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PERUSAHAAN UMUM LISTRIK NEGARA  
JAKARTA , INDONESIA

WEST JAVA  
ELECTRIC TRANSMISSION PROJECT

# MONTHLY REPORT

DECEMBER 1980

WEST JAVA I AND II PROJECTS  
CONTRACTS

Pj. 013/PST/74 and Pj. 023/PST/75

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



CHAS. T. MAIN INTERNATIONAL, INC.

BOSTON MASSACHUSETTS U.S.A.

BANDUNG , INDONESIA

**MAIN**  
*Engineers*

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

BANDUNG - TROMOLPOS 69. TEL. 86869 JL. PROGO 32  
JAKARTA - P.O. BOX 100, KBT KEBAYORAN TIMUR, TEL. 778925 JL. WIJAYA 1/81  
SEMARANG - P.O. BOX 26, TEL. 311702 JL. SLAMET 1

23 January 1981

Letter No. B - 3956

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 December 1980.

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

DECEMBER 1980

A. PERSONNEL

1. ENGINEER

- a. Mr. J.E. Freeman, Civil/Structural Engineer on Temporary Assignment in Indonesia, worked most of the month on the foundations for the West Java Projects. Several days were spent on the Rural Electrification Project in Central Java.
- 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 Engineer	15 Oct. 1977
C.L. Crume	Substation Constr. Eng.	3 Jun. 1979
H. Gunawan	Administrative Assistant	13 Aug. 1979
P.V. Wilson	Stores Specialist	15 Dec. 1978
Zainal Saur	Surveyor	16 Mar. 1978
J.E. Freeman	Civil/Struct. Eng. (Temporary)	26 Nov. 1980
<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	6
Accounting Clerks	2
Reproduction Personnel	2
Drivers	14

b. In addition to the above Staff, approximately 100 PLN Counterpart and field personnel were assigned to the Projects as of 31 December.

B. ADMINISTRATION AND GENERAL

1. ADMINISTRATION

a. West Java I Contract Data

(1) No. Pj. 013/PST/74	16 February '74	US \$ 1,336,452.00
		Rp. 81.308.525,-
Amendment No. 1	2 Sept. '75	US \$ -
		Rp. 14.575.975,-
Amendment No. 2	12 March '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 Sept. '77	US \$	2,531,335.58
	Amendment No. 1	10 July '78		
	Amendment No. 2	17 Sept. '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 July '78	US \$	54,615.55
	Amendment No. 2	30 March '79	US \$	30,914.45
	Southwire Company			
	Conductor			
(5)	No. Pj. 050/PST/78	10 March '78	US \$	369,473.98
	Amendment No. 1	13 Dec. '78	US \$	33,446.88
	Tension Stringing Equipment Co.			
	Wire Stringing Equipment			
(6)	No. Pj. 051/PST/78	10 March '78	US \$	87,852.00
	Ohio Brass Company			
	Lightning Arresters			
(7)	No. Pj. 052/PST/78	11 March '78	US \$	4,499,800.74
	Amendment No. 1	17 Sept. '79	US \$	47,613.72
	Irby Construction Company			
	Substation Equipment			
	Maintenance Tools and Equipment			
(8)	No. Pj. 053/PST/78	11 March '78	US \$	2,452,391.40
	Amendment No.1	7 Jan. '80	US \$	80,409.19
	General Electric Company			
	Substation Equipment			

(9)	No. Pj. 087/PST/78	11 May	'78	US \$	395,819.20
	Amendment No. 1	22 Dec.	'79		-
	Amendment No. 2	21 Nov.	'80		-
	Motorola				
	Radio Equipment				
(10)	No. Spj.022/PLN/PI RING/77	27 Oct.	'77	Rp.	199.278.000,-
	P.T. Tikon Abadi				
	Foundations - Section I				
(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 April	'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/79-80			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 III				

(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 July	'80	
	Ujungberung Substation Temporary 150 KV Transmission Line By-Pass			

b. West Java II Contract Data

(1)	No. Pj. 023/PST/75	25 Jan.	'75	US \$ 1,541,729.00
				Rp. 90.589.149,-
	Amendment No. 1	12 May	'75	US \$ -
				Rp. -
	Amendment No. 2	12 March	'77	US \$ 856,064.00
				Rp. 15.239.504,-
	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 Sept.	77	Rp. 452.526.908,-
				US \$ 7,744,165.78
	Amendments No. 1&2	10 July	'78	Rp. 13.137.605,-
				US \$ 311,400.72
	Amendment No. 3	17 Sept.	'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 Construction

- |      |  |                              |  |
|------|--|------------------------------|--|
| (3)  | No. Pj. 051/PST/78<br>Ohio Brass Company<br>Lightning Arresters                                | 10 March '78                 | US \$ 87,852.00  |
| (4)  | No. Pj. 052/PST/78<br>Amendment No. 1<br><br>Irby Construction Company<br>Substation Equipment | 11 March '78<br>17 Sept. '79 | US \$ 4,981,321.52<br>Funded under Loan<br>497-H-028 West Java |
| (5)  | No. Pj. 053/PST/78<br>Amendment No. 1<br><br>General Electric Company<br>Substation Equipment  | 11 March '78<br>7 Jan. '80   | US \$ 3,974,100.16<br>Funded under Loan<br>497-H-028 West Java |
| (6)  | No. Spj. 001/PLN/PIRING/77-78<br>P.T. Citac Ltd.<br>Foundations - Sections II and III          | 5 June '78                   | Rp. 329.553.000,-  |
| (7)  | No. Spj. 002/PLN/PIRING/78-79<br>P.T. Citac Ltd.<br>Foundations - Ujungberung - Cigereleg      | 9 Aug. '79                   | Rp. 175.128.000,-  |
| (8)  | No. Spj. 022/PLN/PIRING/79-80<br>P.T. Sahabat Agung<br>Cibinong - Gandul Stub Angles           | 4 Dec. '79                   | Rp. 10.618.000,-   |
| (9)  | No. Spj. 009/PLN/PIRING/79-80<br>P.T. Citac Ltd.<br>Foundations - Section IV A                 | 30 Nov. '79                  | Rp. 62.441.000,-   |
| (10) | No. Spj. 010/PLN/PIRING/79-80<br>P.T. Citac Ltd.<br>Foundations - Section IV C                 | 30 Nov. '79                  | Rp. 36.029.000,-   |

- |      |  |             |                   |
|------|--|-------------|-------------------|
| (11) | No. Spj. 018/PLN/PIRING/79-80<br>P.T. Amarta Karya<br>Foundations - Section IV B                                     | 24 Jan. '80 | Rp. 64.630.000,-  |
| (12) | No. Spj. 008/PLN/PIRING/80-81<br>P.T. Pembangunan Perumahan<br>Bandung Utara Substation Civil Work                   | 5 June '80  | Rp. 334.619.000,- |
| (13) | No. Spj. 006/PLN/PIRING/80-81<br>P.T. Perfect Circle<br>Bandung Utara Substation Control House                       | 31 May '80  | Rp. 230.501.000,- |
| (14) | No. Spj. 009/PLN/PIRING/80-81<br>P.T. Perfect Circle<br>Bogor Substation Civil Work                                  | 31 May '80  | Rp. 475.428.000,- |
| (15) | No. Spj. 007/PLN/PIRING/80-81<br>P.T. Perfect Circle<br>Bogor Substation Control House                               | 31 May '80  | Rp. 212.915.000,- |
| (16) | No. Spj. 020/PLN/PIRING/79-80<br>P.T. Utama Karya<br>Bandung Utara Substation Access Road                            | 16 Feb. '80 | Rp. 31.967.000,-  |
| (17) | No. Spj. /PLN/PIRING/<br>Contract not yet signed<br>Bogor Substation Access Road                                     |             | Rp. 64.700.000,-  |
| (18) | No. Spj. 013/PLN/PIRING/80-81<br>P.T. Dharma Niaga<br>Bogor Substation Temporary 150 KV<br>Transmission Line By-Pass | 6 July '80  | Rp. 10.608.000,-  |

c. West Java I and II Contract Data

- |     |  |            |                  |
|-----|--|------------|------------------|
| (1) | No. Spj. 016/PLN/PIRING/77<br>P.T. Sumber Jaya<br>Grounding Material | 4 July '77 | Rp. 54.245.000,- |
|-----|--|------------|------------------|

(2) No. Spj. 017/PLN/PIRING/77

Rp. 40.100.000,-

P.T: Arcon

13 Aug. '77

Stub Angles

2. GENERAL

- a. A draft of Amendment Number 2 to the PLN/Irby Substation Equipment Contract is being reviewed by PLN/Projects. This Amendment provides for the purchase of additional control cable, watt-hour meters, tools and spare parts.
- b. A Certificate of Performance to permit payment of retainage money to Southwire Company is in process by PLN/Pusat.
- c. Where appropriate, retainage funds are being held to ensure full Contract completion by the suppliers.
- d. Amendment Number 2 to the PLN/Tension Stringing Equipment Contract is being reviewed by PLN/Projects. This Amendment provides for certain changes, additions and deletions to the Schedule of Tools and Equipment to be furnished. Some items could not be obtained in time to meet the required delivery dates and their deletion will not effect Project completion. Other items are specified as replacement for tools and equipment originally ordered.
- e. Amendment Number 3 to the PLN/Southwire Conductor Contract is being reviewed by PLN/Projects. This Amendment adjusts the Contract amount to reflect the actual costs of Marine Freight and Insurance.
- f. Expiration date extensions for two (2) Letters of Commitment and increases in amounts for two (2) other Letters of Commitment are in process by USAID.

C.. CONFERENCES AND EVENTS

1. Construction Meetings

a. Ujungberung Substation Civil Work and Control House.

Contractor - P.T. Erses

2 December 1980

16 December 1980

30 December 1980

b. Bandung Utara Substation Civil Work.

Contractor - P.T. Pembangunan Perumahan

1 December 1980

15 December 1980

29 December 1980

c. Bandung Utara Substation Control House.

Contractor - P.T. Perfect Circle

1 December 1980

16 December 1980

31 December 1980

d. Bogor Substation Civil Work and Control House.

Contractor - P.T. Perfect Circle

4 December 1980

18 December 1980

D. PROBLEMS AREAS AND TENTATIVE SOLUTIONS

1. PLN has not as yet received a permit from the Forestry Department to clear the ROW between Towers 38 and 39 on the Ujungberung - Bandung Utara Transmission Line Section but is expected to clear this section during January or February. Scheduled completion of the Project will not be affected.

2. Towers No. 317 and No. 319 on the Cirebon - Ujungberung Transmission Line Section have moved downhill 337 mm and 80 mm, respectively since 26 April 1980. Tower No. 317 moved 150 mm and Tower No. 319 moved 10 mm during December. The tower sites were investigated by a Civil Engineer from MAIN's Charlotte Office. It is expected that towers will be relocated but a final decision is awaiting review by the Charlotte Office. Scheduled completion of the Project will not be affected.
3. The Ujungberung Switchyard and Control House remains several months behind schedule. A meeting was held with PLN and the Contractor to determine the new completion date for the Switchyard work. The Contractor advised that the new date will be February 28, 1981. This date has not been accepted by PLN. Due to the work procedure by the Contractor it is not possible to determine when the Contractor will complete work on the Switchyard and Control House. The Contractor has been requested to obtain additional material and personnel to complete the work on schedule.
4. The installation and erection of equipment and structure by PLN crews is being delayed by the Civil Work problems mentioned above at Ujungberung Substation.
5. The Bandung Utara Switchyard Contractor is behind schedule and will delay the erection of Switchyard equipment and structures unless changes are made very soon. The Contractor has been requested to add additional personnel.
6. The Bandung Utara Control House Contractor is behind schedule but has added additional personnel to correct the behind schedule problems.
7. There are still problems with obtaining the land for the permanent access road to Bandung Utara Substation. Negotiations with the landowners are underway.

8. The land for the permanent access road to Bogor Substation has been purchased and PLN is making the required drawings for the Construction to be let for bids. Bogor Substation Switchyard and Control House work is behind schedule but the Contractor is taking action to correct this problem.

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. PLN still has not received permission from the Forestry Department to do the clearing between Towers 38 and 39 on the Ujungberung - Bandung Utara Line Section. It is expected that PLN will clear this final section during January or February.
- e. Conductor and Shieldwire. Some 2 Km of line remain to be strung on the Ujungberung - Bandung Utara Line Section. This section will be strung as soon as the ROW is procured and cleared.

2. Material Supply

- a. Some locally fabricated steel is still to be provided for the spare towers.

F. TRANSMISSION - WEST JAVA II

1. Construction

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

- b. Foundation. 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 is completed.
- e. Conductor and Shieldwire. Phase conductor and shieldwire has been installed.
- f. By-Pass. The By-Pass Tower at Bogor Substation is being erected and is expected to be completed during January.

## 2. Material Supply

- a. A few items of line hardware and conductor accessories to be used as spares are missing and are in transit.

## G. SUBSTATIONS

### 1. Construction

- a. Tegal Substation.

All work is completed and the station has been energized.

- b. Ujungberung Substation.

#### (1) Switchyard Civil Work.

The Contractor has not completed the required work by the guarantee date of 29 November 1980 and it is not known at this time when the Contractor will complete the required work. The Contractor is continuing work on the foundations, fence, culverts, cable trench and drain pipe installation but the work is not consistent due to insufficient material. At the present rate of Construction it will be many more months before his work is completed.

(2) Control House.

The Contractor is substantially behind schedule. Pouring of the second half of the ground floor roof was completed. At the present rate of construction, it will be many more months before the Control House is completed.

(3) Erection.

PLN crews continued work on the 150 KV Switchyard during the month, but due to the slow progress by the Switchyard Contractor the work by the PLN erection crews has been hampered extensively. Unless the Contractor changes his rate of progress for the Switchyard and Control House construction it will not be possible to complete all work required to energize the Substation by December 1981.

c. Bandung Utara Substation.

(1) Switchyard.

The Contractor is continuing work on the foundations, cable trench, fence and road culverts. Work has started on the Oil Circuit Breaker and Transformer foundations. Due to the Contractor not having sufficient personnel the work by the Contractor is getting further behind schedule. Unless the Contractor adds additional personnel immediately it will not be possible for him to complete the required work by the guarantee date of February 28, 1981.

(2) Control House

The Contractor has completed work on the first section of the vertical columns (above ground). The Contractor has started the form work for the roof beams and slab. The Contractor is approximately six weeks behind schedule.

(3) Access Road.

The Contractor has been unable to continue work on the Access Road due to the fact that all of the right-of-way has not been obtained.

(4) Erection.

PLN crews have not started the erection. The erection is now scheduled to start in February 1981. This starting date will depend on the completion of required work by the Switchyard Civil Contractor.

d. Bogor Substation.

(1) Switchyard Civil Work.

The work by the Contractor has dropped behind schedule during the month. This is mainly due to the Contractor not adding additional personnel when they were needed. The Contractor has completed the pouring of the piles during the month. Driving of the piles for the Oil Circuit Breakers and Transformers will begin in January.

(2) Control House.

The Contractor during the month completed a large portion of the concrete work and started installation of the form work for the roof and floor beams. The Contractor will pour the roof and floor during the month of January. The Contractor should complete the Control House work on schedule if he continues to work at the rate achieved during the months of November and December 1980.

(3) Access Road.

Payment to property owners for the permanent access road was completed during the month. PLN is now making construction drawings to be let for bids.

(4) Erection.

PLN crews have not started the erection. The erection is now scheduled to start in February 1981. This starting date will depend on the completion of required work by the Switchyard Civil Contractor.

2. Material Supply

Most material is presently in Indonesia. There should be no delays due to material shortage.

H. MOBILE RADIO

1. The duplexer at the Puncak Repeater Station needs tuning. The local Motorola agent has still not made adjustments.
2. The fixed station at Bandung Utara will be installed when electric power is installed.

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, 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 Arrestors, 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 & II		
1. Panels for Bandung Utara (3), and Bogor (1), Batteries, Test Equipment, Control Cables, and Miscellaneous items.	23 December 1980	23 February 1981	
2. Relay and Control Panels and Miscellane Items.	23 January 1981	23 March 1981	
H. Contract Pj.053/PST/78;	General Electric Company, Substation Equipment - WJ I & II		
1. Spare Parts	22 August 1980	22 January 1981	In Indonesia
2. Replacement Parts	26 December 1980	26 February 1981	
I. Contract Pj.087/PST/78,	Motorola Company, Mobile Radio Equipment - WJ I		

Additional shipment of material to be made. No schedule to date.

31 December 1980

West Java I Project  
 Project Completion  
 (Includes Engineering and Design)  
 as of 30 November 1980

<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>
<b>Transmission Line</b>					
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	98.9	11.7	11.6
<b>Tegal Substation</b>					
Switchyard Civil Work	2.0	100.0	100.0	2.0	2.0
Erection and Wiring	1.2	100.0	100.0	1.2	1.2
<b>Ujungberung Substation</b>					
Switchyard Civil Work	15.2	60.5	64.6	9.2	9.8
Control House	11.5	55.7	50.0	6.4	5.8
Equipment Erection	8.2	26.8	46.1	2.2	3.8
Wiring and Testing	2.1	23.0	23.0	0.5	0.5
Radio System	<u>5.7</u>	100.0	100.0	<u>5.7</u>	<u>5.7</u>
<b>Total</b>	<b>100.0</b> =====			<b>81.3</b> =====	<b>82.8</b> =====

Revised 31 December 1980

West Java II Project  
 Project Completion  
 (Includes Engineering and Design)  
 as of 30 November 1980

<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>
<b>Transmission Line</b>					
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
<b>Bandung Utara Substation</b>					
Switchyard Civil Work	7.3	54.8	44.4	4.0	3.2
Control House	6.1	47.5	33.7	2.9	2.1
Equipment Erection	3.9	12.8	12.8	0.5	0.5
Wiring and Testing	1.0	12.8	12.8	0.1	0.1
<b>Bogor Substation</b>					
Switchyard Civil Work	10.6	50.0	39.1	5.3	4.1
Control House	5.8	39.7	27.6	2.3	1.6
Equipment Erection	5.6	12.8	12.8	0.7	0.7
Wiring and Testing	1.4	12.8	12.8	0.2	0.2
Radio System	6.0	100.0	99.9	6.0	6.0
<b>Total</b>	<b>100.0</b> =====			<b>74.3</b> =====	<b>70.8</b> =====

West Java I Project  
 Project Completion  
 (Includes Engineering and Design)  
 as of 31 December 1980

<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>
<b>Transmission Line</b>					
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	98.9	11.7	11.6
<b>Tegal Substation</b>					
Switchyard Civil Work	2.0	100.0	100.0	2.0	2.0
Erection and Wiring	1.2	100.0	100.0	1.2	1.2
<b>Ujungberung Substation</b>					
Switchyard Civil Work	15.2	71.1	69.4	10.8	10.5
Control House	11.5	63.0	52.6	7.2	6.0
Equipment Erection	8.2	41.8	53.8	3.4	4.4
Wiring and Testing	2.1	23.0	23.0	0.5	0.5
Radio System	<u>5.7</u>	100.0	100.0	<u>5.7</u>	<u>5.7</u>
<b>Total</b>	<b>100.0</b> =====			<b>84.9</b> =====	<b>84.3</b> =====

West Java II Project  
 Project Completion  
 (Includes Engineering and Design)  
 as of 31 December 1980

<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>
<b>Transmission Line</b>					
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
<b>Bandung Utara Substation</b>					
Switchyard Civil Work		67.0	44.5	4.9	3.2
Control House		48.4	36.9	3.0	2.3
Equipment Erection		20.2	12.8	0.8	0.5
Wiring and Testing		12.8	12.8	0.1	0.1
<b>Bogor Substation</b>					
Switchyard Civil Work	10.6	63.4	42.5	6.7	4.5
Control House	5.8	47.4	34.3	2.7	2.0
Equipment Erection	5.6	16.9	12.8	0.9	0.7
Wiring and Testing	1.4	12.8	12.8	0.2	0.2
Radio System	6.0	100.0	99.9	6.0	6.0
<b>Total</b>	<b>100.0</b>			<b>77.6</b>	<b>71.8</b>
	=====			=====	=====

DRAWING 1

## WEST JAVA I & II CONSTRUCTION PROGRESS AS OF 31 DECEMBER 1980

NO.	WORK ITEM	ACTUAL COMPLETED TO DATE %	ACTUAL COMPLETED THIS MONTH %	SCHEDULED COMPLETION TO DATE %	10% 20% 30% 40% 50% 60% 70% 80% 90% 100%									
					Gantt chart grid for progress tracking									
<b>WEST JAVA I</b>														
1	TOWER ERECTION UJ.BERUNG - BANDUNG UTARA	100	0	100	[Progress bar: 100% actual completion]									
1A	TOWER ACCEPTANCE UJ.BERUNG - BANDUNG UTARA	100	0	100	[Progress bar: 100% actual completion]									
2	CONDUCTOR STRINGING UJ.BERUNG - BANDUNG UTARA	99	0	100	[Progress bar: 99% actual completion]									
3	UJ.BERUNG SUBSTATION CIVIL CONSTRUCTION	60.2	6.2	100	[Progress bar: 60.2% actual, 6.2% this month, 100% scheduled]									
4	UJ.BERUNG SUBSTATION BUILDING CONSTRUCTION	38.5	3.5	84	[Progress bar: 38.5% actual, 3.5% this month, 84% scheduled]									
5	UJ.BERUNG SUBSTATION ELECTRO / MECHANICAL CONSTRUCTION	40	10	20	[Progress bar: 40% actual, 10% this month, 20% scheduled]									
<b>WEST JAVA II</b>														
1	BOGOR SUBSTATION BUILDING CONSTRUCTION	24.7	7.7	27	[Progress bar: 24.7% actual, 7.7% this month, 27% scheduled]									
2	BOGOR SUBSTATION CIVIL CONSTRUCTION	34.1	10.1	45	[Progress bar: 34.1% actual, 10.1% this month, 45% scheduled]									
3	BOGOR SUBSTATION ELECTRO / MECHANICAL CONSTRUCTION	-	-	5	[Progress bar: 5% scheduled]									
4	BANDUNG UTARA SUBSTATION BUILDING CONSTRUCTION	27.6	3.6	50	[Progress bar: 27.6% actual, 3.6% this month, 50% scheduled]									
5	BANDUNG UTARA SUBSTATION CIVIL CONSTRUCTION	33.4	3.4	62	[Progress bar: 33.4% actual, 3.4% this month, 62% scheduled]									
6	BANDUNG UTARA SUBSTATION ELECTRO / MECHANICAL CONSTRUCTION	-	-	8	[Progress bar: 8% scheduled]									

NOTE: PERCENTAGES DO NOT INCLUDE ENGINEERING AND DESIGN.  
SCHEDULED COMPLETION IS BASED UPON CONTRACTOR'S APPROVED SCHEDULES.

WORK IN PROGRESS

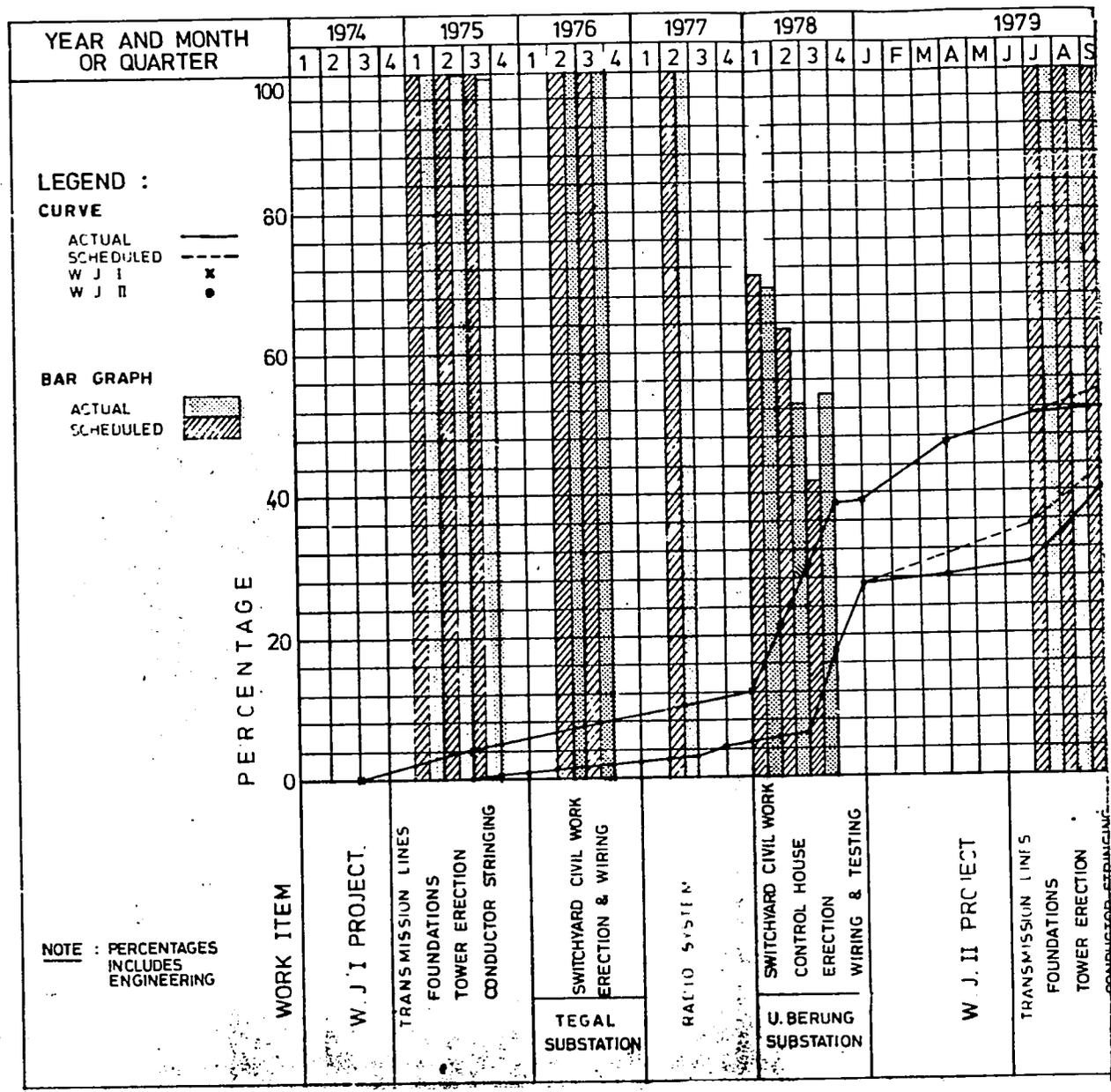
SCHEDULED COMPLETION TO DATE

ACTUAL COMPLETION TO DATE

C.T.MAIN INTL. INC

GRAPH 2A

## WEST JAVA I AND II PROJECTS PROJECT COMPLETION AS OF DECEMBER

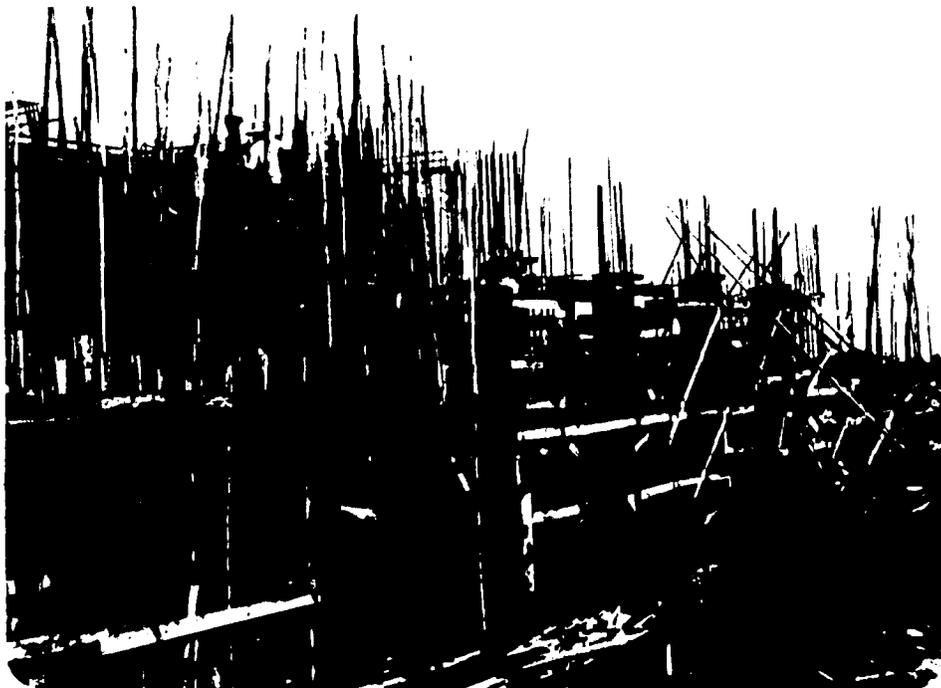




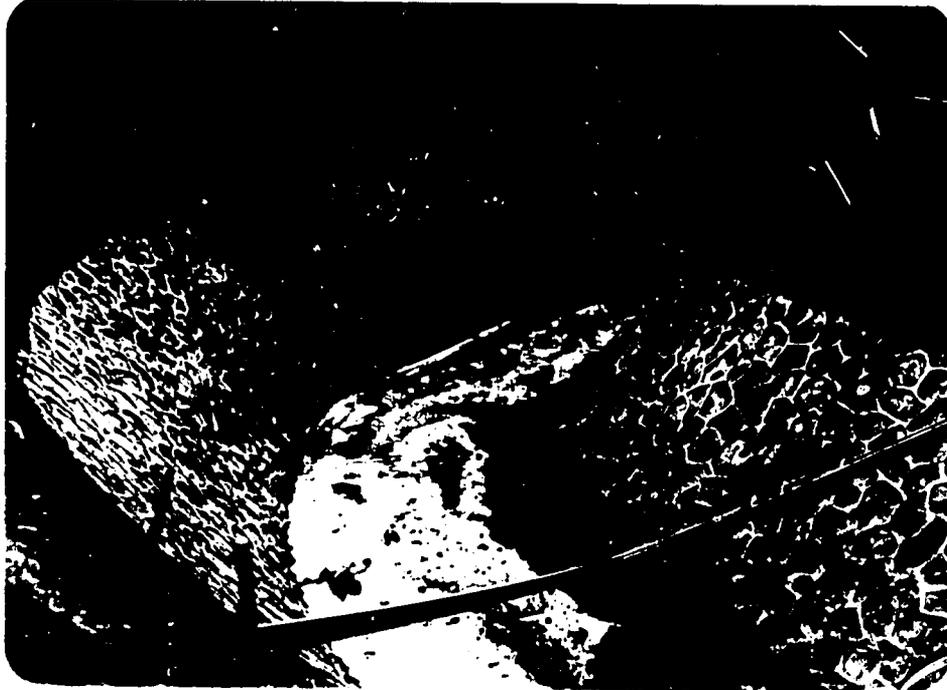
BOGOR SUBSTATION



Switchyard Drainage Pipe  
Finished Pipe Sections and Molds



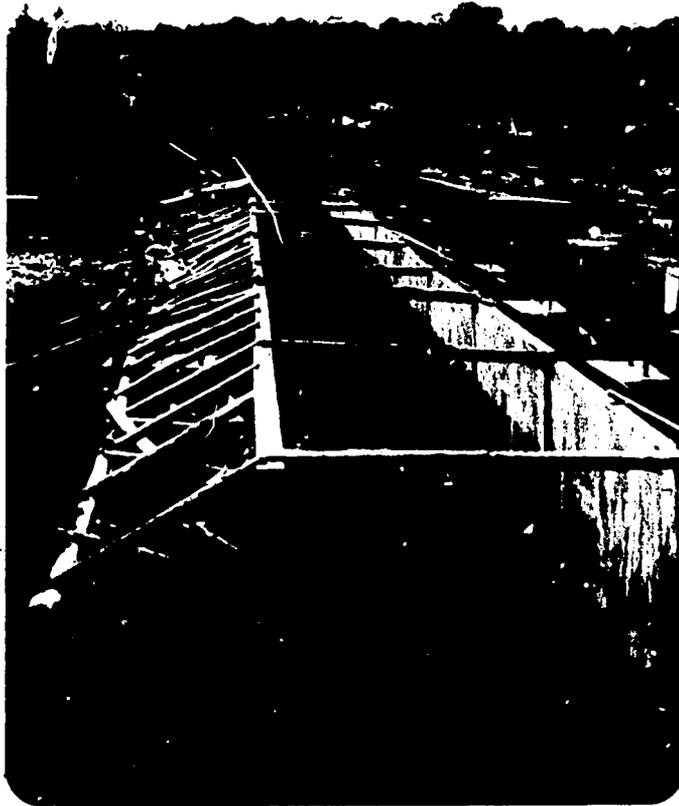
Control House  
Preparation for Pouring Columns



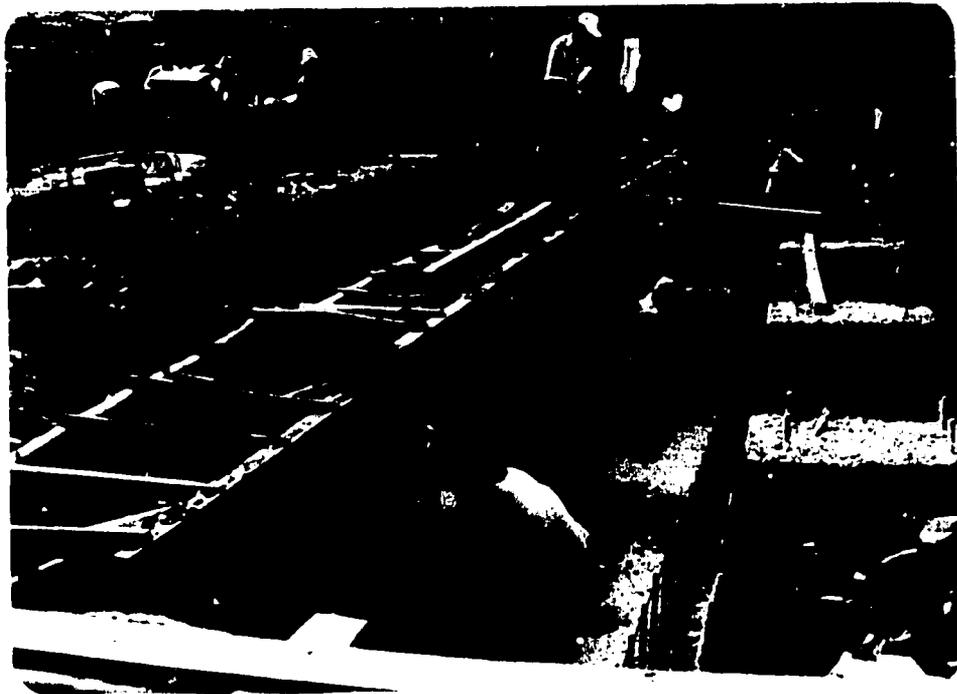
Drainage Ditch



Drainage Ditch and Fence



Cable Trench  
before  
pouring Floor



Cable Trench  
after  
Pouring Floor