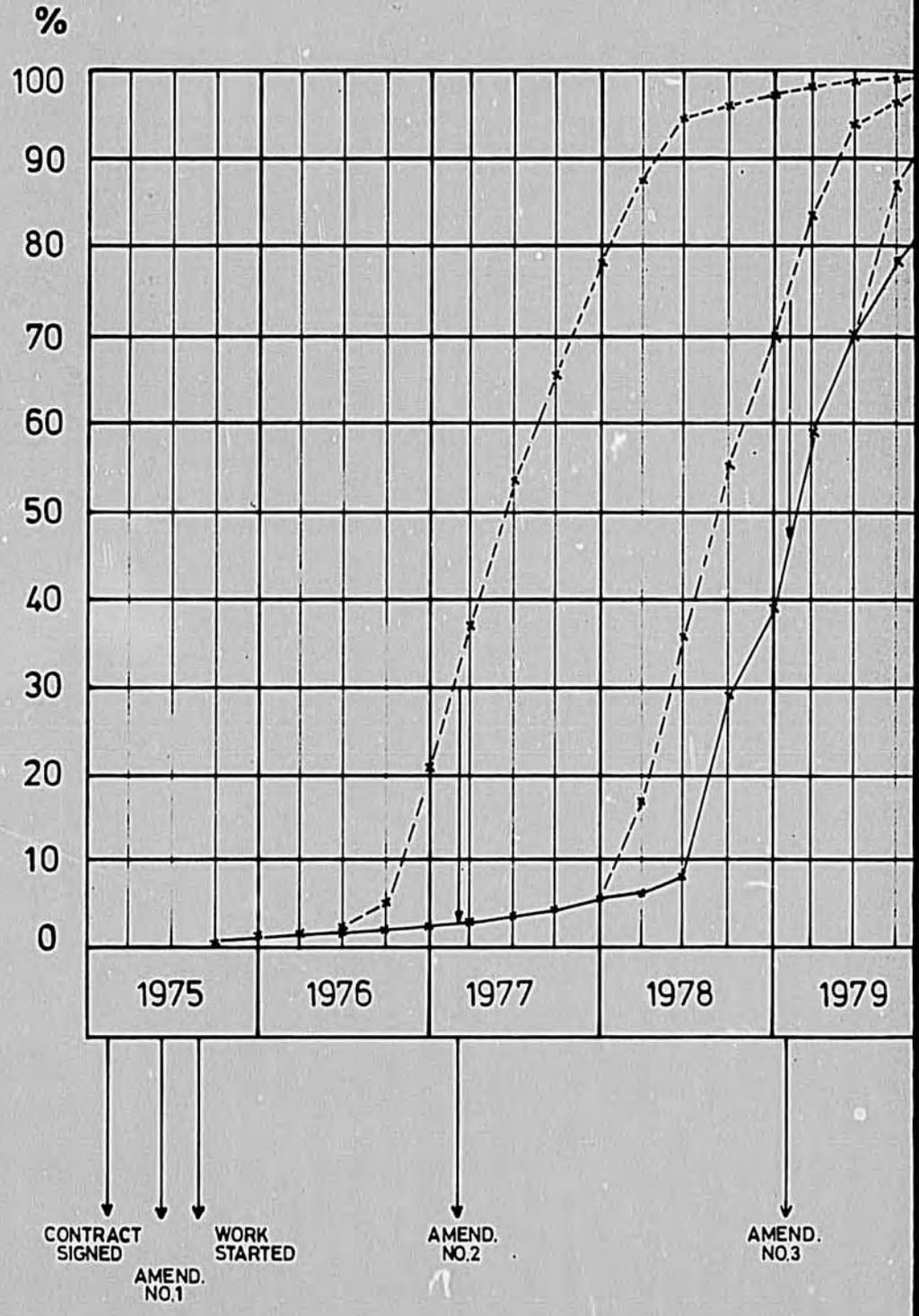


MEND. NO. 4

# WEST JAVA II

SO

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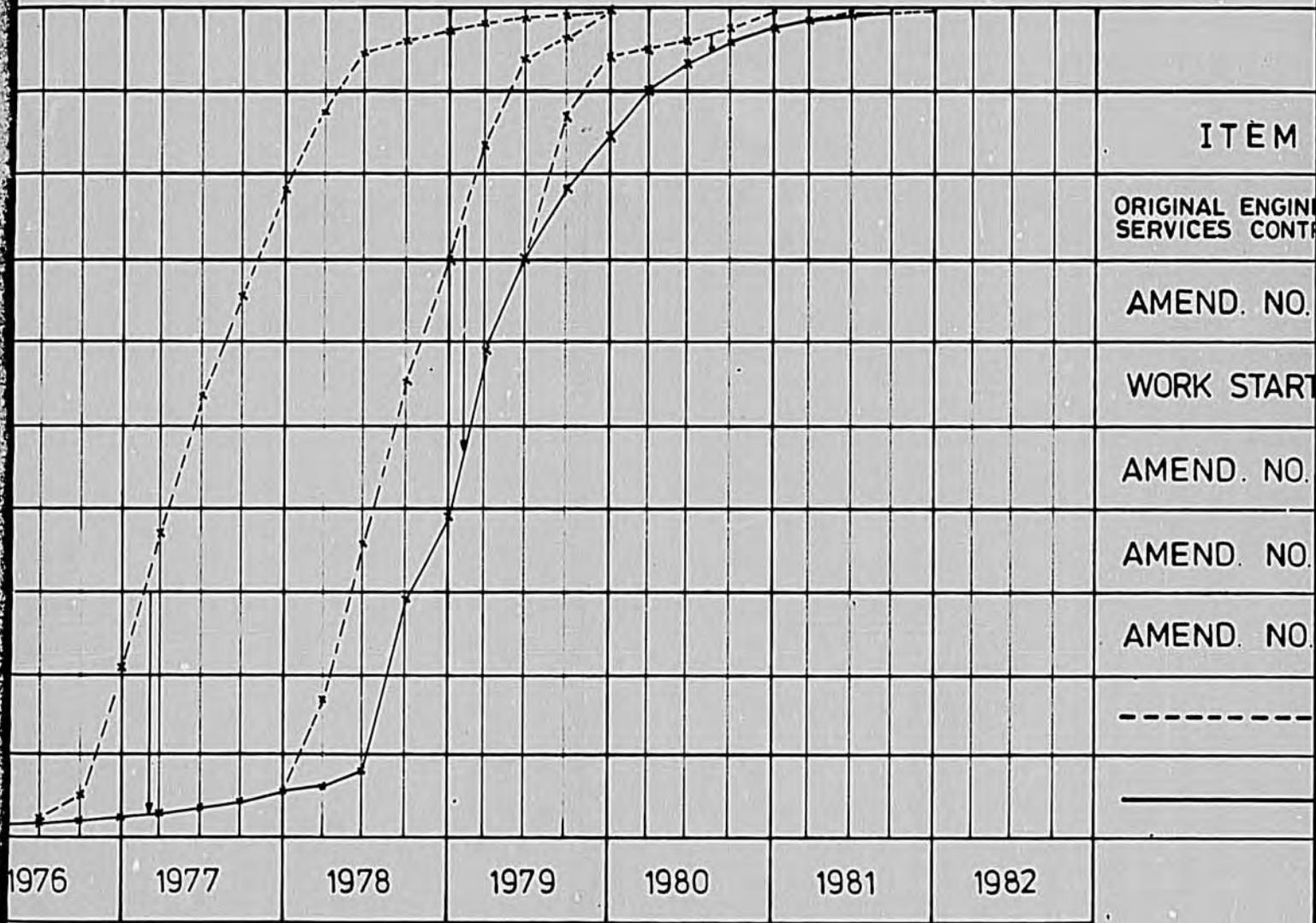


# WEST JAVA II TRANSMISSION AND SUBSTATION PROJECT U.S. \$ CASH FLOW

( TOTAL LOAN FUNDS )

## SCHEDULED VS. ACTUAL

### CUMULATIVE PERCENTAGE BY QUARTER



AMEND. NO. 2

AMEND. NO. 3

AMEND. NO. 4

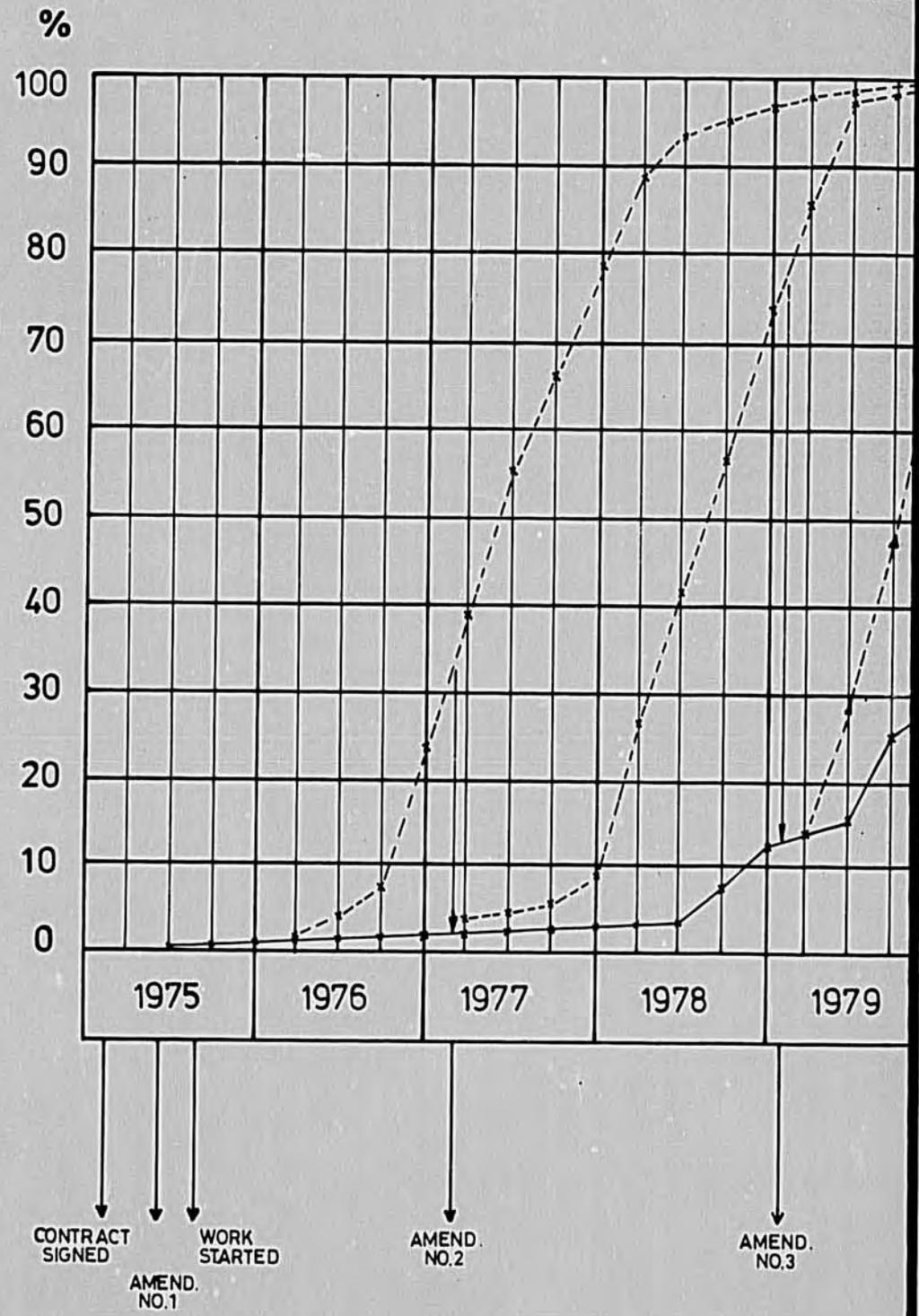
MISSION AND SUBSTATION PROJECT  
 \$ CASH FLOW  
 (AL LOAN FUNDS )  
 SCHEDULED VS. ACTUAL  
 PERCENTAGE BY QUARTER

												NOTES		
												ITEM	DATE	SCHEDULED CONTRACT COMPLETION
												ORIGINAL ENGINEERING SERVICES CONTRACT	27 JAN. 1975	31 DEC. 1979
												AMEND. NO. 1	12 MAY 1975	31 DEC. 1979
												WORK STARTED	29 AUG. 1975	31 DEC. 1979
												AMEND. NO. 2	12 MAR. 1977	31 DEC. 1979
												AMEND. NO. 3	10 JAN. 1979	31 DEC. 1980
												AMEND. NO. 4	29 AUG. 1980	30 JUN. 1982
												-----	SCHEDULED	
												—————	ACTUAL	
30	1981				1982									

↓  
 AMEND.  
 NO. 4

# WEST JAVA II

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( TOTAL  
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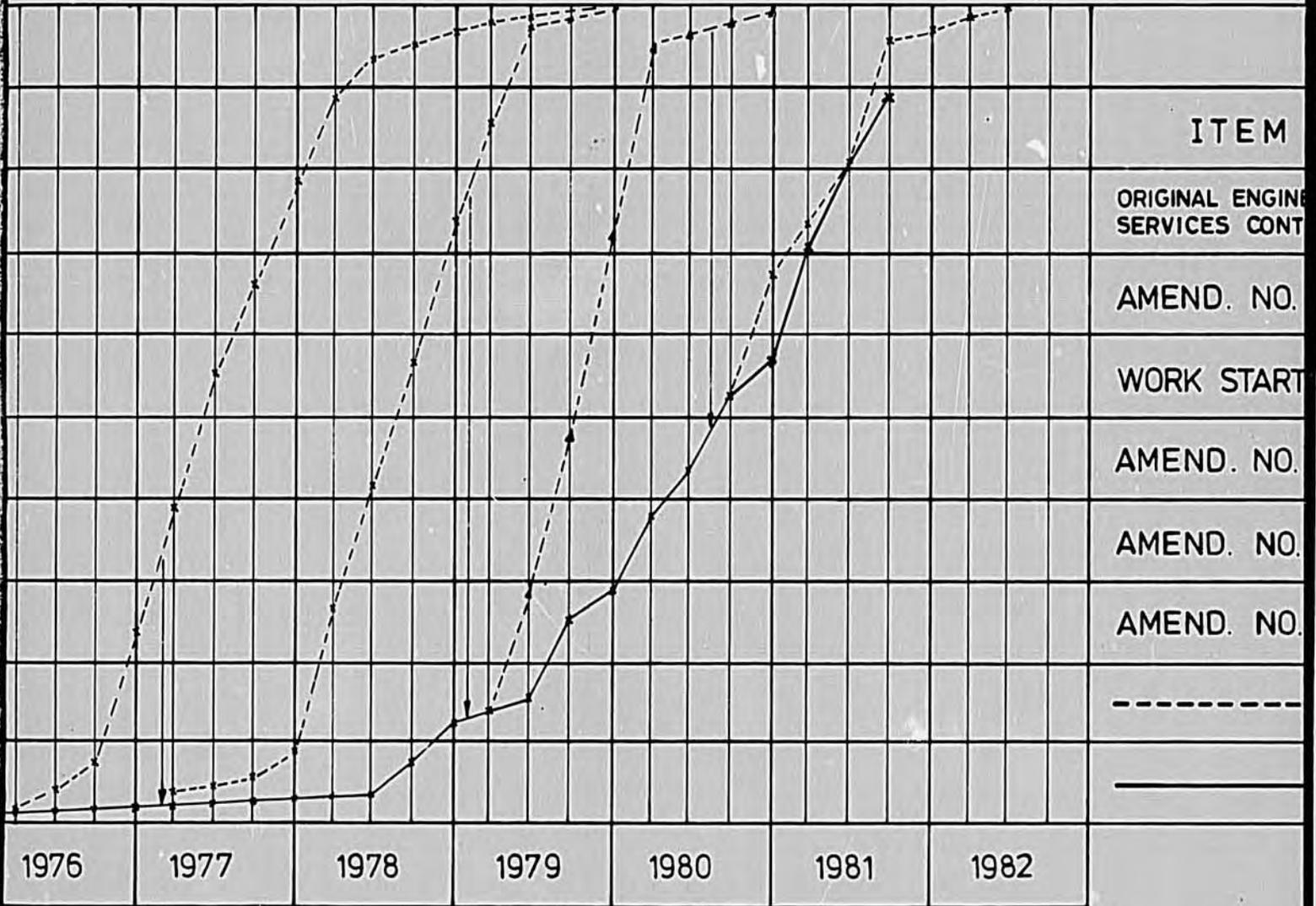
# WEST JAVA II TRANSMISSION AND SUBSTATION PROJECT

## RUPIAH CASH FLOW

( TOTAL PROJECT RUPIAH EXPENDITURES )

### SCHEDULED VS. ACTUAL

### CUMULATIVE PERCENTAGE BY QUARTER



AMEND.  
NO. 2

AMEND.  
NO. 3

AMEND.  
NO. 4

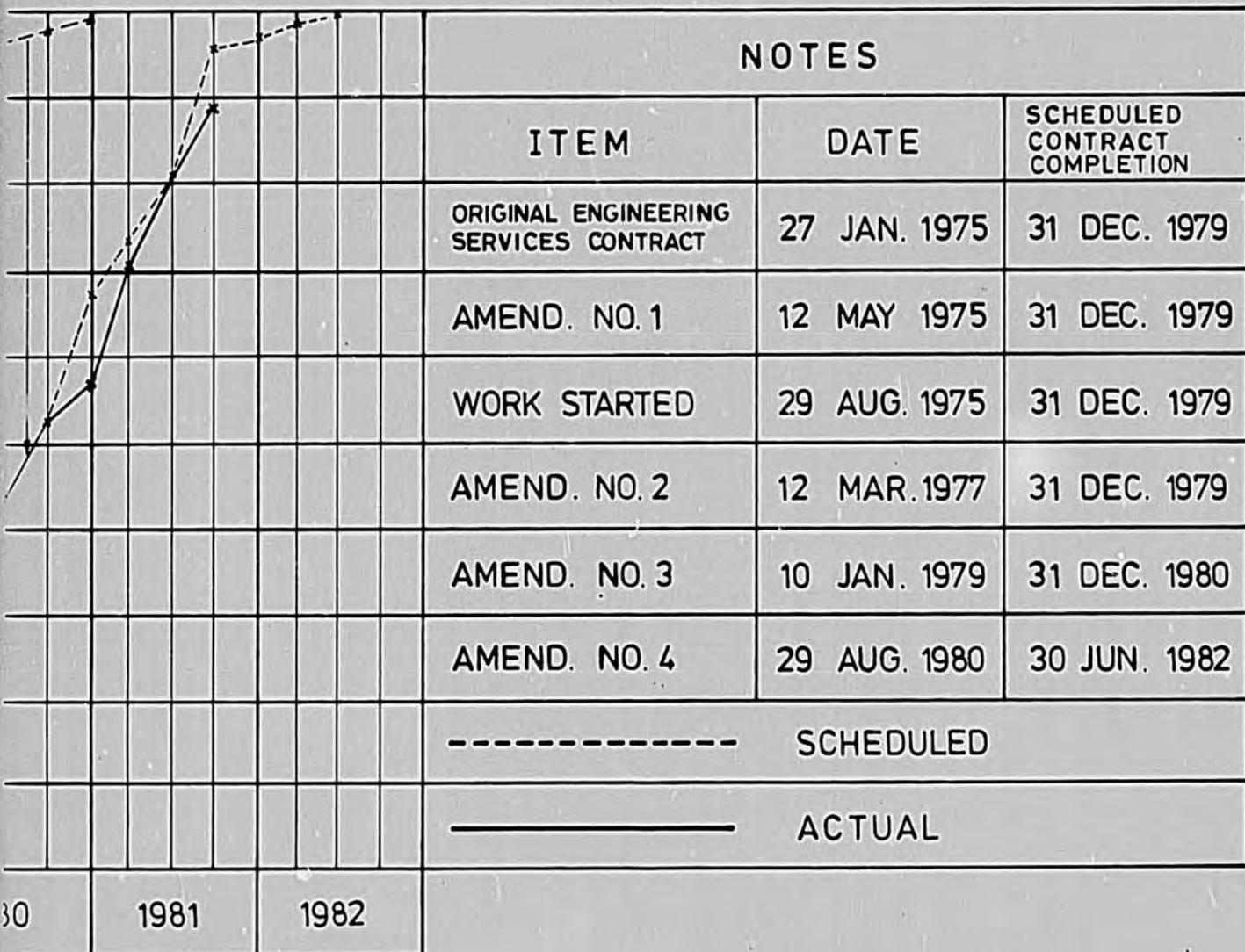
# MISSION AND SUBSTATION PROJECT

## CASH FLOW

( IN RUPIAH EXPENDITURES )

## SCHEDULED VS. ACTUAL

### PERCENTAGE BY QUARTER



AMEND. NO. 4