

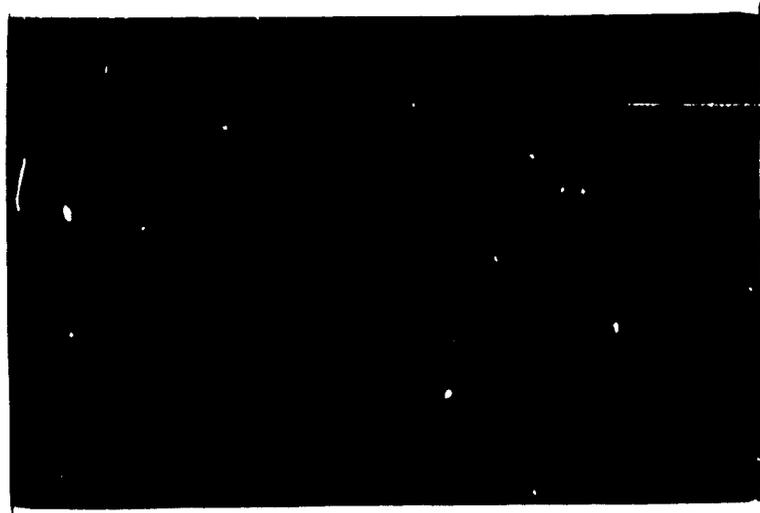
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PERUSAHAAN UMUM LISTRIK NEGARA
JAKARTA , INDONESIA

WEST JAVA
ELECTRIC TRANSMISSION PROJECT

MONTHLY REPORT

APRIL 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



CLAS. T. MAIN INTERNATIONAL, INC.

BOSTON MASSACHUSETTS U.S.A.

BANDUNG , INDONESIA

MAIN
Engineers

PERUSAHAAN UMUM LISTRIK NEGARA CONSULTANT
CHAS. T. MAIN INTERNATIONAL, INC.
BANDUNG THOMOLPOS 69. TEL. 56869 JL. PPOGO 32
JAKARTA - P.O. BOX 100, KBT KEDAYORAN TIMUR, TEL. 778925 JL. WIJAYA 1/81
SEMARANG - P.O. BOX 26, TEL. 311702 JL. WLAMET 1

12 May 1981

Letter No. B - 4340

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 April 1981.

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

R.W. Malchow
R.W. Malchow
Project Manager

RKM/ns.-

cc. : DIRBANG - PLN Pusat (Enc1.1)
USAID - JET (Enc1.4)
MAIN - BSN (Enc1.1)
MAIN - CIA (Enc1.1)

WEST JAVA I AND II PROJECTS

MONTHLY REPORT

APRIL 1981

A. PERSONNEL

1. ENGINEER

- a. On 25 March, MAIN requested from PLN the approval of Mr. T.L. Jones for temporary assignment as Substation Engineer on the Projects. Mr. Jones's services in Indonesia will be required in June 1981 to assist in erection and testing of the Substations. On 27 April, PLN approved Mr. Jones and immigration procedures are underway.
- b. End of the month 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
C.L. Crume	Substation Constr. Eng.	3 Jun. 1979
H. Gunawan	Administrative Assistant	13 Aug. 1979
Zainal Saur	Surveyor	16 Mar. 1978
<u>West Java II</u>		
D.L. Hawks	Substation Inspector	29 Feb. 1980

2.. PLN

a. End of the month 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	14

b. In addition to the above Staff, approximately 60 PLN Counterpart and field personnel were assigned to the Projects as of 30 April.

B. ADMINISTRATION 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.
- (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 \$ 1,366,452.00
			Rp. 81.308.525,-
	Amendment No. 1	2 Sep. '75	US \$ -
			Rp. 14.575.975,-
	Amendment No. 2	12 Mar. '77	US \$ 1,589,996.00
			Rp. 49.916.408,-
	Amendment No. 3	10 Jan. '79	US \$ 867,561.00
			Rp. 92.358.466,-
	Amendment No. 4	29 Aug. '80	US \$ -
			Rp. 316.936.745,-

C.T. Main-Engineering Services

(2)	No. Pj. 153/PST/77	5 Sep. '77	US \$ 2,531,335.58
	Amendment No. 1	10 Jul. '78	US \$ -
	Amendment No. 2	17 Sep. '79	US \$ 202,682.67
	Amendment No. 3	8 Oct. '80	US \$ 168,927.78

Irby Construction Company

Tower Steel, Insulators and Accessories

(3)	No. Pj. 202/PST/77	28 Nov. '77	US \$ 284,289.50
	Amendment No. 1	30 Nov. '78	US \$ 10,449.56

Copperweld Industries

Shieldwire

(4)	No. Pj. 203/PST/77	28 Nov. '77	US \$ 1,906,391.70
	Amendment No. 1	10 Jul. '78	US \$ 54,615.55
	Amendment No. 2	30 Mar. '79	US \$ 30,836.58

Southwire Company

Conductor

(5)	No. Pj. 050/PST/78	10 Mar. '78	US \$ 369,473.98
	Amendment No. 1	13 Dec. '78	US \$ 31,162.39

Tension Stringing Equipment Co.

Wire Stringing Equipment

(6)	No. Pj. 051/PST/78 Ohio Brass Company Lightning Arresters	10 Mar. '78	US \$	87,852.00
(7)	No. Pj. 052/PST/78 Amendment No. 1 Irby Construction Company Substation Equipment Maintenance Tools and Equipment	11 Mar. '78 17 Sep. '79	US \$ US \$	4,499,800.74 47,613.72
(8)	No. Pj. 053/PST/78 Amendment No. 1 General Electric Company Substation Equipment	11 Mar. '78 7 Jan. '80	US \$ US \$	2,452,391.40 80,409.19
(9)	No. Pj. 087/PST/78 Amendment No. 1 Amendment No. 2 Motorola Radio Equipment	11 May '78 22 Dec. '79 21 Nov. '80	US \$ US \$ 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 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 P.T. Sigma Tirta Tegal Substation Structure Erection	17 Oct. '79	Rp. 25.966.000,-
(16)	No. Spj.017/PLN/PI RING/79-80 P.T. Silkar National Conductor Stringing - Section I	22 Jan. '80	Rp. 127.790.850,-
(17)	No. Spj.019/PLN/PI RING/79-80 P.T. Citac Ltd. Conductor Stringing - Section III	2 Feb. '80	Rp. 164.364.000,-
(18)	No Spj.001/PLN/PI RING/80-81 P.T. Erses Ujungberung Substation Civil Work	3 Apr. '80	Rp. 464.500.000,-
(19)	No. Spj.002/PLN/PI RING/80-81 P.T. Erses Ujungberung Substation Control House	3 Apr. '80	Rp. 199.989.000,-
(20)	No. Spj.013/PLN/PI RING/80-81 P.T. Dharma Niaga Ujungberung Substation Temporary 150 KV Transmission Line By-Pass	6 Jul. '80	Rp. 18.860.000,-

c. West Java II Contract Data

(1)	No. PJ. 023/PSI/75	25 Jan. '75	US \$ 1,541,729.00
	Amendment No. 1	12 May '75	Rp. 90.598.149,-
	Amendment No. 2	12 Mar. '77	US \$ 856,064.00
			Rp. 15.129.504,-

Amendment No. 3	10 Jan. '79	US \$ 112.000.00
		Rp. 97.708.072,-
Amendment No. 4	29 Aug. '80	US \$ -
		Rp. 515.307.310,-
C.T. Main Engineering Services		
(2) No. Pj. 152/PST/77	5 Sep. '77	Rp. 452.526.908,-
		US \$ 7,744,165.78
Amendments No. 1 & 2	10 Jul. '78	Rp. 13.137.605,-
		US \$ 311,400.72
Amendment No. 3	17 Sep. '79	Rp. 3.560.229,-
		US \$ 140,881.33
Amendment No. 4	23 Oct. '80	Rp. 176.242.175,-
		US \$ 2,659.54
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
Amendment No. 1	17 Sep. '79	Funded under Loan 497-II-028 West Java I
Irby Construction Company Substation Equipment		
(5) No. Pj. 053/PST/78	11 Mar. '78	US \$ 3,974,100.16
Amendment No. 1	7 Jan. '80	Funded under Loan 497-II-028 West Java I
General Electric Company Substation Equipment		

- | | | | |
|------|---|-------------|--------------------------------|
| (15) | No. Spj. 007/PLN/PI RING/80-81
P.T. Perfect Circle
Bogor Substation Control House | 31 May '80 | Rp. 212.915.000,- |
| (16) | No. Spj. 020/PLN/PI RING/79-80
P.T. Hutama Karya
Bandung Utara Substation Access Road | 16 Feb. '80 | Rp. 31.967.000,- |
| (17) | No. Spj. /PLN/PI RING/
Contract not yet signed
Bogor Substation Access Road | | Rp. 64.700.00,-
(Estimated) |
| (18) | No. Spj. 013/PLN/PI RING/80-81
P.T. Dharma Niaga
Bogor Substation Temporary 150 KV
Transmission Line By-Pass | 6 Jul. '80 | Rp. 10.608.000,- |

d. West Java I and II Contract Data

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

2. GENERAL

- a. A fourth draft of Amendment Number 2 to the PLN/Irby Substation Equipment Contract has been submitted to PLN Projects for review and comments. The Amendment provides for the purchase of additional control cable, watt-hour meters, tools and spare parts. The fourth draft includes the purchase by PLN of material presently in the Irby Construction Company storeroom and for the transfer to PLN of equipment and vehicles which had been imported duty free by Irby under OR-23.

- b. Where appropriate, retainage funds are being held to ensure full Contract completion by the suppliers.
- c. PLN and Tension Stringing Equipment, Inc. have agreed on certain changes, additions and deletions to the schedule of tools and equipment to be furnished under Contract Number Pj. 050/PST/78. The result of these changes is a decrease in the Contract amount of US \$ 2,264.49. The associated Letter of Commitment has been reduced and a reduction in the Letter of Credit is in process. An expiration date extension for the Letter of Commitment is also in process.
- d. PLN and Southwire Company have agreed that Contract Pj. 203/PST/77 should be reduced by US \$ 77.87 to reflect the actual CIF cost of Conductor supplied under the Contract. The associated Letter of Commitment has been reduced and a reduction in the Letter of Credit is in process.
- e. An expiration date extension for Letter of Credit Number 0103/8816/PL for Motorola was approved.

C. CONFERENCES AND EVENTS

1. Construction Meetings

- a. **Ujungberang Substation Civil Work.**
Contractor - P.T. Erses
7 April 1981
21 April 1981
- b. **Ujungberang Substation Control House.**
Contractor - P.T. Citac Ltd.
7 April 1981
21 April 1981

- c. Bandung Utara Substation Civil Work.
Contractor - P.T. Pembangunan Perumahan.
8 April 1981
22 April 1981

- d. Bandung Utara Substation Control House.
Contractor - P.T. Perfect Circle.
8 April 1981
22 April 1981

- e. Bogor Substation Civil Work and Control House.
Contractor - P.T. Perfect Circle.
9 April 1981
24 April 1981

D. PROBLEM AREAS AND TENTATIVE SOLUTIONS

1. The Ujungberung Switchyard and Control House Construction remains several months behind the original schedule. Control House Construction has been turned over to a subcontractor. The subcontractor is making sufficient progress that further delays are not anticipated. Responsibility for the switchyard Civil Works Construction has been taken away from P.T. Erses and the work will be completed by PLN. It is expected that sufficient conduit will be installed by the end of June to allow control wiring to begin. If so, the station should be energized by the end of the year.

2. The Bogor Substation Switchyard and Control House Construction are approximately three (3) months and eight (8) weeks behind schedule, respectively. Provided sufficient conduit is installed by the end of June to permit control wiring to start and sufficient work done on the Control House to allow installation of the 20 KV switchgear by the middle of July, the substation should be energized by the end of the year.

3. The Bandung Utara Switchyard Contractor is approximately six (6) months behind his original schedule but has picked up his pace of work. Sufficient conduit should be installed by the end of June to permit control wiring to begin. It is not expected that the switchyard Civil Work Construction would delay energization of the substation past 31 December 1981.
4. The Bandung Utara Control House Contractor is still approximately three and one-half (3 ½) months behind schedule but it is expected that sufficient work will be completed to permit the start of installation of the 20 KV switchgear by 15 July. As a result, it is not expected that Contractor delays will delay scheduled energization of the substation past the end of the year.
5. Power transformers have still not been moved to the sites. A contractor for transporting the Bogor transformers has been chosen and work has begun. Transformers should be on site by mid-May. PLN is negotiating with a contractor to transport the Bandung Utara and Ujungberung transformers. If negotiations are successful, transformers should be on site by mid-September.
6. The land for the permanent access road to Bogor Substation has been purchased. PLN will negotiate with the Contractor who was the low Bidder on the tender for the previous routing. Negotiations should take place during May. A temporary heavy duty access road will be constructed to permit transport of transformers and other heavy equipment. The scheduled completion of the Project should not be affected.

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. Tower Replacement. Construction required to relocate Towers No. 317 and 319 on the Cirebon - Ujungberung Line Section continued during the month.

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 have been installed 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.

2. Material Supply

- a. A few items of line hardware to be used as spares are in Indonesian customs.

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 Contractor completed little work during the month. The Contractor continued work on the 150/20 KV transformer foundations, fence, road culverts, cable trench, road, grading and firewalls but at a slow pace and at the end of the month work had stopped. The Contractor is now over seven (7) months behind his original schedule. PLN has terminated the Contract and will undertake the work themselves. It is expected that the work will be completed by the end of July.

(2) Control House

Work continued on the site fill, brickwork, ground floor, cable trench, final plastering, ceiling hanger installation, doors, windows, plywood ceiling, electrical conduit and conductor installation and outside drainage. Work began on the acoustic ceiling, cable trench covers, terrazo plinth, painting, electrical panel, fixture and outlet installation and the rainwater drains. The Contractor is six and one-half (6 ½) months behind the original schedule. It is now estimated that the work will be completed by the middle of July.

(3) Erection, Wiring and Testing

PLN erection forces completed erection of 150 KV bus support, CCVT, lightning arresters and wave traps, 70 KV main and CCVT structures, 70 KV switches, CCVT, lightning arresters and OCB's, 20 KV terminator structures and 6.6 KV fuse structures. Work continued on the 150 KV insulators, bus and connectors and 70 KV bus. It is expected that the substation will be energized by the end of the year.

c. Banding Utara Substation

(1) Switchyard

The Contractor completed work on the road culverts and transformer column foundations. He continued work on the substation road, cable trench, fence, conduits and ground mat. The Contractor is approximately six (6) months behind his original schedule but picked up his pace of work during April. It is estimated that the work will be completed by the end of June.

(2) Control House

The Contractor completed the second floor slab during April. The Contractor continued work on the site fill, soil compaction, cable trench, roof, brick work and final plastering. The Contractor began work on the first floor slab, cable trench covers and the electrical conductor installation. The Contractor is still approximately three and one-half (3 ½) months behind schedule. It is estimated that the work will be completed by the end of July.

(3) Access Road

The Contractor continued work during April. It is estimated that the road will be completed by the end of May.

(4) Erection, Wiring and Testing

During April, PLN erection crews completed installation of the 150 KV switch structures. PLN continued work on the 150 KV bus insulators and switches. Work began on installation of the CCVT's and lightning arresters. Energization of the substation should take place by the end of the year.

d. Bogor Substation

(1) Switchyard Civil Work

The Contractor completed the drainage system and foundations. Work continued on the substation road, fence, grounding resistor foundations, cable trench, yard grading, firewalls, ground mat and road culverts.

The Contractor is approximately three (3) months behind schedule. It is estimated that the work will be finished by the end of June.

(2) Control House

The Contractor completed the roof work and stone work. Work continued on the brick work and final plastering. The Contractor began pouring the stairs, installing ceiling hangers, the plywood ceiling and digging the well.

The Contractor is approximately eight (8) weeks behind schedule. It is estimated that the work will be completed by the end of July.

(3) Access Road

PLN has inventoried the work to be done for the new road route and expects to negotiate with the low Bidder for the previous access road route during May.

A heavy duty temporary access road is being built from the Toll Road to the Substation. This will permit transport of the transformers and the other heavy pieces of equipment.

(4) Erection, Wiring and Testing

During April, PLN erection crews completed installation of the 150 KV switch stands, line terminal structures, lightning masts and CCVT and lightning structures. Work began on the installation of the 150 KV bus insulators.

2. Material Supply

Most material is presently in Indonesia. Remaining control boards are scheduled for shipment in April. There should be no delays due to material shortages.

H. MOBILE RADIO

1. The fixed station at Bandung Utara will be installed when electric power is installed, which should be by the end of May

I. SCHEDULES

1. Current Shipping Schedule

This schedule is on pages 18 and 19. Based on the present supply contracts only five (5) shipments are pending. All material should be received well before the end of 1981.

2. West Java I and II Projects Completion

The tables which are on pages 20 and 21 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 scheduled 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.

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

<u>Item</u>	<u>Shipping Date</u>	<u>ETA in PLN Warehouse</u>	<u>Comments</u>
A. Contract Pj.152/PST/77, Socket Clevis	Irby Construction Company, Transmission Line Materials - WJ II 23 December 1980	15 May 1981	In Indonesia
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		

<u>Item</u>	<u>Shipping Date</u>	<u>ETA in PLN Warehouse</u>	<u>Comments</u>
G. Contract Pj.052/PST/78,	Irby Construction Company, Substation Equipment and Maintenance Tools and Equipment - WJ I & WJ II		
1. Panels for Bogor (2), Bandung Utara (2) & Bandung Selatan (1), and miscellaneous items.	26 April 1981	26 June 1981	
2. Substation Bus	4 July 1981	4 Sept. 1981	Replacement Item.
H. Contract Pj.053/PST/78,	General Electric Company, Substation Equipment - WJ I & WJ II		
1. Replacement Parts	26 December 1980	15 May 1981	In Indonesia
I. Contract Pj.087/PST/78,	Motorola Company, Mobile Radio Equipment - WJ I		
Communication System Analyzer, Channel Elements & Base Station Module Servicing Adaptor.	30 April 1981	30 June 1981	

30 April 1981

West Java I Project
 Project Completion
 (Includes Engineering and Design)
 as of 25 April 1981

<u>Work Item</u>	<u>Weighted Percent of Project</u>	<u>Percent of Item Completed to Date</u>		<u>Percent of Project Completed to Date</u>	
		<u>Scheduled</u>	<u>Actual</u>	<u>Scheduled</u>	<u>Actual</u>
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	85.1	15.2	12.9
Control House	11.5	86.1	80.8	9.9	9.3
Equipment Erection, Wiring and Testing	10.3	49.5	55.5	5.1	5.7
Radio System	5.7	100.0	100.0	5.7	5.7
Total	100.0			93.2	90.9
	*****			*****	*****

West Java II Project
 Project Completion
 (Includes Engineering and Design)
 as of 25 April 1981

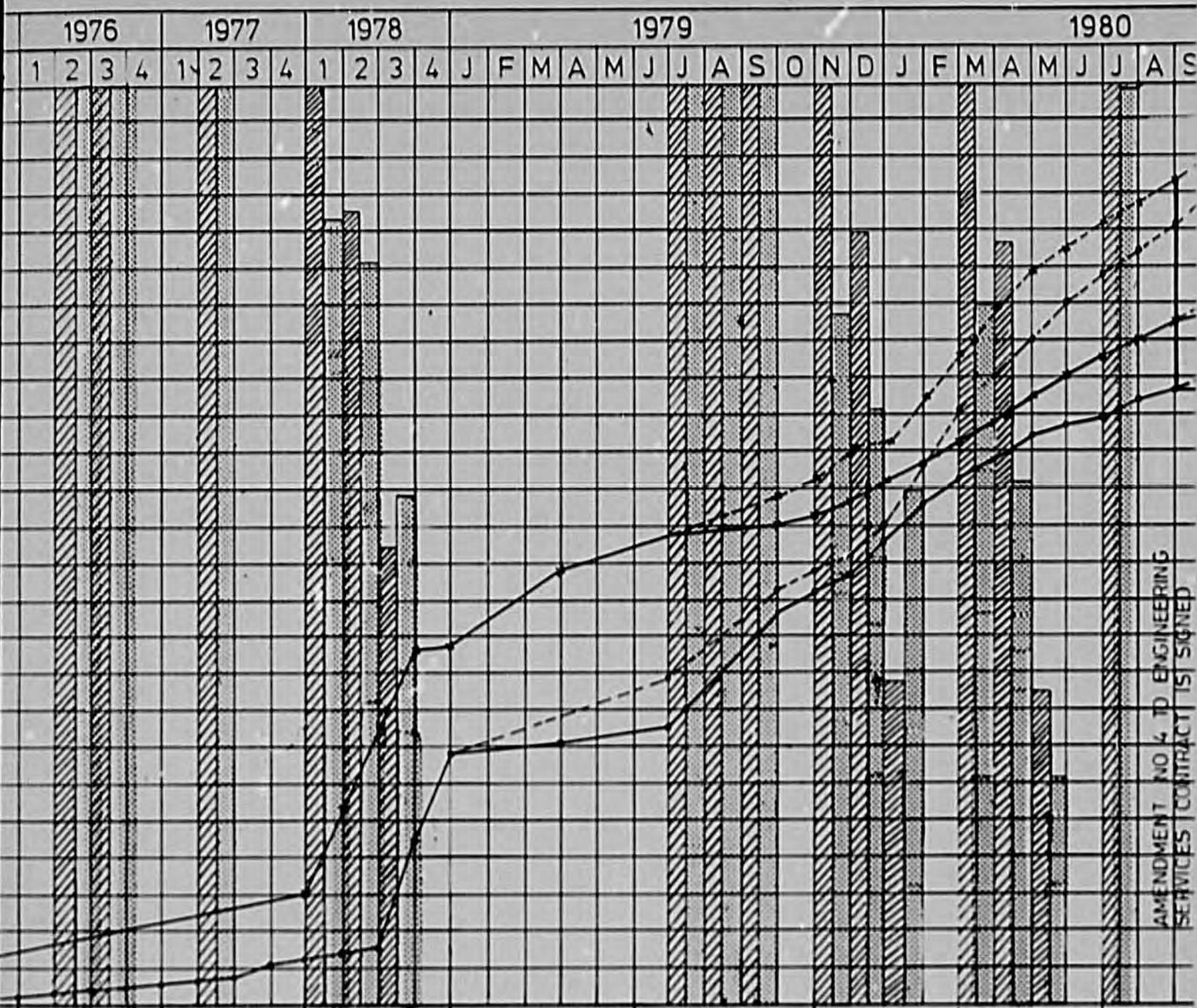
<u>Work Item</u>	<u>Weighted Percent of Project</u>	<u>Percent of Item Completed to Date</u>		<u>Percent of Project Completed to Date</u>	
		<u>Scheduled</u>	<u>Actual</u>	<u>Scheduled</u>	<u>Actual</u>
Transmission Line					
Foundations	28.1	100.0	100.0	28.1	28.1
Tower Erection	13.1	100.0	100.0	13.1	13.1
Conductor Stringing	11.1	100.0	100.0	11.1	11.1
Bandung Utara Substation					
Switchyard Civil Work	7.3	100.0	74.9	7.3	5.5
Control House	6.1	83.6	64.9	5.1	4.0
Equipment Erection, Wiring and Testing	4.9	34.7	55.5	1.7	2.7
Bogor Substation					
Switchyard Civil Work	10.6	100.0	75.3	10.6	8.0
Control House	5.8	82.8	56.3	4.8	3.3
Equipment Erection, Wiring and Testing	7.0	34.3	25.1	2.4	1.8
Radio System	6.0	100.0	99.9	6.0	6.0
Total	100.0			90.2	83.6
	=====			=====	=====

WEST JAVA I AND II PROJECTS

PROJECT COMPLETION

AS OF APRIL 25-1981

23



SWITCHYARD CIVIL WORK ERECTION & WIRING	TEGAL SUBSTATION
RADIO SYSTEM	
SWITCHYARD CIVIL WORK CONTROL HOUSE ERECTION, WIRING & TESTING	U. BERUNG SUBSTATION
W J. II PROJECT	
TRANSMISSION LINES FOUNDATIONS TOWER ERECTION CONDUCTOR STRINGING	
SWITCHYARD CIVIL WORK CONTROL HOUSE ERECTION, WIRING & TESTING	BDG UTARA SUBSTATION
SWITCHYARD CIVIL WORK CONTROL HOUSE ERECTION, WIRING & TESTING	BOGOR SUBSTATION
RADIO SYSTEM	

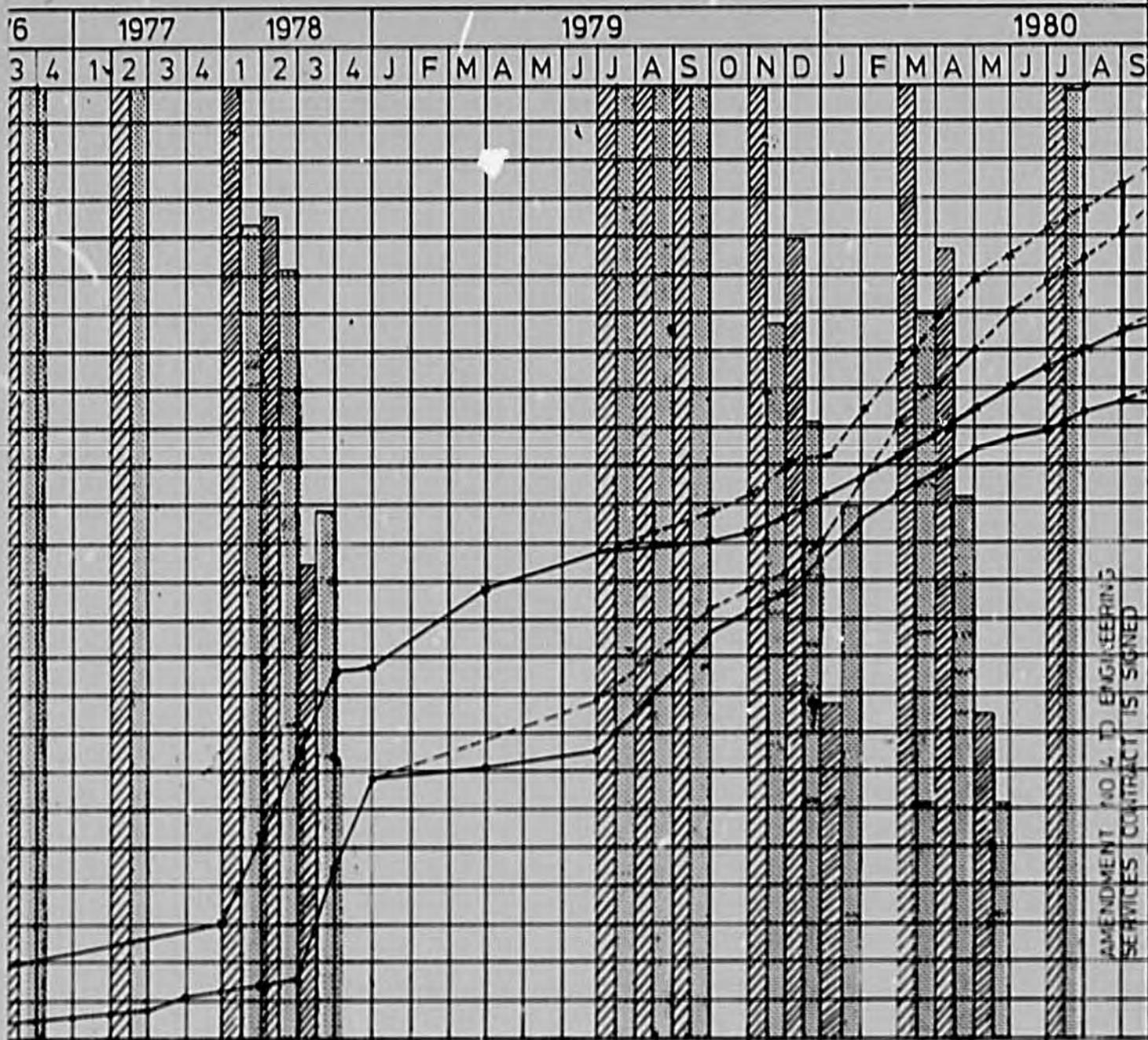
AMENDMENT NO 4 TO ENGINEERING SERVICES CONTRACT IS SIGNED

ST JAVA I AND II PROJECTS

COMPLETION

AS OF APRIL, 25-1981

24



AMENDMENT NO 4 TO ENGINEERING SERVICES CONTRACT IS SIGNED

ERECTION & WIRING

STATION

RADIO SYSTEM

SWITCHYARD CIVIL WORK
CONTROL HOUSE
ERECTION,
WIRING & TESTING

U. BERUNG
SUBSTATION

W. J. II PROJECT

TRANSMISSION LINES
FOUNDATIONS
TOWER ERECTION
CONDUCTOR STRINGING

SWITCHYARD CIVIL WORK
CONTROL HOUSE
ERECTION,
WIRING & TESTING

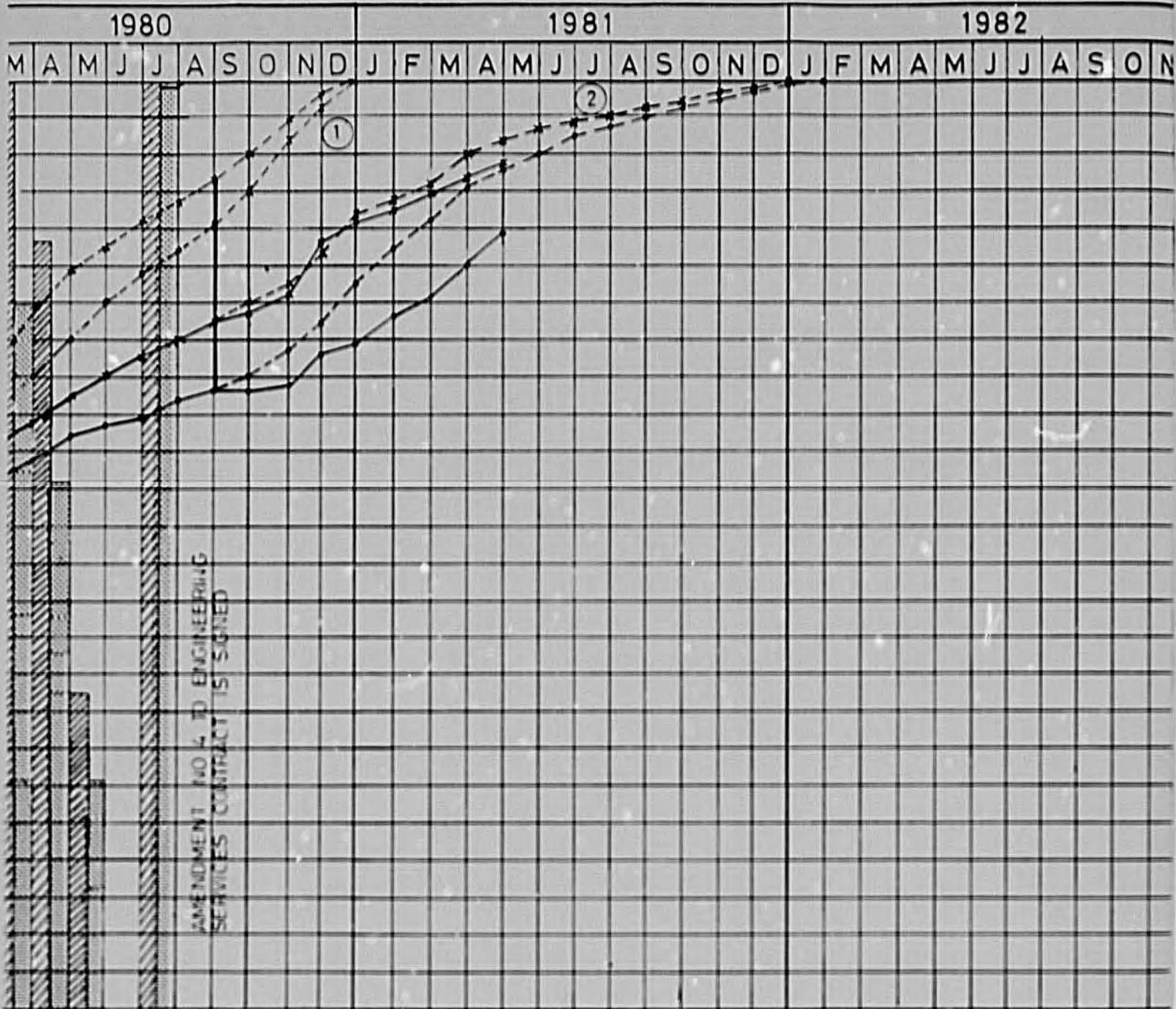
BDG. UTARA
SUBSTATION

SWITCHYARD CIVIL WORK
CONTROL HOUSE
ERECTION,
WIRING & TESTING

BOGOR
SUBSTATION

RADIO SYSTEM

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SWITCHYARD CIVIL WORK
 CONTROL HOUSE
 ERECTION,
 WIRING & TESTING
 RADIO SYSTEM

BOGOR
 SUBSTATION

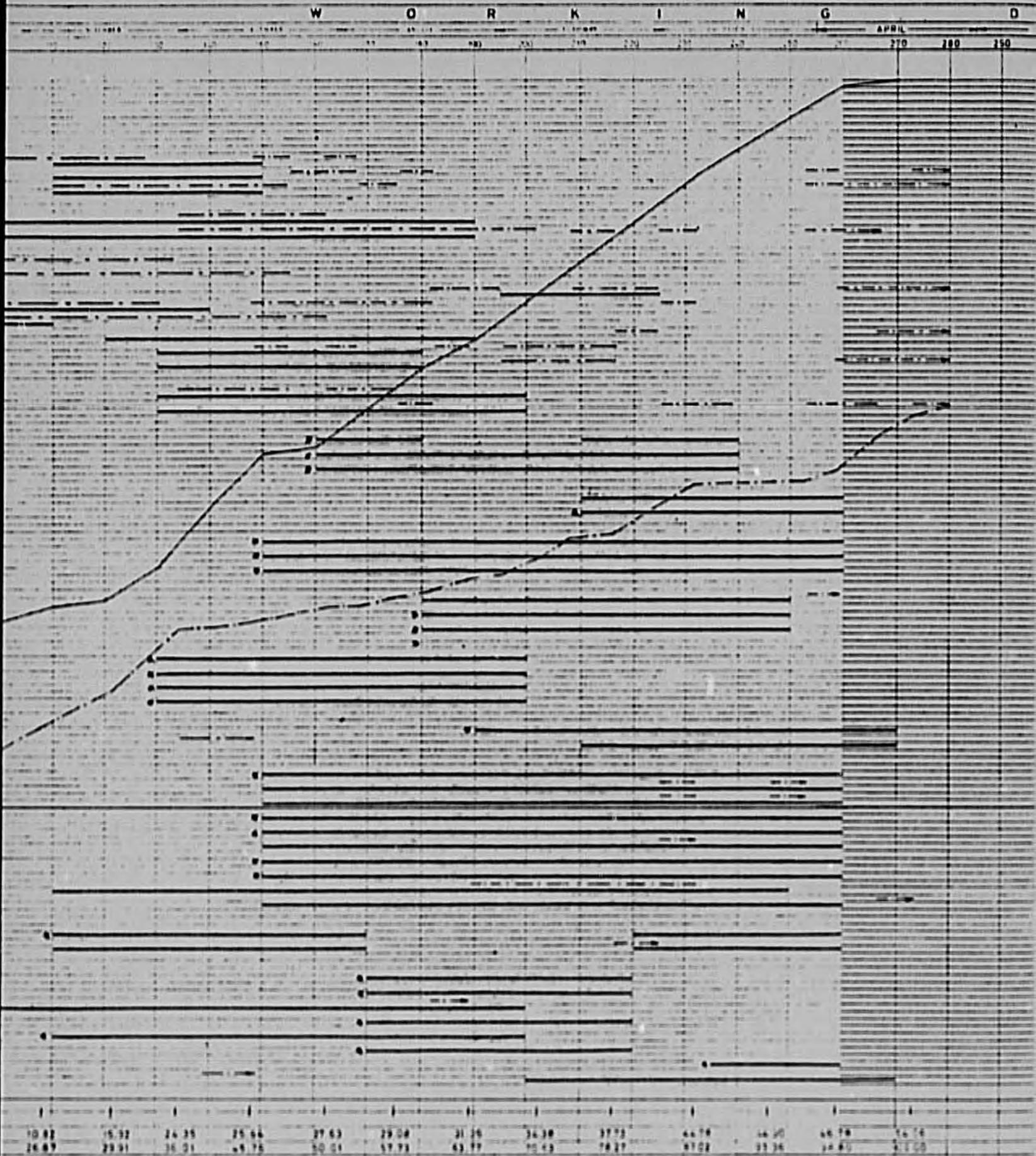
NO	WORK ITEM	UNIT	QTY	PRICE	TOTAL
1	PRELIMINARY WORK				
1.1	Clearing & grubbing of site	1929 sq ft	0.01		
1.2	Contractors office / fence	1	40		
1.3	water supply and permits	1	75		
2	SOIL WORK				
2.1	excavation	931 cu yd	13		
2.2	fill	132 cu yd	26		
2.3	land & soil reclamation	293 cu yd	26		
3	MASONRY				
3.1	stone	3775 cu yd	38		
3.2	brick work	707 cu yd	187		
4	CONCRETE WORK				
4.1	column foundation	28	1647		
4.2	foundation	4160 cu yd	1.46		
4.3	floor	1668 cu yd	7.38		
4.4	column	70.8 cu yd	3.31		
4.5	1" beams	12.27 cu yd	1.72		
4.6	concrete trench	732.8 cu yd	1.25		
4.7	stairs	12.22 cu yd	99		
4.8	roof	282.51 cu yd	11.43		
5	PLASTER WORK				
5.1	rough	390 cu yd	14		
5.2	final work	1360 cu yd	1.83		
6	WOOD				
6.1	staircase supports	1 cu yd	76		
6.2	staircase hangers	105 cu yd	75		
6.3	stairs	14.54 cu yd	18		
7	DOOR WINDOWS				
7.1	doors	23	1.75		
7.2	windows	37	6.26		
8	CEILING WORK				
8.1	gypsum ceiling	518 cu yd	30		
8.2	acoustic ceiling	25.2 cu yd	60		
8.3	acoustic cement	19 cu yd	21		
9	STEEL WORK				
9.1	load trench covers	44.28 cu yd	1.70		
9.2	outstanding channel support	1.18 cu yd	25		
9.3	load work / hangers	80.25 cu yd	11		
10	FLOOR WORK				
10.1	terrazzo tile	32.4 cu yd	1.35		
10.2	terrazzo joint	21.9 cu yd	11		
10.3	partition / concrete tile	50 cu yd	8		
10.4	marble tile	18 cu yd	8		
11	PAINT	1722 sq ft	11		
12	SANITARY	6	3		
13	ELECTRICAL				
13.1	switches	7	1.83		
13.2	fixtures	157	2.72		
13.3	outlets	72	2.7		
13.4	switches	47	0.9		
13.5	conduit (1/2" & 3/4" diam)	1	1.46		
13.6	trays	9	0.9		
13.7	conduit	1	2.91		
13.8	conduit	1	2.91		
13.9	conductor	3	7.5		
14	FIRE PROTECTION				
14.1	CO2 system	18	1.4		
14.2	fire alarm system	46	2.72		
15	DRAINAGE & WATER SYSTEM				
15.1	sanitary drainage	138.8 cu yd	30		
15.2	sanitary pipe	1.2 cu yd	8		
15.3	cast iron	1	1.47		
15.4	pipe	18 cu yd	7.5		
15.5	joints	1	1.46		
15.6	fire head	1	1.47		
16	AIR CONDITION	76	1.17		
17	OTHER WORK	3	5.8		
	TOTAL		483.0		

A 1.07 2.17 2.44 6.01 5.73 10.82
 S 3.63 7.83 11.75 16.94 22.37 26.87

NOTES:
 THE QUANTITY PRICES ARE
 BASED ON PERIODIC
 COST OF EACH MATERIAL
 UNDER LOCAL COSTS
 WHICH ARE NOT LISTED
 ARE NOT LISTED
 AS OF DATE 1/1/50
 CONTRACTOR'S RESPONSIBILITY

28

TIME SCHEDULE BANDUNG UTARA CONTROL HOUSE



D A Y S												1% OF		RESULTS, COSTS, EMPLOYERS		TO DATE APR. 25 51	
MAY												ACTUAL		BUDGET		%	
100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
100																	
18																	
26	1825	100															
24	1	100															
22	1	100															
19																	
16	231	100															
14	527	100															
12	2431	100															
10	377	100															
7	71	100															
5																	
2	28	100															
1	4322	100															
30	5121	100															
29	201	100															
28	2227	100															
27	79	100															
26	118	100															
25	306	100															
24																	
23	590	100															
22	2162	100															
21																	
20	3	100															
19	0	0															
18	0	0															
17	0	0															
16	0	0															
15	0	0															
14	0	0															
13	0	0															
12	0	0															
11	0	0															
10	0	0															
9	0	0															
8	0	0															
7	0	0															
6	0	0															
5	0	0															
4	0	0															
3	0	0															
2	0	0															
1	0	0															

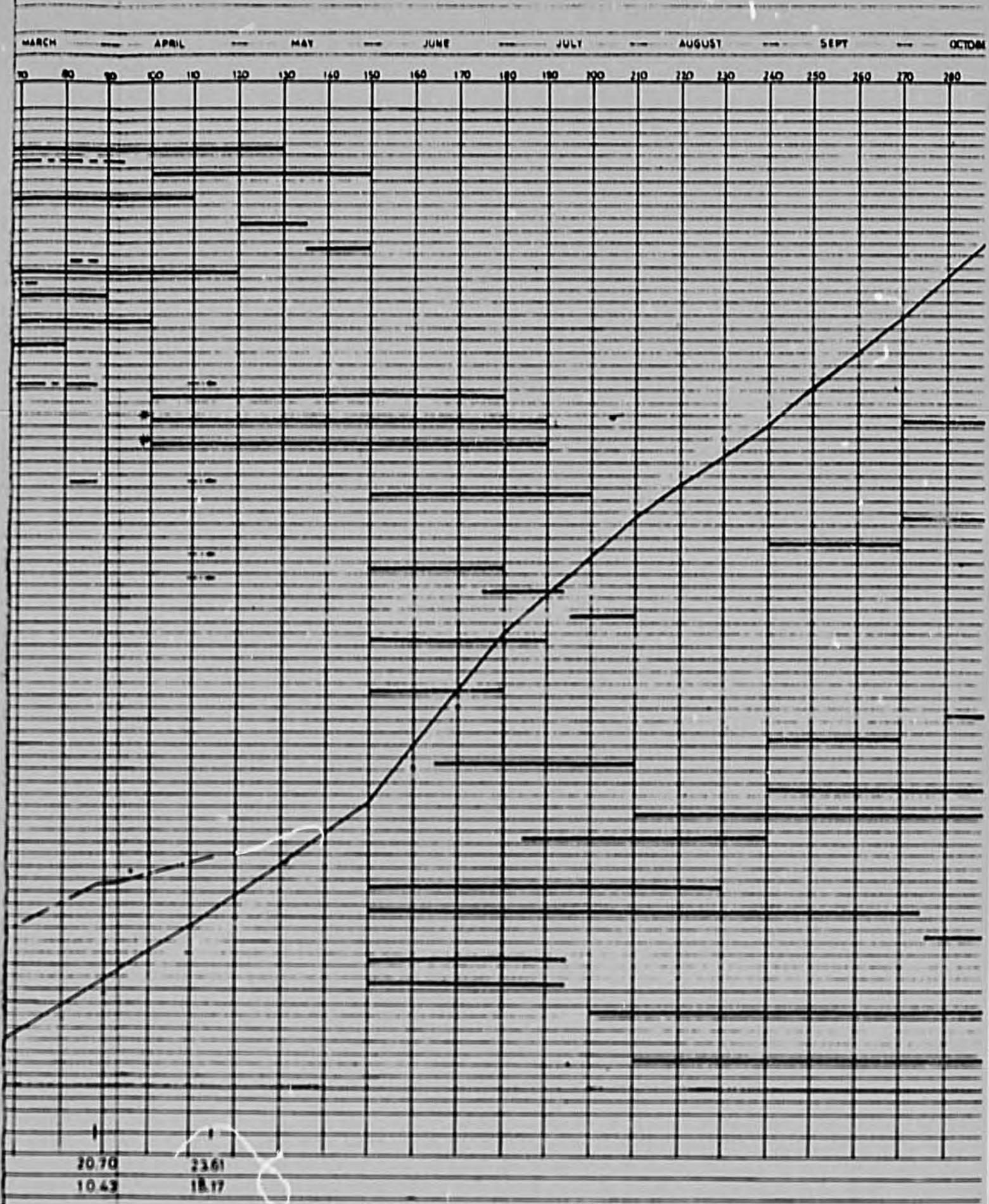
NO	WORK ITEM	UNIT	QTY %	SCHEDULE											
				JAN 1961			FEBRUARY			MARCH			APRIL		
				10	20	30	40	50	60	70	80	90	100	110	120
1.	STRUCTURES														
1.1	150 KV BUS SUPPORT STRUCTURES	190	6.78												
1.2	150 KV SWITCH SUPPORT STRUCTURES	24	2.60												
1.3	150KV DEAD END TOWERS	4	2.60												
1.4	20KV TERMINATOR STRUCTURE	2	0.78												
1.5	66KV FUSE & TRANSF STRUCTURE	2	0.78												
1.6	LIGHTING MAST STRUCTURE	14	3.13												
1.7	CCVT & BUS SUPPORT STAND (BUS)	2	1.04												
1.8	CCVT WAVE TRAP & L.A. STAND (LINE)	4	1.56												
1.9	CCVT, L.A. SUPPORT STRUCTURE	8	1.04												
2	BUS														
2.1	INSULATORS	406	4.17												
2.2	BUS PIPE & ACSR (AND DAMPER CABLE)	480	6.28												
2.3	CONNECTORS	774	4.69												
3	EQUIPMENT (SWITCH YARD)														
3.1	150KV SWITCHES (INSTALLATION)	24	2.08												
3.2	150KV SWITCH ADJUSTMENT	24	4.17												
3.3	6.6KV FUSE & SWITCHES	2	1.56												
3.4	CCVTS	14	1.56												
3.5	LIGHTNING ARRESTERS	12	1.04												
3.6	WAVE TRAPS	4	0.78												
3.7	OIL CIRCUIT BREAKERS	7	2.08												
3.8	OIL CIRCUIT BREAKER SET UP	7	2.08												
3.9	PRELIMINARY POWER TRASF SET UP	2	1.56												
3.10	TRASF. INSTALLATION AND TESTING	2	1.04												
3.11	STATION SERVICE TRANSFORMERS	6	1.56												
4.0	GROUNDING MATERIAL	100	2.34												
5.0	YARD LIGHTING	100	3.13												
6.0	CONDUIT INSTALLATION	217	4.69												
7.0	YARD PANEL INSTALLATION	13	2.60												
8.0	CONTROL HOUSE														
8.1	RELAY AND CONTROL PANEL INST	9	4.17												
8.2	20KV SWTCH GEAR INST.	24	6.51												
8.3	FINAL 20KV SW. GEAR TESTING	100	2.66												
8.4	BATTERY CHARGER INSTALLATION	2	2.34												
8.5	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											
				NOTES: * WORK NOT STARTED — WORK NOT COMPLETE AS OF DATE											

A - ACTUAL
 S - SCHEDULE

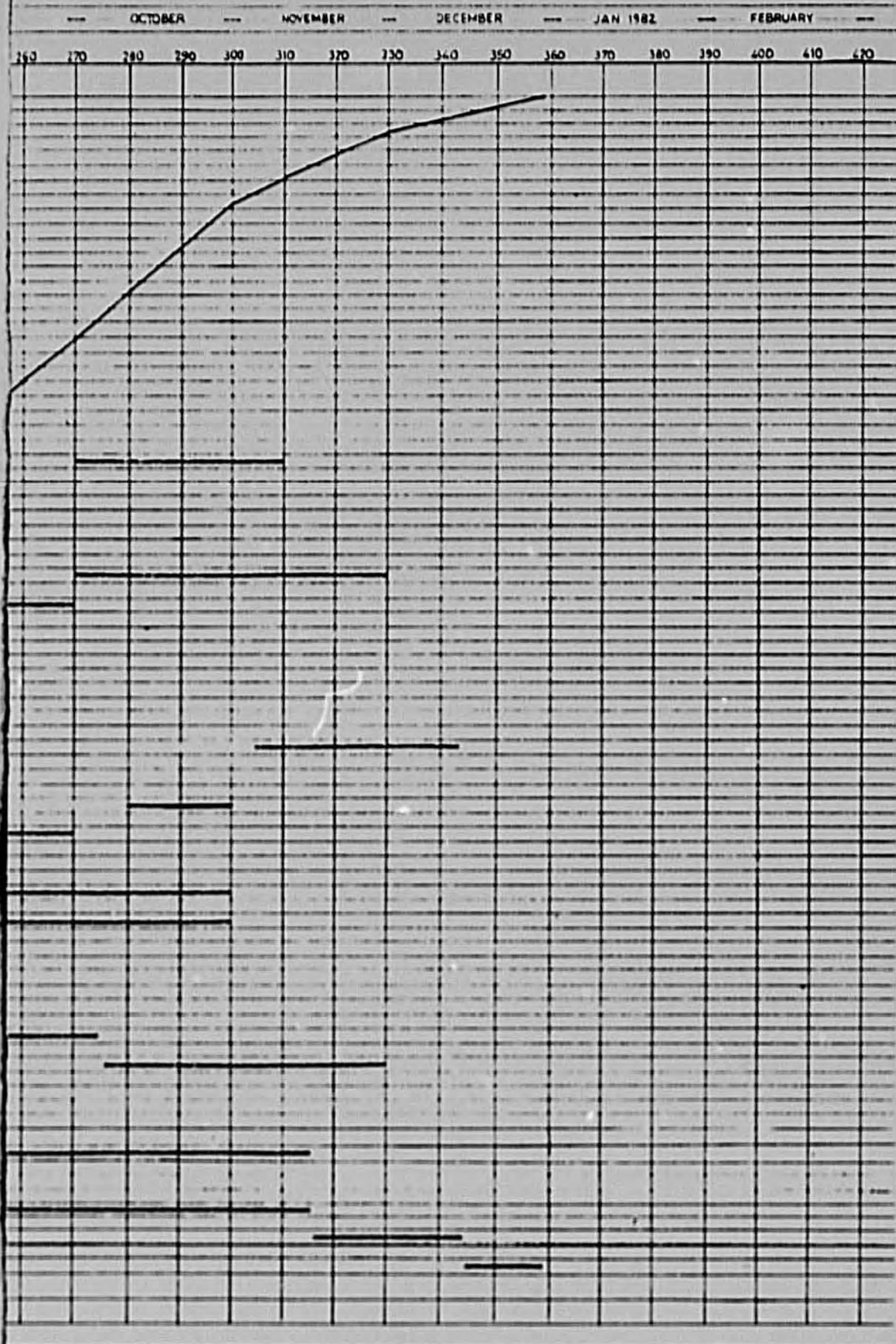
NOTES:
 * WORK NOT STARTED
 — WORK NOT COMPLETE AS OF DATE

31

TIME SCHEDULE BANDUNG UTARA ERECTION



20.70	23.61
10.43	18.17



NO	WORK ITEM	QTY	UNIT	PERCENTAGE COMPLETION			
				MAY 28	JUNE	JULY	AUG
1	Excavation						
1.1	Excavating & grubbing 15' x 12'	81	LSOM	100			
1.2	10cm crush stone	10	MSOM	100			
1.3	1000 sub-base	4	MSOM	100			
1.4	1000 top surface	1	MSOM	100			
1.5	1000 10cm concrete paving	81	MSOM	100			
1.6	1000 10cm concrete paving	81	MSOM	100			
1.7	1000 10cm concrete paving	81	MSOM	100			
1.8	1000 10cm concrete paving	81	MSOM	100			
1.9	1000 10cm concrete paving	81	MSOM	100			
1.10	1000 10cm concrete paving	81	MSOM	100			
2	CONSTRUCTION PLANT	1	MSOM	100			
3	FOUNDATION						
3.1	All out OCB & 10cm	100	MSOM	100			
3.2	15cm OCB	1	MSOM	100			
3.3	COLUMN FOUNDATION	58	MSOM	100			
3.4	15 20x20cm reinforcement pt	1	MSOM	100			
3.5	15 20x20cm reinforcement pt	1	MSOM	100			
3.6	15 20x20cm reinforcement pt	1	MSOM	100			
3.7	15 20x20cm reinforcement pt	1	MSOM	100			
3.8	15 20x20cm reinforcement pt	1	MSOM	100			
3.9	15 20x20cm reinforcement pt	1	MSOM	100			
3.10	15 20x20cm reinforcement pt	1	MSOM	100			
40	OND SYSTEM						
41	Below ond system	100	MSOM	100			
42	Above ond system	100	MSOM	100			
50	CONDUIT SYSTEM						
51	Below gpd system	100	MSOM	100			
52	Above ond system	100	MSOM	100			
60	Furnish material for job lighting	100	MSOM	100			
70	Furnish material for sign service	100	MSOM	100			
	TOTAL	100.0					



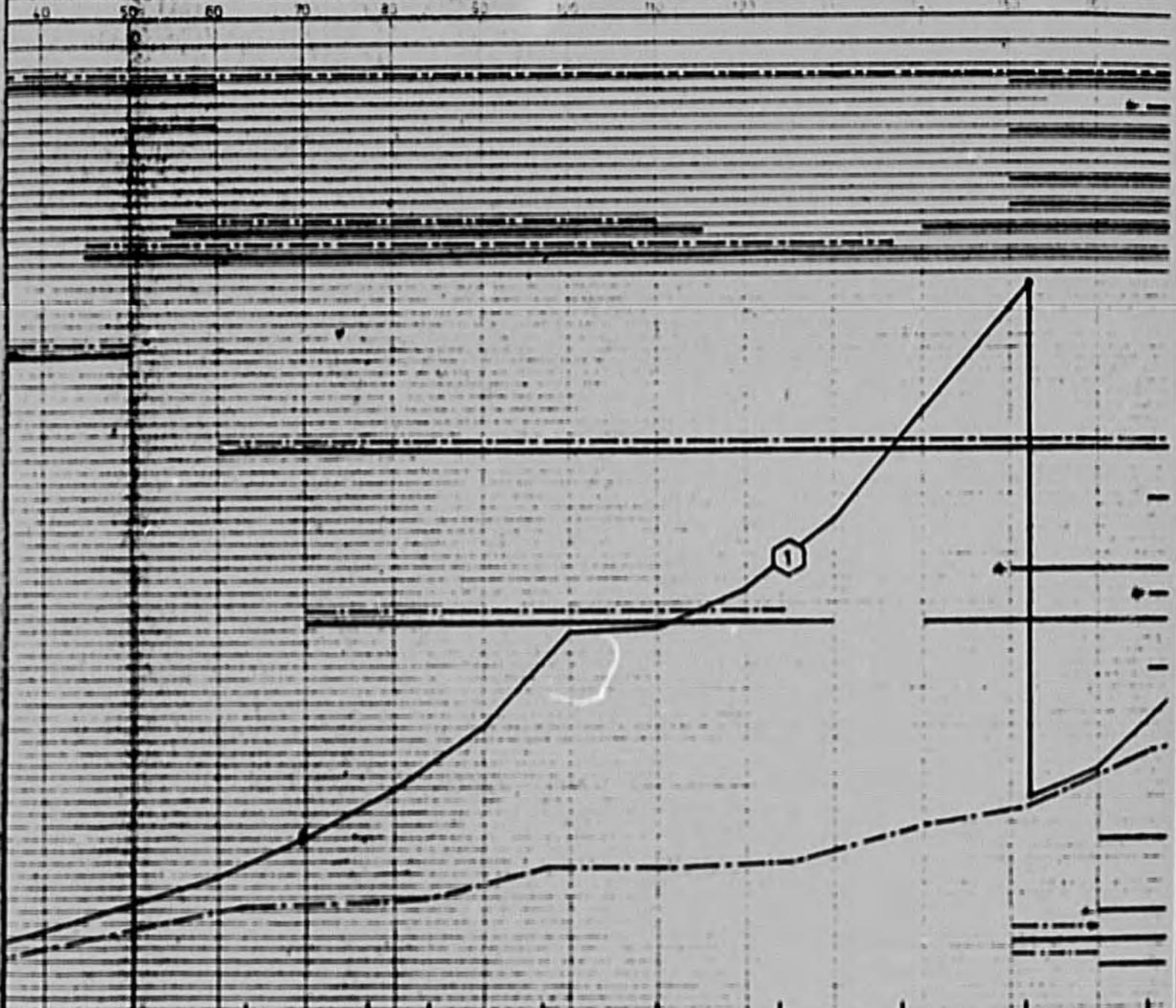
A= ACTUAL
 S= SCHEDULE
 ORIGINAL SCHEDULE (1)
 REVISED SCHEDULE (2)

NOTES:
 1. The 91% completion is based on current work in progress.
 2. Work not started
 3. Work not complete as of date sheet
 4. Preparation progress

BAND I

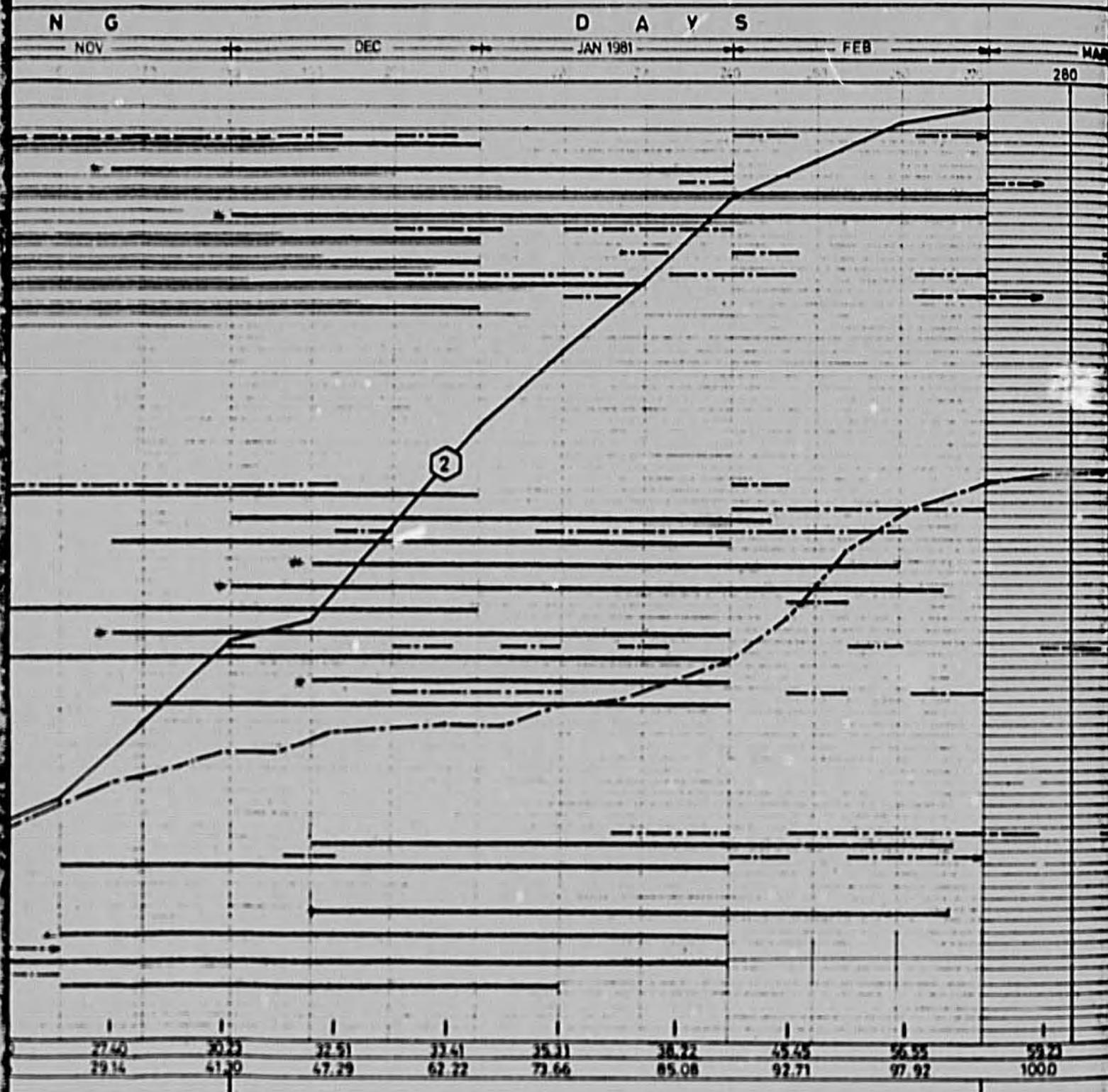
W O R K I N G

JULY AUGUST SEPT OCT NOV



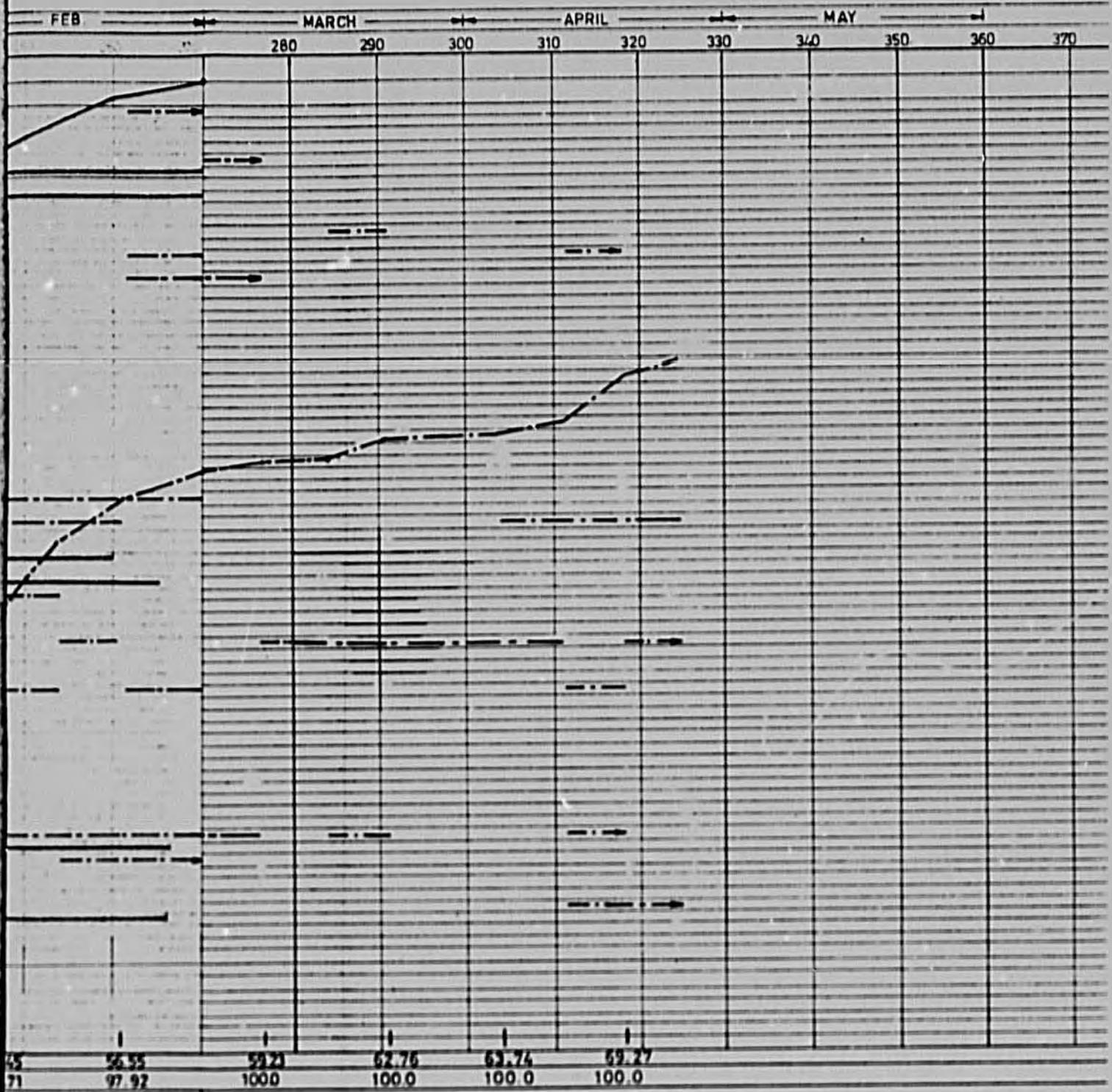
11.438	12.08	12.66	13.30	13.92	14.50	15.09	15.50	16.00	16.50	17.00	17.50	18.00	18.50	19.00	19.50	20.00	20.50	21.00	21.50	22.00	22.50	23.00	23.50	24.00	24.50	25.00	25.50	26.00	26.50	27.00	27.50	28.00	28.50	29.00	29.50	30.00	30.50	31.00	31.50	32.00	32.50	33.00	33.50	34.00	34.50	35.00	35.50	36.00	36.50	37.00	37.50	38.00	38.50	39.00	39.50	40.00	40.50	41.00	41.50	42.00	42.50	43.00	43.50	44.00	44.50	45.00	45.50	46.00	46.50	47.00	47.50	48.00	48.50	49.00	49.50	50.00																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
19.61	22.50	25.08	27.32	29.22	30.80	32.09	33.10	33.93	34.59	35.19	35.74	36.25	36.72	37.15	37.54	37.89	38.20	38.47	38.70	38.89	39.04	39.15	39.22	39.26	39.27	39.25	39.20	39.12	39.01	38.87	38.70	38.50	38.27	38.01	37.72	37.40	37.05	36.67	36.26	35.82	35.35	34.85	34.32	33.76	33.17	32.55	31.90	31.22	30.51	29.77	29.00	28.20	27.37	26.51	25.62	24.70	23.75	22.77	21.76	20.72	19.65	18.55	17.42	16.26	15.07	13.85	12.60	11.32	10.01	8.67	7.30	5.90	4.47	3.01	1.52	0.00	-1.52	-3.01	-4.47	-5.90	-7.30	-8.67	-10.01	-11.32	-12.60	-13.85	-15.07	-16.26	-17.42	-18.55	-19.65	-20.72	-21.76	-22.77	-23.75	-24.70	-25.62	-26.51	-27.37	-28.20	-29.01	-29.77	-30.51	-31.22	-31.90	-32.55	-33.17	-33.76	-34.32	-34.85	-35.35	-35.82	-36.25	-36.60	-36.89	-37.15	-37.32	-37.40	-37.47	-37.50	-37.50	-37.47	-37.32	-37.15	-36.89	-36.60	-36.25	-35.82	-35.35	-34.85	-34.32	-33.76	-33.17	-32.55	-31.90	-31.22	-30.51	-29.77	-29.00	-28.20	-27.37	-26.51	-25.62	-24.70	-23.75	-22.77	-21.76	-20.72	-19.65	-18.55	-17.42	-16.26	-15.07	-13.85	-12.60	-11.32	-10.01	-8.67	-7.30	-5.90	-4.47	-3.01	-1.52	0.00	1.52	3.01	4.47	5.90	7.30	8.67	10.01	11.32	12.60	13.85	15.07	16.26	17.42	18.55	19.65	20.72	21.76	22.77	23.75	24.70	25.62	26.51	27.37	28.20	29.01	29.77	30.51	31.22	31.90	32.55	33.17	33.76	34.32	34.85	35.35	35.82	36.25	36.60	36.89	37.15	37.32	37.40	37.47	37.50	37.50	37.47	37.32	37.15	36.89	36.60	36.25	35.82	35.35	34.85	34.32	33.76	33.17	32.55	31.90	31.22	30.51	29.77	29.00	28.20	27.37	26.51	25.62	24.70	23.75	22.77	21.76	20.72	19.65	18.55	17.42	16.26	15.07	13.85	12.60	11.32	10.01	8.67	7.30	5.90	4.47	3.01	1.52	0.00	1.52	3.01	4.47	5.90	7.30	8.67	10.01	11.32	12.60	13.85	15.07	16.26	17.42	18.55	19.65	20.72	21.76	22.77	23.75	24.70	25.62	26.51	27.37	28.20	29.01	29.77	30.51	31.22	31.90	32.55	33.17	33.76	34.32	34.85	35.35	35.82	36.25	36.60	36.89	37.15	37.32	37.40	37.47	37.50	37.50	37.47	37.32	37.15	36.89	36.60	36.25	35.82	35.35	34.85	34.32	33.76	33.17	32.55	31.90	31.22	30.51	29.77	29.00	28.20	27.37	26.51	25.62	24.70	23.75	22.77	21.76	20.72	19.65	18.55	17.42	16.26	15.07	13.85	12.60	11.32	10.01	8.67	7.30	5.90	4.47	3.01	1.52	0.00	1.52	3.01	4.47	5.90	7.30	8.67	10.01	11.32	12.60	13.85	15.07	16.26	17.42	18.55	19.65	20.72	21.76	22.77	23.75	24.70	25.62	26.51	27.37	28.20	29.01	29.77	30.51	31.22	31.90	32.55	33.17	33.76	34.32	34.85	35.35	35.82	36.25	36.60	36.89	37.15	37.32	37.40	37.47	37.50	37.50	37.47	37.32	37.15	36.89	36.60	36.25	35.82	35.35	34.85	34.32	33.76	33.17	32.55	31.90	31.22	30.51	29.77	29.00	28.20	27.37	26.51	25.62	24.70	23.75	22.77	21.76	20.72	19.65	18.55	17.42	16.26	15.07	13.85	12.60	11.32	10.01	8.67	7.30	5.90	4.47	3.01	1.52	0.00	1.52	3.01	4.47	5.90	7.30	8.67	10.01	11.32	12.60	13.85	15.07	16.26	17.42	18.55	19.65	20.72	21.76	22.77	23.75	24.70	25.62	26.51	27.37	28.20	29.01	29.77	30.51	31.22	31.90	32.55	33.17	33.76	34.32	34.85	35.35	35.82	36.25	36.60	36.89	37.15	37.32	37.40	37.47	37.50	37.50	37.47	37.32	37.15	36.89	36.60	36.25	35.82	35.35	34.85	34.32	33.76	33.17	32.55	31.90	31.22	30.51	29.77	29.00	28.20	27.37	26.51	25.62	24.70	23.75	22.77	21.76	20.72	19.65	18.55	17.42	16.26	15.07	13.85	12.60	11.32	10.01	8.67	7.30	5.90	4.47	3.01	1.52	0.00	1.52	3.01	4.47	5.90	7.30	8.67	10.01	11.32	12.60	13.85	15.07	16.26	17.42	18.55	19.65	20.72	21.76	22.77	23.75	24.70	25.62	26.51	27.37	28.20	29.01	29.77	30.51	31.22	31.90	32.55	33.17	33.76	34.32	34.85	35.35	35.82	36.25	36.60	36.89	37.15	37.32	37.40	37.47	37.50	37.50	37.47	37.32	37.15	36.89	36.60	36.25	35.82	35.35	34.85	34.32	33.76	33.17	32.55	31.90	31.22	30.51	29.77	29.00	28.20	27.37	26.51	25.62	24.70	23.75	22.77	21.76	20.72	19.65	18.55	17.42	16.26	15.07	13.85	12.60	11.32	10.01	8.67	7.30	5.90	4.47	3.01	1.52	0.00	1.52	3.01	4.47	5.90	7.30	8.67	10.01	11.32	12.60	13.85	15.07	16.26	17.42	18.55	19.65	20.72	21.76	22.77	23.75	24.70	25.62	26.51	27.37	28.20	29.01	29.77	30.51	31.22	31.90	32.55	33.17	33.76	34.32	34.85	35.35	35.82	36.25	36.60	36.89	37.15	37.32	37.40	37.47	37.50	37.50	37.47	37.32	37.15	36.89	36.60	36.25	35.82	35.35	34.85	34.32	33.76	33.17	32.55	31.90	31.22	30.51	29.77	29.00	28.20	27.37	26.51	25.62	24.70	23.75	22.77	21.76	20.72	19.65	18.55	17.42	16.26	15.07	13.85	12.60	11.32	10.01	8.67	7.30	5.90	4.47	3.01	1.52	0.00	1.52	3.01	4.47	5.90	7.30	8.67	10.01	11.32	12.60	13.85	15.07	16.26	17.42	18.55	19.65	20.72	21.76	22.77	23.75	24.70	25.62	26.51	27.37	28.20	29.01	29.77	30.51	31.22	31.90	32.55	33.17	33.76	34.32	34.85	35.35	35.82	36.25	36.60	36.89	37.15	37.32	37.40	37.47	37.50	37.50	37.47	37.32	37.15	36.89	36.60	36.25	35.82	35.35	34.85	34.32	33.76	33.17	32.55	31.90	31.22	30.51	29.77	29.00	28.20	27.37	26.51	25.62	24.70	23.75	22.77	21.76	20.72	19.65	18.55	17.42	16.26	15.07	13.85	12.60	11.32	10.01	8.67	7.30	5.90	4.47	3.01	1.52	0.00	1.52	3.01	4.47	5.90	7.30	8.67	10.01	11.32	12.60	13.85	15.07	16.26	17.42	18.55	19.65	20.72	21.76	22.77	23.75	24.70	25.62	26.51	27.37	28.20	29.01	29.77	30.51	31.22	31.90	32.55	33.17	33.76	34.32	34.85	35.35	35.82	36.25	36.60	36.89	37.15	37.32	37.40	37.47	37.50	37.50	37.47	37.32	37.15	36.89	36.60	36.25	35.82	35.35	34.85	34.32	33.76	33.17	32.55	31.90	31.22	30.51	29.77	29.00	28.20	27.37	26.51	25.62	24.70	23.75	22.77	21.76	20.72	19.65	18.55	17.42	16.26	15.07	13.85	12.60	11.32	10.01	8.67	7.30	5.90	4.47	3.01	1.52	0.00	1.52	3.01	4.47	5.90	7.30	8.67	10.01	11.32	12.60	13.85	15.07	16.26	17.42	18.55	19.65	20.72	21.76	22.77	23.75	24.70	25.62	26.51	27.37	28.20	29.01	29.77	30.51	31.22	31.90	32.55	33.17	33.76	34.32	34.85	35.35	35.82	36.25	36.60	36.89	37.15	37.32	37.40	37.47	37.50	37.50	37.47	37.32	37.15	36.89	36.60	36.25	35.82	35.35	34.85	34.32	33.76	33.17	32.55	31.90	31.22	30.51	29.77	29.00	28.20	27.37	26.51	25.62	24.70	23.75	22.77	21.76	20.72	19.65	18.55	17.42	16.26	15.07	13.85	12.60	11.32	10.01	8.67	7.30	5.90	4.47	3.01	1.52	0.00	1.52	3.01	4.47	5.90	7.30	8.67	10.01	11.32	12.60	13.85	15.07	16.26	17.42	18.55	19.65	20.72	21.76	22.77	23.75	24.70	25.62	26.51	27.37	28.20	29.01	29.77	30.51	31.22	31.90	32.55	33.17	33.76	34.32	34.85	35.35	35.82	36.25	36.60	36.89	37.15	37.32	37.40	37.47	37.50	37.50	37.47	37.32	37.15	36.89	36.60	36.25	35.82	35.35	34.85	34.32	33.76	33.17	32.55	31.90	31.22	30.51	29.77	29.00	28.20	27.37	26.51

TIME SCHEDULE BANDUNG UTARA SWITCH YARD



ORIGINAL COMPLETION DATE

REVISED COMPLETION DATE

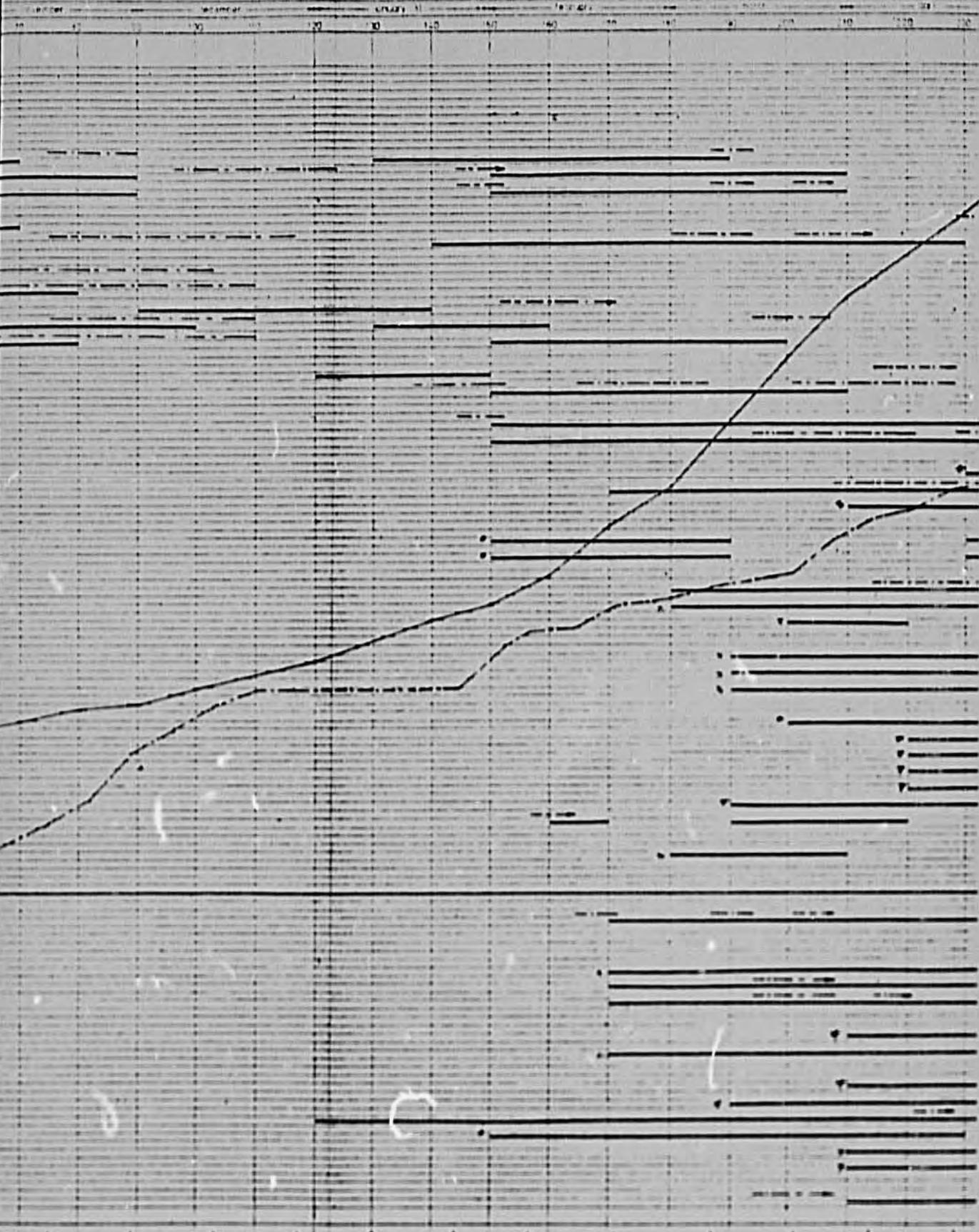


REVISED COMPLETION
DATE

TIME SCHEDULE BOGOR CONTROL HOUSE

40

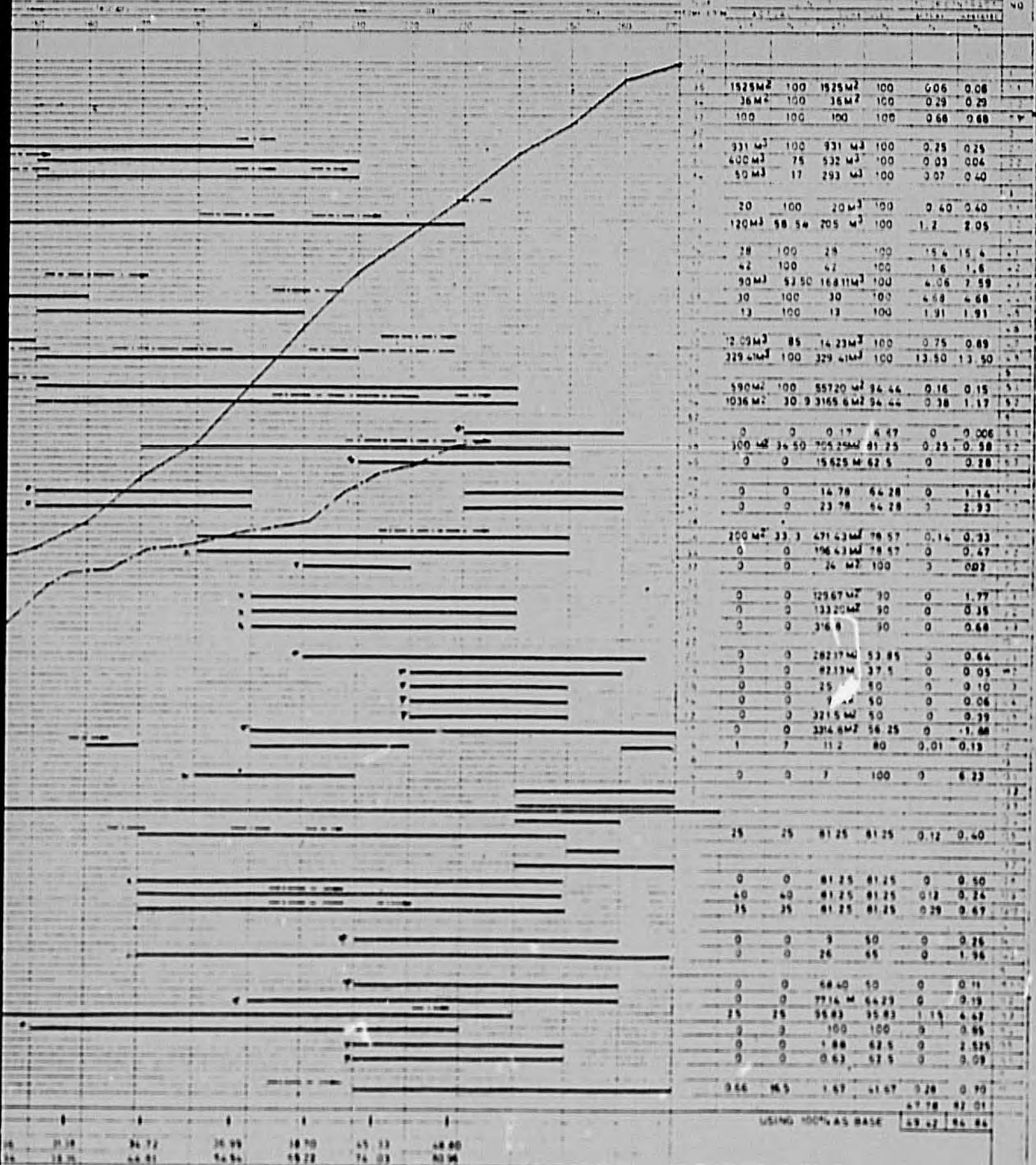
W O R K I N G D A Y S



8.35	16.30	22.45	24.20	24.71	24.96	31.38	34.72	36.55	38.70	45.33	48.00
22.30	22.52	25.48	27.58	30.42	32.36	38.26	44.01	46.56	50.22	54.03	58.06

D A Y S

APRIL 25 81



15	1525M ²	100	1525M ²	100	0.06	0.06
16	36M ²	100	36M ²	100	0.29	0.29
17	100	100	100	100	0.68	0.68
18	331M ³	100	331M ³	100	0.25	0.25
19	400M ³	75	532M ³	100	0.03	0.04
20	50M ³	17	293M ³	100	3.07	0.40
21	20	100	20M ³	100	0.40	0.40
22	120M ³	98.54	205M ³	100	1.2	2.05
23	28	100	28	100	15.4	15.4
24	42	100	42	100	1.6	1.6
25	90M ³	53.50	16811M ³	100	4.06	7.59
26	30	100	30	100	4.68	4.68
27	13	100	13	100	1.91	1.91
28	12.09M ³	85	14.23M ³	100	0.25	0.89
29	329.4M ³	100	329.4M ³	100	13.50	13.50
30	590M ²	100	55720M ²	34.44	0.16	0.15
31	1036M ²	30.9	3165.6M ²	34.44	0.38	1.17
32	0	0	0.17	6.47	0	0.006
33	100M ²	34.50	755.29M ²	81.25	0.25	0.58
34	0	0	15.625M	62.5	0	0.28
35	0	0	14.78	64.28	0	1.14
36	0	0	23.78	64.28	0	2.93
37	200M ²	33.3	471.43M ²	78.57	0.14	0.33
38	0	0	196.43M ²	78.57	0	0.47
39	0	0	74M ²	100	0	0.02
40	0	0	129.67M ²	30	0	1.77
41	0	0	133.20M ²	30	0	0.35
42	0	0	316.8	30	0	0.68
43	0	0	282.7M	53.85	0	0.64
44	0	0	82.13M	37.5	0	0.05
45	0	0	25	50	0	0.10
46	0	0	7	50	0	0.06
47	0	0	321.5M	50	0	0.39
48	0	0	334.8M ²	56.25	0	1.68
49	1	7	11.2	80	0.01	0.13
50	0	0	7	100	0	6.23
51	25	25	81.25	81.25	0.12	0.40
52	0	0	81.25	81.25	0	0.50
53	40	40	81.25	81.25	0.12	0.24
54	35	35	81.25	81.25	0.29	0.47
55	0	0	3	50	0	0.26
56	0	0	26	65	0	1.96
57	0	0	68.40	50	0	0.11
58	0	0	77.16M	64.23	0	0.19
59	25	25	95.83	95.83	1.15	4.47
60	0	0	100	100	0	0.55
61	0	0	1.88	62.5	0	2.525
62	0	0	0.63	57.5	0	0.09
63	3.66	16.5	1.67	41.67	0.28	0.70

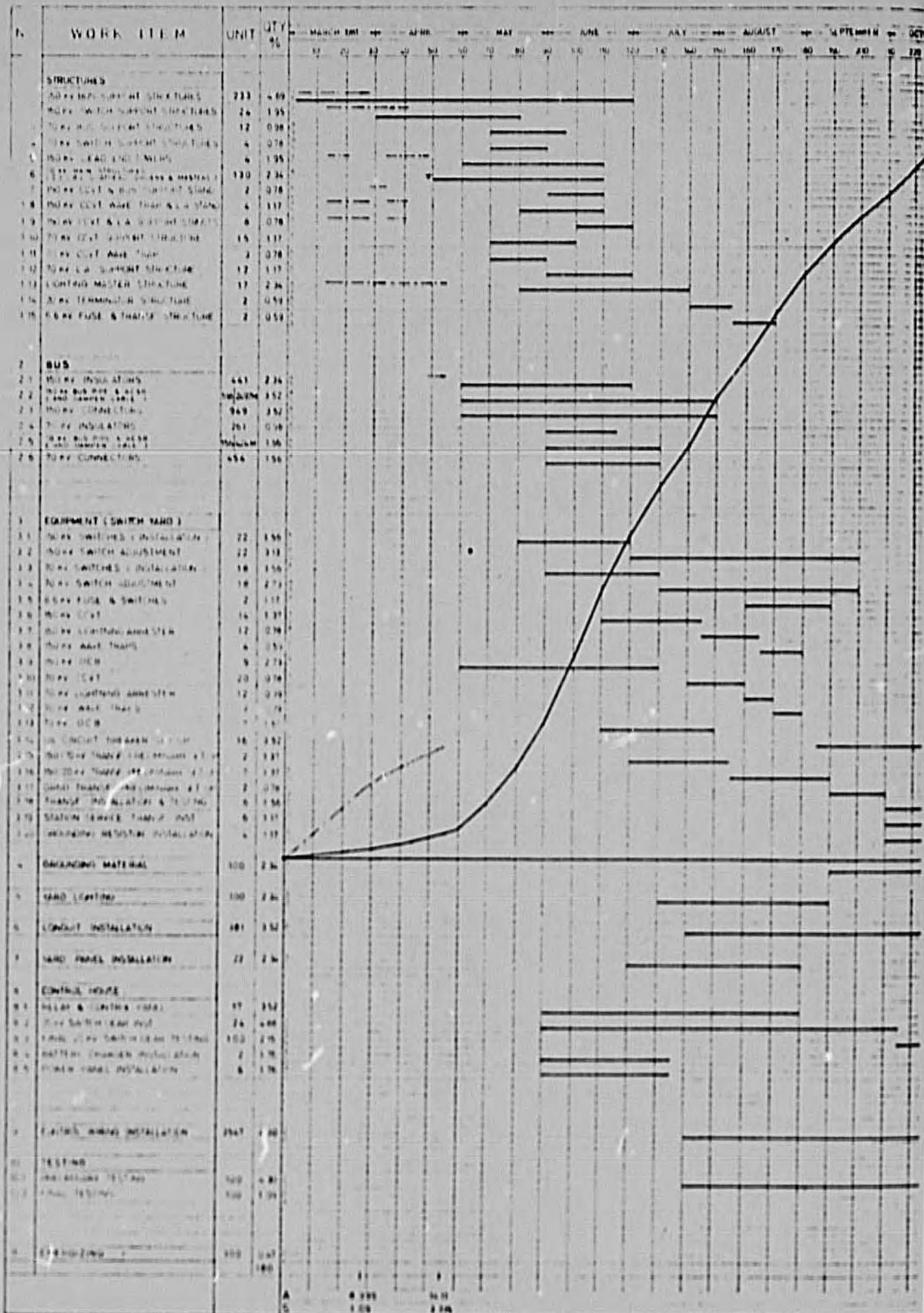
USING 100% AS BASE 49.42 94.84

25	31.28	34.72	36.99	38.70	45.33	48.80
26	18.75	44.81	54.94	59.22	74.03	80.94

BY PERFECT CIRCLE

TIME SCHEDULE
BOGOR ERECTION

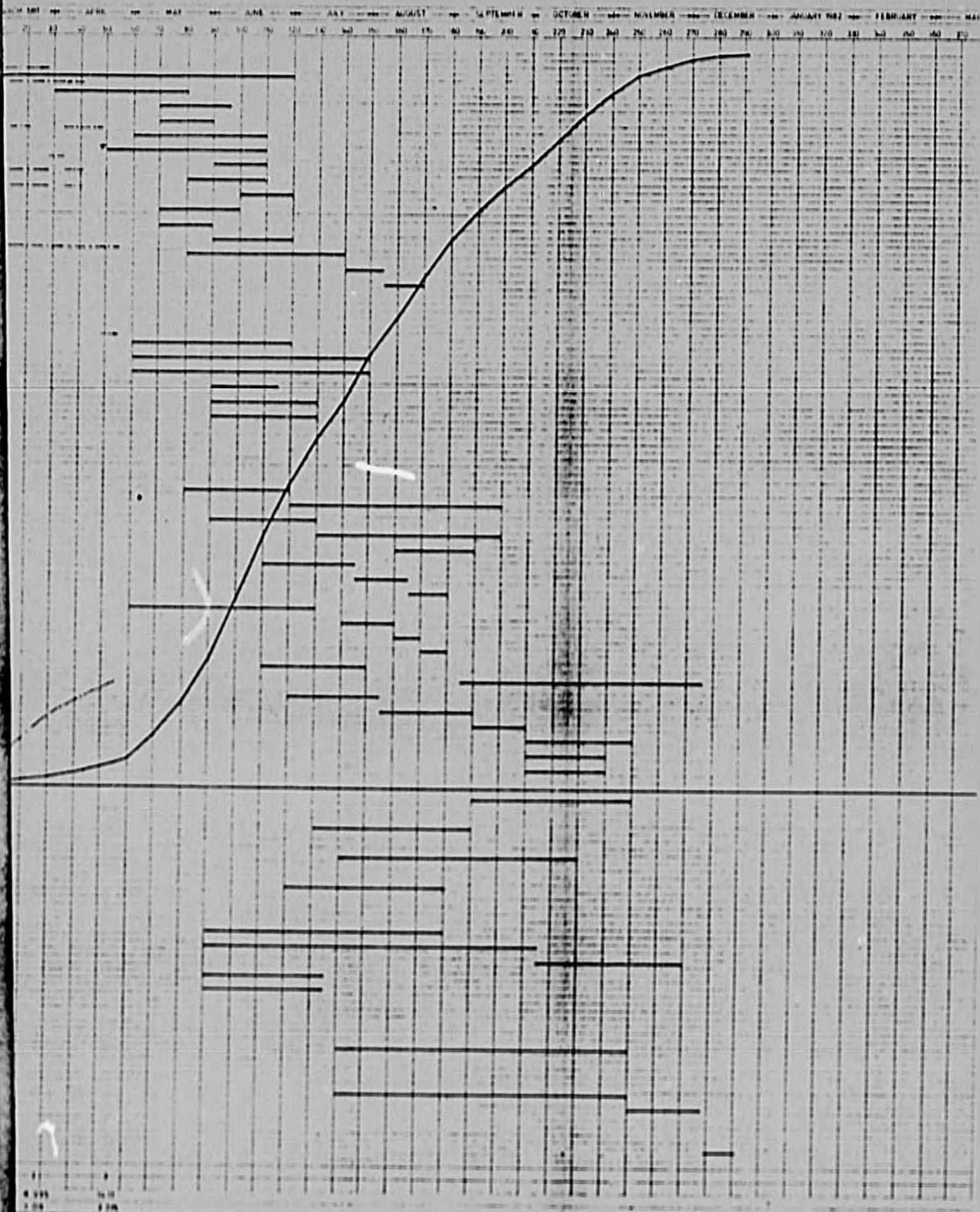
42



A = ACTUAL
S = SCHEDULE
NOTE: WORK NOT STARTED

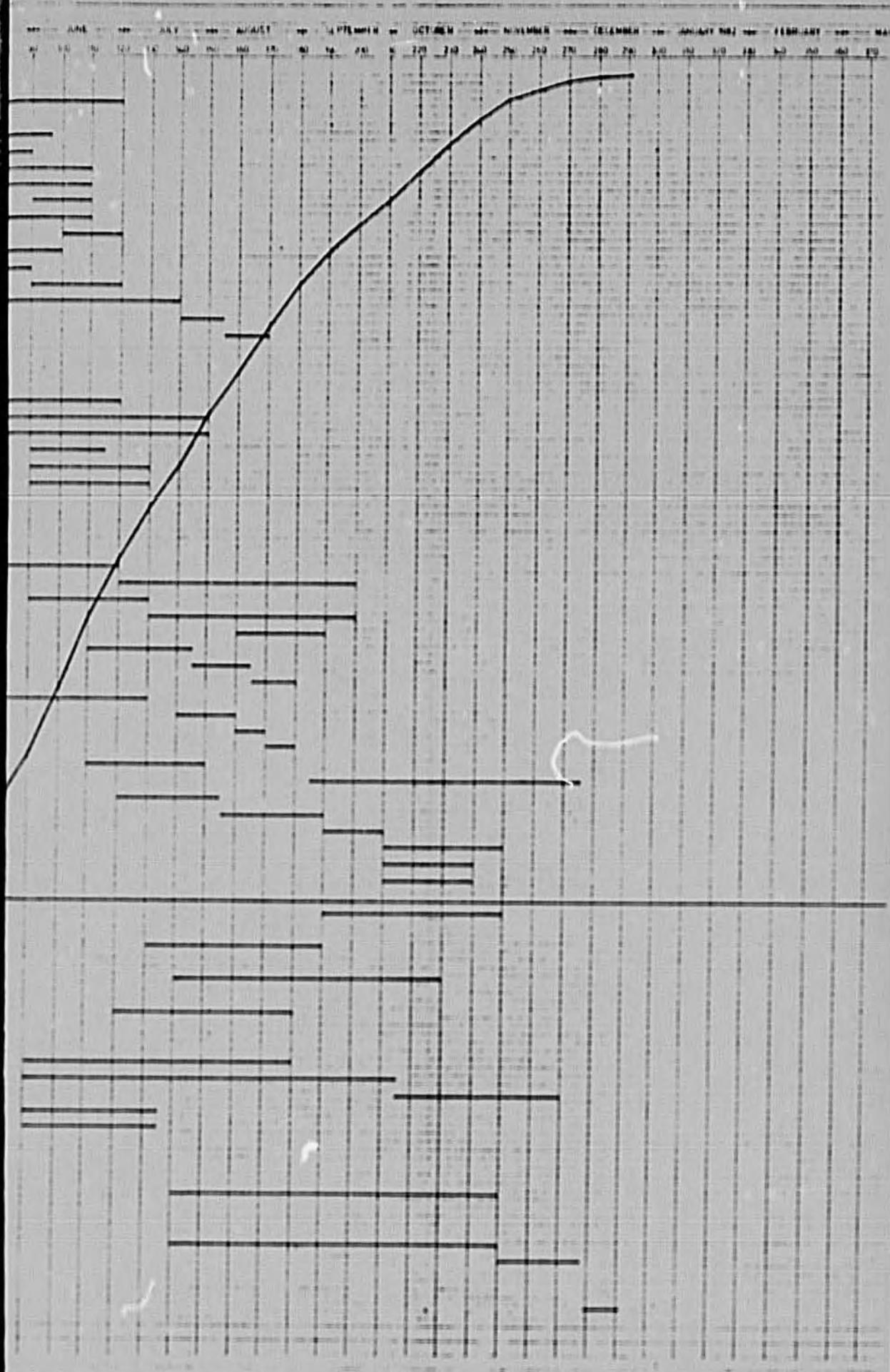
TIME SCHEDULE BOGOR ERECTION

43



TIME SCHEDULE BOGOR ERECTION

44



From the collection

NO	WORK ITEM	UNIT	QTY %	SEPTEMBER					OCTOBER				
				10	20	30	1	10	20	30	1	10	20
CIVIL													
1.1	clearing & grubbing of site	1.15M	1.20	[Progress bars]									
1.2	15cm crush stone	15.80CM	3.52	[Progress bars]									
1.3	road sub-base	5.60M	1.22	[Progress bars]									
1.4	road top surface	5.15M	1.13	[Progress bars]									
1.5	yard drainage piping	1.71M	0.38	[Progress bars]									
1.6	catch basin & dropinals	1	0.17	[Progress bars]									
1.7	chain link fence	800M	1.81	[Progress bars]									
1.8	drainage	5.71M	1.27	[Progress bars]									
CONSTRUCTION PLANT													
FOUNDATION													
3.1	all but DCB & transt	MASSIVE	21.95	[Progress bars]									
3.1A	piles	90	11.95	[Progress bars]									
3.2	150KV DCB	1	1.19	[Progress bars]									
3.3	70KV DCB	1	2.90	[Progress bars]									
3.4	150/70KV transformer	2	3.15	[Progress bars]									
3.5	150/70KV trans oil containment pit	2	2.95	[Progress bars]									
3.6	150/70KV transformer	2	3.27	[Progress bars]									
3.7	150/70KV trans oil containment pit	2	1.41	[Progress bars]									
3.8	grounding transformer	2	5.25	[Progress bars]									
3.9	grounding resistor	1	2.24	[Progress bars]									
3.10	firewall	1	2.75	[Progress bars]									
3.11	cable trench	371M	6.68	[Progress bars]									
3.12	20KV distribution trench	22M	2.91	[Progress bars]									
3.13	concrete road culverts	8	9.90	[Progress bars]									
3.14	retaining wall	1	1.00	[Progress bars]									
OND SYSTEM													
4.1	below ground system	100	11.62	[Progress bars]									
4.2	above ground system	100	2.22	[Progress bars]									
CONDUIT SYSTEM													
5.1	below ground conduit	100	2.19	[Progress bars]									
5.2	above ground conduit	100	1.31	[Progress bars]									
6.0	furnish material for yard lighting	100	2.15	[Progress bars]									
7.0	furnish material for station service	100	2.18	[Progress bars]									
TOTAL			100.00	[Progress bars]									

A = ACTUAL
S = SCHEDULE

A	5.79	8.64	11.69	12.87	15.75
S	2.73	9.1	14.38	17.72	21.42

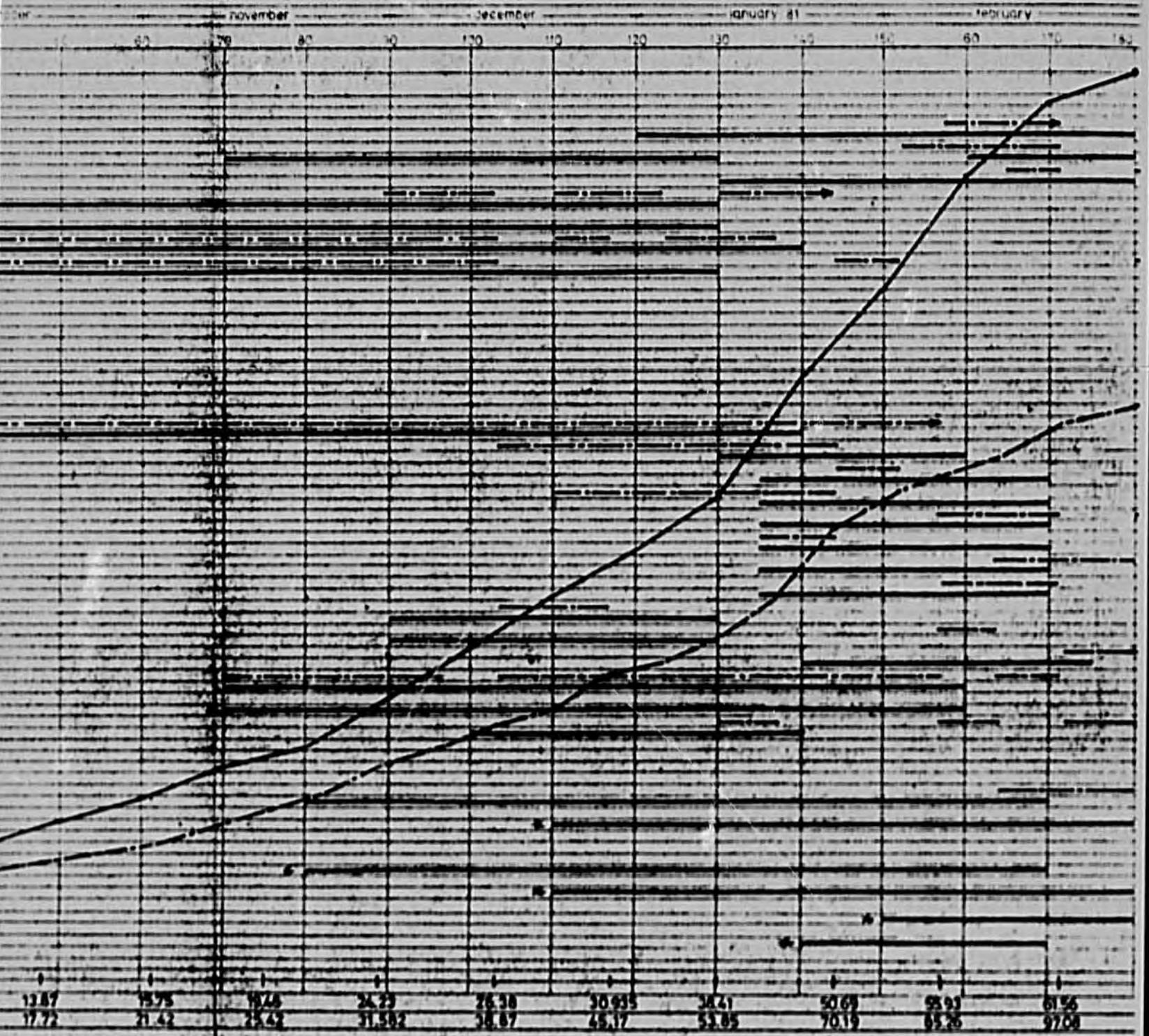
NOTES: THE QTY PERCENT IS BASED ON PERCENT OF COST OF EACH FUNCTION VERSUS TOTAL COST

- WORK NOT STARTED
- WORK NOT COMPLETE AS DATE UNDER CONSTRUCTION PROGRESS

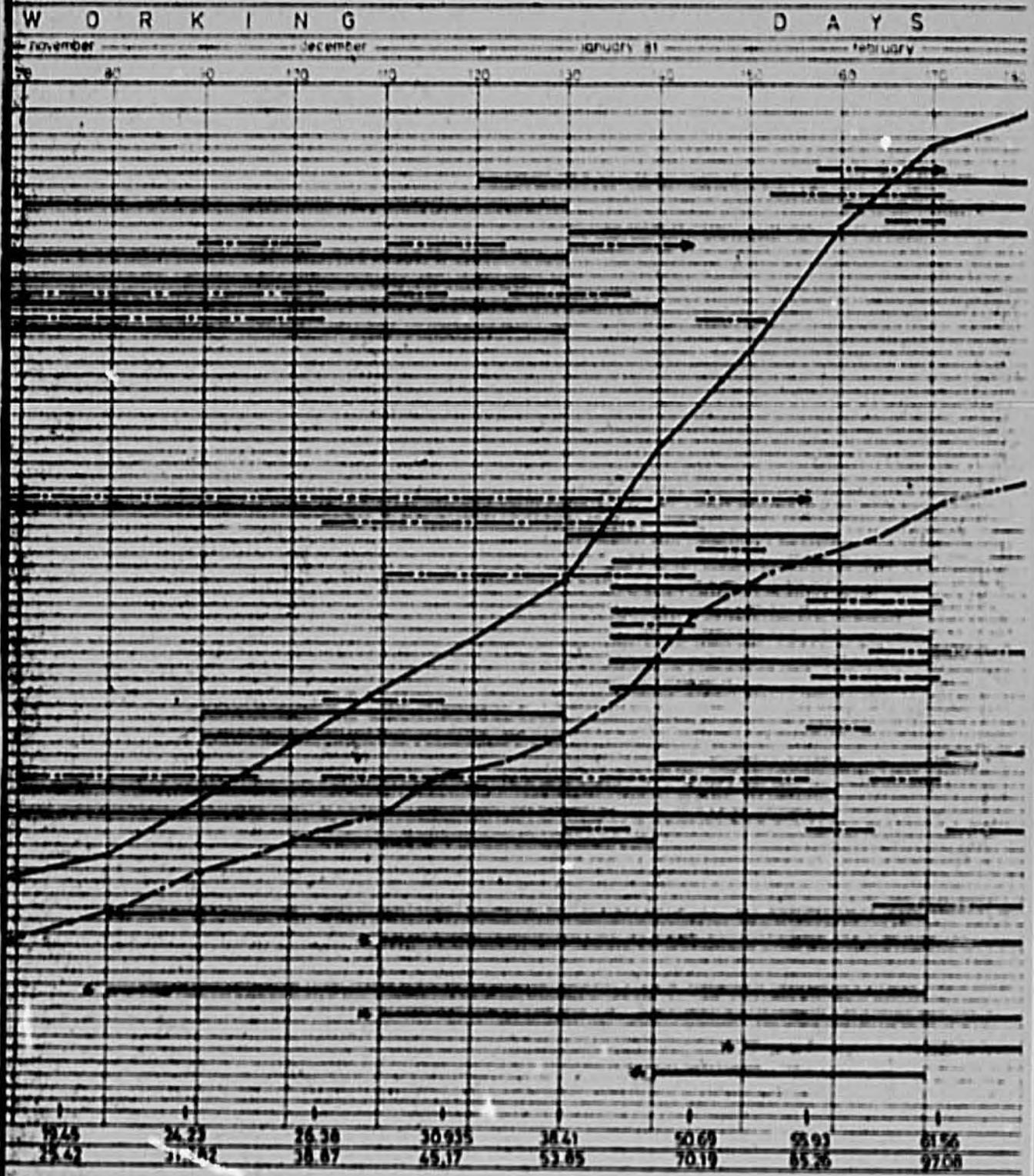
TIME SCHEDULE BOGOR SWITCH YARD

W O R K I N G

D A Y S

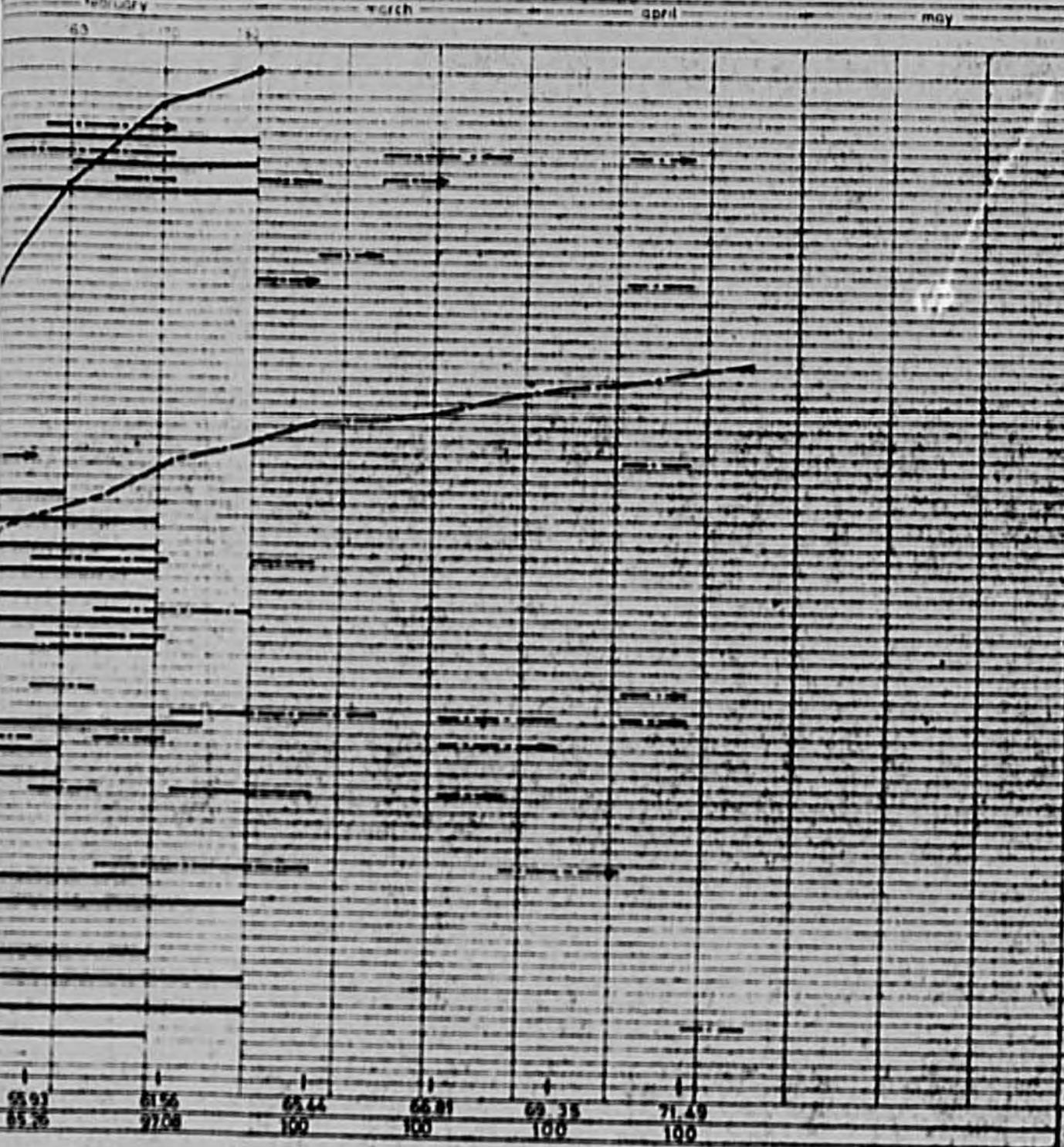


TIME SCHEDULE BOGOR SWITCH YARD



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D A Y S



CONSTRUCTION PROGRESS

% OF COMPLETION	ACTUAL QTY	
	Value 1	Value 2
100		
97.5		
95	96700M	8
92.5	1000M	
90	4860 M	9
87.5	300M	3
85	50M	5
82.5	0	
80	600M	6
77.5	875 M	10
75		
72.5		
70		
67.5		10
65		
62.5		
60		10
57.5		10
55		10
52.5		10
50		10
47.5		10
45		10
42.5		10
40		10
37.5		7.5
35		8.5
32.5	318 M	8.5
30	0	0
27.5	0	0
25		
22.5		
20	40	40
17.5	0	0
15		
12.5	0	0
10	0	0
7.5	0	0
5	100	100
2.5		
0		

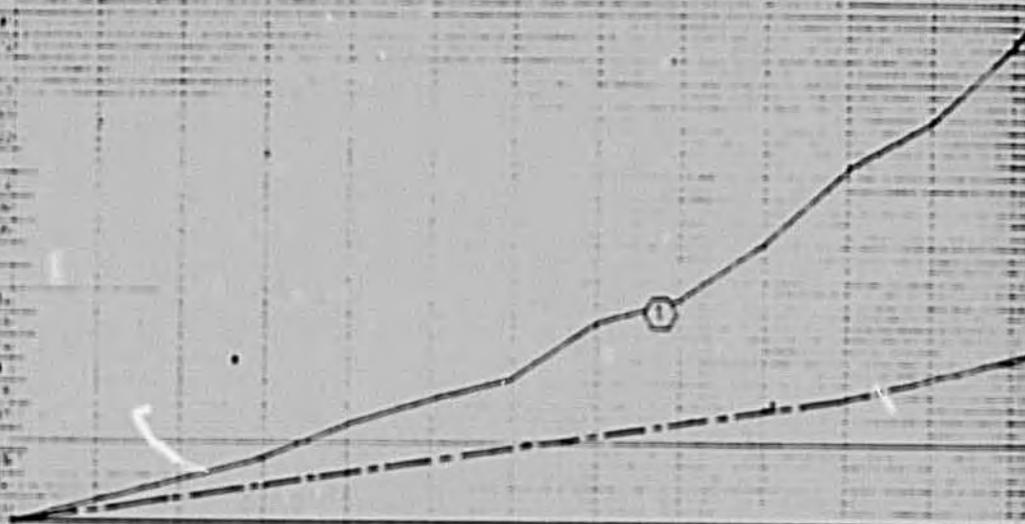
49

				CONSTRUCTION PROGRESS				TO DATE APRIL 25 81		NO.	
april		may		% OF COMPLETION	U N I T		% OF CONTRACT				
					ACTUAL	SCHEDULED	ACTUAL	SCHEDULED			
				QTY	%	QTY	%	%	%		
				100							
				37.5					1		
				95	98700M ³	85	113800M ³	100	6.12	7.2	1.1
				92.5	1000M ²	8	19800M ²	100	0.18	3.53	1.2
				90	4860 M	90	5400M	100	1.73	1.92	1.3
				87.5	300M	36.67	818M	100	1.65	4.49	1.4
				85	50M	50	101M	100	0.15	0.31	1.8
				82.5	0	0	5	100	0	0.17	1.6
				80	600M	66.67	900M	100	2.27	3.41	1.7
				37.5	875 M	100	875M	100	4.47	4.47	1.8
				75							
				72.5							
				70							
				67.5	8	100	8	100	1.16	1.16	2
				65							
				62.5							3
				60	190.521	100	190.521	100	21.95	21.95	3.1
				57.5	90	100	90	100	11.55	11.55	3.1A
				55	9	100	9	100	1.39	1.39	3.2
				52.5	7	100	7	100	0.56	0.56	3.3
				50	2	100	2	100	0.55	0.55	3.4
				47.5	2	100	2	100	2.65	2.65	3.5
				45	2	100	2	100	0.47	0.47	3.6
				42.5	2	100	2	100	1.41	1.41	3.7
				40	2	100	2	100	0.25	0.25	3.8
				37.5	3	75	4	100	0.18	0.24	3.9
				35	3.5	87.5	4	100	1.88	2.15	3.10
				32.5	318 M	85	374M	100	5.66	6.66	3.7
				30	0	0	132M	100	0	0.94	3.17
				27.5	8	88.89	9	100	0.61	0.68	3.13
				25							3.14
				22.5							4
				20	40	40	100	100	4.65	11.62	4.1
				17.5	0	0	100	100	0	2.32	4.2
				15							5
				12.5	0	0	100	100	0	3.19	5.1
				10	0	0	100	100	0	1.91	5.2
				7.5	0	0	100	100	0	2.65	6
				5	100	100	100	100	0.18	0.18	7
				2.5							
				0					71.67	100	

69.35 71.49
100 100

P.T. PERFECT CIRCLE

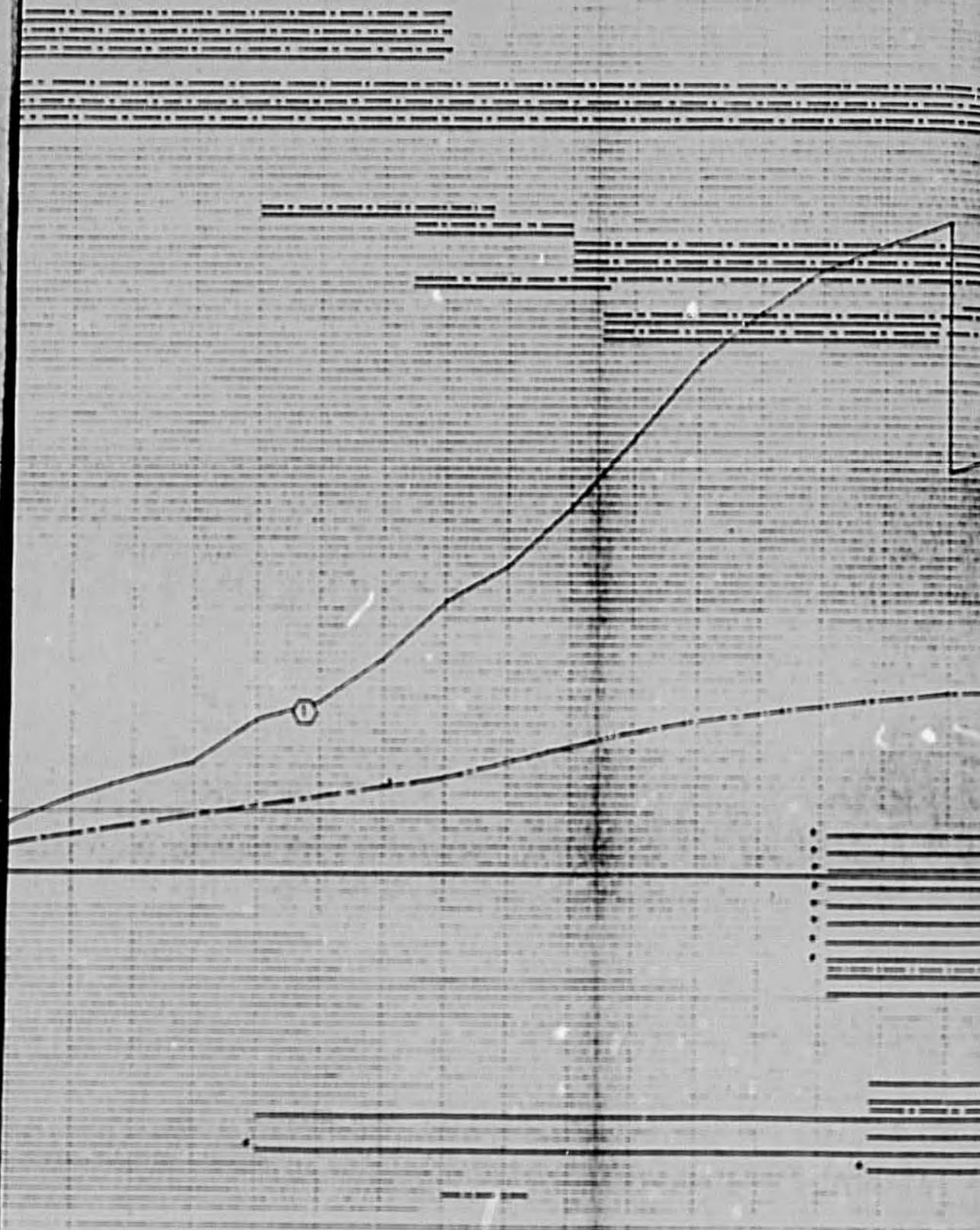
ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL
1	Excavation	cu yd	100	1.20	120.00
2	Backfill	cu yd	100	0.80	80.00
3	Gravel	cu yd	100	1.50	150.00
4	Concrete	cu yd	100	2.50	250.00
5	Rebar	lb	1000	0.10	100.00
6	Formwork	sq ft	1000	0.20	200.00
7	Paint	gal	100	2.00	200.00
8	Manhole	each	1	100.00	100.00
9	Valve	each	1	50.00	50.00
10	Flange	each	1	20.00	20.00
11	Welding	hr	10	10.00	100.00
12	Electric	hr	10	10.00	100.00
13	Material	hr	10	10.00	100.00
14	Transport	hr	10	10.00	100.00
15	Overhead	hr	10	10.00	100.00
16	Profit	hr	10	10.00	100.00
17	Tax	hr	10	10.00	100.00
18	Insurance	hr	10	10.00	100.00
19	Contingency	hr	10	10.00	100.00
20	Subtotal				1000.00
21	Excavation	cu yd	100	1.20	120.00
22	Backfill	cu yd	100	0.80	80.00
23	Gravel	cu yd	100	1.50	150.00
24	Concrete	cu yd	100	2.50	250.00
25	Rebar	lb	1000	0.10	100.00
26	Formwork	sq ft	1000	0.20	200.00
27	Paint	gal	100	2.00	200.00
28	Manhole	each	1	100.00	100.00
29	Valve	each	1	50.00	50.00
30	Flange	each	1	20.00	20.00
31	Welding	hr	10	10.00	100.00
32	Electric	hr	10	10.00	100.00
33	Material	hr	10	10.00	100.00
34	Transport	hr	10	10.00	100.00
35	Overhead	hr	10	10.00	100.00
36	Profit	hr	10	10.00	100.00
37	Tax	hr	10	10.00	100.00
38	Insurance	hr	10	10.00	100.00
39	Contingency	hr	10	10.00	100.00
40	Subtotal				1000.00
41	Excavation	cu yd	100	1.20	120.00
42	Backfill	cu yd	100	0.80	80.00
43	Gravel	cu yd	100	1.50	150.00
44	Concrete	cu yd	100	2.50	250.00
45	Rebar	lb	1000	0.10	100.00
46	Formwork	sq ft	1000	0.20	200.00
47	Paint	gal	100	2.00	200.00
48	Manhole	each	1	100.00	100.00
49	Valve	each	1	50.00	50.00
50	Flange	each	1	20.00	20.00
51	Welding	hr	10	10.00	100.00
52	Electric	hr	10	10.00	100.00
53	Material	hr	10	10.00	100.00
54	Transport	hr	10	10.00	100.00
55	Overhead	hr	10	10.00	100.00
56	Profit	hr	10	10.00	100.00
57	Tax	hr	10	10.00	100.00
58	Insurance	hr	10	10.00	100.00
59	Contingency	hr	10	10.00	100.00
60	Subtotal				1000.00
61	Excavation	cu yd	100	1.20	120.00
62	Backfill	cu yd	100	0.80	80.00
63	Gravel	cu yd	100	1.50	150.00
64	Concrete	cu yd	100	2.50	250.00
65	Rebar	lb	1000	0.10	100.00
66	Formwork	sq ft	1000	0.20	200.00
67	Paint	gal	100	2.00	200.00
68	Manhole	each	1	100.00	100.00
69	Valve	each	1	50.00	50.00
70	Flange	each	1	20.00	20.00
71	Welding	hr	10	10.00	100.00
72	Electric	hr	10	10.00	100.00
73	Material	hr	10	10.00	100.00
74	Transport	hr	10	10.00	100.00
75	Overhead	hr	10	10.00	100.00
76	Profit	hr	10	10.00	100.00
77	Tax	hr	10	10.00	100.00
78	Insurance	hr	10	10.00	100.00
79	Contingency	hr	10	10.00	100.00
80	Subtotal				1000.00
81	Excavation	cu yd	100	1.20	120.00
82	Backfill	cu yd	100	0.80	80.00
83	Gravel	cu yd	100	1.50	150.00
84	Concrete	cu yd	100	2.50	250.00
85	Rebar	lb	1000	0.10	100.00
86	Formwork	sq ft	1000	0.20	200.00
87	Paint	gal	100	2.00	200.00
88	Manhole	each	1	100.00	100.00
89	Valve	each	1	50.00	50.00
90	Flange	each	1	20.00	20.00
91	Welding	hr	10	10.00	100.00
92	Electric	hr	10	10.00	100.00
93	Material	hr	10	10.00	100.00
94	Transport	hr	10	10.00	100.00
95	Overhead	hr	10	10.00	100.00
96	Profit	hr	10	10.00	100.00
97	Tax	hr	10	10.00	100.00
98	Insurance	hr	10	10.00	100.00
99	Contingency	hr	10	10.00	100.00
100	Subtotal				1000.00



1 ORIGINAL CONTRACTOR
 2 PROPOSED CONTRACTOR
 3 NEW CONTRACTOR

NOTES
 1. ALL WORK TO BE DONE IN ACCORDANCE WITH THE SPECIFICATIONS AND DRAWINGS.
 2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS.
 3. THE CONTRACTOR SHALL MAINTAIN ACCESS TO ALL ADJACENT PROPERTIES AT ALL TIMES.

10 27 13 77
 28 76 28 00

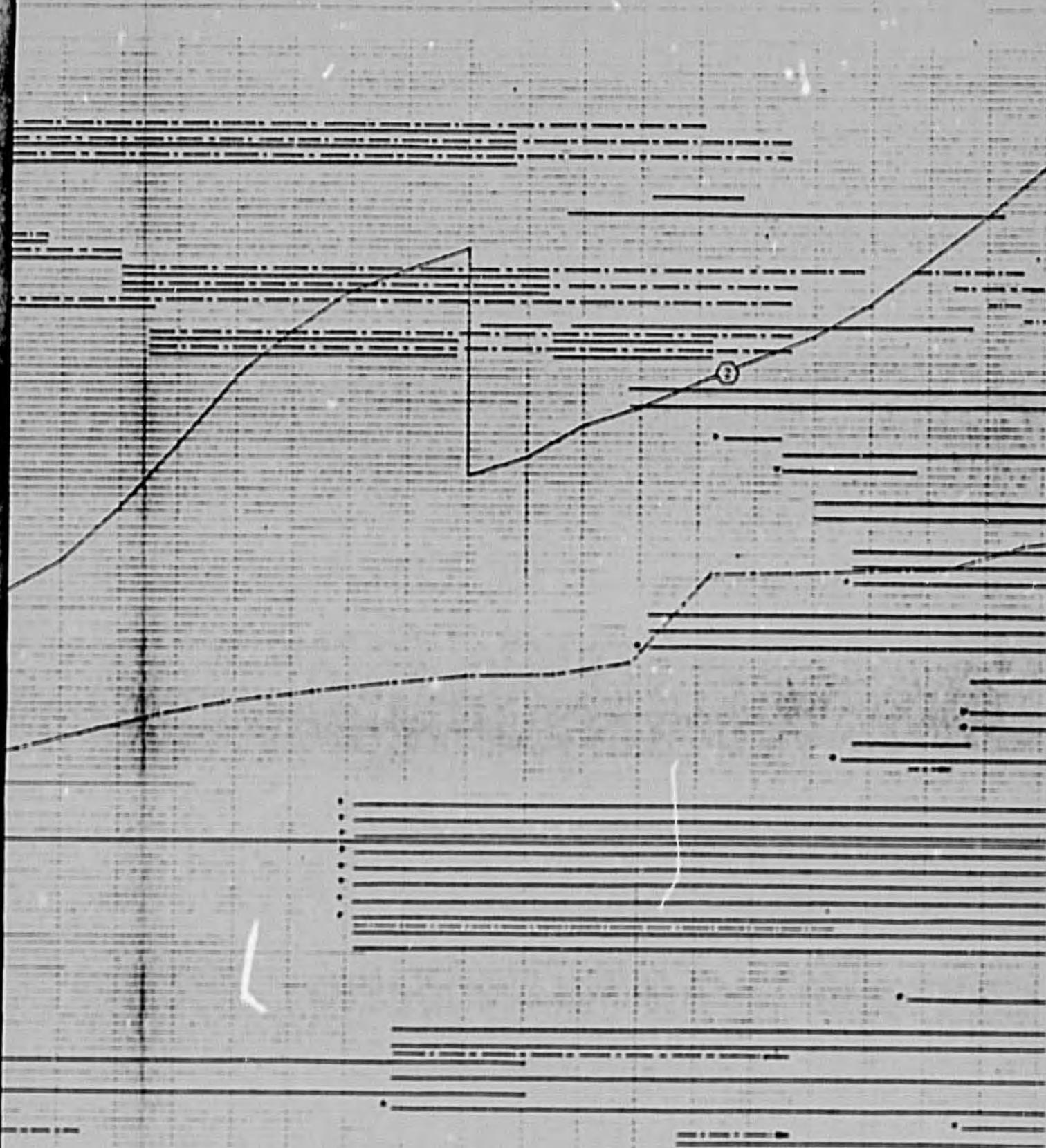


10.27	13.77	15.45	17.26	18.94	19.81	20.92
29.24	28.91	48.26	12.14	12.01	71.18	45.72

53

TIME SCHEDULE UJUNG BERUNG CONTROL HOUSE

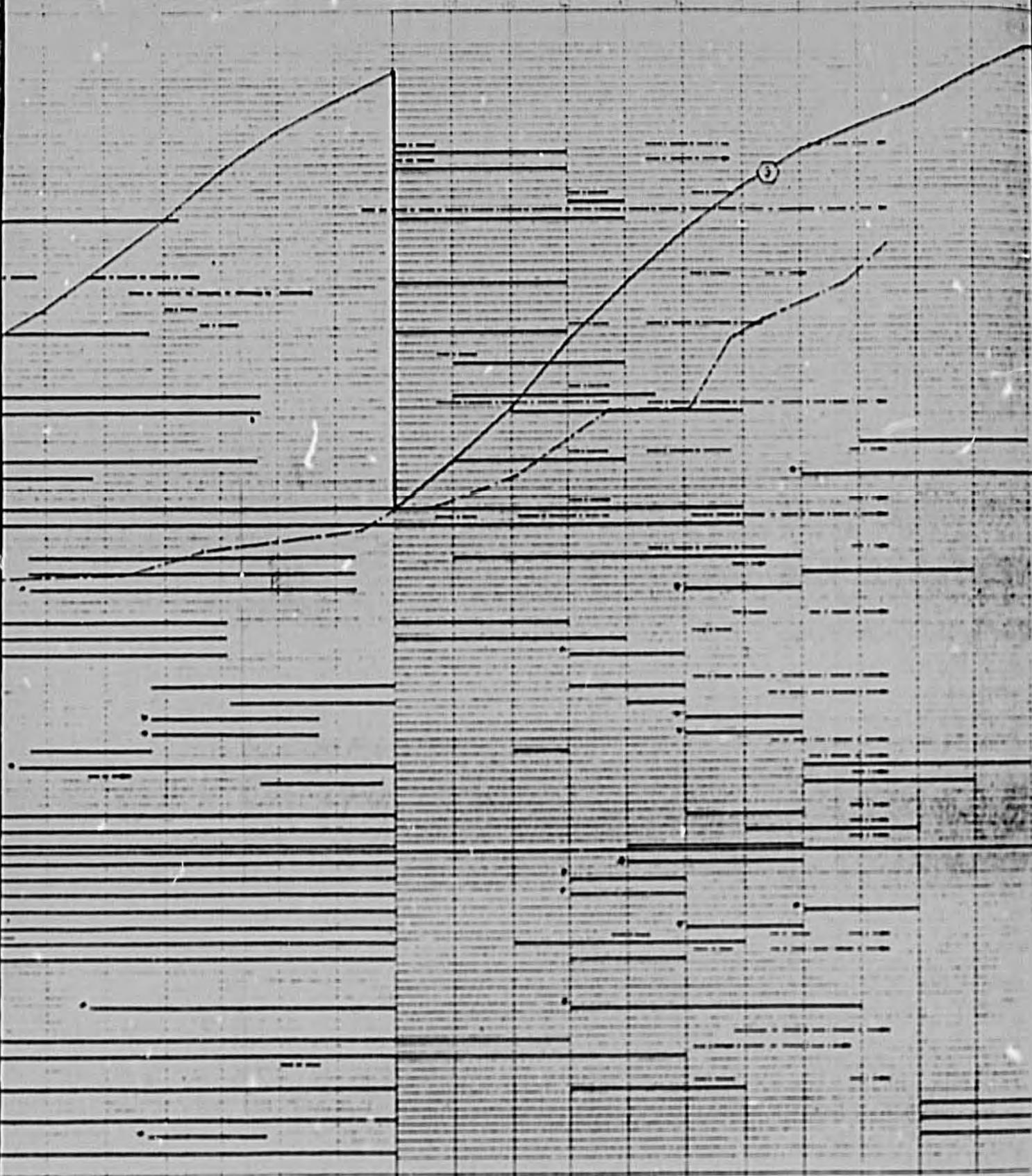
W O R K I N G



13.77	15.45	17.29	19.34	19.81	20.92	21.07	22.59	33.61	33.90	34.90	34.90	37.37
38.00	44.36	55.74	65.91	71.98	85.72	90.42	94.70	107.12	122.08	146.39	175.08	212.52

ORIGINAL COMPLETION DATE

D A Y S



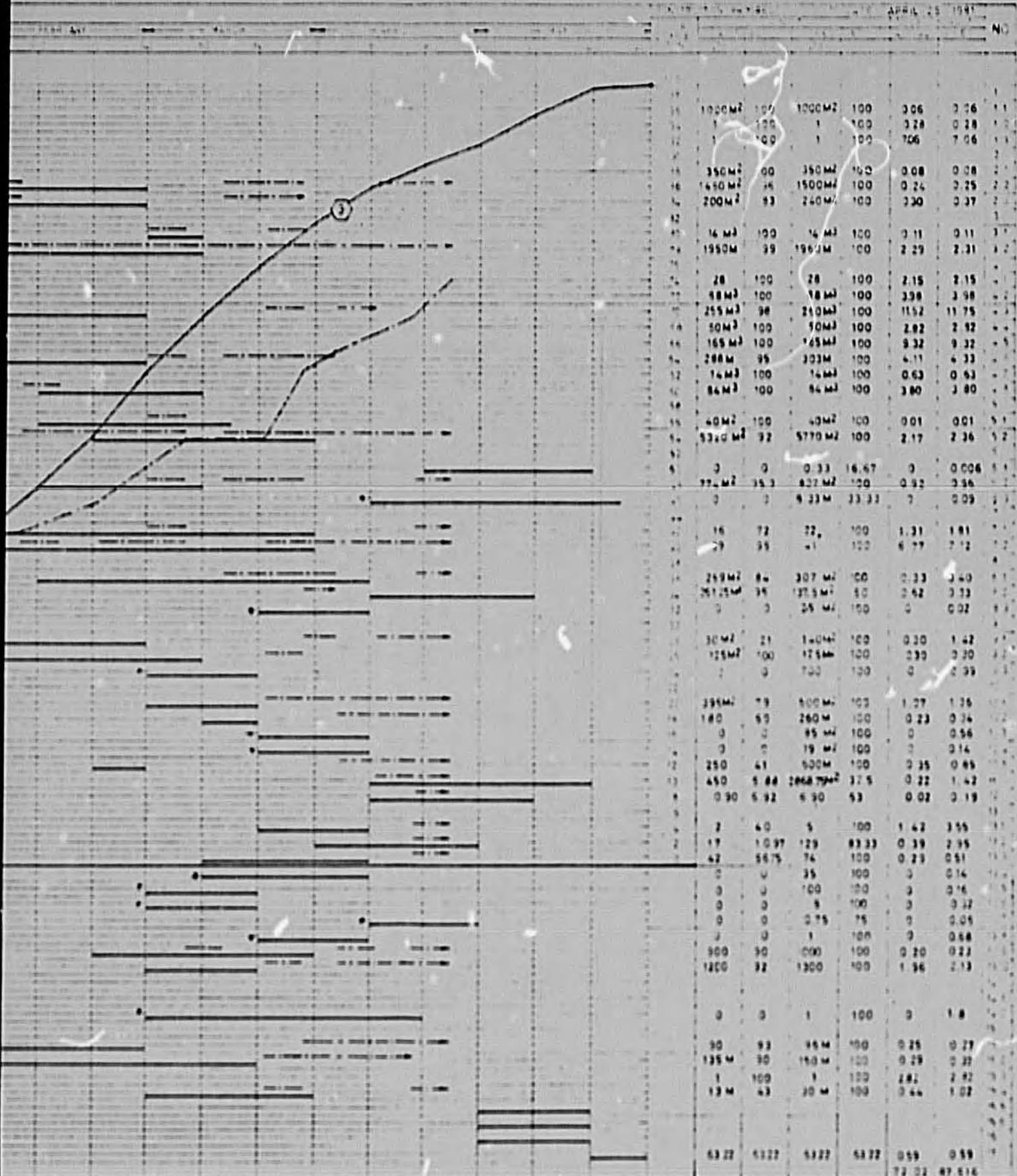
34 30	34 30	37 37	38 37	38 90	40 42	41 30	54 53	54 54	55 55	70 53
56 39	75 04	82 52	83 12	74 45	41 54	25 75	68 17	77 26	84 38	89 30

ORIGINAL COMPLETION DATE

1ST REVISED COMPLETION DATE

APRIL 25 1947

NO



1000M2	100	1000M2	100	306	306	11
1	100	1	100	328	028	10
1	100	1	100	706	706	11
350M2	00	350M2	100	008	008	2
1450M2	36	1500M2	100	024	025	22
200M2	93	240M2	100	330	037	2
14 M3	100	14 M3	100	011	011	1
1950M	99	1960M	100	229	231	12
28	100	28	100	215	215	1
98M3	100	98M3	100	338	338	1
255M3	98	210M3	100	1152	1175	1
50M3	100	50M3	100	282	282	1
165M3	100	145M3	100	932	932	1
288M	95	303M	100	411	433	1
14M3	100	14M3	100	063	063	1
84M3	100	84M3	100	380	380	1
40M2	100	40M2	100	001	001	1
5310 M2	92	5770 M2	100	217	236	12
0	0	0 33	16.67	0	0.006	11
77. M2	35.3	827 M2	100	092	336	1
0	0	8 33M	33.33	0	009	1
16	72	72	100	1.31	1.81	1
29	35	41	100	6.77	7.12	1
219M2	84	307 M2	100	033	340	11
25125M	35	27.5M2	50	062	333	1
0	0	25 M2	100	0	002	1
30M2	21	140M2	100	030	142	1
125M2	100	175M2	100	030	030	1
0	0	700	100	0	0 99	1
395M2	79	500M2	100	107	126	1
180	50	260M	100	023	036	1
0	0	85 M2	100	0	056	1
0	0	19 M2	100	0	014	1
250	41	500M	100	035	065	1
450	5 88	2668 79M2	37.5	022	1.42	1
0 90	5 92	5 90	53	002	0 19	1
2	40	5	100	1.42	355	1
17	10 97	129	83 33	0 39	2 95	1
42	56 75	74	100	0 23	0 51	1
0	0	35	100	0	0 14	1
0	0	100	100	0	0 16	1
0	0	5	100	0	0 32	1
0	0	0 75	75	0	0 05	1
0	0	1	100	0	0 88	1
900	30	000	100	0 20	0 22	1
1200	32	1300	100	1 96	2 13	1
0	0	1	100	0	1 8	1
90	93	95 M	100	0 25	0 27	1
135 M	30	150 M	100	0 29	0 32	1
1	100	1	100	2 82	2 82	1
13 M	43	30 M	100	0 44	1 02	1
53 22	53 22	53 22	53 22	0 59	0 59	1
				72 02	87 516	
				75 01	91 15	

USING 117% AS RATE

1st REVISED COMPLETION DATE
 4-42 4-30 5-43 6-04 11-99 70-53
 4-55 2-73 6-17 7-26 24-18 82-37

END REVISED COMPLETION DATE

PT ERSES / PT CITAC

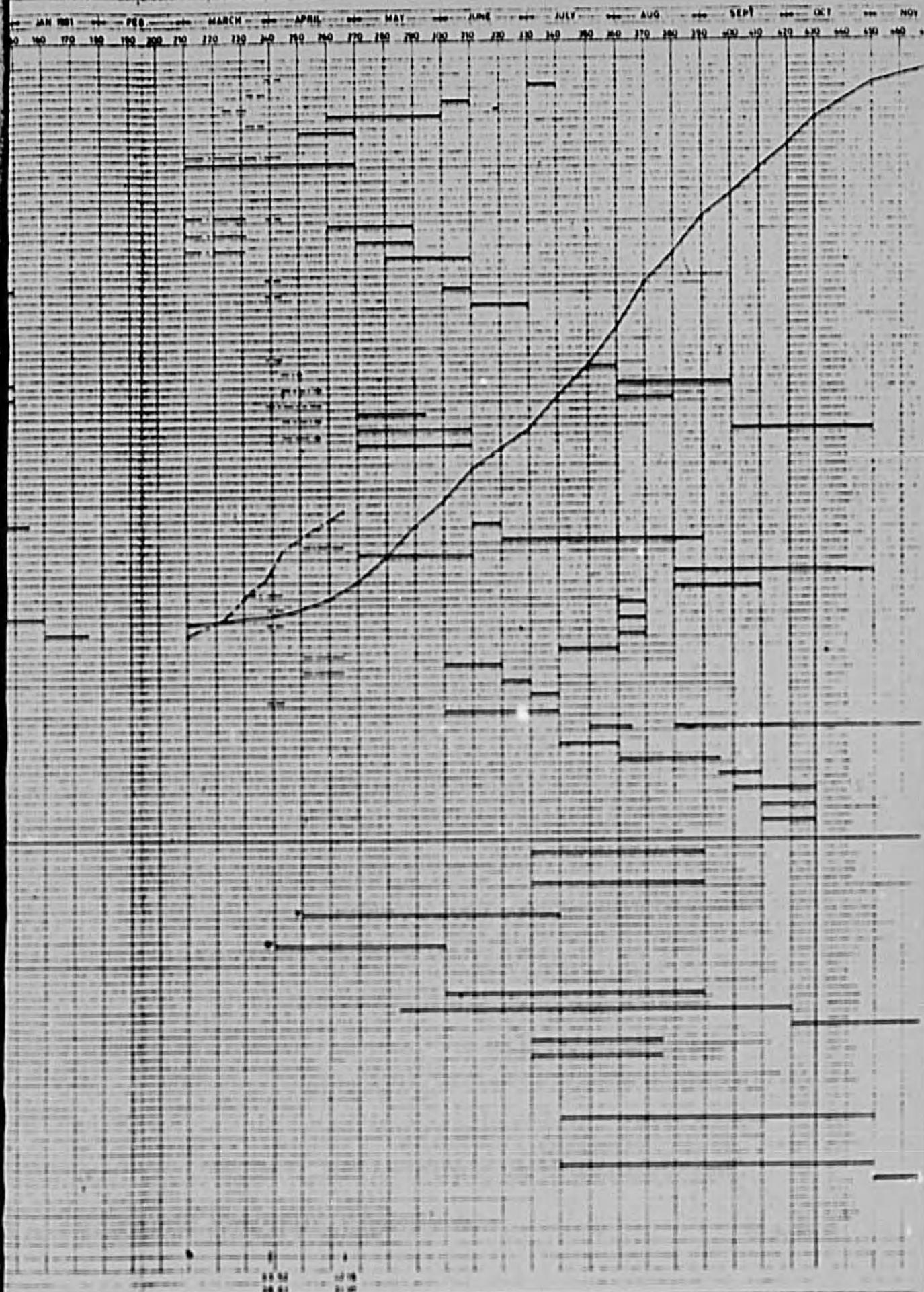
NO	WORK ITEM	UNIT	QTY %	AUG		SEPT			OCT			NOV		DEC		JAN 1961						
				10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160	170	180	
1 STRUCTURES																						
1	100% WITHIN ...	277	6.26																			
2	100% WITHIN ...	20	2.19																			
3	100% WITHIN ...	26	1.66																			
4	100% WITHIN ...	6	0.73																			
5	100% WITHIN ...	12	2.19																			
6	100% WITHIN ...	120	2.19																			
7	100% WITHIN ...	2	0.73																			
8	100% WITHIN ...	6	1.10																			
9	100% WITHIN ...	12	1.10																			
10	100% WITHIN ...	12	1.10																			
11	100% WITHIN ...	2	0.73																			
12	100% WITHIN ...	12	1.10																			
13	100% WITHIN ...	10	2.19																			
14	100% WITHIN ...	2	0.73																			
15	100% WITHIN ...	2	0.73																			
2 BUS																						
1	100% WITHIN ...	489	2.56																			
2	100% WITHIN ...	1050	6.75																			
3	100% WITHIN ...	1050	6.02																			
4	100% WITHIN ...	231	0.91																			
5	100% WITHIN ...	1050	3.29																			
6	100% WITHIN ...	378	1.46																			
3 EQUIPMENT (SWITCH YARD)																						
1	100% WITHIN ...	26	1.05																			
2	100% WITHIN ...	26	2.56																			
3	100% WITHIN ...	16	1.66																			
4	100% WITHIN ...	16	2.56																			
5	100% WITHIN ...	2	1.10																			
6	100% WITHIN ...	20	1.46																			
7	100% WITHIN ...	18	0.91																			
8	100% WITHIN ...	6	0.91																			
9	100% WITHIN ...	10	2.56																			
10	100% WITHIN ...	19	0.73																			
11	100% WITHIN ...	12	0.37																			
12	100% WITHIN ...	2	0.37																			
13	100% WITHIN ...	6	1.46																			
14	100% WITHIN ...	18	4.20																			
15	100% WITHIN ...	1	0.73																			
16	100% WITHIN ...	2	1.28																			
17	100% WITHIN ...	1	0.55																			
18	100% WITHIN ...	6	1.10																			
19	100% WITHIN ...	6	0.73																			
20	100% WITHIN ...	3	0.73																			
4 SHARDING MATERIAL																						
1	100% WITHIN ...	100	2.19																			
5 HARD LIGHTING																						
1	100% WITHIN ...	100	2.19																			
6 WIRE INSULATION																						
1	100% WITHIN ...	445	3.29																			
7 HARD FRAME INSULATION																						
1	100% WITHIN ...	28	2.19																			
8 CONTROL WARE																						
1	100% WITHIN ...	18	2.29																			
2	100% WITHIN ...	26	4.96																			
3	100% WITHIN ...	100	1.83																			
4	100% WITHIN ...	2	1.83																			
5	100% WITHIN ...	6	1.66																			
9 OTHER WARE INSULATION																						
1	100% WITHIN ...	1388	4.02																			
10 TESTING																						
1	100% WITHIN ...	100	4.02																			
2	100% WITHIN ...	100	1.10																			
11 TRAINING																						
1	100% WITHIN ...	100	0.55																			
			100																			

A = ACTUAL
S = SCHEDULE

NOTES

① WORK NOT STARTED
② WORK NOT COMPLETE AS OF DATE
③ UNDER CONST. PROCESS

57
 TIME SCHEDULE
 UJUNG BERUNG ERECTION



From the coll

22 52 12 18
 28 51 21 47

ION

NO	MONTHS												TOTAL	NO					
	SEPT	OCT	NOV	DEC	JAN 1987	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG							
103													100	1					
11													277	100	253.93	91.67	4.38	4.01	
12													26	100	21.67	83.33	2.19	1.82	
13													24	100	1	12.50	1.66	0.16	
14													6	100	2	75	0.73	0.55	
15													12	100	12	100	2.19	2.19	
16													130	100	119	91.67	2.19	2.01	
17													86	2	100	2	100	0.73	0.73
18													51	6	100	6	100	1.10	1.10
19													20	12	100	12	100	1.10	1.10
20													78	12	100	2	16.67	1.10	0.16
21													76	3	100	0	0	0.73	0
22													74	12	100	0	0	1.10	0
23													72	18	100	18	100	2.19	2.19
24													70	2	100	1	50	0.73	0.37
25													68	2	100	0	0	0.73	0
26													66						
27													64						
28													62	653	92.66	619.16	85.71	2.37	2.19
29													60	497.25	57.55	288.38	69.23	2.35	3.29
30													58	626	62.67	286.55	81.82	2.43	3.29
31													56	225	97.40	0	0	0.99	0
32													54	15	55.28	0	0	0.91	0
33													52	81	21.37	0	0	0.31	0
34													50						
35													48						
36													46						
37													44	22	84.62	20.22	77.70	1.40	1.20
38													42						
39													40	16	600	0	0	1.60	0
41													38						
42													36						
43													34	20	100	15	75	1.40	1.10
44													32	18	100	10	60	0.99	0.55
45													30	6	105	3.6	60	0.91	0.55
46													28	6	60	7.14	71.43	1.56	1.03
47													26	17	100	0	0	0.73	0
48													24	12	100	0	0	0.27	0
49													22						
50													20	4	100	0	0	1.60	0
51													18						
52													16						
53													14						
54													12						
55													10						
56													8						
57													6						
58													4						
59													2						
60													0						
61													0						
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93													0						
94													0						
95													0						
96													0						
97													0						
98													0						
99													0						
100													0						

From

NO	WORK ITEM	UNIT	QTY	27MARCH	APR	MAY
10	CIVIL					
11	clearing & grubbing at site	1000M ²	5.23			
12	15cm crush stone	1000M ³	29.			
13	road sub-base	1	289			
14	road top surface	1	227			
15	yard drainage piping	100M	382			
16	catch basin & dropinlets	10	327			
17	chain link fence	1000M	6.18			
18	drainage	100M	4.13			
19	flume	1	237			
110	bridge	1	222			
111	walkway	1	212			
20	CONSTRUCTION PLAN*	0	250			
30	FOUNDATION					
31	all but OCB & transt	628	28.18			
32	150KV OCB	10	1.56			
33	70 KV OCB	6	2.7			
34	150/70KV transformer	1	23.			
35	150/70 KV trans oil containment pit	1	257			
36	150/20KV transformer	2	18			
37	150/20KV trans oil containment pit	2	1			
38	grounding transformer	1	1			
39	grounding resistor	1	1			
310	firewall	1	1			
311	cable trench	250M	7.14			
312	20KV distribution trench	120M	7.20			
313	concrete road culverts	10	1.90			
314	retaining wall					
40	GND SYSTEM					
41	below ground system	100	1.40			
42	above ground system	100	0.20			
50	CONC RT SYSTEM					
51	below ground conduit	100	1.40			
52	above ground conduit	100	0.20			
60	furnish material for yard lighting	100	4.20			
70	furnish material for station service	100	4.85			
	TOTAL		85.21			

A = ACTUAL
 S = SCHEDULE

ORIGINAL SCHEDULE (1)
 REVISED SCHEDULE (2)

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

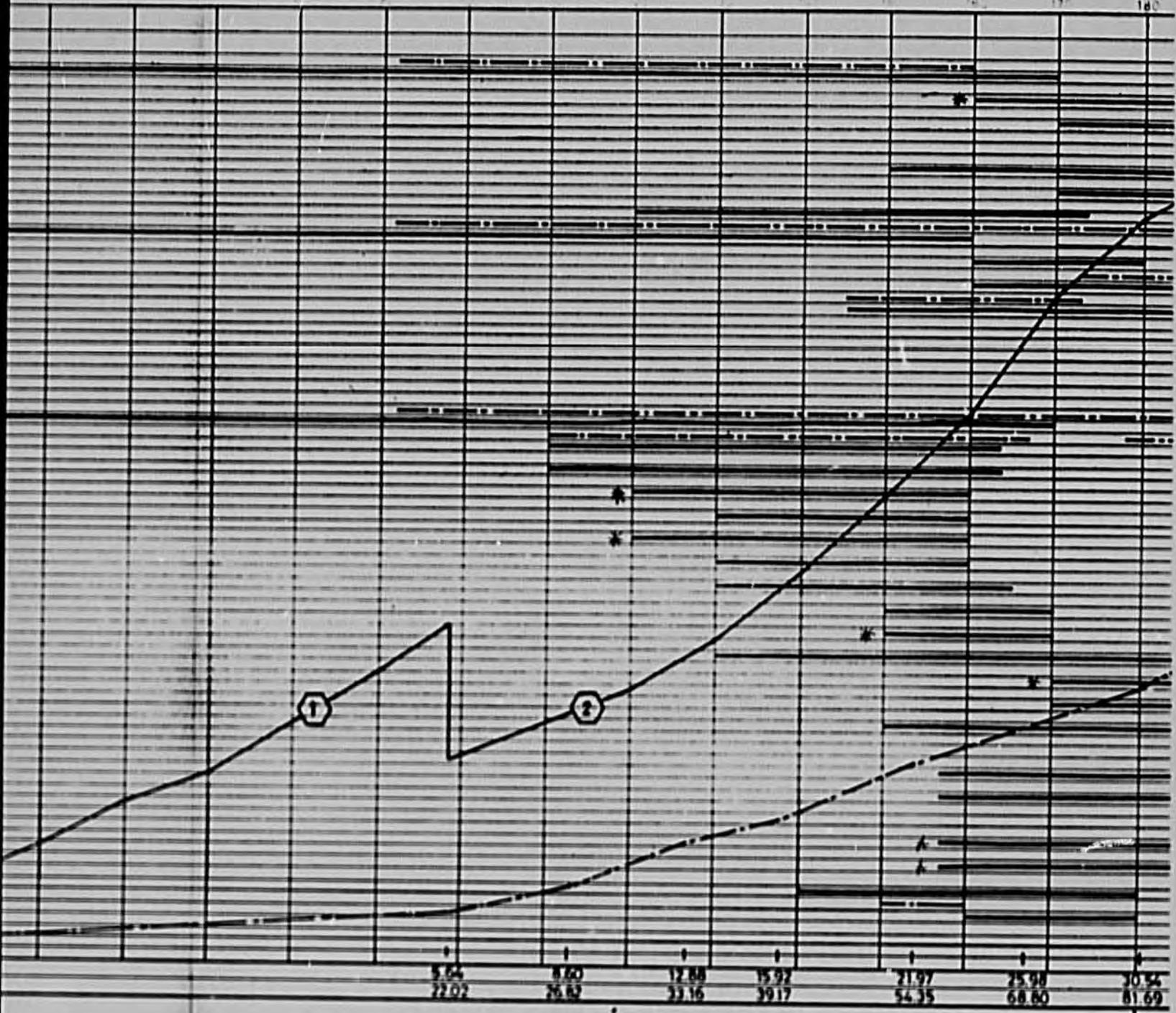
- work not started
- work not complete as of date of 1st construction progress



60

W O

SEPT 1960

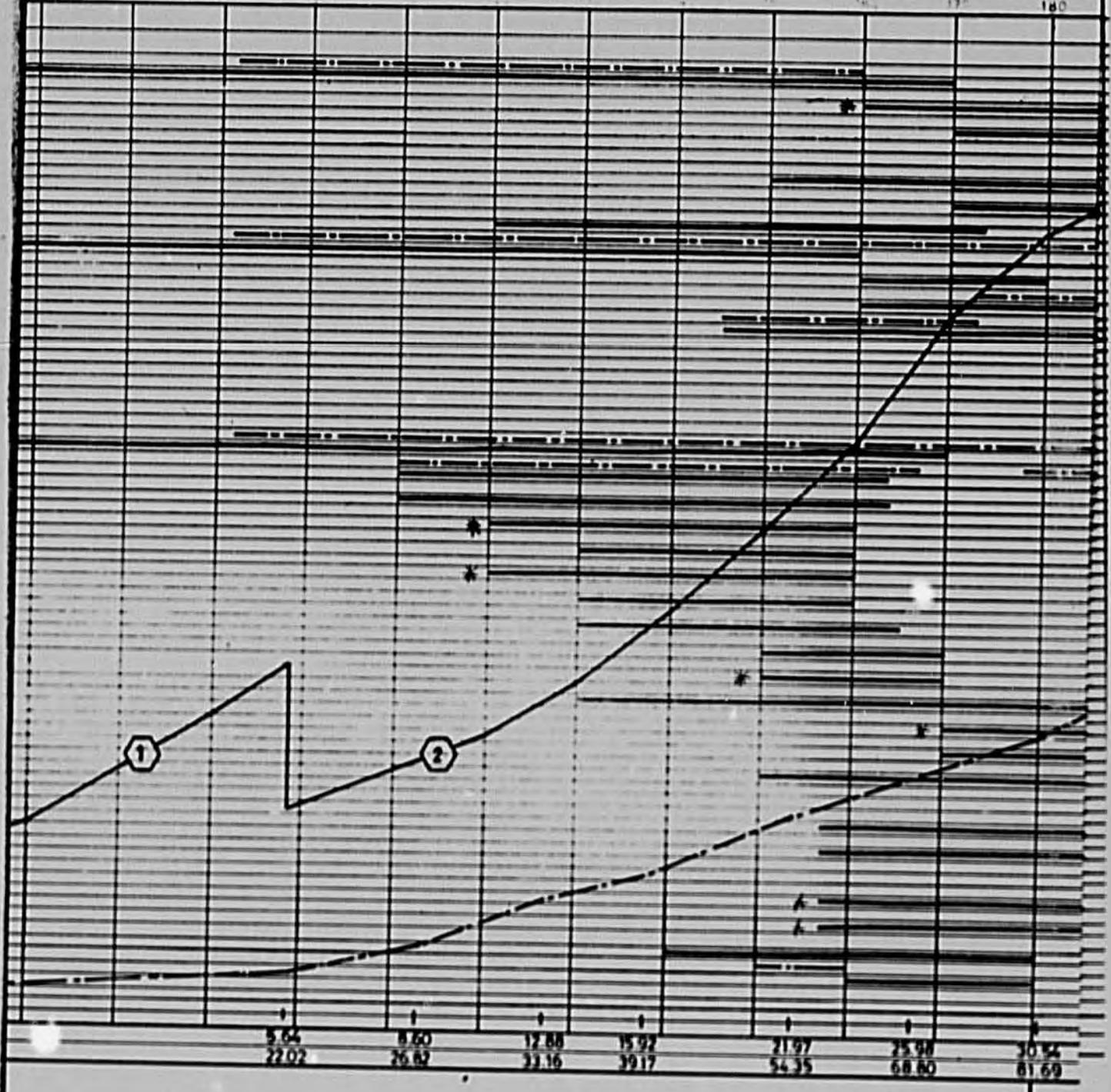


ORIGINAL COMI
DATE

61

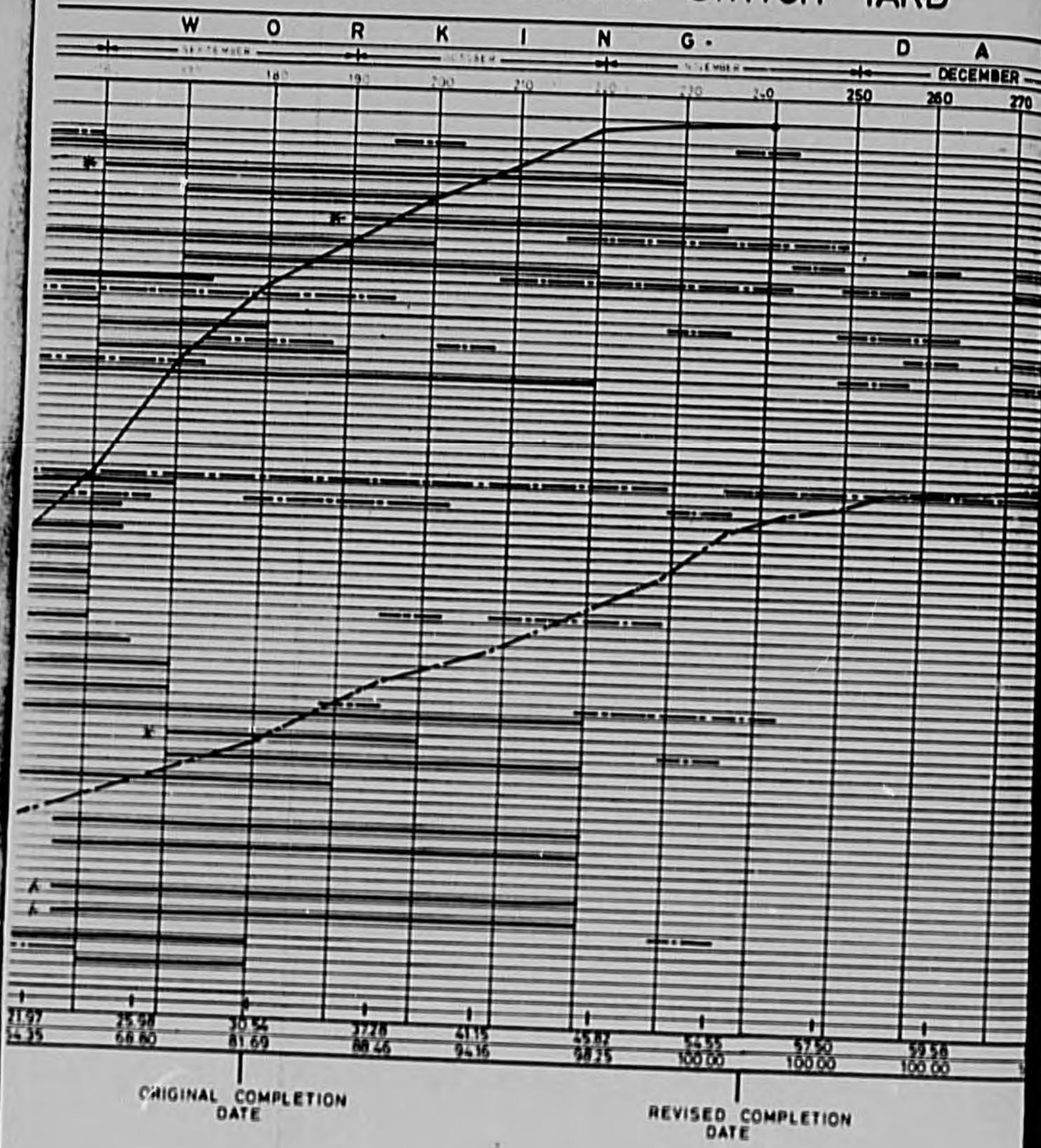
W O

SEPTEMBER 1960



ORIGINAL COMP DATE

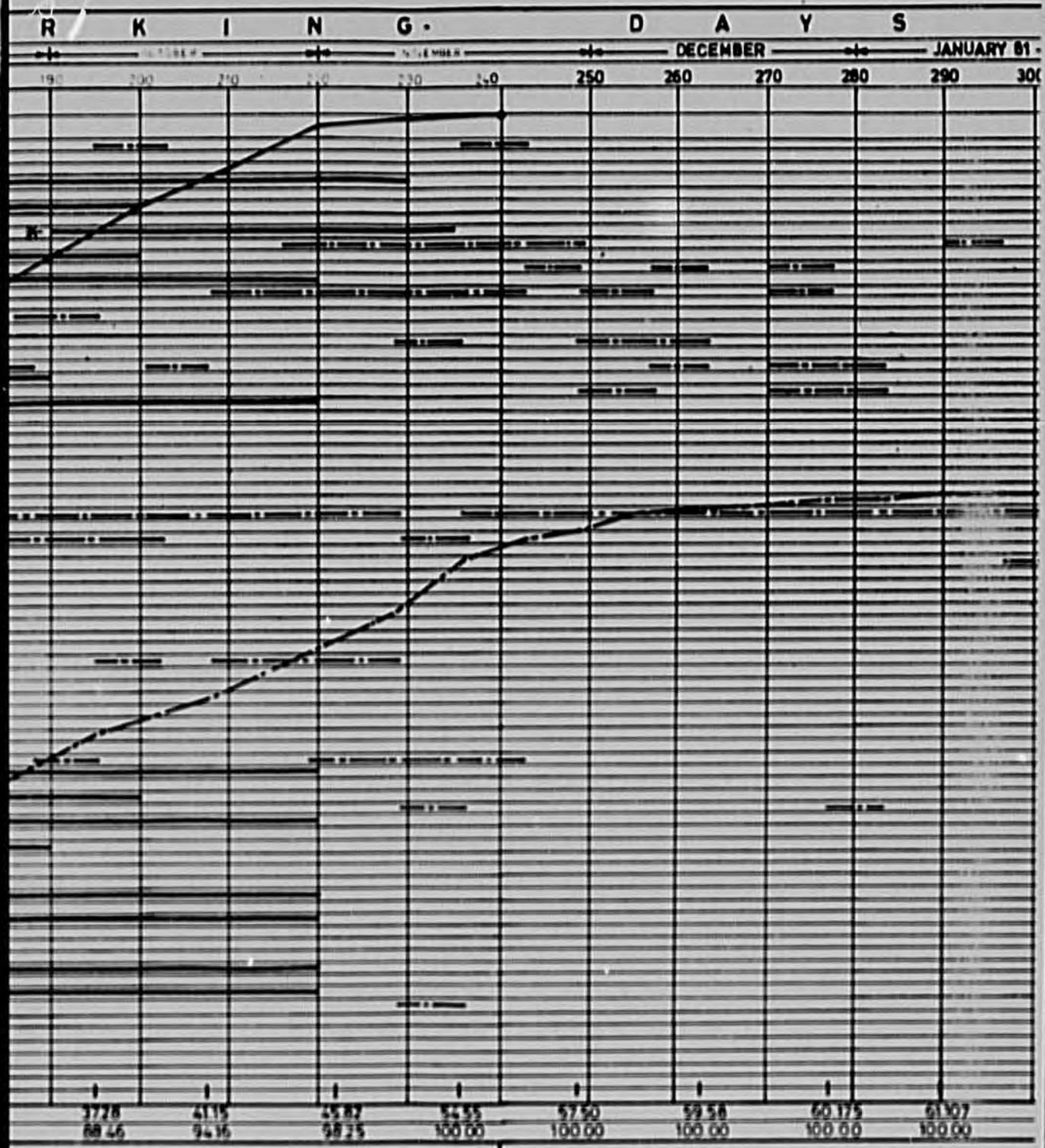
62 TIME SCHEDULE UJUNG BERUNG SWITCH YARD



ORIGINAL COMPLETION DATE

REVISED COMPLETION DATE

TIME SCHEDULE 63 UJUNG BERUNG SWITCH YARD



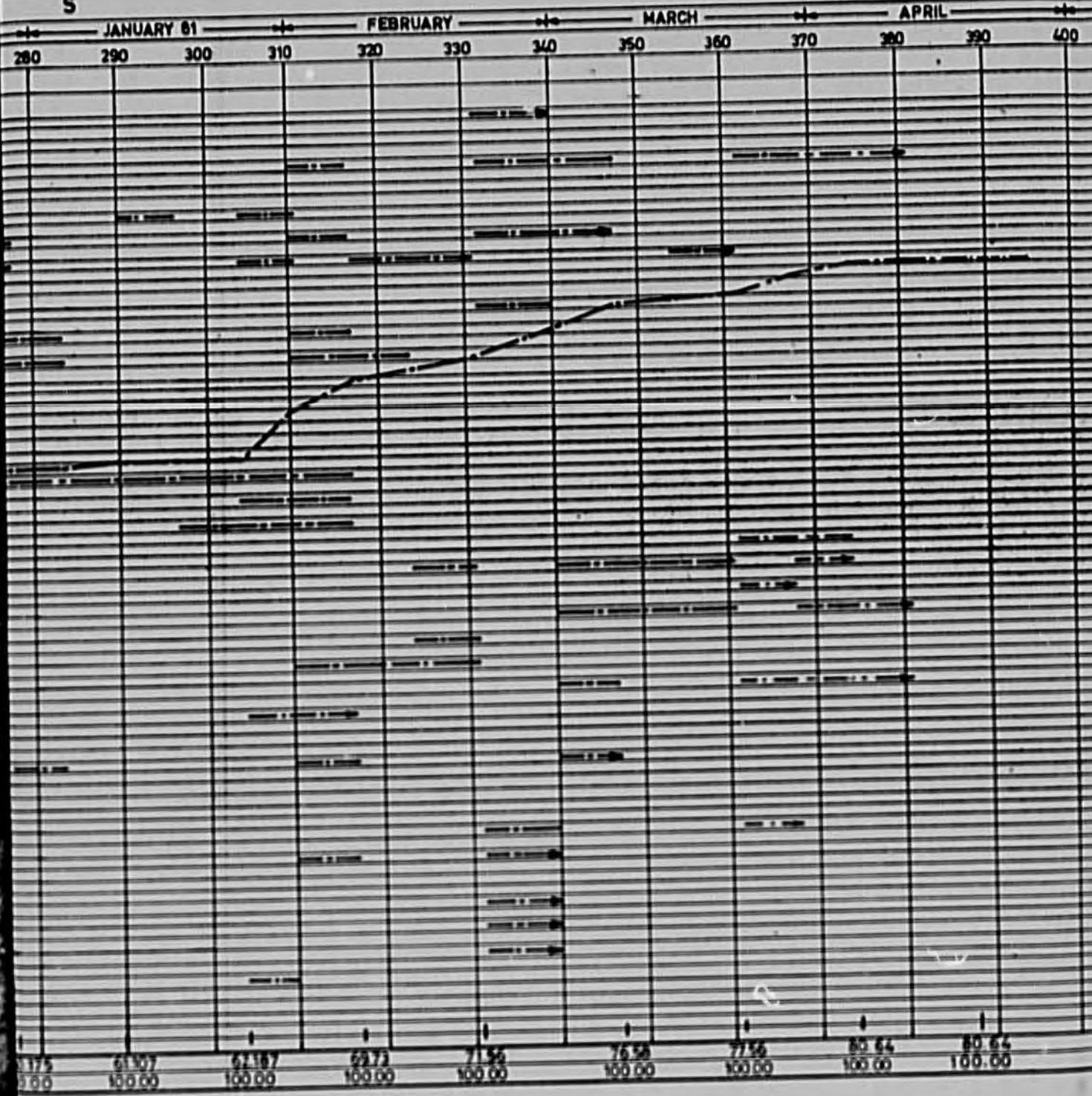
LETION

REVISED COMPLETION DATE

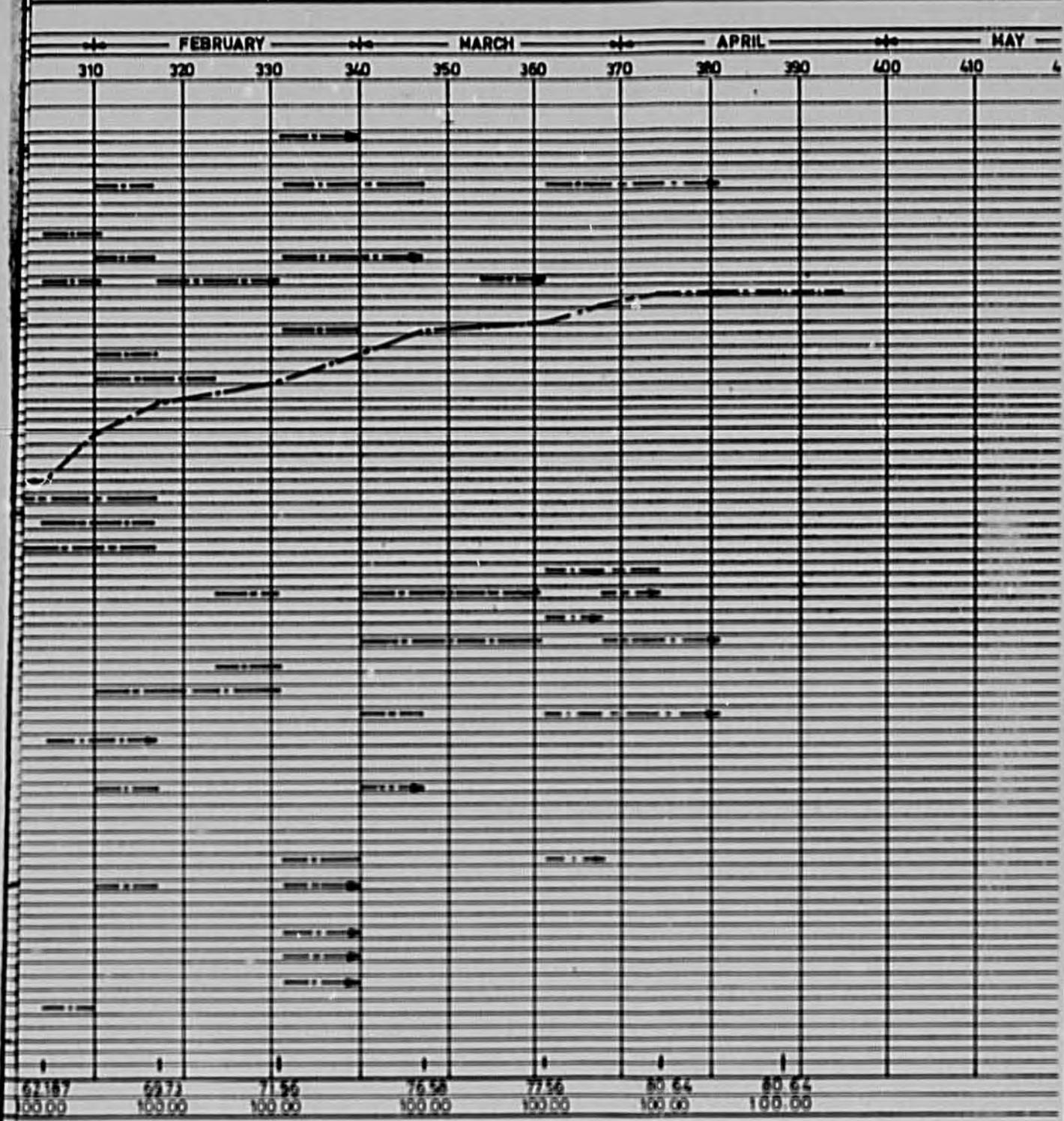
From

64

S



65



From the

67



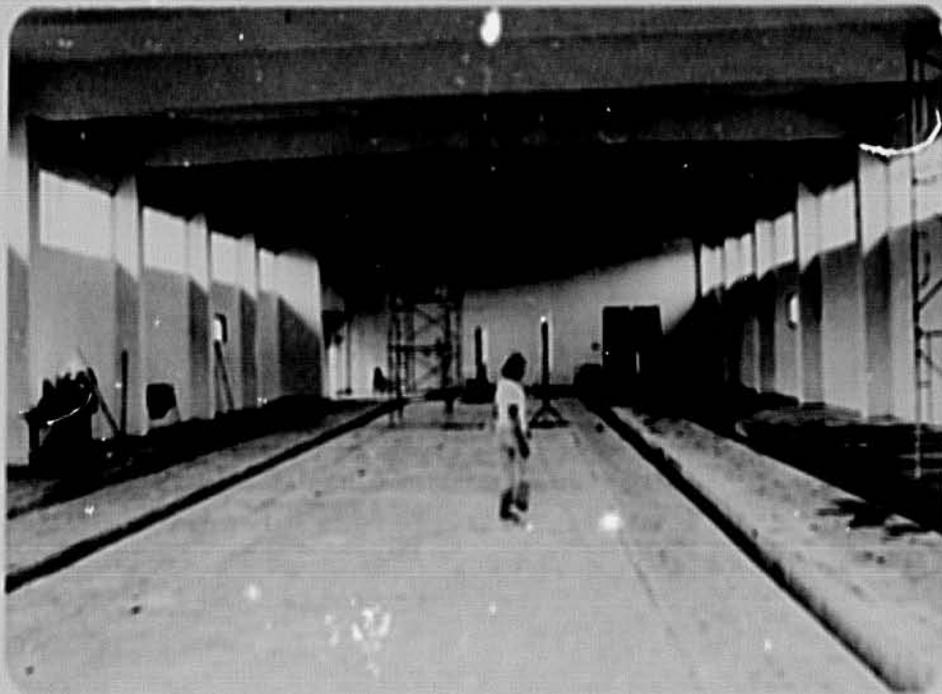
West Java I
Transmission Tower No. 278
One year after
installation



Bogor Substation Temporary Access Road
Reinforced to support Power Transformers



Ujungberung Substation Control House
Control Room

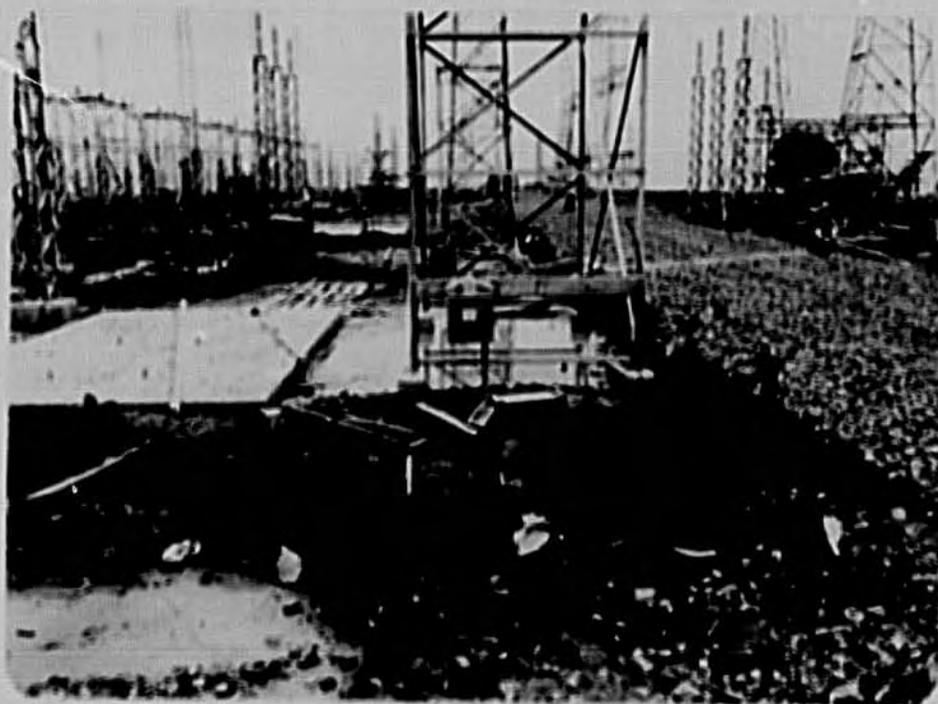


Ujungberung Substation Control House
20 KV Switchgear Room

69



Bogor Substation 70 KV Switchyard
Structure steel laid out for erection



Bandung Utara Substation
Installation of Conduit