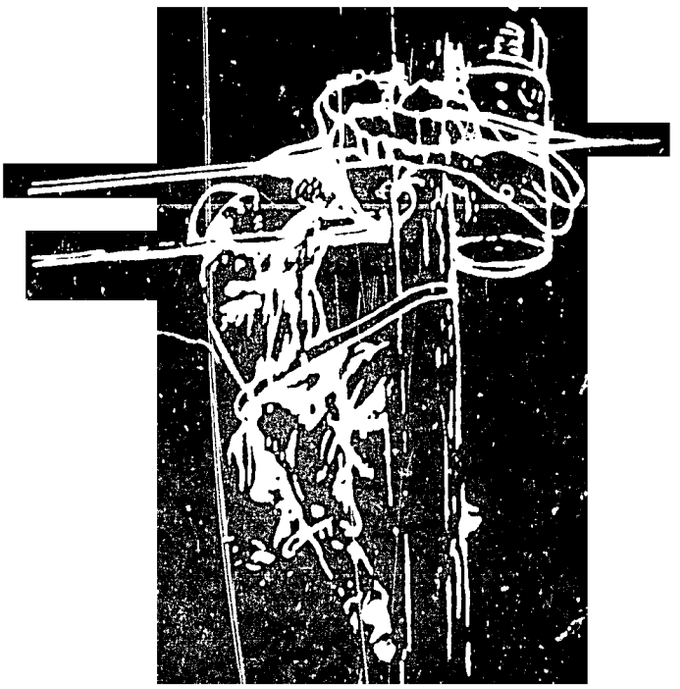
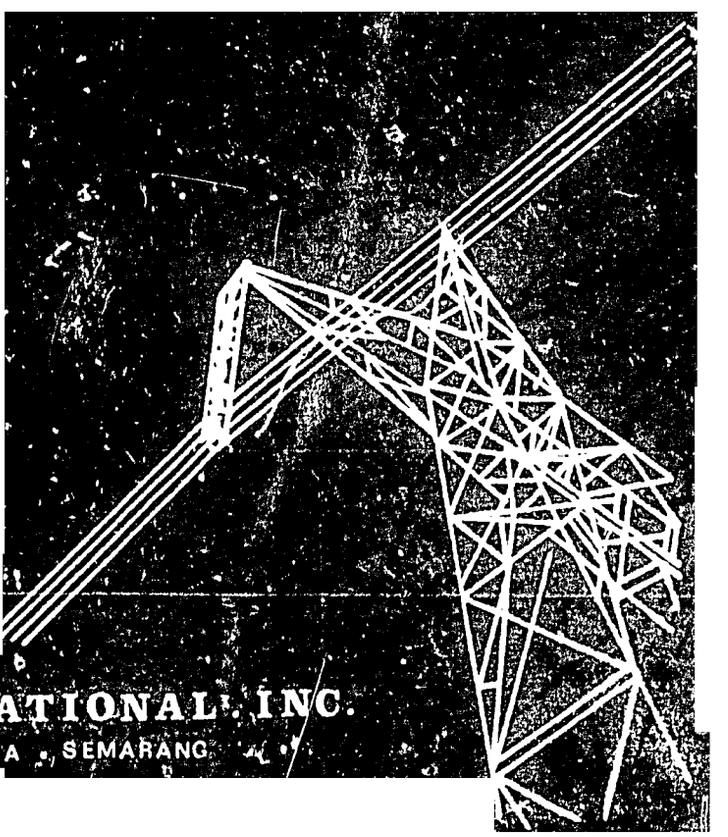


PERUSAHAAN UMUM LISTRIK NEGARA

JAKARTA - INDONESIA



MAIN
Engineers

CHAS. T. MAIN INTERNATIONAL INC.
BOSTON . BANDUNG . JAKARTA . SEMARANG

PERUSAHAAN UMUM LISTRIK NEGARA
JAKARTA, INDONESIA

WEST JAVA
ELECTRIC TRANSMISSION PROJECT

MONTHLY REPORT

NOVEMBER 1981

WEST JAVA I AND II PROJECTS
CONTRACTS
Pj. 013/PST/74 and Pj. 023/PST/75

USAID LOANS 497-H-028 & 497-W-032

MAIN
Engineers

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 I/61
SEMARANG - P.O. BOX 26, TEL. 311702 JL. SLAMET 1

14 December 1981

Letter No. B - 5248

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
Monthly Report

Dear Ir. Semiawan :

In accordance with Article 7.2 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 six (6) copies of our Report for the month of November 1981.

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

R.W. Malchow

R.W. Malchow
Project Manager

RWM/ns.-

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

WEST JAVA I AND II PROJECTS

MONTHLY REPORT

NOVEMBER 1981

A. PERSONNEL

1. Engineer

a. End of the month strength was as follows :

NAME	TITLE	ARRIVAL DATE
West Java I and II		
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

2. PLN

a. End of the month strength was as follows :

JOB TITLE	NUMBER
Logistics Coordinator	1
Secretaries	2
Draftsmen	4
Accounting Clerks	1
Reproduction Personnel	2
Drivers	9

b. In addition to the above staff, approximately 40 PLN Counterpart and field personnel were assigned to the Projects as of 30 November.

B. ADMINISTRATIVE AND GENERAL

1. ADMINISTRATION

a. 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 :

	West Java I	West Java II
USAID Loan	$ 17,200,000.00	$ 19,700,000.00
Committed	$ 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.

b. West Java I Contract Data

(1) No. Pj. 013/PST/74 16 Feb. '74 US $ 3,824,009.00
Rp. 555.096.119,-
C.T. Main-Engineering Services

(2) No. Pj. 153/PST/77 5 Sep. '77 US $ 2,902,946.03
Irby Construction Company
Tower Steel, Insulators and Accessories

(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 Maintenance 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 Radio Equipment	11 May '78	US $	395,819.20
(10)	No. Spj. 022/PLN/PI RING/77 P.T. Tikon Abadi Foundations - Section I	24 Oct. '77	Rp.	199.278.000,-

(11) No. Spj. 023/PLN/PI RING/77 27 Oct. '77 Rp. 153.445.000,-
P.T. Gunung Kencana
Foundations - Section IIA

(12) No. Spj. 024/PLN/PI RING/77 27 Oct. '77 Rp. 164.789.000,-
P.T. Dharma Niaga
Foundations - Section IIB

(13) No. Spj. 010/PLN/PI RING/78-79 8 Dec. '78 Rp. 132.894.300,-
P.T. Perfect Circle
Tower Erection

(14) No. Spj. 065A/SPP/PI RING JATENG/78-79 Rp. 50.278.000,-
P.T. Santraco Raya 21 Apr. '79
Tegal Substation Civil Work

(15) No. Spj. 072/SPP/ PI RING JATENG/78-79 Rp. 25.966.000,-
P.T. Sigma Tirta 17 Oct. '79
Tegal Substation Structure Erection

(16) No. Spj. 017/PLN/PI RING/78-79 Rp. 127.790.850,-
P.T. Silkar National 22 Jan. '80
Conductor Stringing - Section I

(17) No. Spj. 019/PLN/PI RING/79-80 Rp. 164.364.000,-
P.T. Citac Ltd. 2 Feb. '80
Conductor Stringing - Section I

(18) No. Spj. 001/PLN/PI RING/80-81 Rp. 464.500.000,-
P.T. Erses 3 Apr. '80
Ujungberung Substation Civil Work

(19) No. Spj. 002/PLN/PI RING/80-81 Rp. 199.989.000,-
P.T. Erses 3 Apr. '80
Ujungberung Substation Control House

(20) No. Spj. 013/PLN/PI RING/80-81 Rp. 18.860.000,-
P.T. Dharma Niaga 6 Jul. '80
Ujungberung Substation Temporary 150 KV
Transmission Line By-Pass

(21) No. Spj. 007/PLN/PI RING/80-81 Rp. 32.234.000,-
P.T. Citacontrac 3 Jun. '80
Caisson for Tower No. 278

(22) No. Spk. 003/PLN/PI RING/81 Rp. 19.823.000,-
P.T. Citacontrac 26 Mar. '81
Relocate Towers 317 and 319

c. West Java II Contract Data

(1) No. Pj. 023/PST/75 25 Jan. '75 US $ 2,509,793.00
Rp. 718.743.035,-
C.T. Main-Engineering Services

(2) No. Pj. 152/PST/77 5 Sep. '77 US $ 8,199,107.37
Rp. 774.481.343,-
Irby Construction Company
Transmission Line Supply and Construction

(3) No. Pj. 051/PST/78 10 Mar. '78 US $ 87,852.00
Ohio Brass Company
Lightning Arresters

(4) No. Pj. 052/PST/78 11 Mar. '78 US $ 4,981,321.52
Irby Construction Company Rp. 135.227.727,-
Substation Equipment

(5) No. Pj. 053/PST/78 11 Mar. '78 US $ 3,974,100.16
General Electric Company
Substation Equipment

(6)	No. Spj. 001/PLN/PI RING/77-78 P.T. Citac Ltd. 5 Jun. '78 Foundations - Section II and III	Rp.	329.553.000,-
(7)	No. Spj. 002/PLN/PI RING/78-79 P.T. Citac Ltd. 9 Aug. '78 Foundations - Ujungberung - Cigereleng	Rp.	175.128.000,-
(8)	No. Spj. 022/PLN/PI RING/79-80 P.T. Sahabat Agung 4 Dec. '79 Cibinong - Gandul Stub Angles	Rp.	10.618.000,-
(9)	No. Spj. 009/PLN/PI RING/79-80 P.T. Citac Ltd. 30 Nov. '79 Foundations - Section IV A	Rp.	62.441.000,-
(10)	No. Spj. 010/PLN/PI RING/79-80 P.T. Citac Ltd. 30 Nov. '79 Foundations - Section IV C	Rp.	36.029.000,-
(11)	No. Spj. 018/PLN/PI RING/79-80 P.T. Amarta Karya 24 Jan. '80 Foundations - Section IV B	Rp.	64.630.000,-
(12)	No. Spj. 008/PLN/PI RING/80-81 P.T. Pembangunan Perumahan 5 Jun. '80 Bandung Utara Substation Civil Work	Rp.	334.619.000,-
(13)	No. Spj. 006/PLN/PI RING/80-81 P.T. Perfect Circle 31 May '80 Bandung Utara Substation Control House	Rp.	230.501.000,-
(14)	No. Spj. 009/PLN/PI RING/80-81 P.T. Perfect Circle 31 May '80 Bogor Substation Civil Work	Rp.	475.428.000,-

(15) No. Spj. 007/PLN/PI RING/80-81 Rp. 212.915.000,-
P.T. Perfect Circle 31 May '80
Bogor Substation Control House

(16) No. Spj. 020/PLN/PI RING/79-80 Rp. 31.967.000,-
P.T. Hutama Karya 16 Feb. '80
Bandung Utara Substation Access Road

(17) No. Spj. 009B/PLN/PI RING/81-82 Rp. 64.700.000,-
P.T. Buana Power 29 May '81
Bogor Substation Access Road

(18) No. Spj. 013/PLN/PI RING/80-81 Rp. 10.608.000,-
P.T. Dharma Niaga 6 Jul. '80
Bogor Substation Temporary 150 KV
Transmission Line By-Pass

(19) No. Spj. 001j/PLN PIRING/80-81 Rp. 89.843.000,-
P.T. Samapta Nusantara 6 May '81
Transportation of Power Transformers to Bogor

d. West Java I and II Contract Data

(1) No. Spj. 016/PLN/PI RING/77 Rp. 54.245.000,-
P.T. Sumber Jaya 4 Jul. '77
Grounding Material

(2) No. Spj. 017/PLN/PI RING/77 Rp. 40.100.000,-
P.T. Arcon 13 Aug. '77
Stub Angles

(3) No. Spj. 001j/OP LOG/79 Rp. 128.999.492,-
P.T. Keluarga Pradeni Veem 7 Feb. '79
Transportation of Power Transformers to Bandung.

2. GENERAL

a. Amendment Number 2 to the PLN/Irby Substation Equipment Contract was signed 11 November. The Amendment provides for the purchase of additional control cable, watthour meters, tools and spare parts.

b. Amendment Number 5 to PLN/Irby West Java II Transmission Line Contract was signed 23 November. 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.

C. CONFERENCES AND EVENTS

1. Construction Meetings

a. Ujungberung Substation Civil Work
Contractor - PLN / P.T. Mitra Bangun Utama
10 November 1981

b. Ujungberung Substation Control House/Electrical Installation
Contractor - P.T. Citac Ltd.
10 November 1981

2. Energization of Equipment

a. Ujungberung Substation 20 KV bus
Energized 11 November 1981

b. Ujungberung Substation 70 KV bus.
Energized 22 November 1981

D. PROBLEM AREAS AND TENTATIVE SOLUTIONS

1. The Ujungberung Switchyard Civil Works Construction is more than one year behind schedule. Responsibility for the 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. However, funds have been arranged to complete the yard final grading and the substation road. Delays in the remaining civil works should not delay complete energization of the substation.

2. The Bandung Utara Switchyard Contractor is several months behind schedule. However, no delay in the energization of the substation is expected.

3. Negotiations are completed for the transport of the 60 MVA transformer. The 60 MVA transformer should be on site around December 20, 1981. The Ujungberung Substation should be completed by the end of January 1982.

4. During erection of the electrical equipment, material shortages, defects and damages are continually discovered. Immediately upon discovery, replacement parts are ordered for air shipments. However, there is a possibility that some delays in equipment energization may occur.

E. TRANSMISSION - WEST JAVA I

1. Construction

   a. Tower Site Procurement. All tower sites have been procured.

b. Foundations. All foundations have been installed.

c. Tower Erection. All towers are erected and accepted.

d. ROW Procurement and Clearing. All ROW procurement and clearing are completed.

e. Conductor and Shieldwire. Phase conductor and shieldwire have been installed.

f. Tower Movement. Towers No. 317 and 319 were monitored during the middle part of the month. No additional downhill movement was detected. Measurements will continue to be taken during the following months.

F. TRANSMISSION - WEST JAVA II

1. Construction

a. Tower Site Procurement. All tower sites have been procured.

b. Foundations. All foundations have been installed.

c. Tower Erection. All towers are erected and accepted.

d. ROW Procurement and Clearing. All ROW procurement and clearing are completed.

e. Conductor and Shieldwire. Phase conductor and shieldwire have been installed.

G. SUBSTATIONS

1. Construction

a. Tegal Substation

All work is completed and the addition has been energized.

b. Ujungberung Substation

(1) Switchyard Civil Work

The following work was completed during October :

Installation of 150/20 KV transformer oil containment pits.

Installation of cable trench.

Work continued on the chain link fence. The work is over one year behind the original schedule. PLN has terminated the Contract and undertook to do the work. PLN has arranged for funds to complete the final grading and the substation road by the end of December.

(2) Control House

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

(3) Erection, Wiring and Testing

The following work remains to be completed :

Installation, testing and energization of 60 MVA, 150 to 70 KV transformer.

Complete installation and testing of one 30 MVA, 150 to 20 KV transformer.

Install wiring and high voltage connections to 150 to 70 KV transformer.

Install 20 KV cable terminals.

Energize Busses No. 2 and 2A (20KV).

During October the 70 KV transmission lines were terminated and the 70 KV bus energized. In addition, 20 KV bus 1 and 1A were energized.

c. Bandung Utara Substation

(1) Switchyard

The following work remain to be completed :

Installation of substation rock cover.

Final grading and clean-up of site.

The Contractor is now approximately twelve (12) months behind his original schedule. It is now estimated that the switchyard work will not be completed until the end of December.

(2) Control House

The Control House was completed during November.

The Contractor completed his work approximately eight (8) months behind schedule.

(3) Access Road

The road is complete.

(4) Erection, Wiring and Testing

The following work was completed during October :

Installation of the above-ground conduits.

Installation of the battery charger.

Work continued on the following phases :

150 KV switch adjustment.
Installation of 20 KV switchgear.
Installation of control wiring.
Preliminary testing.
Final testing.

Work began on the following phases :

150 KV oil circuit breaker set-up
Installation of above-ground grounding.

d. Bogor Substation

(1) Switchyard Civil Work

The Switchyard Civil Work is complete.

The Contractor is now in the warranty period and will make repairs as required.

(2) Control House

The Control House is complete.

The Contractor is now in the warranty period and will make repairs as required.

(3) Access Road

The improvement of the kampung road between the substation entrance road and the main road is complete.

(4) Erection, Wiring and Testing

Work remaining :

Complete taping of 20 KV cable terminal studs. (Ties between switchgear lineups).

Varnish 20 KV cable terminal stud taping.

2. Material Supply

All material is presently in Indonesia except for replacement and spare parts. The need for replacement parts for the 150 KV OCB's and 20 KV Switchgear may delay completion of the Bandung Utara Substation.

H. MOBILE RADIO

1. Installation of the mobile radio system is complete and the system is operating.

I. SCHEDULES

1. Current Shipping Schedules

This schedule is on pages 16 and 17 . Based on the present supply Contracts only three (3) shipments are pending. As erection work continues and additional shortages are determined, the number of pending shipments can increase.

2. West Java I and II Projects Completion

The tables which are on pages 18 and 19 give the scheduled and actual completion of the various phases of the Projects. Engineering as well as physical completion are included in the percentage figures.

The page following is the Project Completion graph based on these tables and in addition shows the monthly scheduled percentage completion to the end of the Project. The scheduled completion is based on the estimated schedule at the time Amendment No. 4 of the Engineering Services Contract was signed and does not necessarily reflect the Schedule provided by the various Construction Contractors.

3. Construction Progress

The pages following the Project Completion graph are Project schedules showing the relationship between the actual physical construction and Contractor or PLN scheduled progress. The Bogor Substation Control House and Switchyard Civil Works Construction was completed in October and their schedules are not included.

WEST JAVA I AND II
TRANSMISSION AND SUBSTATION PROJECTS
CURRENT SHIPPING SCHEDULE

Item	Shipping Date	ETA in PLN Warehouse	Comments
A. Contract Pj. 152/PST/77, Shipment Complete	Irby Construction Company, Transmission Line Materials - WJ II		
B. Contract Pj. 153/PST/77, Shipment Complete	Irby Construction Company, Transmission Line Materials - WJ I		
C. Contract Pj. 203/PST/77, Shipment Complete	Southwire Company, Conductor - WJ I		
D. Contract Pj. 202/PST/77, Shipment Complete	Copperweld Industries, Alumoweld Shieldwire - WJ I		
E. Contract Pj. 050/PST/78, Shipment Complete	Tension Stringing Equipment, Inc. Wire Stringing Equipment - WJ I		
F. Contract Pj. 051/PST/78, Shipment Complete	Ohio Brass Company, Surge Arresters, WJ I & II		
G. Contract Pj. 053/PST/78, Shipment Complete	General Electric Company, Substation Equipment - WJ I & II		
H. Contract Pj. 087/PST/78, Shipment Complete	Motorola Company, Mobile Radio Equipment - WJ I		

Item	Shipping Date	ETA in PLN Warehouse	Comments
I. Contract Pj. 052/PST/78,	Irby Construction Company Substation Equipment and Maintenance Tools and Equipment - WJ I & II		
1. Battery Electrolyte	21 August 1981	4 Dec. 1981	Spare
2. Fuses, Wire Terminals and Replacement Parts for Oil Filter Trailer	4 November 1981	4 Dec. 1981	Air Freight
3. Spare Parts for Transformers, Switchyard and Relaying	15 December 1981	15 Feb. 1982	Spare Parts to be purchased under Amendment No. 2

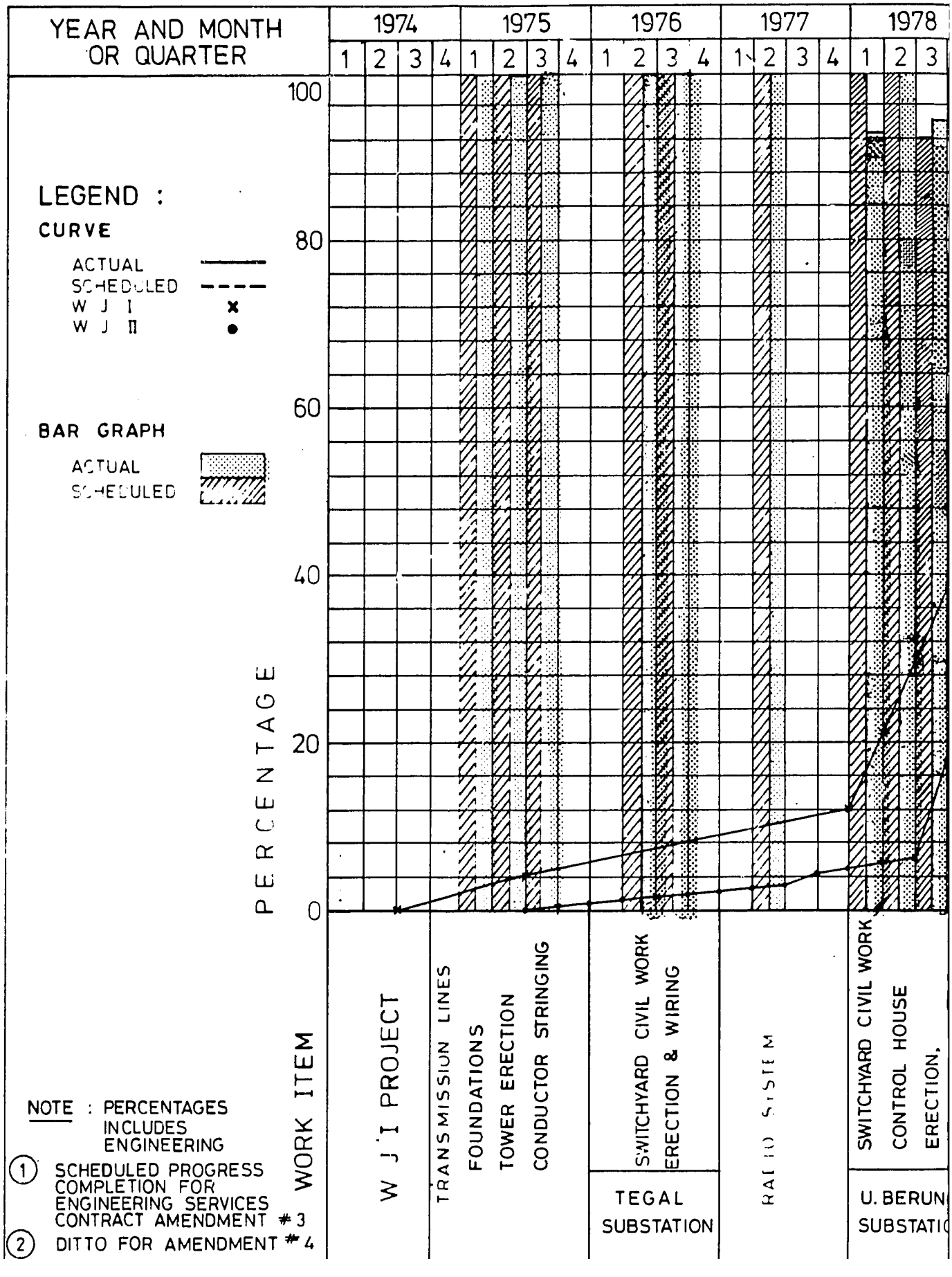
West Java I Project
Project Completion
(Includes Engineering and Design)
as of 28 November 1981

Work Item	Weighted Percent of Project	Percent of Item Completed to Date		Percent of Project Completed to Date	
		Scheduled	Actual	Scheduled	Actual
Transmission Line					
Foundations	28.9	100.0	100.0	28.9	28.9
Tower Erection	13.5	100.0	100.0	13.5	13.5
Conductor Stringing	11.7	100.0	100.0	11.7	11.7
Tegal Substation					
Switchyard	2.0	100.0	100.0	2.0	2.0
Erection and Wiring	1.2	100.0	100.0	1.2	1.2
Ujungberung Substation					
Switchyard Civil Work	15.2	100.0	92.6	15.2	14.1
Control House	11.5	100.0	100.0	11.5	11.5
Equipment Erection, Wiring and Testing	10.3	92.2	94.4	9.5	9.7
Radio System	5.7	100.0	100.0	5.7	5.7
Total	100.0			99.2	98.3

West Java II Project
Project Completion
(Includes Engineering and Design)
as of 28 November 1981

Work Item	Weighted Percent of Project	Percent of Item Completed to Date		Percent of Project Completed to Date	
		Scheduled	Actual	Scheduled	Actual
Transmission Line					
Foundations	28.1	100.0	100.0	28.1	28.1
Tower Erection	13.1	100.0	100.0	13.1	13.1
Conductor Stringing	11.1	100.0	100.0	11.1	11.1
Bandung Utara Substation					
Switchyard Civil Work	7.3	100.0	99.5	7.3	7.3
Control House	6.1	100.0	100.0	6.1	6.1
Equipment Erection, Wiring and Testing	4.9	91.8	91.1	4.5	4.5
Bogor Substation					
Switchyard Civil Work	10.6	100.0	100.0	10.6	10.6
Control House	5.8	100.0	100.0	5.8	5.8
Equipment Erection, Wiring and Testing	7.0	92.9	99.2	6.5	6.9
Radio System	6.0	100.0	100.0	6.0	6.0
Total	100.0			99.1	99.5

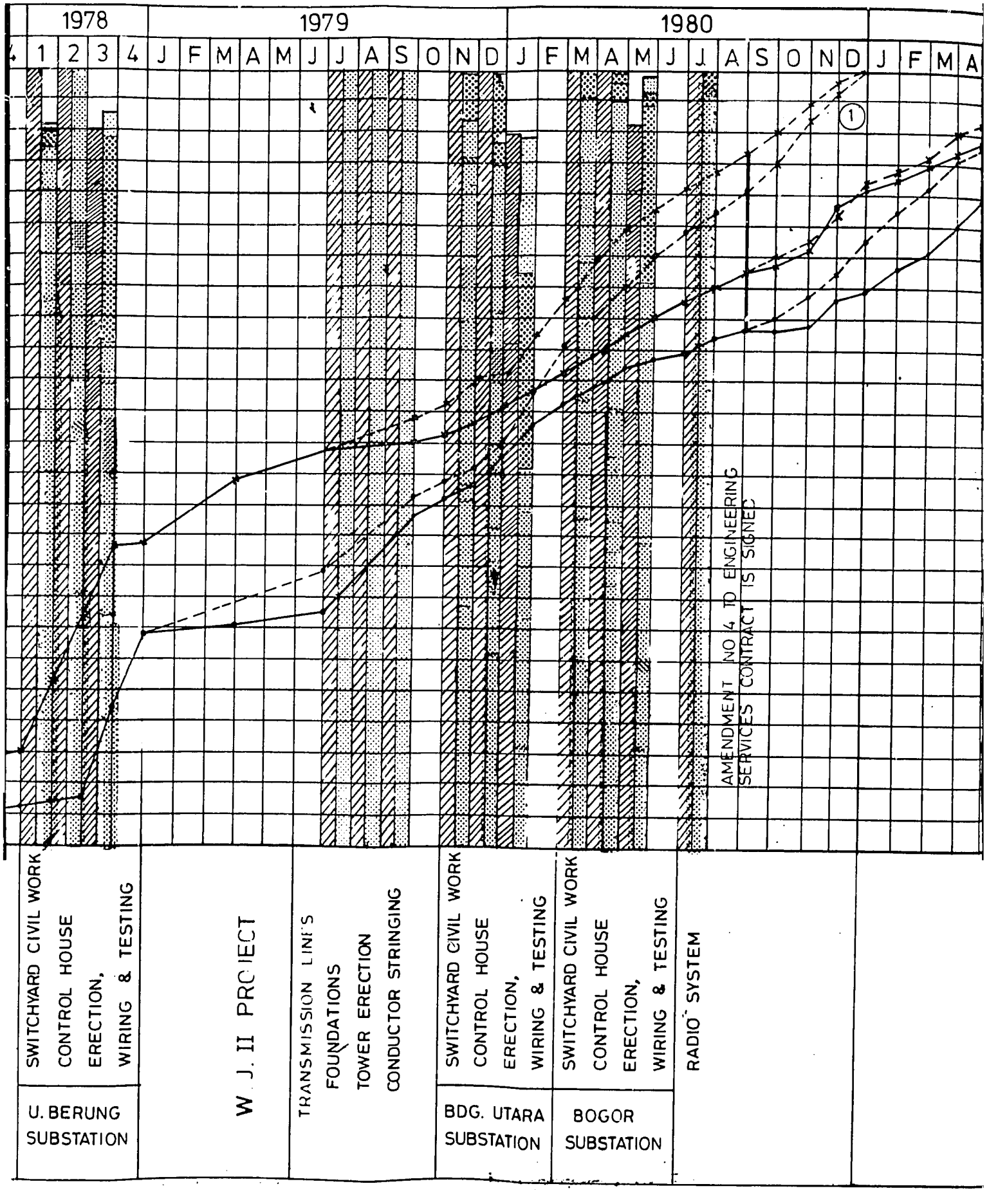
WEST JAVA I AND PROJECT COMPLETION

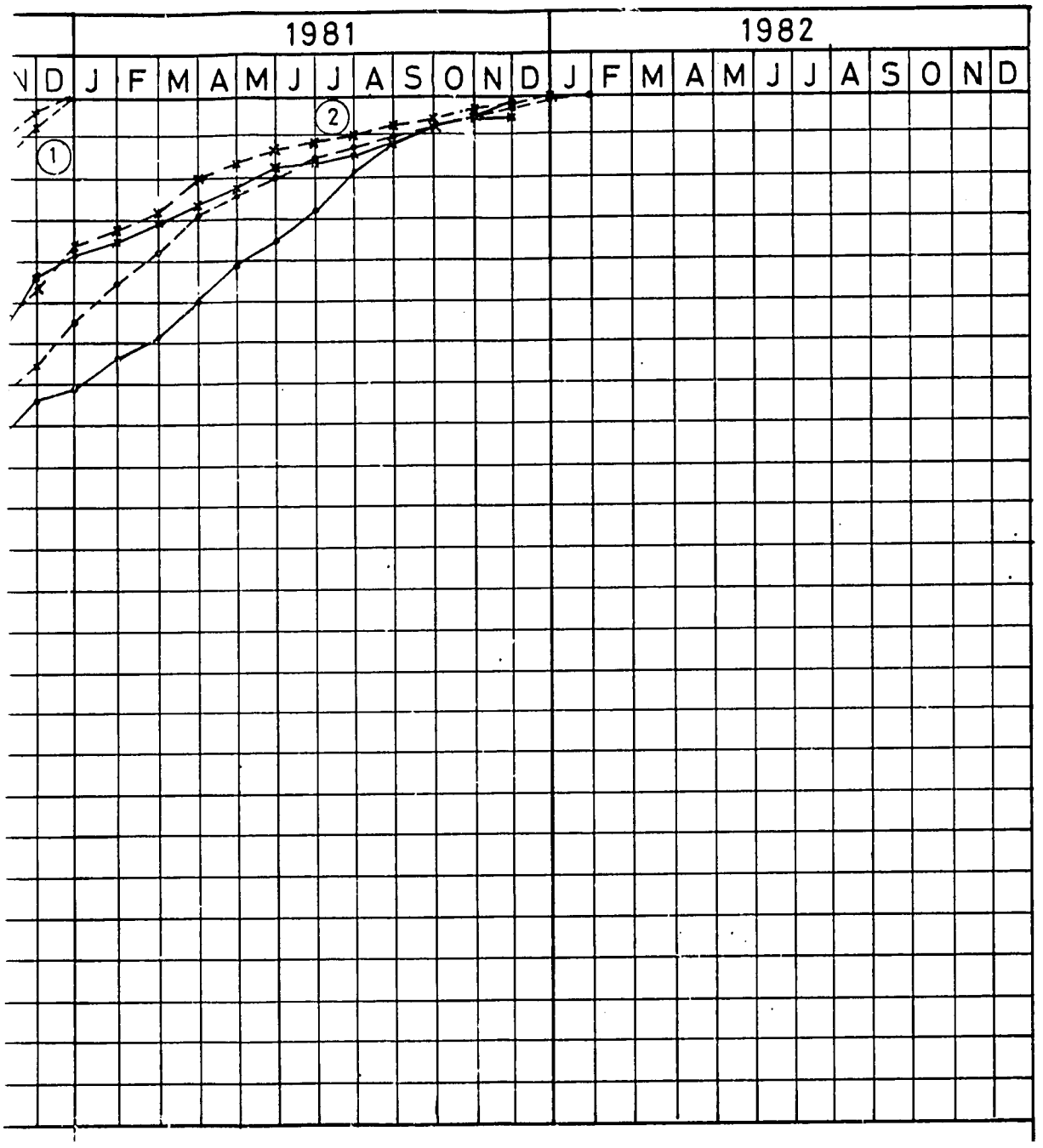


I AND II PROJECTS

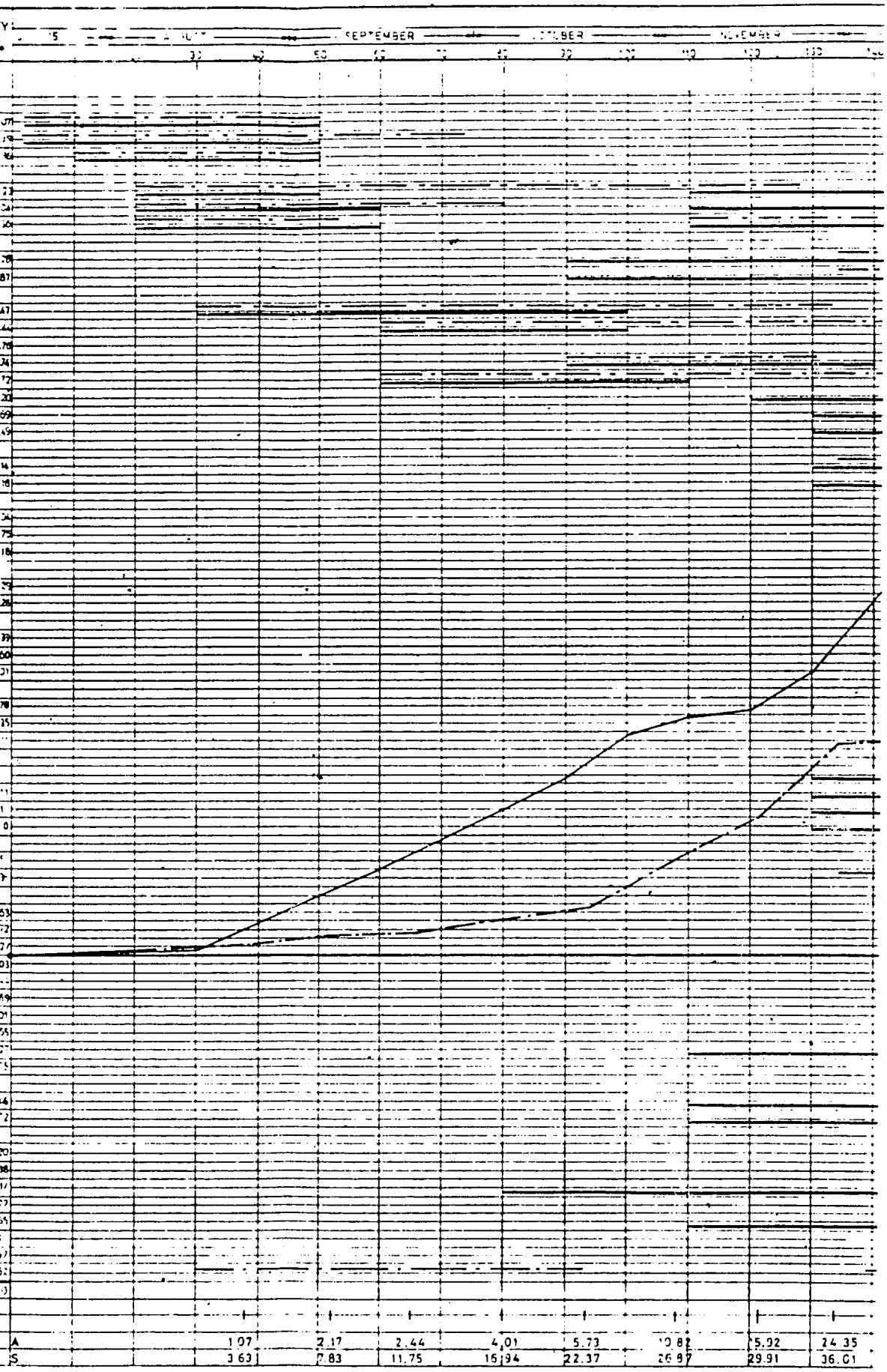
TION AS OF NOVEMBER . 28 . 1981

21




1981
1982
N D J F M A M J J A S O N D J F M A M J J A S O N D
1
2

NO	WORK ITEM	UNIT	QTY %
	PRELIMINARY WORK		
[illegible]	clearing & grubbing of site	5.25 m²	[illegible]
[illegible]	contractors office fence	1	[illegible]
[illegible]	water supply and sewers	1	[illegible]
2	SOIL WORK		
[illegible]	excavation	931 m³	[illegible]
[illegible]	site fill	537 m³	[illegible]
[illegible]	sand & soil compaction	272 m³	[illegible]
3	MASONRY		
3.1	stone	3775 m³	[illegible]
3.2	brick work	207 m³	1.87
4	CONCRETE WORK		
[illegible]	column foundation	28	2.47
[illegible]	foundation	4360 m³	[illegible]
[illegible]	floor	1568 m³	7.78
[illegible]	column	1063 m³	6.74
[illegible]	tie beams	32.27 m³	1.72
[illegible]	cable trench	232.8 M	3.20
[illegible]	stairs	12.22 M	[illegible]
[illegible]	roof	1105.1 M	11.69
5	PLASTER WORK		
[illegible]	rough	590 m²	[illegible]
5.2	final work	3380 m²	[illegible]
6	WOOD		
[illegible]	kitchen cupboards	5 m²	[illegible]
[illegible]	ceiling hangers	905 m²	[illegible]
[illegible]	doors	34.64 m²	[illegible]
7	DOOR, WINDOWS		
[illegible]	doors	23	[illegible]
[illegible]	windows	37	5.26
8	CEILING WORK		
[illegible]	plywood ceiling	518 m²	[illegible]
[illegible]	acoustic ceiling	252 m²	[illegible]
[illegible]	asbestos cement #	25 m²	[illegible]
9	STEEL WORK		
[illegible]	cable trench covers	[illegible]	1.78
[illegible]	switchgear channel support	[illegible]	[illegible]
[illegible]	cable rack / [illegible]	[illegible]	[illegible]
10	FLOOR WORK		
[illegible]	terrazzo tile	52[illegible]	[illegible]
[illegible]	terrazzo paint	219 m²	[illegible]
[illegible]	[illegible] / ceramic tile	50	[illegible]
[illegible]	mosaic tile	19[illegible]	0
[illegible]	PAINT	5722 m²	[illegible]
[illegible]	SANITARY	16	[illegible]
13	ELECTRICAL		
13.1	panels	7	5.53
13.5.1	fixtures	157	2.72
[illegible]	outlets	72	[illegible]
[illegible]	switches	67	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	lines	9	[illegible]
[illegible]	transformer	[illegible]	[illegible]
[illegible]	lightning arrester		[illegible]
[illegible]	conduit	[illegible]	[illegible]
[illegible]	conductor	3	[illegible]
[illegible]	FIRE PROTECTION		
[illegible]	[illegible] water	18	[illegible]
[illegible]	[illegible] system	[illegible]	[illegible]
15	DRAINAGE & WATER SYSTEM		
[illegible]	rain water drainage	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	deep well	[illegible]	[illegible]
[illegible]	pipe	39[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	365
[illegible]	fire hose	[illegible]	[illegible]
[illegible]	[illegible]	24	[illegible]
[illegible]	OTHER WORK	3	[illegible]
			100.0



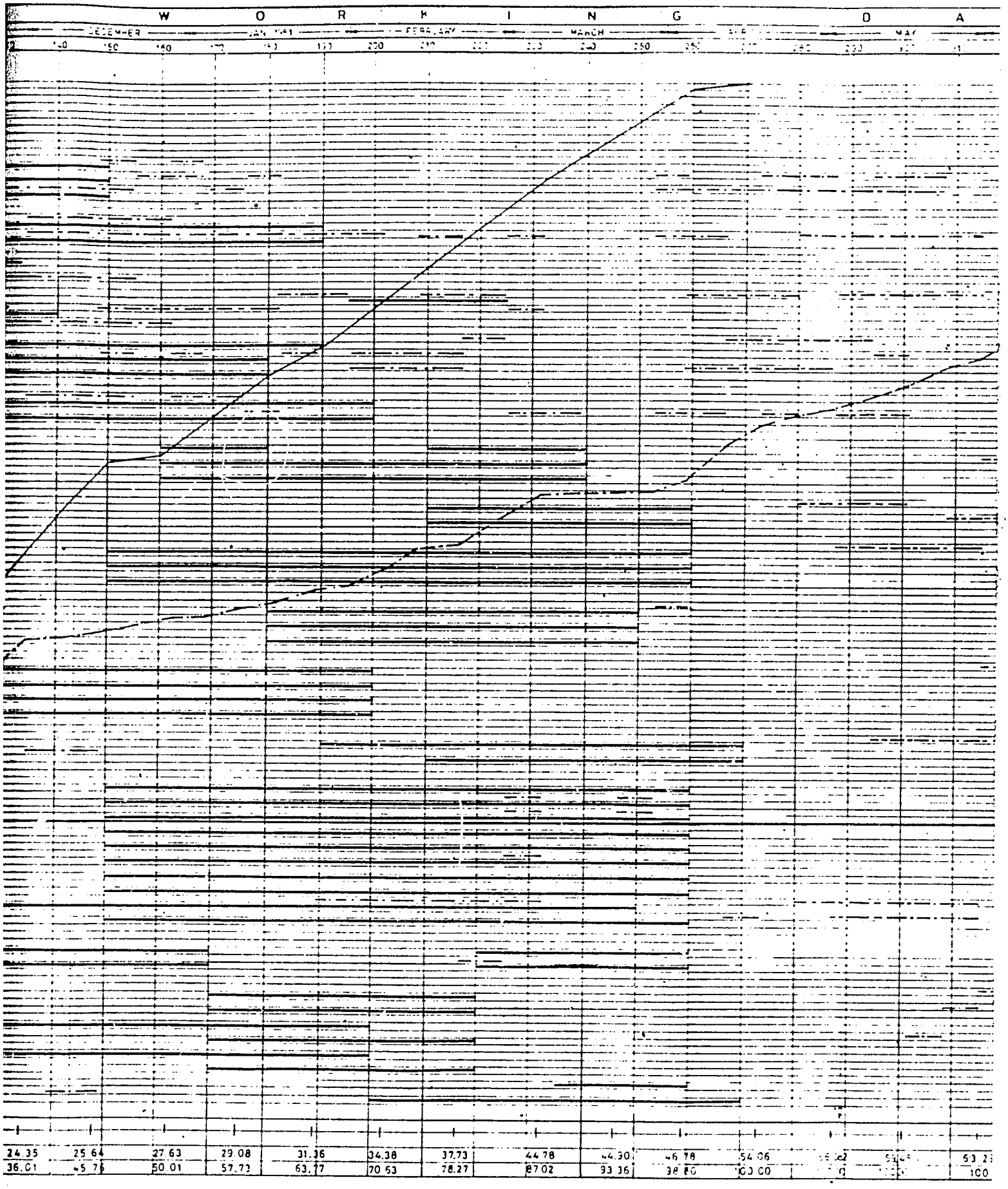
A = ACTUAL
S = SCHEDULE

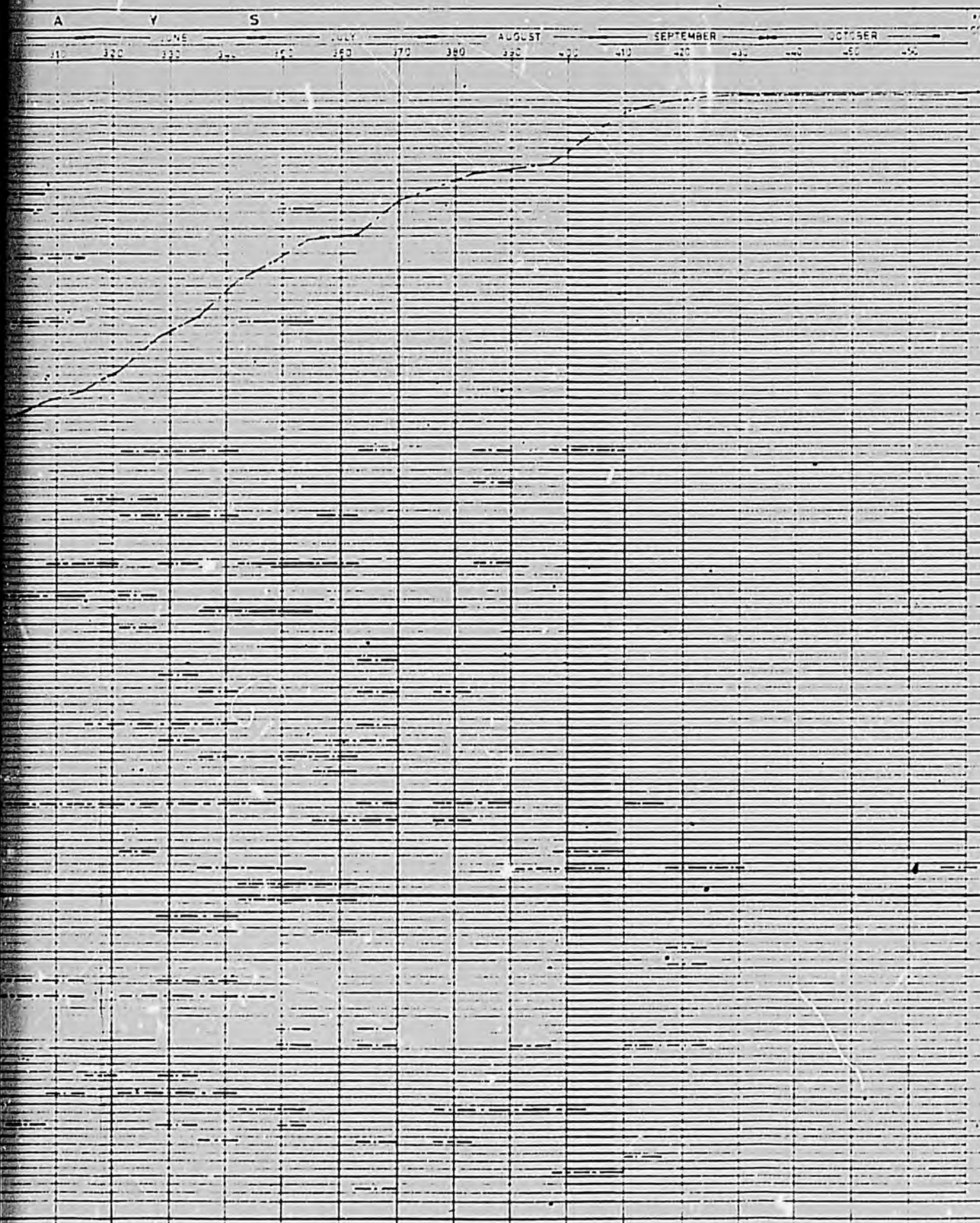
NOTES :

ITEMS 100% COMPLETED (TYP.)

BANDUNG UTARA CONTROL HOUSE

24

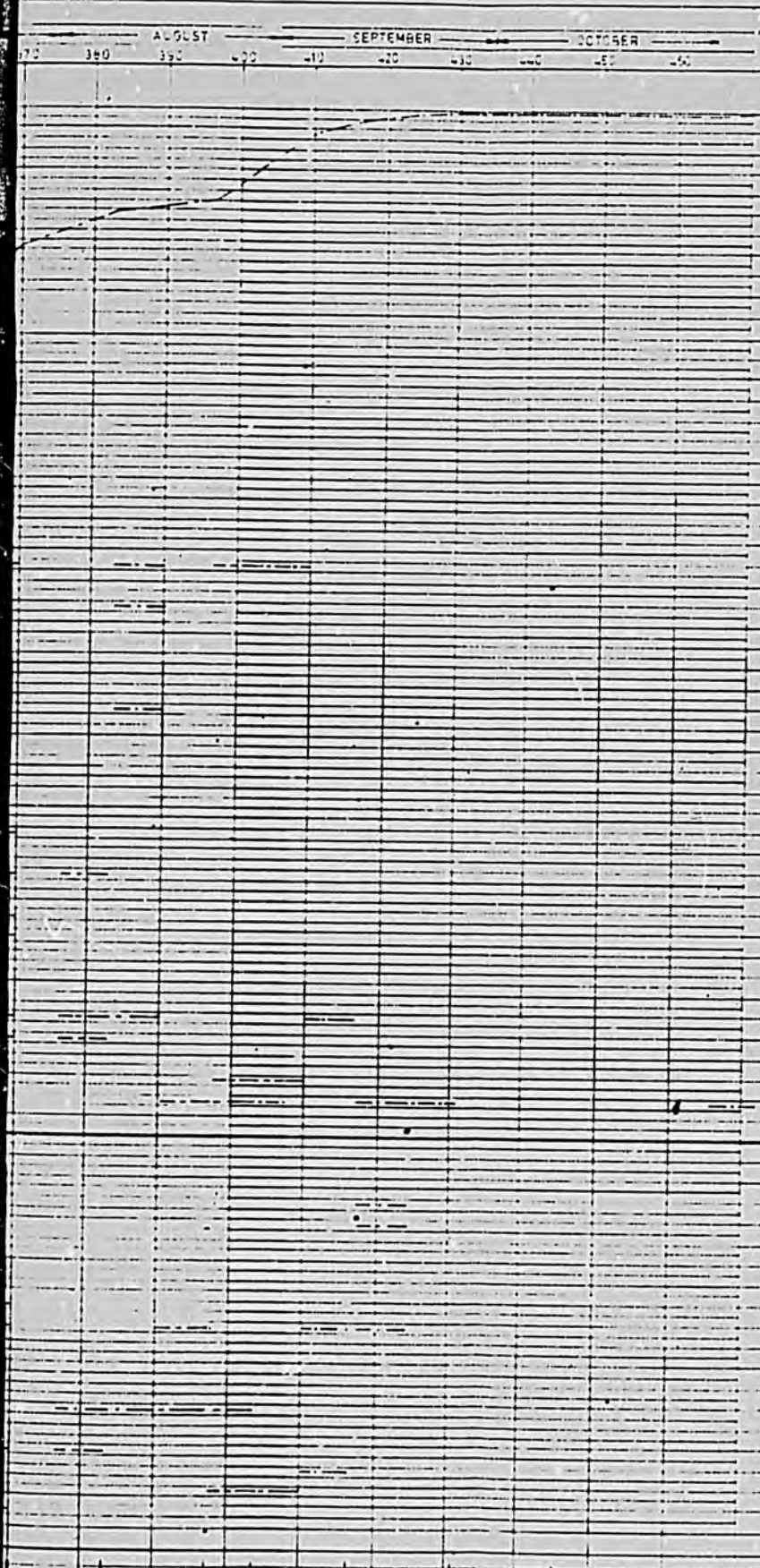




% OF COMPLETION	CONSTRUCTION PROGR		
	ACTUAL		
		%	
100			
98			
96	1525 M2	100	152
94		100	
92	1	100	
90			
88	931 M3	100	931
86	532 M3	100	53
84	293 M3	100	29
82			
80	37.75 M3	100	37
78	207 M3	100	20
76			
74	28	100	2
72	43.60 M3	100	43.6
70	168.11 M3	100	168
68	70.53 M3	100	70.6
66	32.27 M3	100	32.2
64	232 8 M	100	232
62	12.22 M	100	12.2
60	310.51 M	100	310
58			
56	590 M2	100	59
54	338.0 M2	100	338
52			
50	5 M2	100	5
48	905 M2	100	90
46	34.64 M2	100	34.6
44			
42	23	100	2
40	37	100	3
38			
36	618 M2	100	61
34	262 M2	100	26
32	25 M2	100	2
30			
28	144.08 M2	100	144
26	148 M	100	1
24	352 25.75 M	100 100	352
22			
20	524 M2	100	52
18	219 M	100	21
16	50 M2	100	5
14	18 M2	100	1
12			
10	5722 M2	100	572
8	16	100	
6			
4	7	100	
2	157	100	1
0	72	100	
	47	100	
	1	100	
	9	100	
	1	100	
	1	100	
	1	100	
	3	100	
	18	100	
	40	100	
	136.8	100	13
	142 M	100	1
	1	100	
	39 M	100	
	3	100	
	1	100	
	24	100	
	3	100	

45.	53.23	69.50	76.81	81.645	86.16	89.75	91.08	94.49	98.94	99.90	99.90	[illegible]	[illegible]
00	100	100	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	[illegible]	[illegible]

P.T. PE



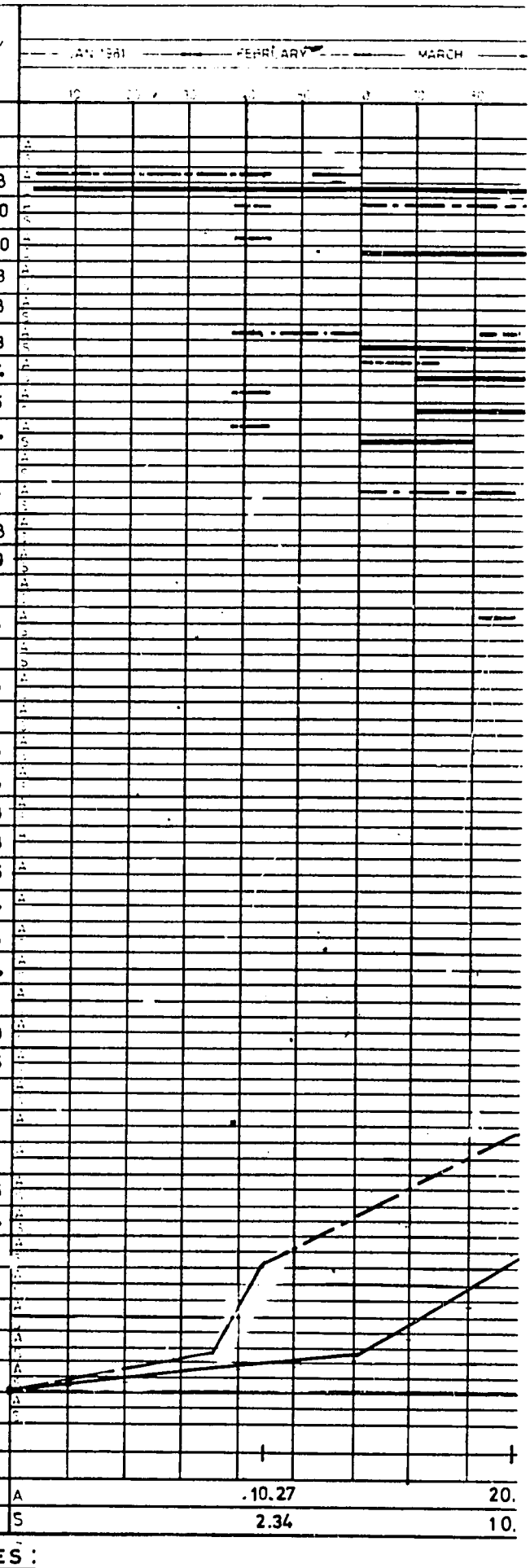
% OF COMPLETION	CONSTRUCTION PROGRESS TO DATE 11-7-1981 ACTUAL QTY	ACTUAL %	SCHEDULED QTY	SCHEDULED %	% OF CONTRACT ACTUAL %	% OF CONTRACT SCHED %	NO.
100							
98							1.
96	1525 M2	100	1525 M2	100	0.07	0.07	1.1
94	1	100	1	100	0.39	0.39	1.2
92	1	100	1	100	0.86	0.86	1.3
90							2.
88	931 M3	100	931 M3	100	0.23	0.23	2.1
86	532 M3	100	532 M3	100	0.04	0.04	2.2
84	293 M3	100	293 M3	100	0.36	0.36	2.3
82							3.
80	37.75 M3	100	37.75 M3	100	0.28	0.28	3.1
78	207 M3	100	207 M3	100	1.87	1.87	3.2
76							4
74	28	100	28	100	19.47	19.47	4.1
72	43.60 M3	100	43.60 M3	100	1.44	1.44	4.2
70	168.11 M3	100	168.11 M3	100	7.76	7.76	4.3
68	70.53 M3	100	70.53 M3	100	4.74	4.74	4.4
66	32.27 M3	100	32.27 M3	100	1.72	1.72	4.5
64	232.8 M	100	232.8 M	100	3.20	3.20	4.6
62	12.22 M	100	12.22 M	100	0.59	0.59	4.7
60	310.51 M	100	310.51 M	100	11.49	11.49	4.8
58							5.
56	590 M2	100	590 M2	100	0.14	0.14	5.1
54	3380 M2	100	3380 M2	100	1.18	1.18	5.2
52							6.
50	5 M2	100	5 M2	100	0.04	0.04	6.1
48	905 M2	100	905 M2	100	0.75	0.75	6.2
46	34.64 M2	100	34.64 M2	100	0.18	0.18	6.3
44							7.
42	23	100	23	100	1.29	1.29	7.1
40	37	100	37	100	5.26	5.26	7.2
38							8.
36	618 M2	100	618 M2	100	0.39	0.39	8.1
34	262 M2	100	262 M2	100	0.60	0.60	8.2
32	25 M2	100	25 M2	100	0.01	0.01	8.3
30							9.
28	144.08 M2	100	144.08 M2	100	1.78	1.78	9.1
26	148 M	100	148 M	100	0.35	0.35	9.2
24	352.575 M	100	352.575 M	100	1.11	1.11	9.3
22							10
20	524 M2	100	524 M2	100	1.08	1.08	10.1
18	219 M	100	219 M	100	0.11	0.11	10.2
16	50 M2	100	50 M2	100	0.18	0.18	10.3
14	18 M2	100	18 M2	100	0.10	0.10	10.4
12							
10	5722 M2	100	5722 M2	100	3.53	3.53	11.
8	16	100	16	100	0.38	0.38	12.
6							13.
4	7	100	7	100	5.63	5.63	13.1
2	157	100	157	100	2.72	2.72	13.2
0	72	100	72	100	0.27	0.27	13.3
	47	100	47	100	0.03	0.03	13.4
	1	100	1	100	0.44	0.44	13.5
	9	100	9	100	0.69	0.69	13.6
	1	100	1	100	0.01	0.01	13.7
	1	100	1	100	0.55	0.55	13.8
	1	100	1	100	0.27	0.27	13.9
	3	100	3	100	0.75	0.75	13.10
							14
	18	100	18	100	0.46	0.46	14.1
	40	100	40	100	2.72	2.72	14.2
							15
	136.8	100	136.8	100	0.20	0.20	15.1
	142 M	100	142 M	100	0.38	0.38	15.2
	1	100	1	100	4.17	4.14	15.3
	39 M	100	39 M	100	0.77	0.77	15.4
	3	100	3	100	3.66	3.66	15.5
	1	100	1	100	0.12	0.12	15.6
	24	100	24	100	1.57	1.57	16
	3	100	3	100	1.52	1.52	17
					100.00	100.00	

16	89.75	91.08	94.49	98.94	99.90	99.90	[illegible]	[illegible]	[illegible]
100	100.00	100.00	100.00	100.00	100.00	100.00	[illegible]	[illegible]	100

Jakarta , April 1980

P.T PERFECT CIRCLE ENGINEERING

NO	WORK ITEM	UNIT	QTY %
1.	STRUCTURES		
[illegible]	150 KV BUS SUPPORT STRUCTURES	130	6.78
[illegible]	150 KV SWITCH SUPPORT STRUCTURES	24	2.60
[illegible]	150 KV DEAD END TOWERS	4	2.50
[illegible]	20 KV TERMINATOR STRUCTURE	2	0.78
[illegible]	66 KV FUSE & TRANSF STRUCTURE	2	0.78
[illegible]	LIGHTING MAST STRUCTURE	14	3.13
[illegible]	CCVT & BUS SUPPORT STAND (BUS)	2	1.04
[illegible]	CCVT WAVE TRAP & L A STAND (LINE)	4	1.56
[illegible]	CCVT , L.A. SUPPORT STRUCTURE	8	1.04
2.	BUS		
[illegible]	INSULATORS	405	4.17
[illegible]	BUS PIPE & ACSR. (AND DAMPER CABLE)	480 2486 M	6.28
[illegible]	CONNECTORS	774	4.69
3	EQUIPMENT (SWITCH YARD)		
[illegible]	150 KV SWITCHES (INSTALLATION)	18	2.08
3.2	150 KV SWITCH ADJUSTMENT	18	4.17
[illegible]	66 KV FUSE & SWITCHES	2	1.56
[illegible]	CCVTS	4	1.56
[illegible]	LIGHTNING ARRESTERS	12	1.04
[illegible]	WAVE TRAPS	4	0.78
[illegible]	OIL CIRCUIT BREAKERS	7	2.08
3 8	OIL CIRCUIT BREAKER SET UP	7	2.08
[illegible]	PRELIMINARY POWER TRASF SET UP	2	1.56
[illegible]	TRANSF INSTALLATION AND TESTING	2	1.04
[illegible]	STATION SERVICE TRANSFORMERS	6	1.56
4.0	GROUNDING MATERIAL	100	2.34
5 0	YARD LIGHTING	100	3.13
[illegible]	CONDUIT INSTALLATION	217	4.69
[illegible]	YARD PANEL INSTALLATION	13	2.86
8 0	CONTROL HOUSE		
[illegible]	RELAY AND CONTROL PANEL INST	9	4.17
8 2	20 KV SWITCH GEAR INST.	24	6.51
8 3	FINAL 20 KV SW GEAR TESTING	100	2.86
8.4	BATTERY CHARGER INSTALLATION	2	2.34
[illegible]	POWER PANEL INSTALLATION	4	2.34
9.0	CONTROL WIRING INSTALLATION	2328	5.99
10 0	TESTING		
10 1	PRELIMINARY TESTING	100	5.47
10 2	FINAL TESTING	100	1.56
11 0	ENERGIZING	100	0.78
	TOTAL		100



A = ACTUAL
S = SCHEDULE

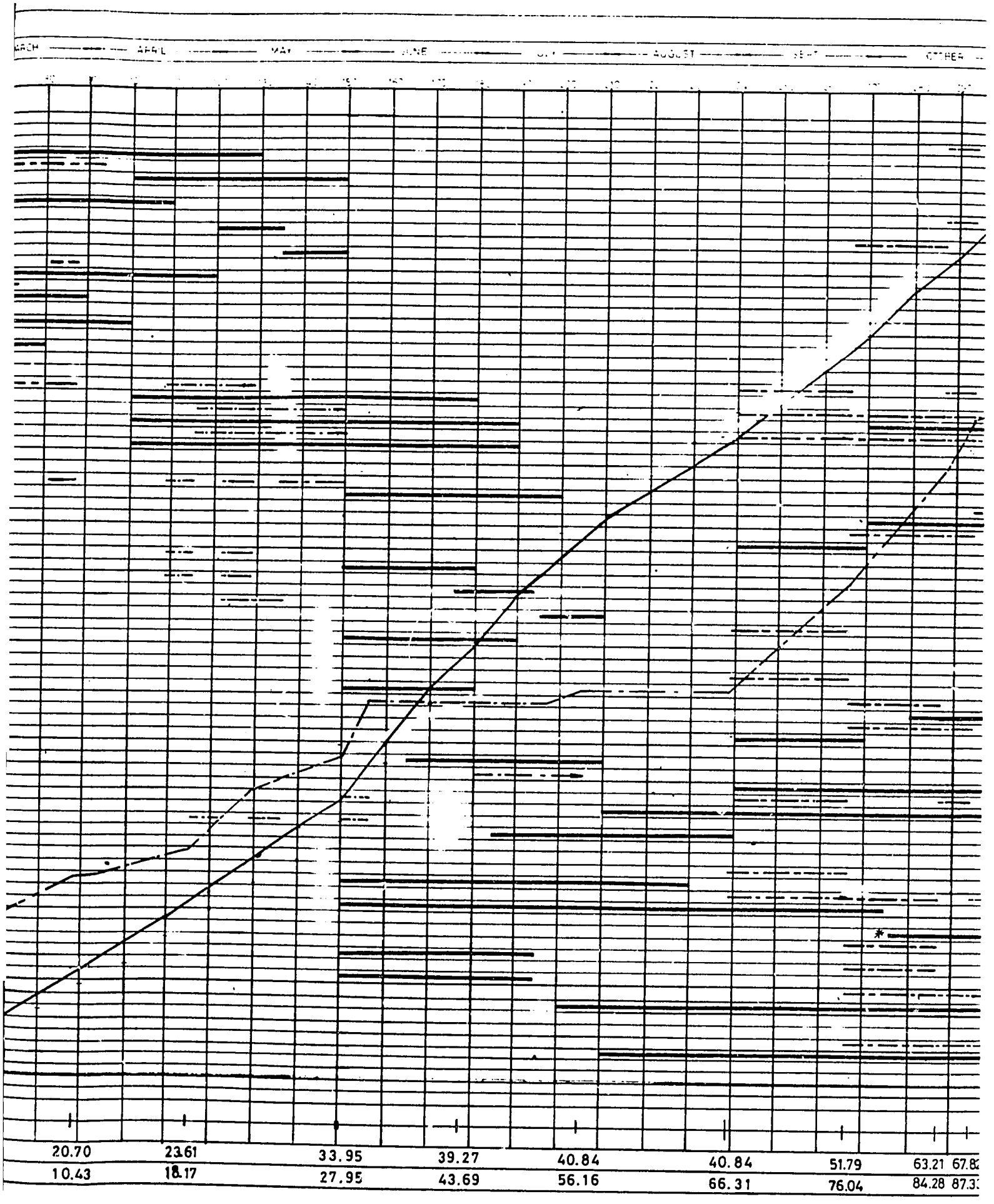
ITEMS 100% COMPLETED (TYP.)

NOTES :

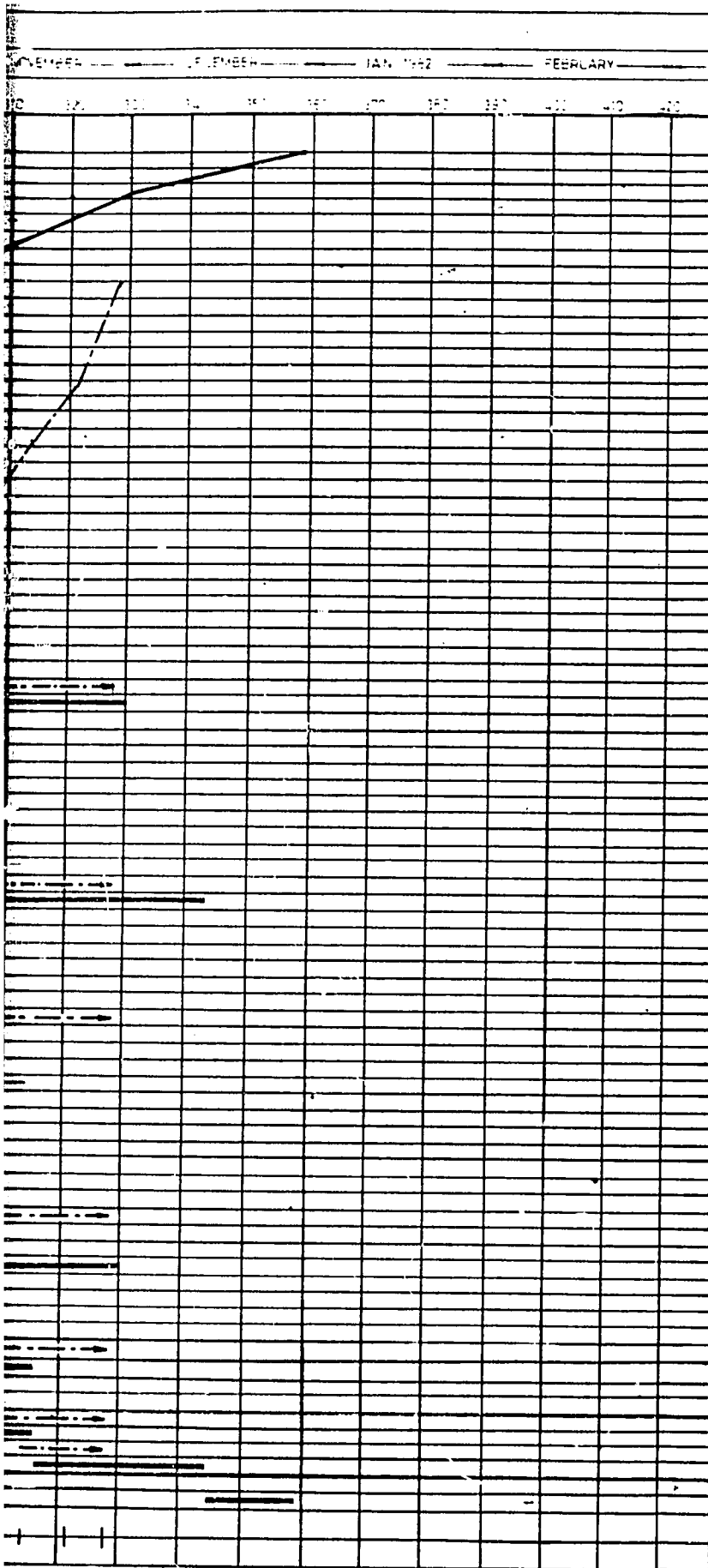
* WORK NOT STARTED .

WORK NOT COMPLETE AS OF DATE UNDER CONST. PROGRESS .

BANDUNG UTARA ERECTION



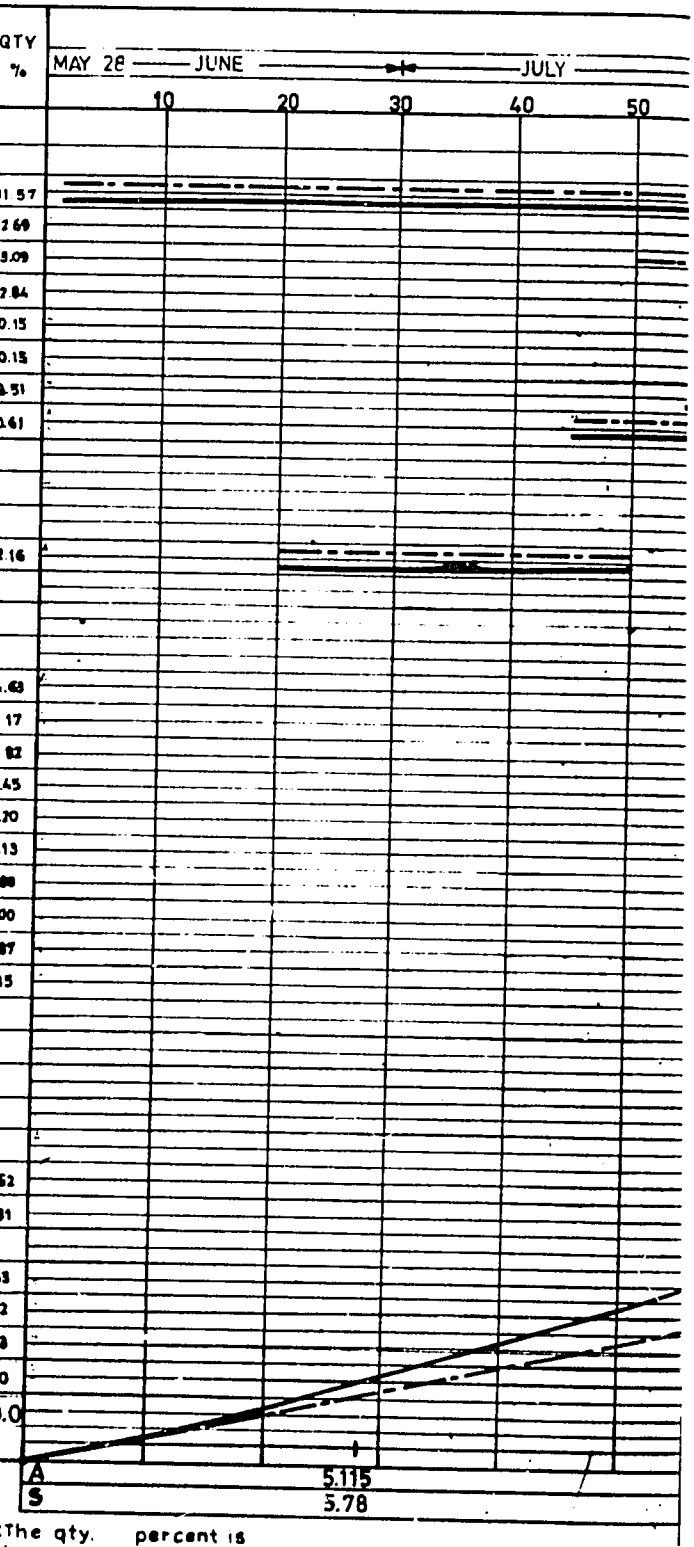
1. WORK CAN NOT BE COMPLETED DUE TO MATERIAL PROBLEM.



% OF COMPLETION	CONSTRUCTION PROGRESS TO DATE 11-28-81						NO.
	UNIT				% OF TOTAL		
	ACTUAL		SCHEDULED		ACTUAL	SCHEDULED	
	QTY	%	QTY	%	%	%	
100							
97.5							1
95	190	100	190	100	6.78	6.78	1.1
92.5	24	100	24	100	2.60	2.60	1.2
90	4	100	4	100	2.60	2.60	1.3
87.5	2	100	2	100	0.78	0.78	1.4
85	2	100	2	100	0.78	0.78	1.5
82.5	14	100	14	100	3.13	3.13	1.6
80	2	100	2	100	1.04	1.04	1.7
77.5	4	100	4	100	1.56	1.56	1.8
75	8	100	8	100	1.04	1.04	1.9
72.5							2
70	406	100	406	100	4.17	4.17	2.1
67.5	480 / 2486	100	480 / 2486	100	6.28	6.28	2.2
65	774	100	774	100	4.69	4.69	2.3
62.5							3
60	18	100	18	100	2.08	2.06	3.1
57.5	16	88.89	17	96	3.71	4.03	3.2 SEE NOTE
55	2	100	2	100	1.56	1.56	3.3
52.5	14	100	14	100	1.56	1.56	3.4
50	12	100	12	100	1.04	1.04	3.5
47.5	4	100	4	100	0.78	0.78	3.6
45	7	100	7	100	2.08	2.08	3.7
42.5	3	42.86	4	57.50	0.89	1.20	3.8 SEE NOTE.
40	2	100	2	100	1.56	1.56	3.9
37.5	2	100	2	100	1.04	1.04	3.10
35	6	100	6	100	1.56	1.56	3.11
32.5	95	95	100	100	2.22	2.34	4.0
30	50	50	100	100	1.57	3.13	5.0
27.5	217	100	217	100	4.69	4.69	6.0
25	13	100	13	100	2.86	2.86	7.0
22.5							8.0
20	9	100	9	100	4.17	4.17	8.1
17.5	21	90	24	100	5.86	6.51	8.2
15	0	0	96	96	0	2.76	8.3
12.5	2	100	2	100	2.34	2.34	8.4
10	4	100	4	100	2.34	2.34	8.5
7.5	2281	98	2328	100	5.87	5.99	9.0
5							10.0
2.5	75	75	100	100	4.10	5.47	10.1
0	30	30	43	43	0.47	0.68	10.2
							11.0
					89.80	97.22	

.88 89.80
.01 97.22

	WORK ITEM	UNIT	QTY %
1	CIVIL		
1.1	clearing & grubbing of site	81.450M2	11.57
1.2	15cm crush stone	10.700M2	2.69
1.3	road sub-base	4.663M2	5.09
1.4	road top surface	3.843M2	2.84
1.5	yard drainage piping	82M	0.15
1.6	catch basin & dropinlets	5	0.15
1.7	chain link fence	71.9M	3.51
1.8	drainage	100	0.61
2	CONSTRUCTION PLANT	8	2.16
3	FOUNDATION		
3.1	All but OCB & transf.	PMD 138 / PMB 396	14.63
3.2	150KV OCB	7	1.17
3.3	column foundation	58	11.82
3.4	150/20KV transformer	2	0.45
3.5	150/20KV trans oil containment pit	2	4.70
3.6	grounding resistor	2	0.13
3.7	firewall	2	1.00
3.8	cable trench	245M	6.00
3.9	20KV distribution trench	135M	0.87
3.10	concrete road calvert	7	1.15
4.0	GND SYSTEM		
4.1	below gnd. system	100	18.62
4.2	above gnd system	100	2.81
5.0	conduit system		
5.1	below gnd. system	100	5.33
5.2	above gnd. system	100	1.32
6.0	furnish material for yard lighting	100	4.23
7.0	furnish material for station service	100	1.80
	TOTAL		100.0



A = ACTUAL

S = SCHEDULE

ORIGINAL SCHEDULE (1)

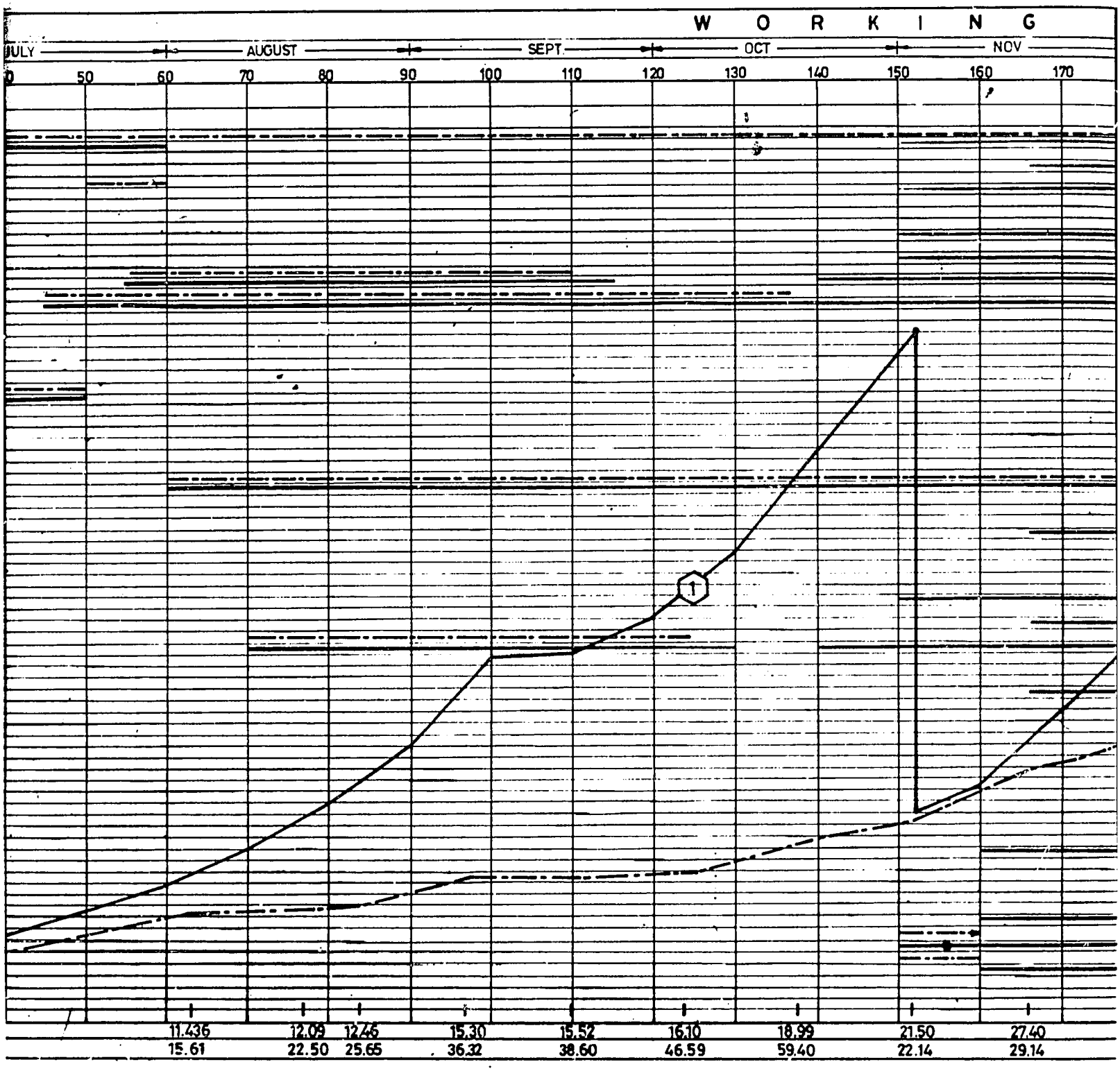
REVISED SCHEDULE (2)

1.1 ITEMS 100% COMPLETED (TYP.)

NOTES: The qty. percent is based on percent of cost of each function verse total cost.

• Work not started.

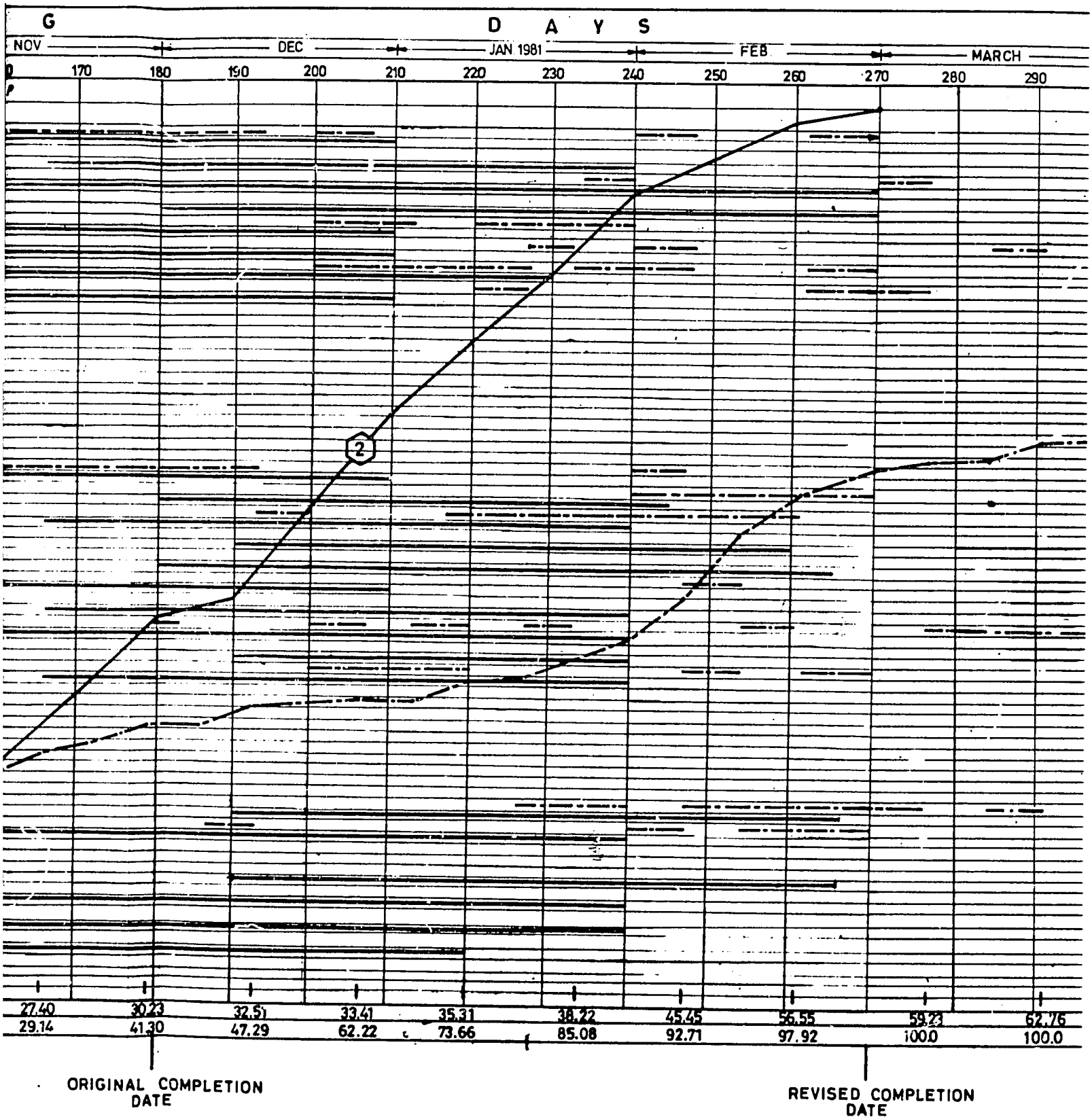
→ Work not complete as of date under construction progress


W O R K I N G
JULY
AUGUST
SEPT
OCT
NOV
0
50
60
70
80
90
100
110
120
130
140
150
160
170
1
11.436
15.61
12.09
22.50
12.46
25.65
15.30
36.32
15.52
38.60
16.10
46.59
18.99
59.40
21.50
22.14
27.40
29.14

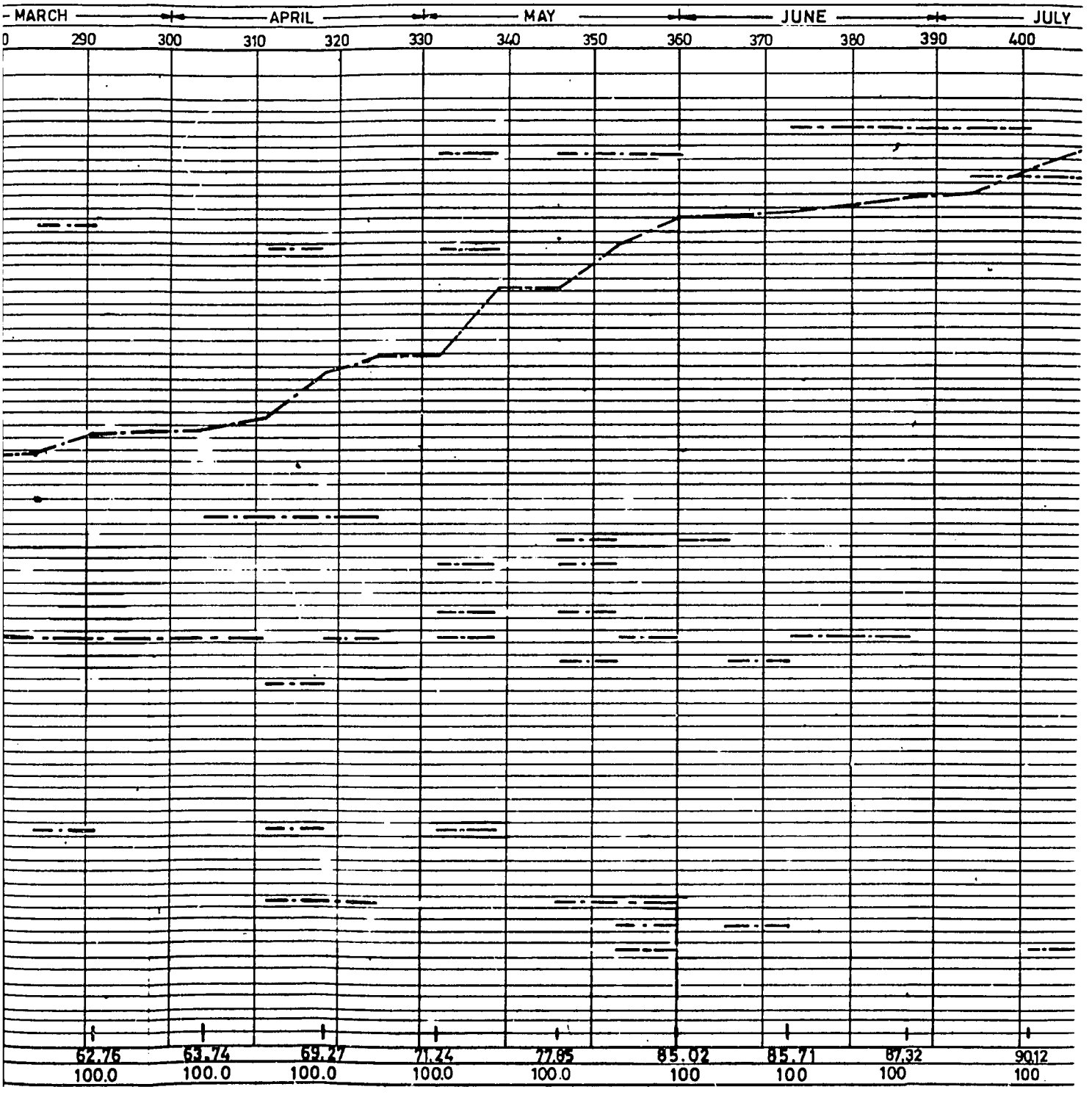
ORIGIN

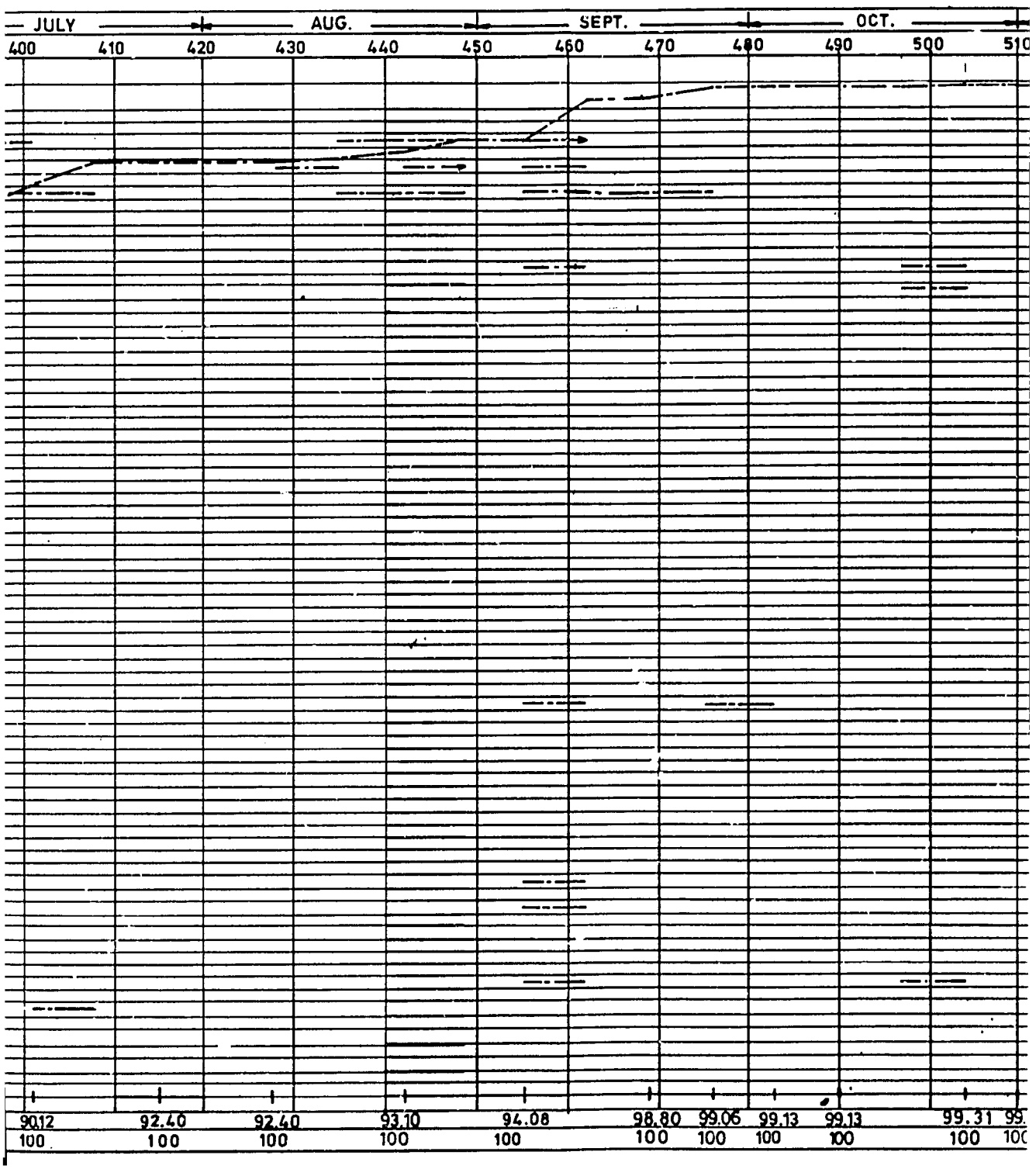
32

TIME SCHEDULE
BANDUNG UTARA SWITCH YARD



YARD


MARCH
APRIL
MAY
JUNE
JULY
0
290
300
310
320
330
340
350
360
370
380
390
400
62.76
100.0
63.74
100.0
69.27
100.0
71.24
100.0
77.85
100.0
85.02
100
85.71
100
87.32
100
90.12
100


JULY
AUG.
SEPT.
OCT.
400
410
420
430
440
450
460
470
480
490
500
510
90.12
92.40
92.40
93.10
94.08
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99.13
99.31
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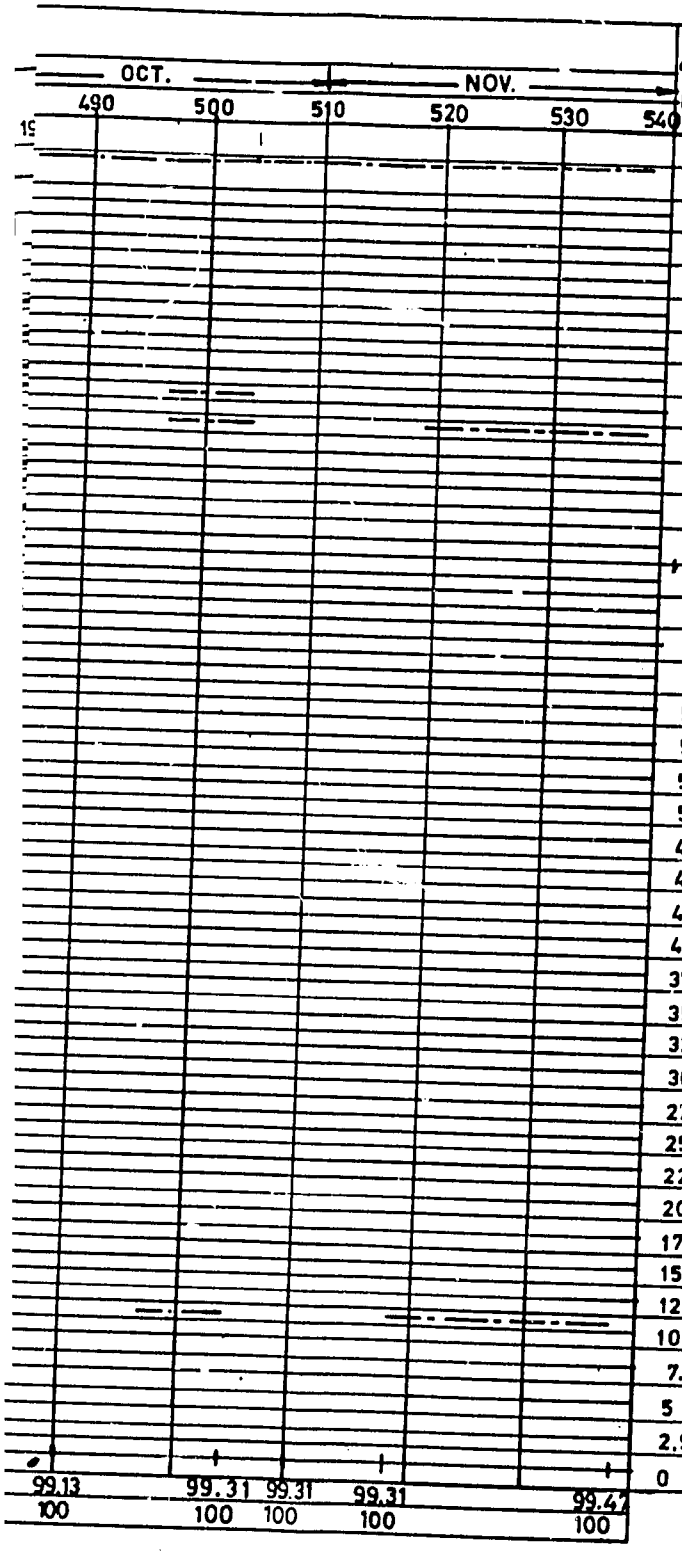
100
100
100
100
100
100
100



CONSTRUCTION PROGRESS TO DATE: NOV.28-1981

% OF COMPLETION	UNIT ACTUAL QTY.	UNIT ACTUAL %	UNIT SCHEDULED QTY.	UNIT SCHEDULED %	% OF CONTRACT ACTUAL %	% OF CONTRACT SCHED. %	NO.
100							
97.5							
95	79821 M²	98	81450 M²	100	11.34	11.57	1
92.5	10300 M²	96	10700 M²	100	2.59	2.69	1.1
90	4663 M²	100	4663 M²	100	3.09	3.09	1.2
87.5	3843 M²	100	3843 M²	100	2.84	2.84	1.3
85	82 M	100	82 M	100	0.15	0.15	1.4
82.5	5	100	5	100	0.15	0.15	1.5
80	719 M	100	719 M	100	3.51	3.51	1.6
77.5	100	100	100	100	0.61	0.61	1.7
75							1.8
72.5							
70							
67.5	8	100	8	100	2.16	2.16	2
65							
62.5							
60	PAD / PIER	PAD / PIER	PAD / PIER				3
57.5	138 / 396	100 / 100	138 / 396	100	14.63	14.63	3.1
55	7	100	7	100	1.17	1.17	3.2
52.5	58	100	58	100	11.82	11.82	3.3
50	2	100	2	100	0.45	0.45	3.4
47.5	2	100	2	100	4.20	4.20	3.5
45	2	100	2	100	0.13	0.13	3.6
42.5	2	100	2	100	1.80	1.80	3.7
40	245 M	100	245 M	100	6.00	6.00	3.8
37.5	135 M	100	135 M	100	0.87	0.87	3.9
35	7	100	7	100	1.15	1.15	3.10
32.5							
30							
27.5							
25							
22.5							4
20	100	100	100	100	15.32	15.32	4.1
17.5	100	100	100	100	2.81	2.81	4.2
15							5
12.5	100	100	100	100	5.33	5.33	5.1
10	100	100	100	100	1.32	1.32	5.2
7.5	100	100	100	100	4.23	4.23	6
5	100	100	100	100	1.80	1.80	7
2.5							
0					99.47	100	

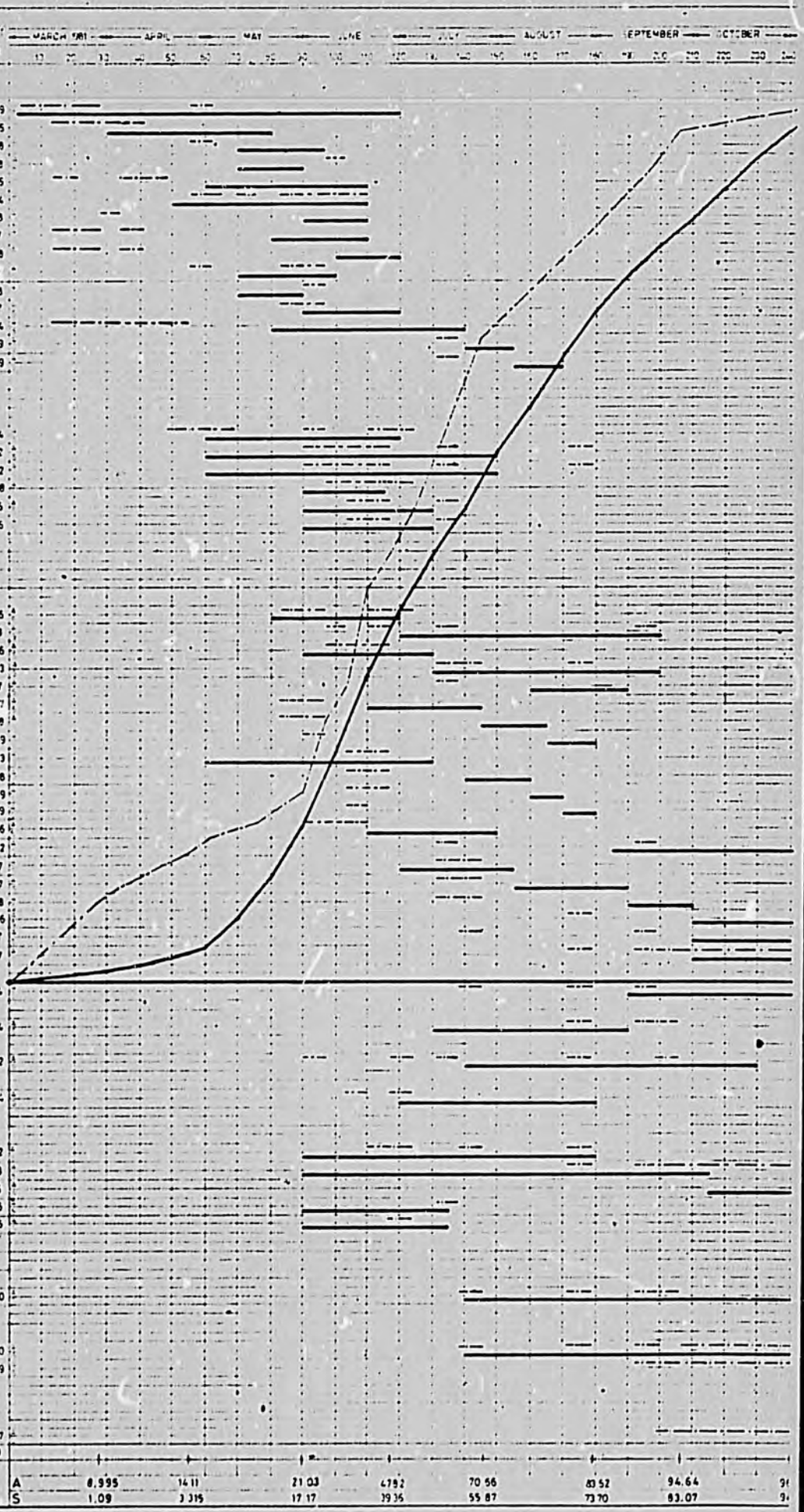
Bandung, October 1980

P.T. PEMBANGUNAN PERUMAHAN
WEST JAVA BRANCH

36

TIME SCHEDULE
BOGOR ERECTION

	WORK ITEM	UNIT	%
	STRUCTURES		
	[illegible]	233	4.69
	[illegible]	24	1.95
	[illegible]	12	0.98
	[illegible]	4	0.78
	[illegible]	4	1.95
	[illegible]	130	2.34
	[illegible]	2	0.78
	[illegible]	4	1.17
	[illegible]	8	0.78
	[illegible]	15	1.1
	[illegible]	3	0.78
	[illegible]	12	1.17
3.13	[illegible] STRUCTURE	17	2.34
3.14	[illegible] TERMINATOR STRUCTURE	2	0.59
3.15	5.6 kV FUSE & TRANSF STRUCTURE	2	0.59
2	BUS		
2.1	150 kV INSULATORS	441	2.34
2.2	[illegible]	[illegible]	3.52
2.3	150 kV CONNECTORS	949	3.52
2.4	[illegible] INSULATORS	261	0.98
2.5	[illegible]	[illegible]	1.56
2.6	[illegible] CONNECTORS	454	1.56
3	EQUIPMENT (SWITCH YARD)		
3.1	150 kV SWITCHES (INSTALLATION	22	1.56
3.2	150 kV SWITCH ADJUSTMENT	22	3.13
3.3	[illegible] SWITCHES INSTALLATION	18	1.56
3.4	[illegible] SWITCH ADJUSTMENT	18	2.73
3.5	5.6 kV FUSE & SWITCHES	2	1.17
3.6	150 kV CCVT	14	1.37
3.7	150 kV LIGHTNING ARRESTER	12	0.78
3.8	150 kV WAVE TRAPS	4	0.59
3.9	150 kV CCB	9	2.73
3.10	[illegible] CCVT	20	0.78
3.11	[illegible] LIGHTNING ARRESTER	12	0.39
3.12	[illegible] WAVE TRAPS	3	0.39
3.13	[illegible] CCB	7	1.56
3.14	[illegible] CIRCUIT BREAKER SET UP	10	3.52
3.15	150/[illegible] kV TRANSF PRELIMINARY SET UP	2	1.37
3.16	150/[illegible] kV TRANSF PRELIMINARY SET UP	2	1.37
3.17	GRND TRANSF PRELIMINARY SET UP	2	0.78
3.18	TRANSF INSTALLATION & TESTING	6	1.56
3.19	STATION SERVICE TRANSF INST	6	1.17
3.20	GROUNDING RESISTOR INSTALLATION	4	1.17
4	GROUNDING MATERIAL	100	2.34
5	YARD LIGHTING	100	2.34
6	CONDUIT INSTALLATION	181	3.52
7	YARD PANEL INSTALLATION	22	2.34
8	CONTROL HOUSE		
8.1	RELAY & CONTROL PANEL	16	3.52
8.2	[illegible] SWITCH GEAR INST	24	4.88
8.3	FINAL [illegible] kV SWITCH GEAR TESTING	100	2.35
8.4	BATTERY CHARGER INSTALLATION	2	1.76
8.5	POWER PANEL INSTALLATION	6	1.76
9	CONTROL WIRING INSTALLATION	3547	4.30
10	TESTING		
	PRELIMINARY TESTING	[illegible]	4.30
	FINAL TESTING	100	1.39
11	ENERGIZING	100	0.47
			100



A = ACTUAL
S = SCHEDULE

NOTES:

* WORK NOT STARTED

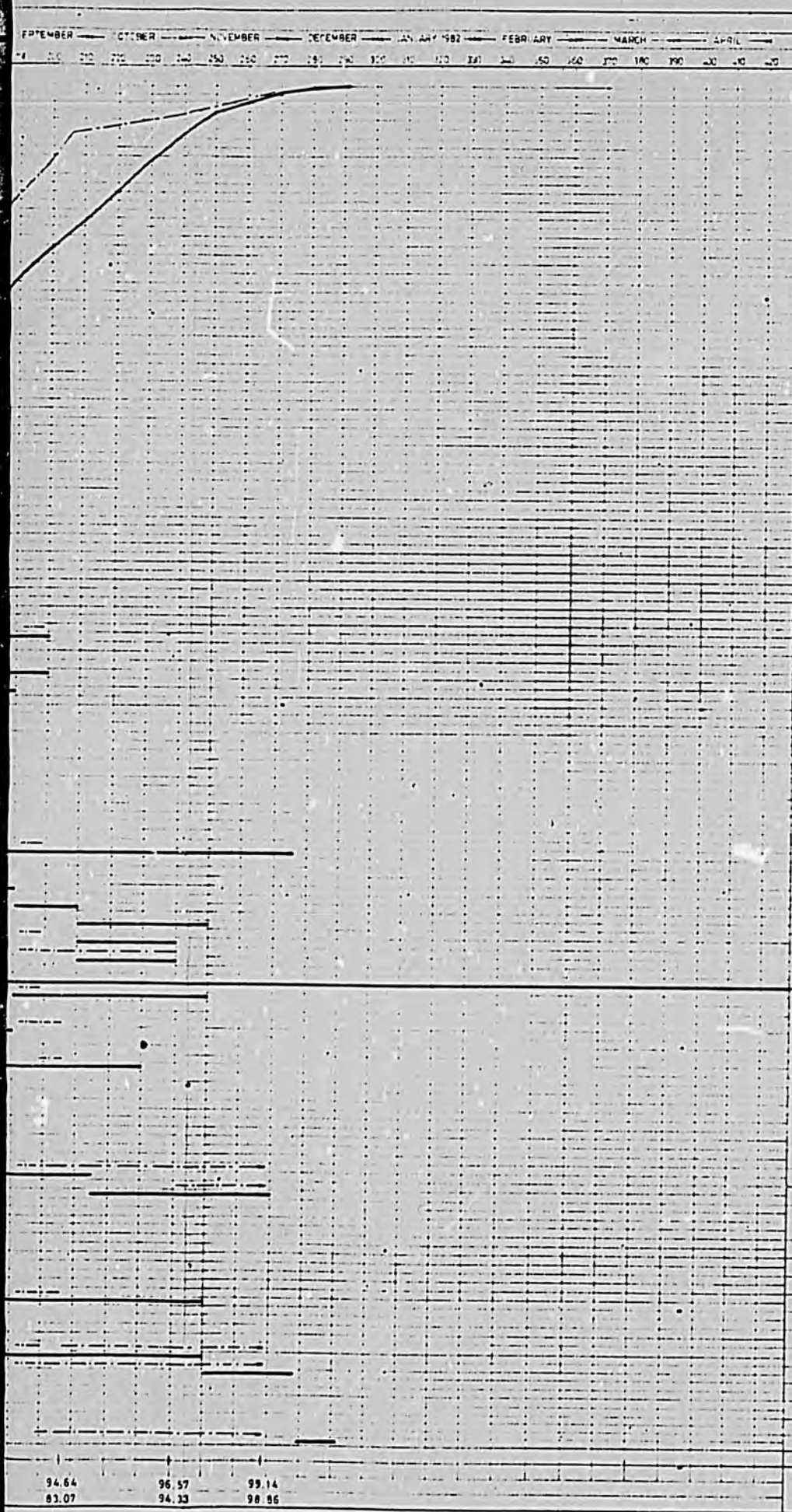
WORK NOT COMPLETE AS OF DATE
UNDER CONST. PROGRESS

[ ] ITEMS 100% COMPLETED (TYP)

CHEDULE

ERECTION

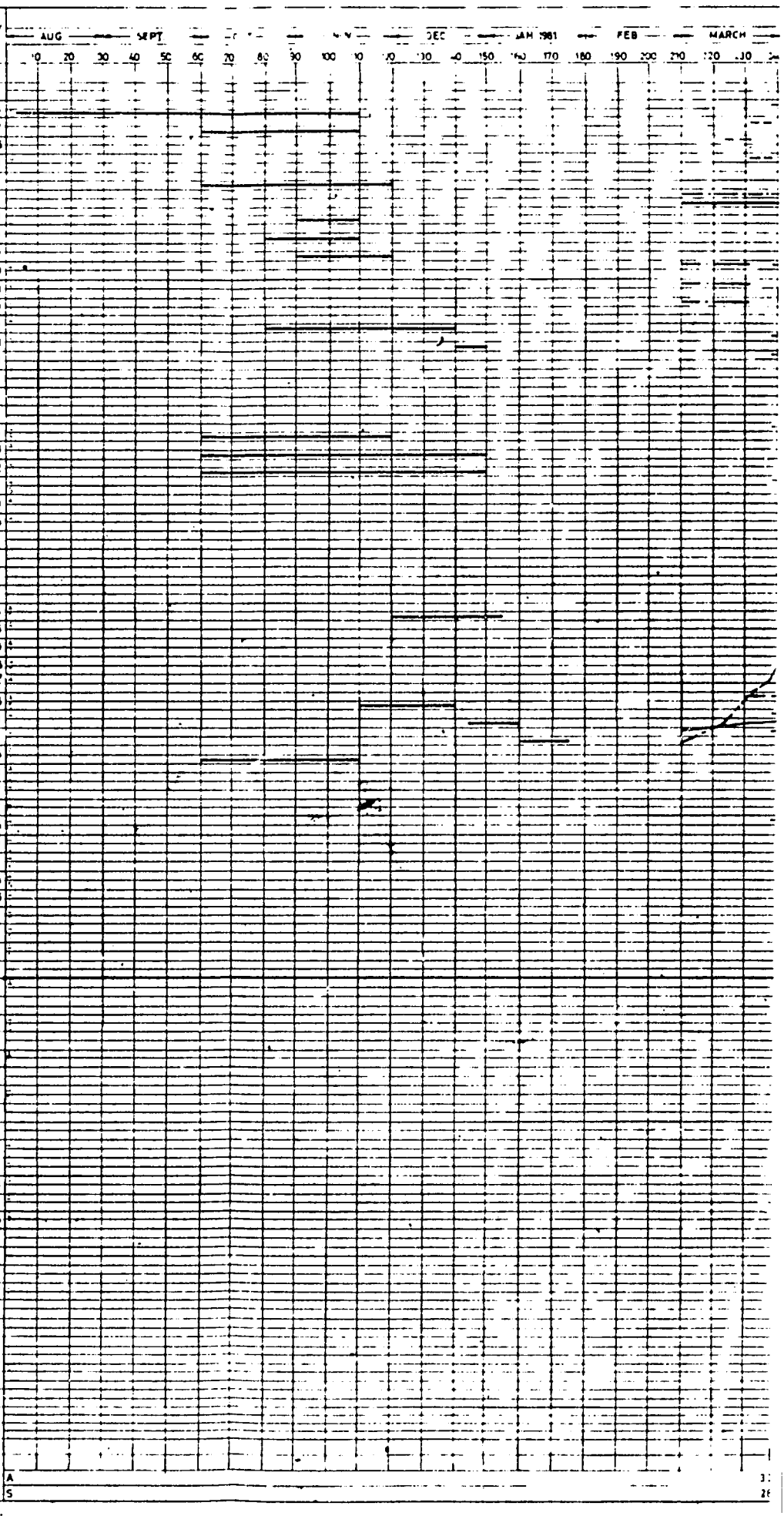
37



11-28-81

							NO.
	233	100	233	100	4.69	4.69	
	24	100	24	100	1.95	1.95	
	12	100	12	100	0.98	0.98	
	4	100	4	100	0.78	0.78	
	4	100	4	100	1.95	1.95	
	130	100	130	100	2.34	2.34	
	2	100	2	100	0.78	0.78	
	4	100	4	100	1.17	1.17	
	8	100	8	100	0.78	0.78	
	15	100	15	100	1.17	1.17	
	3	100	3	100	0.78	0.78	
	12	100	12	100	1.17	1.17	
	17	100	17	100	2.34	2.34	1.13
	2	100	2	100	0.59	0.59	1.14
58	2	100	2	100	0.59	0.59	1.15
56							
54							
52							2.
50	441	100	441	100	2.34	2.34	2.1
58	918 / 2497	100	100 489	2358	100	3.52	3.52	2.2
56	949	100	896	100	3.52	3.52	2.3
54	261	100	261	100	0.98	0.98	2.4
52	156 / 424	100	100 156	424	100	1.56	1.56	2.5
50	454	100	454	100	1.56	1.56	2.6
48							
46							
44							
42							3
40	22	100	22	100	1.56	1.56	3.1
38	22	100	22	100	3.13	3.13	3.2
36	18	100	18	100	1.56	1.56	3.3
34	18	100	18	100	2.73	2.73	3.4
32	2	100	2	100	1.17	1.17	3.5
30	14	100	14	100	1.37	1.37	3.6
28	12	100	12	100	0.78	0.78	3.7
26	4	100	4	100	0.59	0.59	3.8
24	9	100	9	100	2.73	2.73	3.9
22	20	100	20	100	0.78	0.78	3.10
20	12	100	12	100	0.39	0.39	3.11
18	3	100	3	100	0.39	0.39	3.12
16	7	100	7	100	1.56	1.56	3.13
14	16	100	15	92	3.52	3.25	3.14
12	2	100	2	100	1.37	1.37	3.15
10	2	100	2	100	1.37	1.37	3.16
8	2	100	2	100	0.78	0.78	3.17
6	6	100	6	100	1.56	1.56	3.18
4	6	100	6	100	1.17	1.17	3.19
2	4	100	4	100	1.17	1.17	3.20
0							
	100	100	100	100	2.34	2.34	4
	100	100	100	100	2.34	2.34	5
	381	100	381	100	3.52	3.52	
	22	100	22	100	2.34	2.34	
							4
	15	100	16	100	3.52	3.52	
	23	95	24	100	4.64	4.88	
	90	90	96	96	1.94	2.07	
	2	100	2	100	1.76	1.76	
	6	100	6	100	1.76	1.76	
	3547	100	3547	100	4.30	4.30	
							10
	95	95	100	100	4.09	4.30	10.1
	90	90	72	72	0.98	0.78	10.2
	83	83	0	0	0.39	0	
					99.14	98.86	

	WORK ITEM	UNIT	QTY	%
	STRUCTURES			
	150 KV BUS	277	4.38	
		26	2.19	
		24	1.46	
		4	0.73	
		12	2.19	
		130	2.19	
		2	0.73	
		6	1.10	
		12	1.10	
		12	1.10	
		3	0.73	
		12	1.10	
		18	2.19	
		2	0.73	
		2	0.73	
	BUS			
		489	2.56	
		5[illegible]634	4.75	
		1050	4.02	
		231	0.91	
		45405M	3.29	
		379	1.46	
	EQUIPMENT (SWITCH YARD)			
		26	1.65	
	150 KV SWITCH ADJUSTMENT	26	2.56	
3.3		16	1.46	
3.4		16	2.56	
	550 KV RISER & SWITCHES	2	1.10	
3.6		20	1.46	
3.7		18	0.91	
3.8		6	0.91	
		10	2.56	
		17	0.73	
		12	0.37	
3.12		3	0.37	
3.13		6	1.46	
		16	4.20	
3.15		1	0.73	
		2	1.28	
		1	0.55	
		4	1.10	
3.19		4	0.73	
		3	0.73	
	GROUNDING MATERIAL	100	2.19	
5	YARD LIGHTING	100	2.19	
	CONDUIT INSTALLATION	445	3.29	
	YARD PANEL INSTALLATION	29	2.19	
	CONTROL HOUSE.			
		18	3.29	
		24	4.94	
		100	1.83	
		2	1.65	
8.5		7	1.65	
		3386	4.02	
10	TESTING			
10.1	PRELIMINARY TESTING	100	4.02	
10.2	FINAL TESTING	100	1.10	
	ENERGIZING	100	0.55	
			100	



A = ACTUAL
S = SCHEDULE

NOTES:

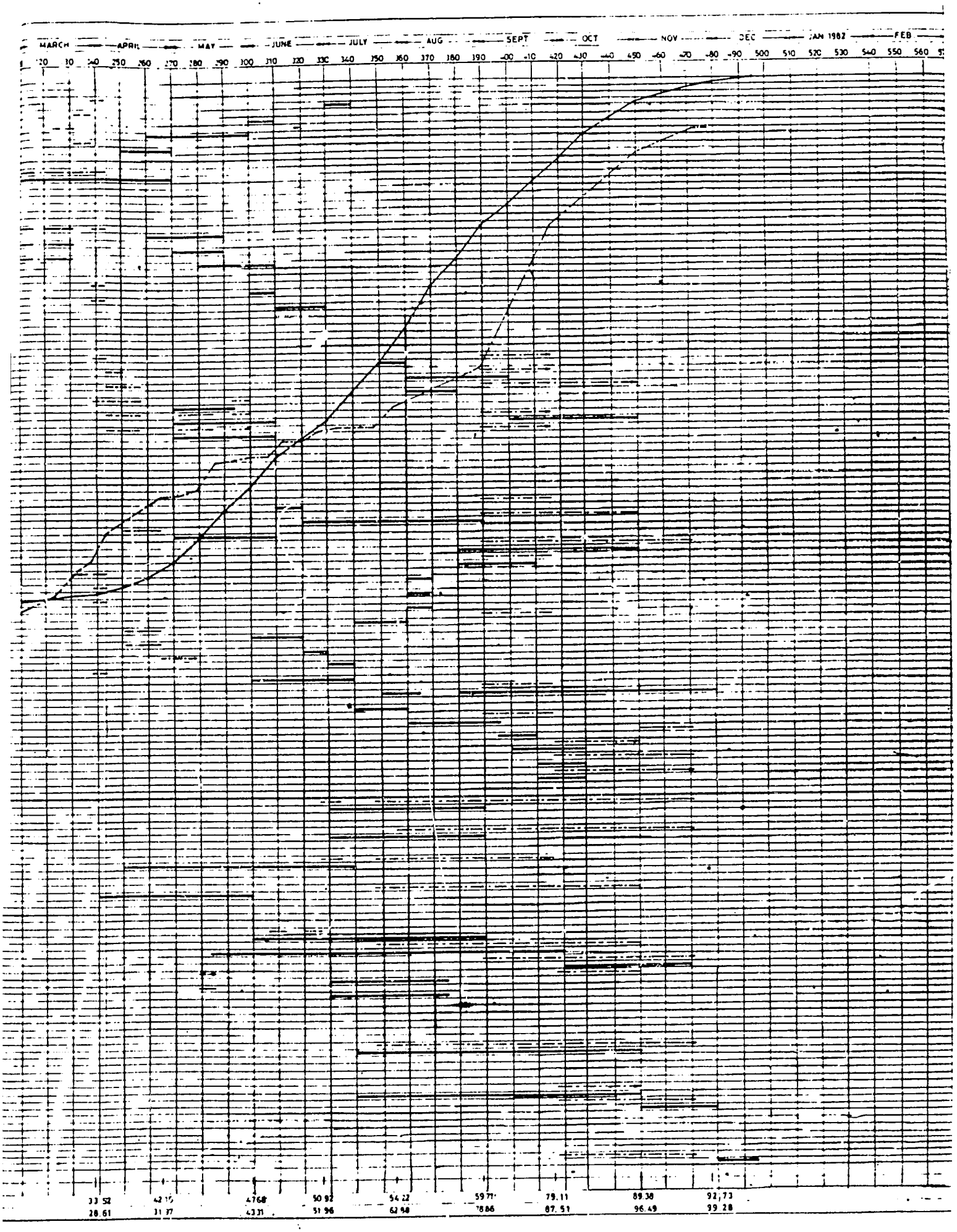
● WORK NOT STARTED.

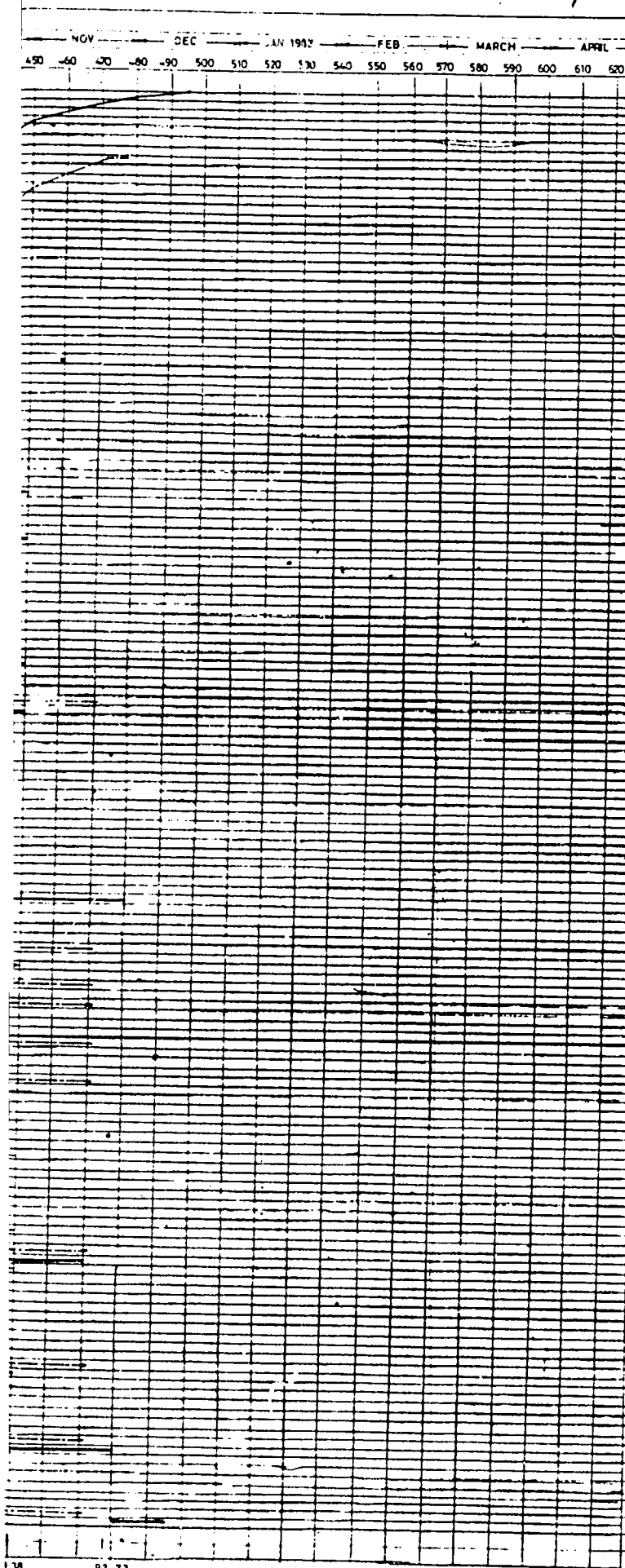
WORK NOT COMPLETE AS OF DATE UNDER CONST PROGRESS.

ITEMS 100% COMPLETED (TYP).

TIME SCHEDULE
UJUNG BERUNG ERECTION

39

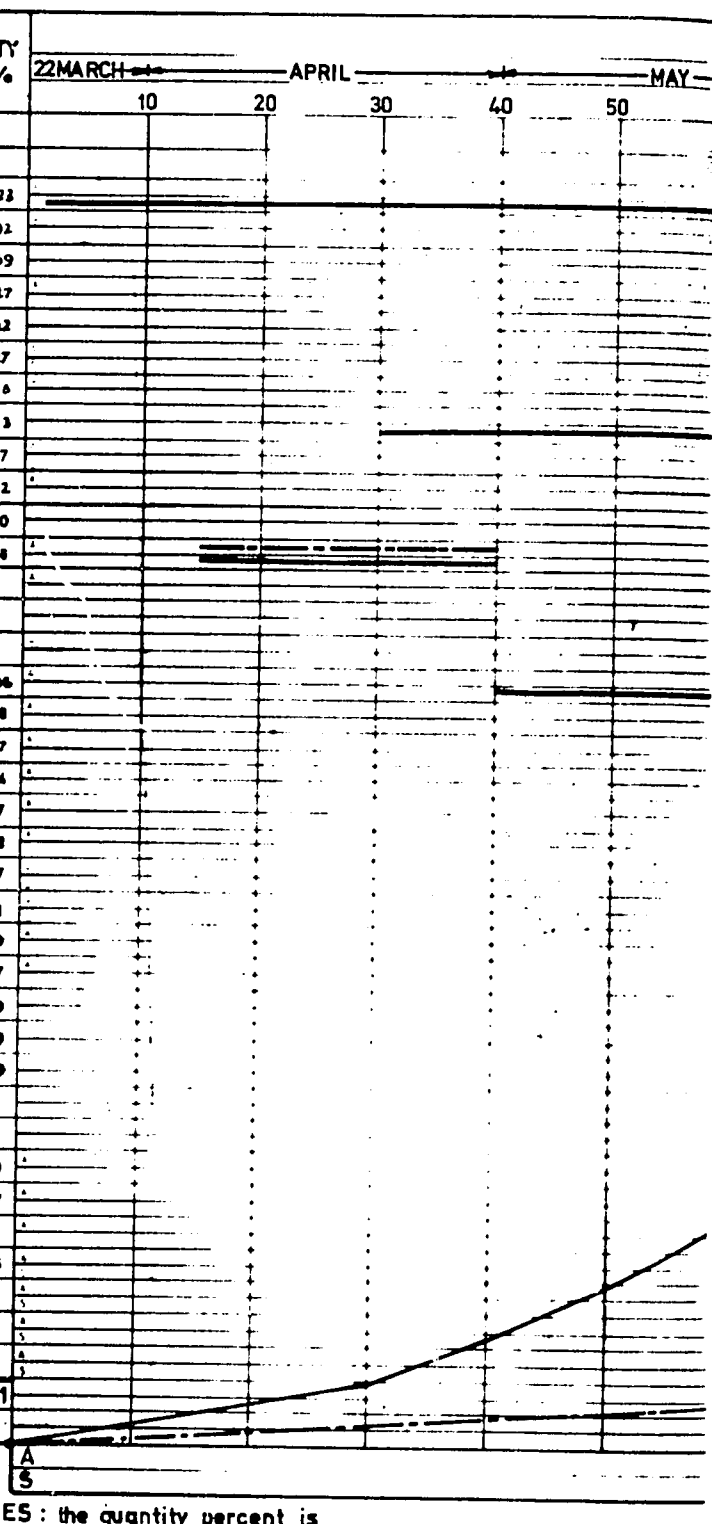




% OF COMPLETION	CONSTRUCTION PROGRESS TO DATE 11-28-81 ACTUAL		SCHEDULE				NO
100							
98							
96	277	100	277	100	4.38	4.38	1.1
94	26	100	26	100	2.19	2.19	1.2
92	24	100	24	100	1.46	1.46	1.3
90	4	100	4	100	0.73	0.73	1.4
88	12	100	12	100	2.19	2.19	1.5
86	130	100	130	100	2.19	2.19	1.6
84	2	100	2	100	0.73	0.73	1.7
82	6	100	6	100	1.10	1.10	1.8
80	12	100	12	100	1.10	1.10	1.9
78	12	100	12	100	1.10	1.10	1.10
76	3	100	3	100	0.73	0.73	1.11
74	12	100	12	100	1.10	1.10	1.12
72	18	100	18	100	2.19	2.19	1.13
70	2	100	2	100	0.73	0.73	1.14
68	2	100	2	100	0.73	0.73	1.15
66							
64							
62							2
60	483	98.77	489	100	2.53	2.56	2.1
58	558 25	95.93 ~~97.74~~	561 ~~1464~~	100	2.73	4.75	2.2
56	1035	98.57	1050	100	3.96	4.02	2.3
54	231	100	231	100	0.91	0.91	2.4
52	138 290	95.17 ~~99.58~~	145 415	100	2.72	3.29	2.5
50	361	95.25	379	100	1.39	1.46	2.6
48							
46							
44							
42							3
40	26	100	26	100	1.65	1.65	3.1
38	26	100	26	100	2.56	2.56	3.2
36	16	100	16	100	1.46	1.46	3.3
34	16	100	16	100	2.56	2.56	3.4
32	2	100	2	100	1.10	1.10	3.5
30	20	100	20	100	1.46	1.46	3.6
28	18	100	18	100	0.91	0.91	3.7
26	6	100	6	100	0.91	0.91	3.8
24	10	100	10	100	2.56	2.56	3.9
22	17	100	17	100	0.73	0.73	3.10
20	12	100	12	100	0.37	0.37	3.11
18	3	100	3	100	0.37	0.37	3.12
16	6	100	6	100	1.46	1.46	3.13
14	16	100	15	98	4.20	4.13	3.14
12	0	0	1	100	0	0.73	3.15
10	2	100	2	100	1.28	1.28	3.16
8	1	100	1	100	0.55	0.55	3.17
6	2	50	4	100	0.55	1.10	3.18
4	4	100	4	100	0.73	0.73	3.19
2	2	66	3	100	0.49	0.73	3.20
0							
	100	100	100	100	2.19	2.19	4
	100	100	100	100	2.19	2.19	5
	445	100	445	100	3.29	3.29	6
	29	100	29	100	2.19	2.19	7
							8
	18	100	18	100	3.29	3.29	9
	24	100	24	100	4.94	4.94	10
	84	94	100	100	1.54	1.83	11
	2	100	2	100	1.65	1.65	12
	7	100	7	100	1.65	1.65	13
	3317	98	3386	100	3.94	4.02	
	48	48	100	100	1.93	4.02	
	72	72	93	93	0.79	1.03	
	54	54	0	0	0.35	0	
					32.73	99.28	

38 92.73
5.49 99.28

NO	WORK ITEM	UNIT	QTY %
1 0	CIVIL		
1.1	clearing & grubbing of site	50000M2	5 22
1 2	15cm crush stone	5000M2	2.92
1 3	road sub-base	1	2.09
1 4	road top surface	1	3.27
1.5	yard drainage piping	306M	0.82
1.6	catch basin & drop inlets	10	0.27
1 7	chain link fence	1030M	5.16
1.8	drainage	500M	4.13
1.9	flume	1	0.37
1.10	bridge	1	0.22
1.11	walkway	1	0.10
1.12	CONSTRUCTION PLANT	8	0.58
3 0	FOUNDATION		
3.1	all but OCB & transf	428	28.96
3.2	150KV OCB	10	1.68
3.3	70 KV OCB	6	0.47
3.4	150/70KV transformer	1	0.24
3 5	150/70 KV trans oil containment pit	1	0.97
3.6	150/20 KV transformer	2	0.58
3.7	150/20 KV trans oil containment pit	2	1.07
3.8	grounding transformer	1	0.11
3.9	grounding resistor	3	0.20
3.10	firewall	3	1 17
3.11	cable trench	390M	7.59
3.12	20KV distribution trench	1 20M	0.29
3.13	concrete road colverts	10	0.89
3 14	retaining wall		
4 0	GND SYSTEM		
4.1	below ground system	100	3.40
4.2	above ground system	100	0.37
5 0	CONDUIT SYSTEM		
5 1	below ground conduit	100	1.46
5.2	above ground conduit	100	0.31
5.3	furnish material for yard lighting	100	4.21
5.4	furnish material for station service	100	4.86
	TOTAL		85.21



A = ACTUAL

S = SCHEDULE

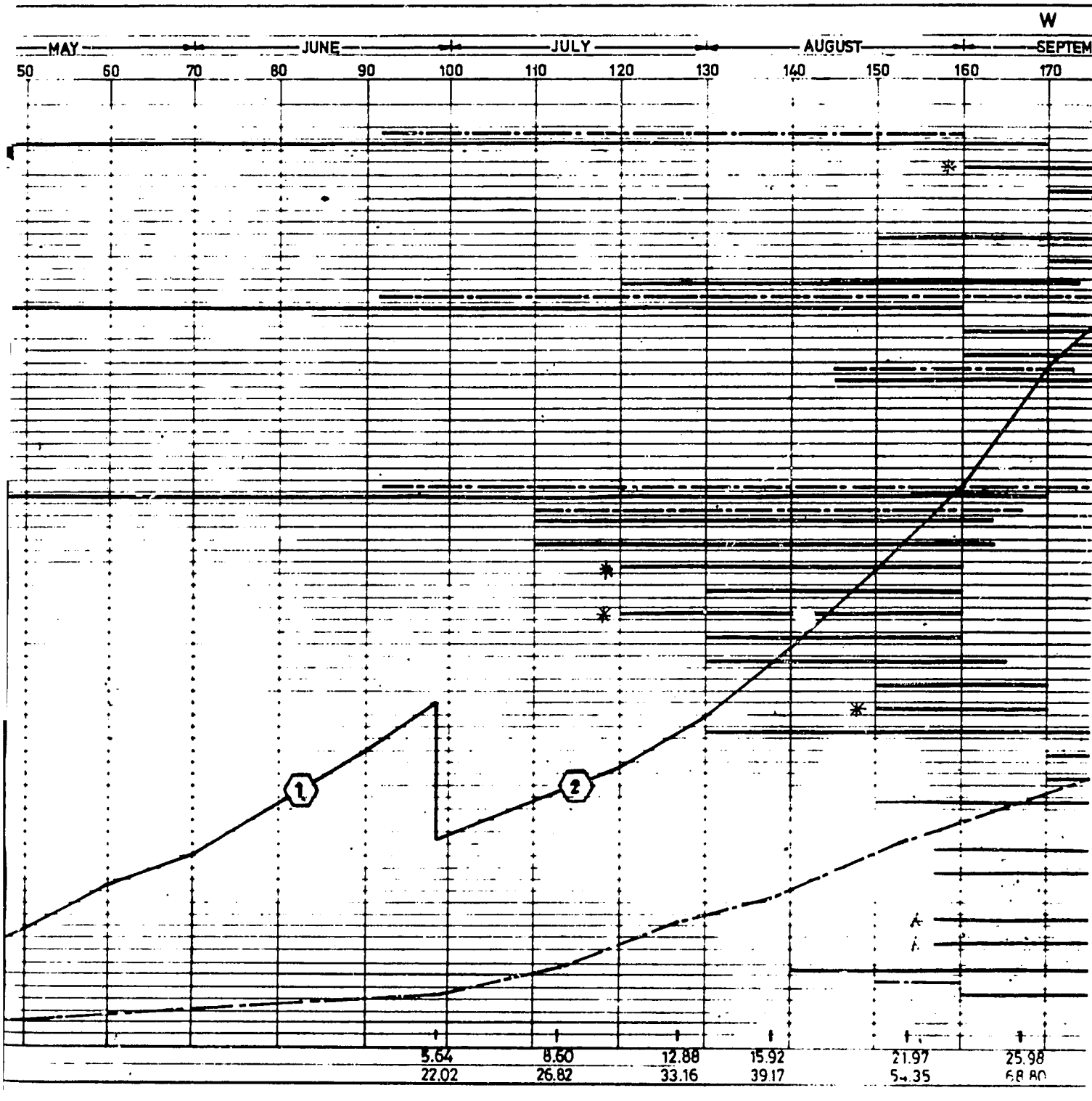
ORIGINAL SCHEDULE (1)

REVISED SCHEDULE (2)

1.1 ITEMS 100 % COMPLETED (TYP.)

NOTES: the quantity percent is based on percent of cost of each function verse total cost

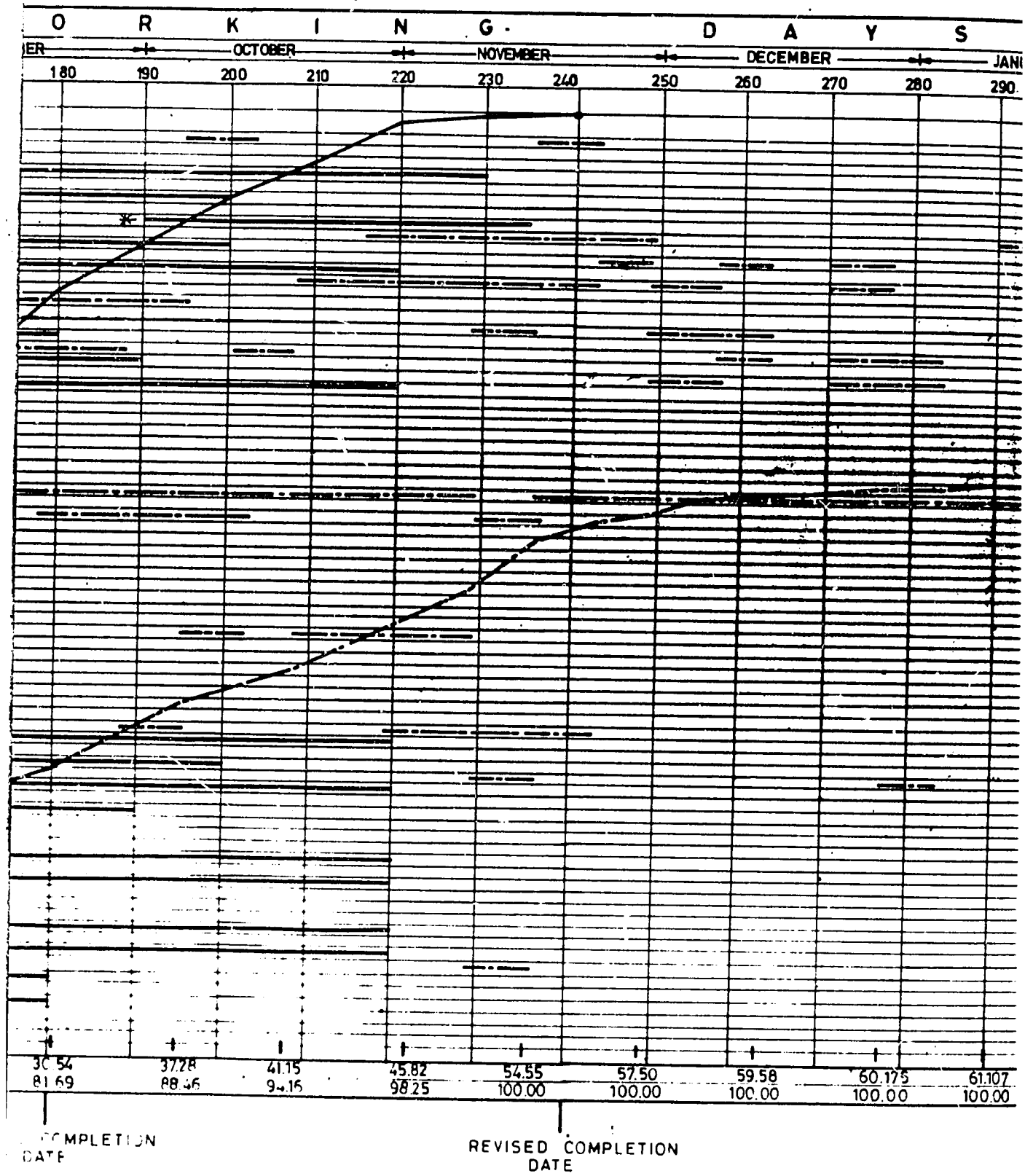
- work not started
- work not complete as of date under construction progress

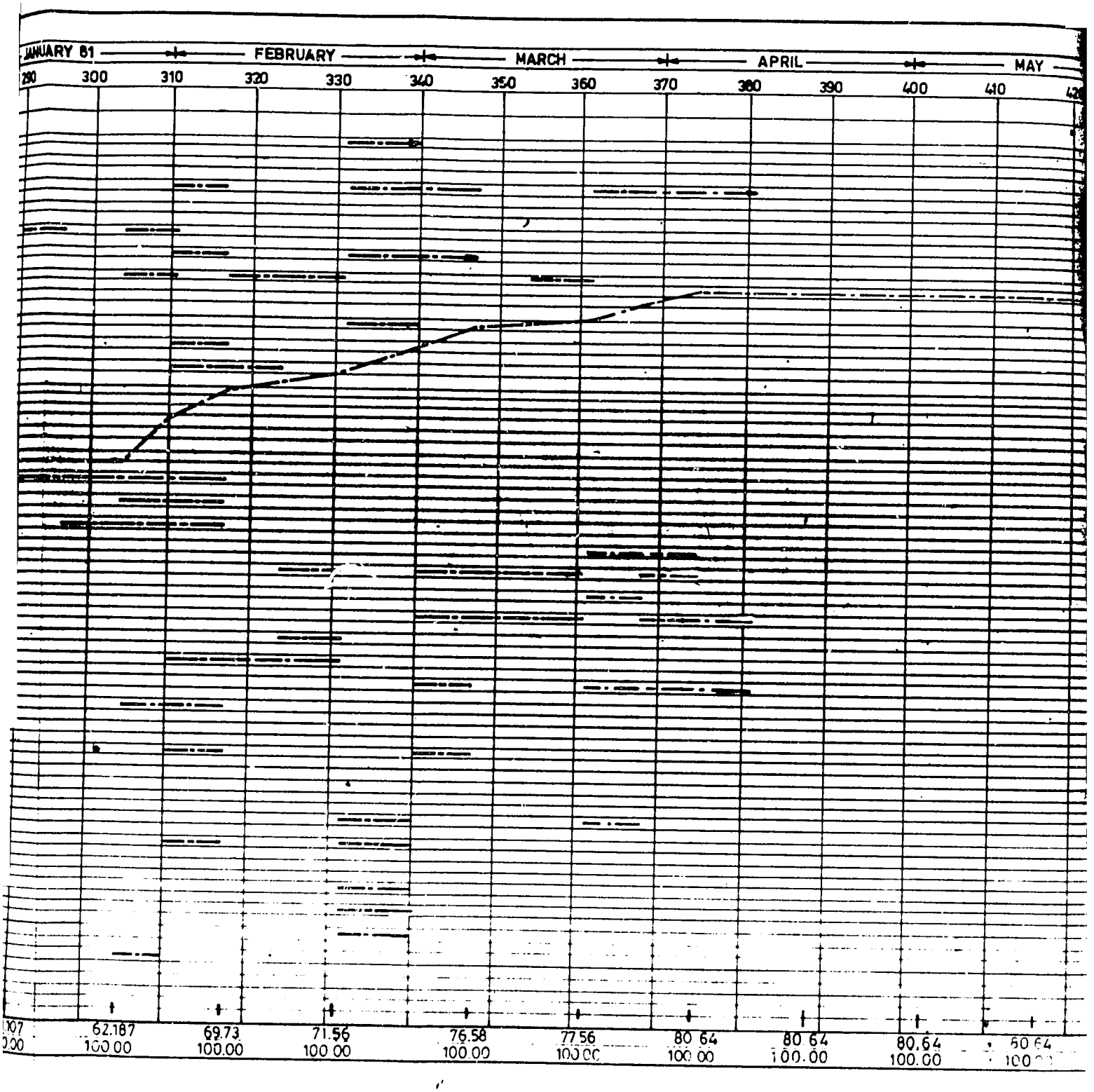

W
MAY
JUNE
JULY
AUGUST
SEPTEM
50
60
70
80
90
100
110
120
130
140
150
160
170
1
2
5.64
22.02
8.60
26.82
12.88
33.16
15.92
39.17
21.97
25.98

TIME SCHEDULE

43

UJUNG BERUNG SWITCH YARD




JANUARY 81
FEBRUARY
MARCH
APRIL
MAY
290
300
310
320
330
340
350
360
370
380
390
400
410
62.187
100.00
69.73
100.00
71.56
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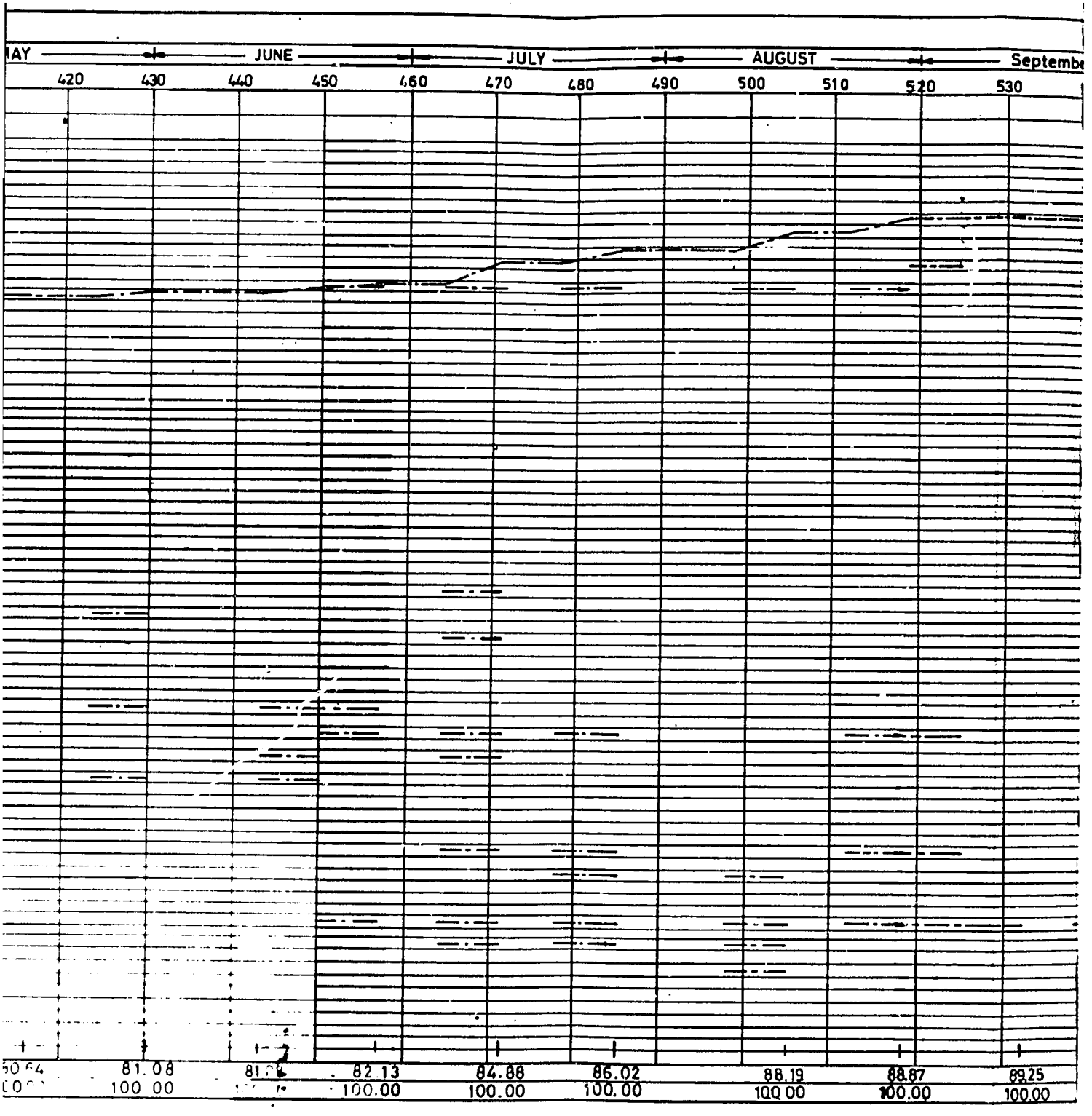
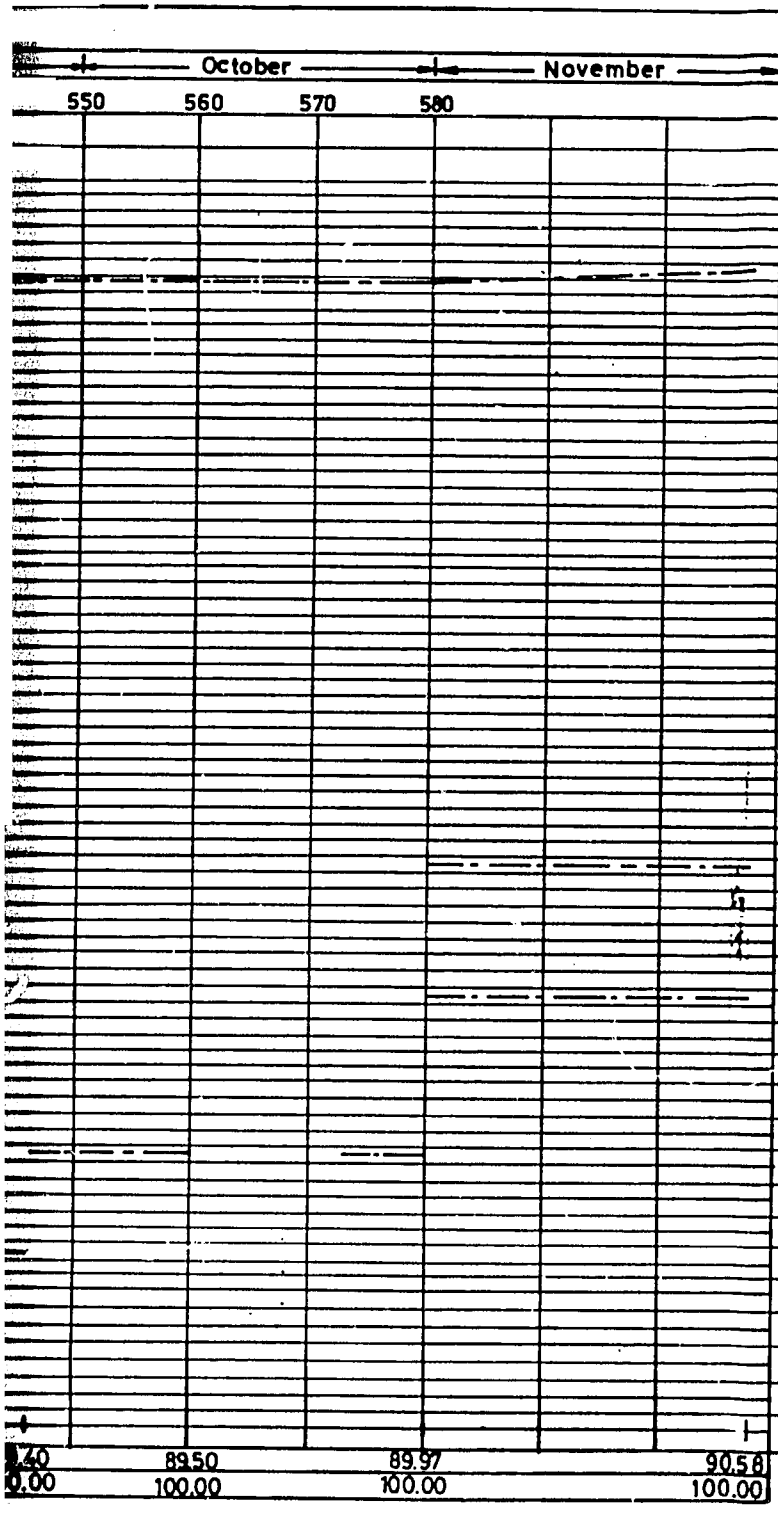
100.00


MAY
JUNE
JULY
AUGUST
Septembe
420
430
440
450
460
470
480
490
500
510
520
530
81.08
100 00
82.13
100.00
84.88
100.00
86.02
100.00
88.19
100 00
88.87
100.00
89.25
100.00

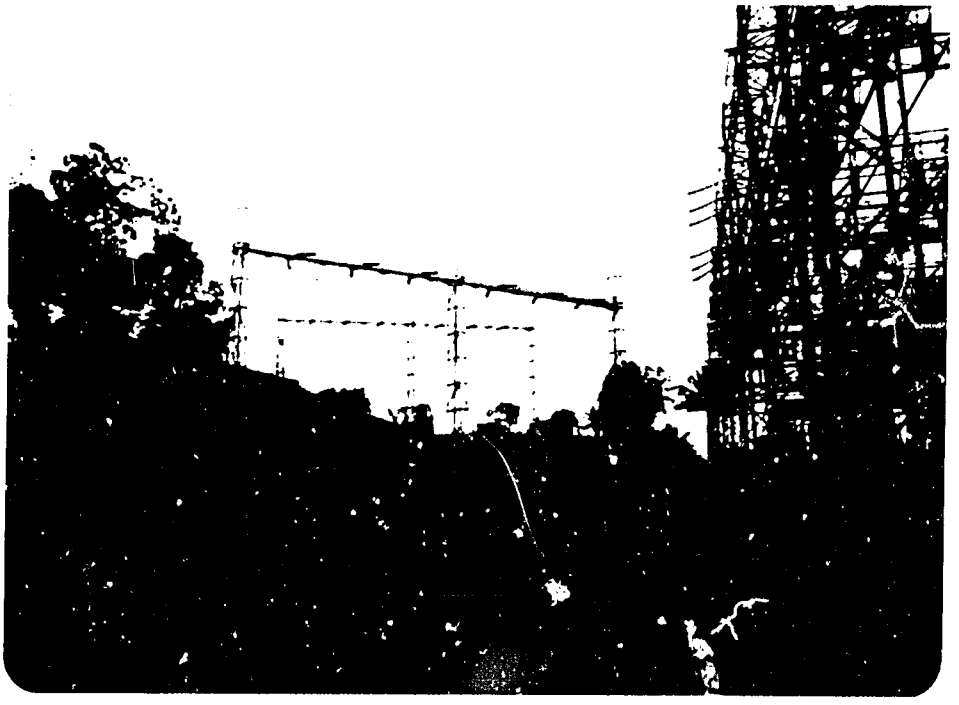


% OF COMPLETION	CONSTRUCTION PROGRESS TO DATE: 11-28-1981						NO.
	UNIT				% OF CONTRACT		
	ACTUAL		SCHEDULED		ACTUAL	SCHED.	
	QTY.	%	QTY.	%	%	%	
100							
97.5							1.
95	49000M²	98	50,000M²	100	5.13	5.23	1.1
92.5	0	0	50,000M²	100	0	2.92	1.2
90	0.40	40	1	100	1.8	2.69	1.3
87.5	0	0	1	100	0	3.27	1.4
85	306 M	100	306 M	100	0.82	0.82	1.5
82.5	10	100	10	100	0.27	0.27	1.6
80	1009 M	98	1030 M	100	6.06	6.18	1.7
77.5	500 M	100	500 M	100	4.13	4.13	1.8
75	1	100	1	100	0.37	0.37	1.9
72.5	1	100	1	100	0.22	0.22	1.10
70	1	100	1	100	0.10	0.10	1.11
67.5	8	100	8	100	0.58	0.58	2.
65							
62.5							
60							3.
57.5	428	100	428	100	28.56	28.56	3.1
55	10	100	10	100	1.68	1.68	3.2
52.5	6	100	6	100	0.47	0.47	3.3
50	1	100	1	100	0.34	0.34	3.4
47.5	0.98	98	1	100	0.95	0.97	3.5
45	2	100	2	100	0.58	0.58	3.6
42.5	2	100	2	100	1.07	1.07	3.7
40	1	100	1	100	0.11	0.11	3.8
37.5	3	100	3	100	0.20	0.20	3.9
35	3	100	3	100	1.17	1.17	3.10
32.5	390M	100	390 M	100	7.59	7.59	3.11
30	120M	100	120 M	100	0.29	0.29	3.12
27.5	10	100	10	100	0.89	0.89	3.13
25							3.14
22.5							4.
20	100	100	100	100	3.40	3.40	4.1
17.5	100	100	100	100	0.37	0.37	4.2
15							5.
12.5	100	100	100	100	1.46	1.46	5.1
10	100	100	100	100	0.21	0.21	5.2
7.5	100	100	100	100	4.21	4.21	6.
5	100	100	100	100	4.86	4.86	7.
2.5							
0					77.18	85.21	
	USING 100% AS BASE				90.58	100.00	

Jakarta , April 1980

P.T. ERSES
Contractor

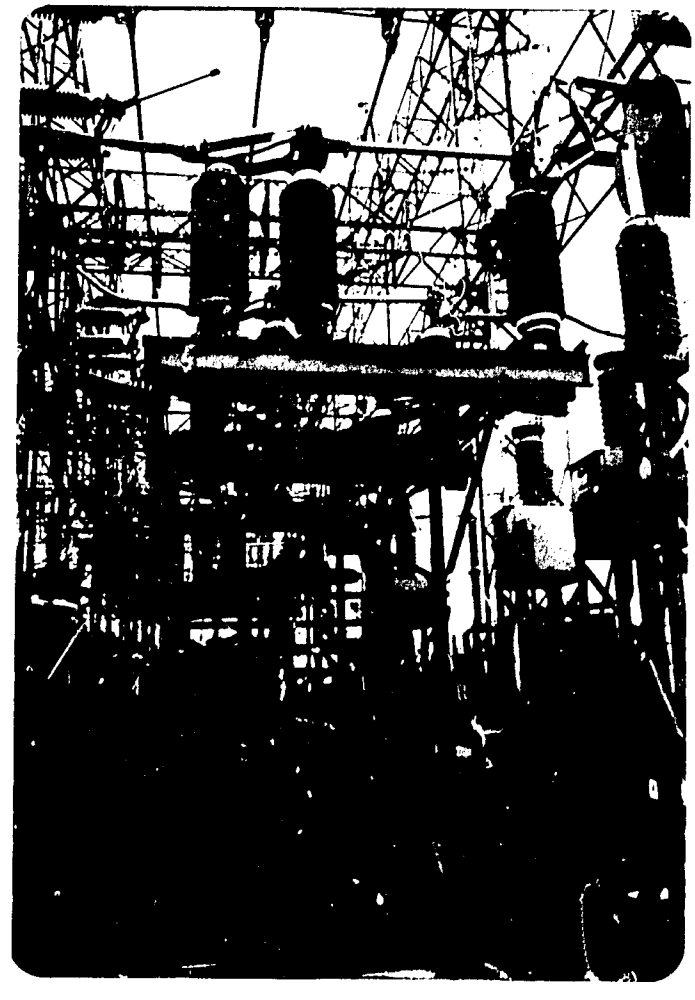
UJUNGBERUNG SUBSTATION



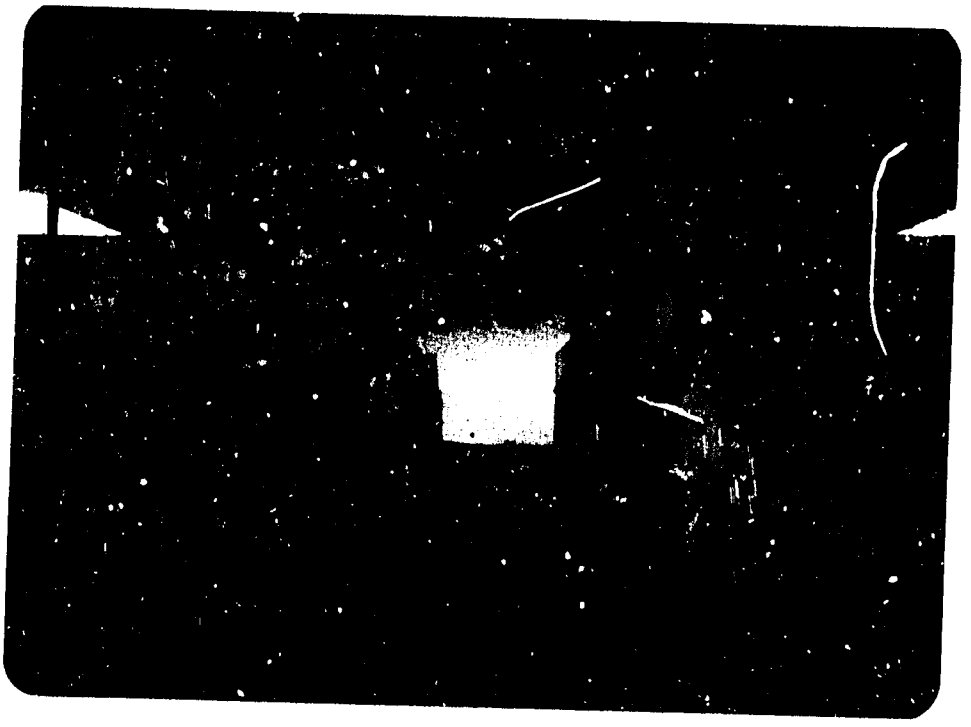
Connection - 70 Kv Terminal to Sumedang
Transmission Line

70 Kv
Oil Circuit Breaker

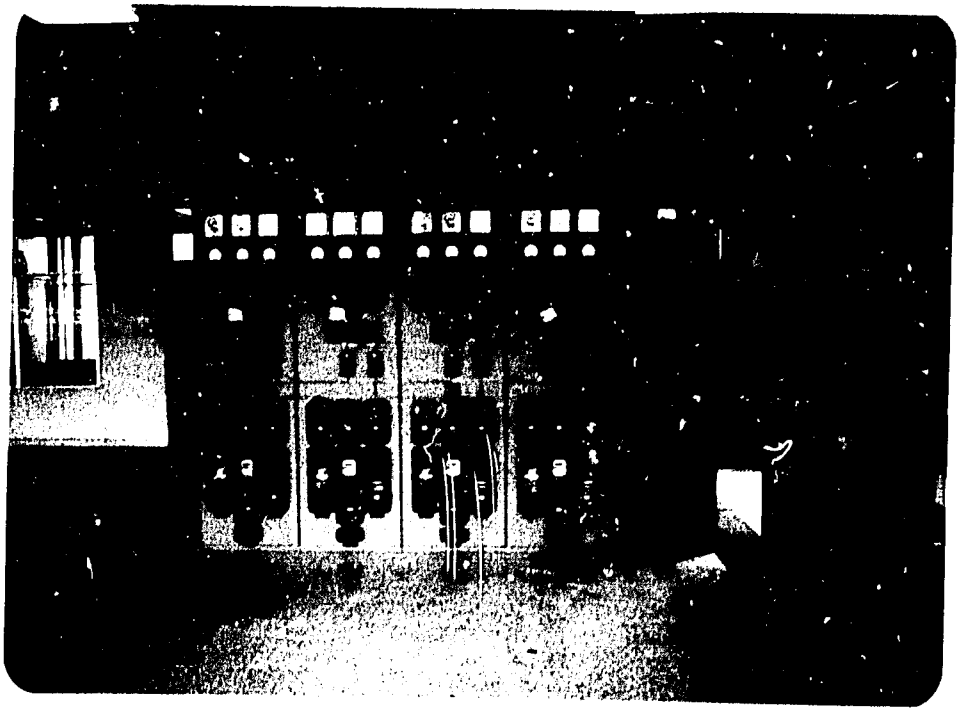
70 Kv Wave Trap
and
Coupling Capacitor



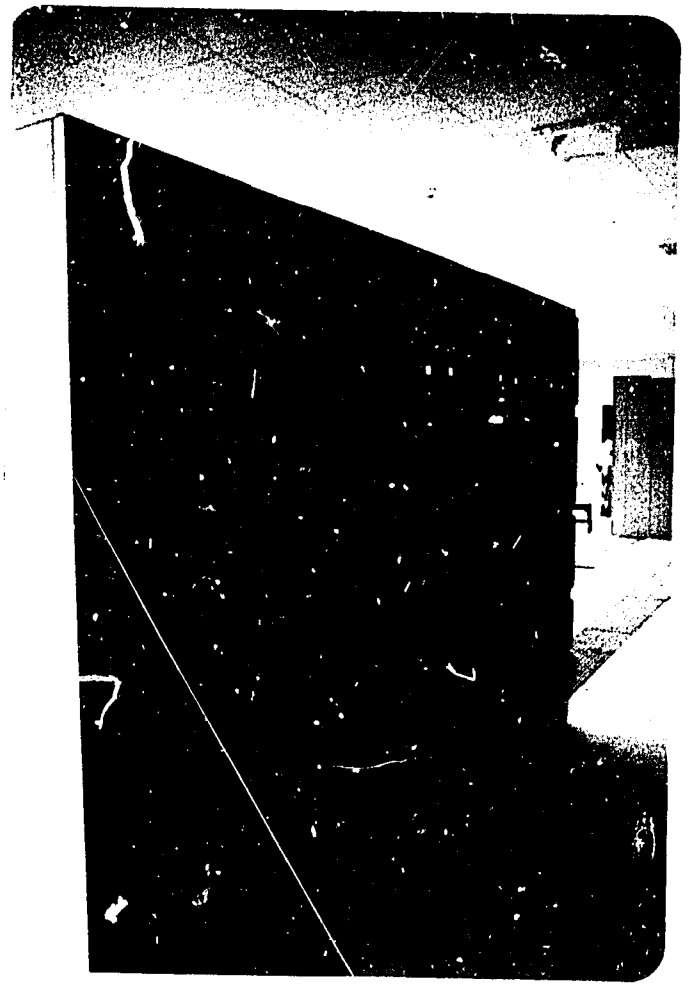
70 Kv Motor Operated
Disconnect Switch



20 Kv Switchgear



70 Kv Control Panels



70 Kv Relay Panels