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RURAL ELECTRIFICATION PROJECTS

INDONESIA



NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION

JAKARTA, INDONESIA

NRECA TEAM REPORT

PLN

INDONESIA

(NOVEMBER 1981)

MONTHLY REPORT

NRECA INDONESIAN TEAM REPORT

UNITED STATES AGENCY FOR
INTERNATIONAL DEVELOPMENT

Contract No. AID/ASIA CI347
Loan No. 497-T-052

IMPLEMENTING AGENCIES:

DIREKTORAT JENDERAL KOPERASI
Directorate General of Cooperatives

PERUSAHAAN UMUM LISTRIK NEGARA:
National Electric Power Agency

CONSULTANTS:

National Rural Electric Cooperative Association
Management, Organization and Training

C.T. Main International, Inc.
Architect and Engineering

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NRECA TEAM MEMBERS AS OF SEPTEMBER, 1981

<u>NAME</u>	<u>TITLE</u>	<u>ADDRESS</u>
Peter McNeill	Team Leader	Pondok Indah Bukit Hijau VIII/31 PH: 761132
Louie Sansing	Sr. RE Specialist	Ratu Plaza Apartment #1103 Jl. Jenderal Sudirman PH: 712209 ext. 2020
*Sam Adkins	Sr. RE Specialist	c/o C.T. Main Inc. Box 26 Semarang PH: 024-311832
Paul Swanson	Sr. RE Specialist	Kotak Pos 43 Ampenan, Lombok PH: 0364-23517
John DeFoor	RE Specialist	c/o Bina Marga Office Jl. Imam Bonjol 8 Palopo, S. Sulawesi
Ray Shoff	Administrative/Finance Officer	Ratu Plaza Apartment #1002 Jl. Jenderal Sudirman PH: 712209 ext. 2015
Claude Franke	RE Specialist	P.O. Box 88 Tanjungkarang Lampung PH: 0721-52058

* PLN Advisor

I. DESCRIPTION AND OBJECTIVES OF PROJECT (PLN)

The Government of Indonesia is vitally interested in the electrification of rural Indonesia, and has taken steps with the assistance of the United States Government (USAID) to implement pilot rural electrification programs. Fewer than 1% of the rural people in Indonesia presently enjoy the benefits of electric service. Rural electrification is essential in developing the wealth of forest and agricultural land, minerals, and water resources. The "area coverage" concept of electrification will bring better living conditions to millions of rural residents and will spread benefits to all of Indonesia.

Ten Pilot Rural Electrification Project areas have been selected. Seven of the projects are in Central Java and are to be constructed and developed by the state owned national power company (PLN) who will own and operate these systems. The source of power for these systems will be the existing PLN transmission grid in Central Java.

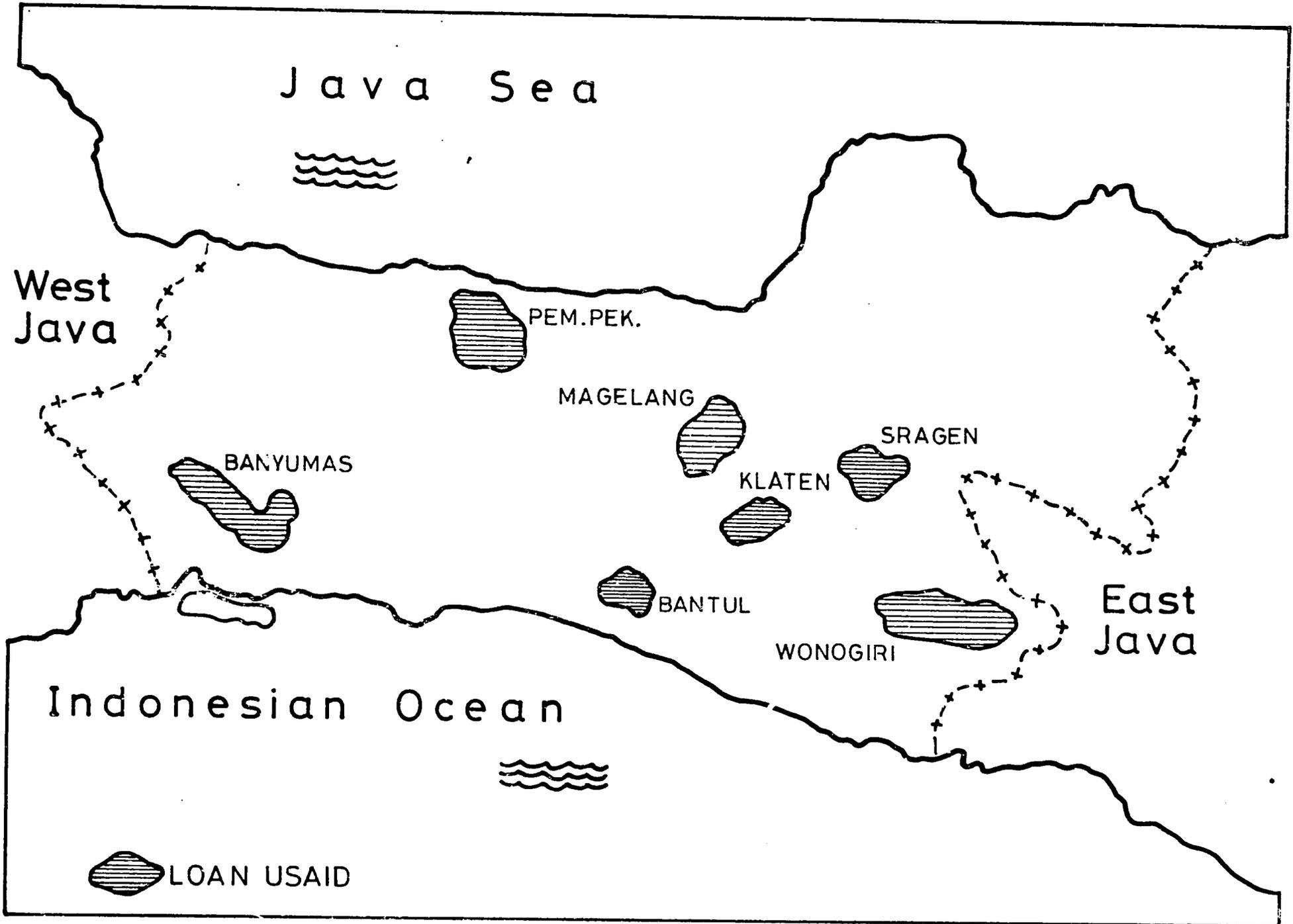
The National Rural Electric Cooperative Association through their International Programs Division is serving as consultant to PLN in organization, management and technical areas. Services for PLN includes providing assistance in organization of staffs to operate the systems in Central Java, as well as in cost accounting, O&M methods, housewiring and training.

SEVEN PLN PROJECTS

<u>SERVICE AREA</u>	<u>VILLAGES TO BE SERVED</u>	<u>APPROXIMATE NO. OF CONNECTIONS</u>	<u>ESTIMATED NO. OF RECEIPIENTS</u>
Klaten	95	25,000	225,000
Pem/Pek	103	20,000	180,000
Bantul	21	20,000	180,000
Wonogiri	54	15,000	135,000
Sragen	49	15,000	135,000
Magelang	83	20,000	180,000
Banyumas	<u>35</u>	<u>15,000</u>	<u>135,000</u>
TOTALS	440	130,000	1,170,000

The above tabulations are estimates for the end of the third year of commercial operation.

CENTRAL JAVA



II. PROJECT ACTIVITIES

A. Organization/Management

NRECA-Jakarta Office --- The NRECA team leader made a field-trip to Central Java this month for consultation with staff of PLN Wilayah XIII, operations division, and PLN P.I. Ring, construction division. During this trip, the team leader attended PLN's energization ceremony commemorating the energization of twenty-seven (27) desa in the Dieng Plateau area.

--- NRECA was represented at a meeting called by the Director of Energy, Dr. Samaun Samadikun. PLN officials joined representatives of the Director General of Cooperative's office, Ministry of Finance, and the Department of Home Affairs to discuss the role of mini-hydro in rural electrification. PLN and DGC presented reports and results of survey, compiled by their respective organizations.

As a follow-up on this subject, a meeting was held at DGC with PLN, DGC, Ministry of Finance officials, and NRECA in attendance. It was agreed that PLN and DGC will work together on pre-feasibility mini-hydro site selections. Representatives of the Department of Finance expressed interest in the project and requested additional information on the financial assistance proposed by USAID.

--- NRECA team members met with Ir. Pasaribu, Chief of Technical Branch, PLN-RE, Jakarta. A major area for discussion was feasibility studies, past studies of the Central Java projects, and studies in progress at present by PLN-RE staff members. NRECA was advised that PLN desires to continue the use of the NRECA-method of project evaluation, however, additional background information is required.

In response to the request for feasibility study information, NRECA team members met with PLN staff members who actually perform financial evaluations. Problem areas were discussed and documented. It was agreed that a seminar on RE project financial evaluation and study preparation

would be of great benefit and NRECA-Jakarta has forwarded this request to NRECA-Washington.

NRECA Central Java Office --- During this reporting period, assistance was provided to PLN-Wilayah XIII in planning for housewiring-service entrance installations which are a part of "PLN crash program 82". This program, which is designed to extend electric service to thirteen thousand (13,000) households by April 1982, will follow the PLN-RE Implementation Plan for the seven RE projects. Since materials being procured through the USAID loan are not on-site, existing PLN materials and materials procured through a separate budget will be used.

--- NRECA and Wilayah XIII representatives spent two days in the Klaten area this month. Load studies were conducted on the demonstration RE-project to obtain information to plot a daily load-curve and determine project load-factor. The 20 KV circuit which provides electric service to this area does not contain metering equipment necessary to obtain this information directly. Therefore constant observation and timing of kWh meter-disks was necessary throughout a 24-hour period.

From information obtained, it was determined that the maximum kilowatt load in the demonstration project area was 334 kw. One thousand nine hundred sixty-four (1964) customers were being served with an average demand of 170 watts per customer. The load-factor for the study period was computed at 43%, a relatively high percentage for a RE project in early years of operation. (See pages 8 & 9 of this report.)

--- The NRECA advisor in Central Java accompanied the NRECA team leader and PLN officials to an energization ceremony at Dieng, north of Wonosoro. P.I. Ring and Wilayah XIII are working together to provide electric service to approximately six thousand (6,000) customers by constructing twenty-five (25) kilometers of three-phase 20 KV distribution line and associated service lines. The poles used in this distribution system are spun concrete poles obtained from a newly-constructed fabricating plant located near Boyolali, Central Java.

The Dieng project is an example of PLN's ability to cultivate alternate energy sources. Power-supply for this project is provided from a two-megawatt geo-thermal plant which was developed by PLN with assistance from the New Zealand government. This project also demonstrates the construction and operations capabilities of PLI's Central Java personnel in providing electric service for the rural population.

B. TRAINING

--- PLN Wilayah XIII conducted a three-day training course in Semarang this month on housewiring/service installations. The eighteen participants, PLN employees from branch and sub-branch offices, will serve as instructors for project-site training of electricians.

Training course instruction was given by PLN staff members from Jakarta and Semarang. Included in the Semarang staff were PLN employees who have been selected to serve in management positions in the seven RE projects (and have received overseas training in 1979-80). The subject matter ranged from customer-contact/human relations to actual installation procedures.

The training materials for this course will also be used by course participants as they begin their assignment of conducting training courses in each project area in December. The electricians trained in each area will be utilized during PLN's crash-program 82 and will provide a nucleus for housewiring/service installers during construction of the main PLN/USAID program. (Pictures on page 14 & 15.)

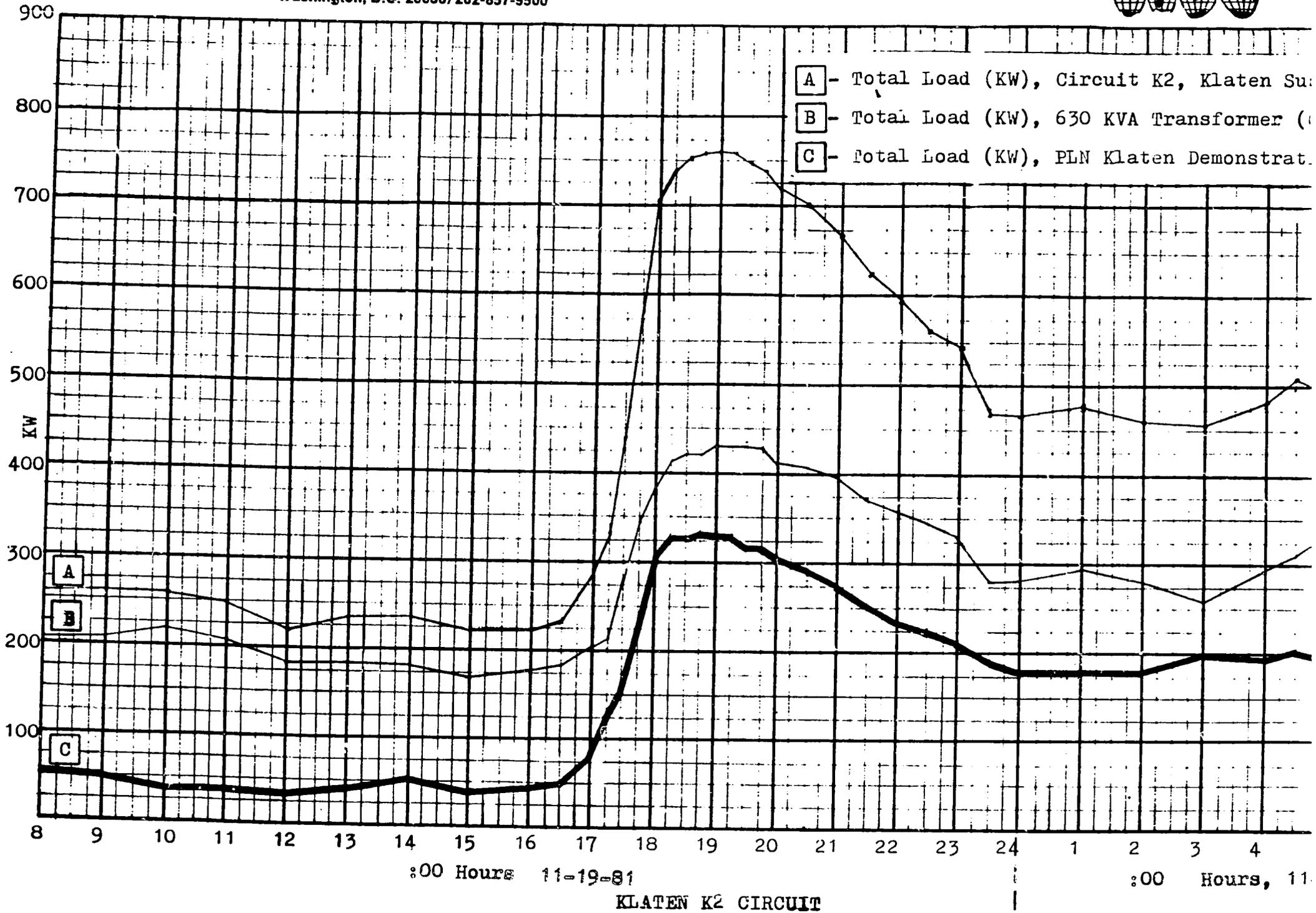
--- An organization-management-training (OMT) progress schedule is included on page 10 of this report. It may be noted that work completed is listed at 63% and work scheduled for completion at 78%. The difference relates to timing OMT activities with construction-material receipt and project construction.

C. KLATEN DEMONSTRATION PROJECT

--- Billing statistics for a 13-month period ending November 1981 may be found on page 12 of this report. One thousand nine hundred and seventy-two (1972) customers received service in November with an average use of 43 kWh for the month.

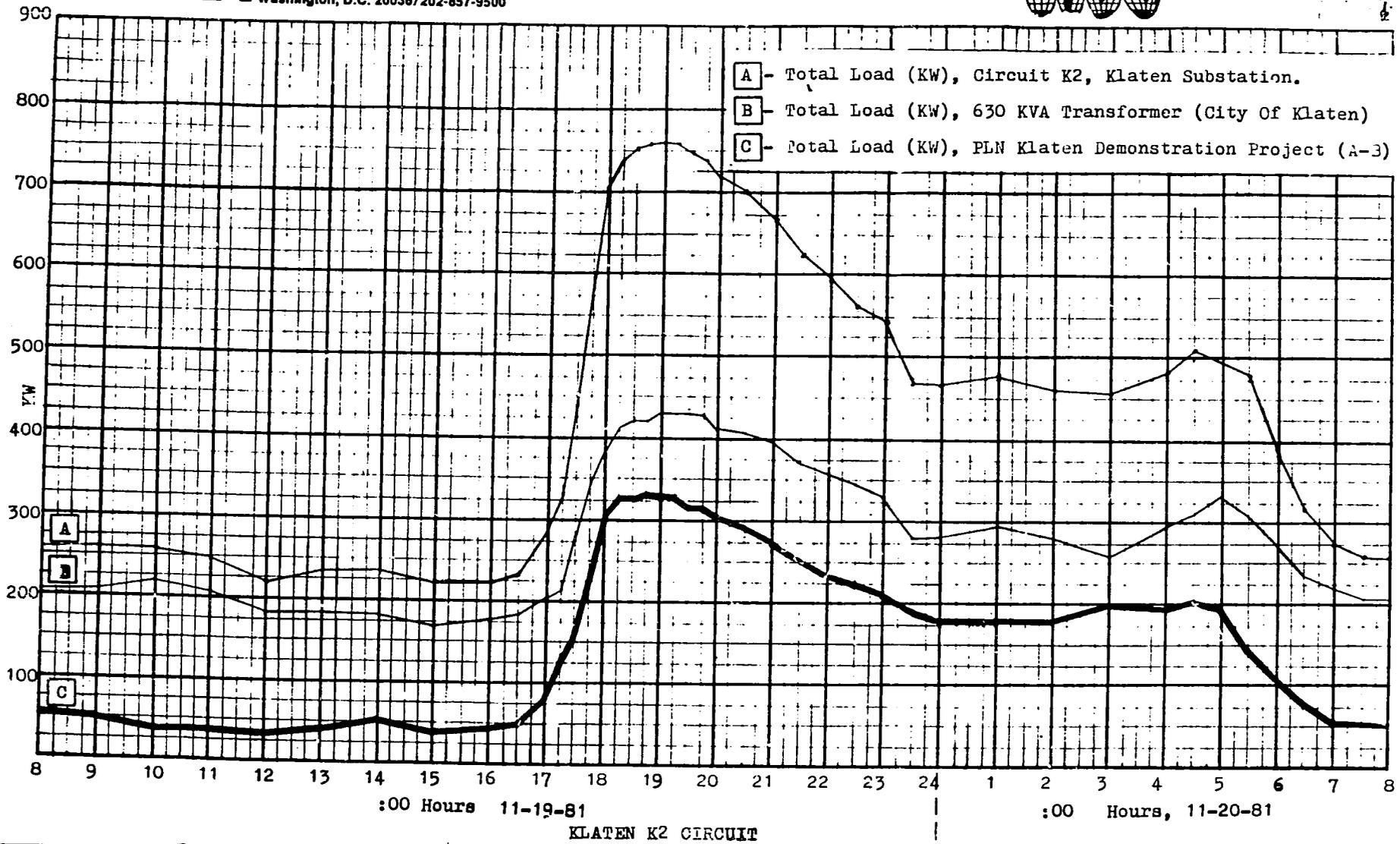
D. MEETINGS & TRIPS (Central Java NRECA Advisor)

- Nov. 10 - Semarang-PLN Wilayah XIII - Meeting with PLN RE management trainees to discuss training course on housewiring held on Nov. 2-4.
- Nov. 11 - Semarang - Meeting with PLN RE management trainees to discuss type of lightning arrester that will be used on the RE projects.
- Nov. 13 - Semarang - Meeting with official of bank for small business to discuss the service area of the Klaten RE project in Central Java.
- Nov. 14 - Semarang - Meeting at PLN Wilayah XIII with the deputy director to discuss preparations of a daily load curve of the Klaten RE Demonstration Project.
- Nov. 16 - Klaten - Meeting with PLN RE management trainee at the productive use office to discuss assistance in monitoring the Klaten RE Project.
- Nov. 20 - Klaten - Meeting with PLN sub-branch manager to discuss RE Demonstration Project load curve.
- Nov. 16 - Visit the Klaten RE Project area to make preparations to monitor circuit K-2 at the Klaten sub-station.
- Nov. 19-20 - Klaten - Monitor circuit K-2 for 24 hours at the Klaten sub-station RE Demonstration Project.



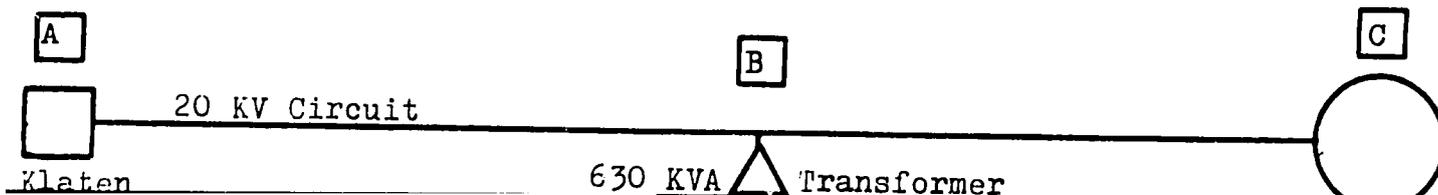
KLATEN K2 CIRCUIT

8 B



DATE	TIME	KW 'A'	KW 'B'	KW 'C' (A-B)	DATE	TIME	KW 'A'	KW 'B'	KW 'C' (A-B)
Nov. 19	08:00	258	205	53		19:45	744	428	316
	09:00	259	209	50		20:00	719	411	305
	10:00	259	222	37		20:30	700	407	293
	11:00	249	207	42		21:00	670	395	275
	12:00	220	183	37		21:30	625	374	251
	13:00	232	189	43		22:00	595	358	237
	14:00	239	187	52		22:30	569	343	226
	15:00	221	171	58		23:00	545	329	216
	16:00	224	176	48		23:30	470	280	190
	16:30	236	186	50		24:00	470	288	182
	17:00	290	203	87	Nov.20	01:00	478	293	185
	17:15	340	215	125		02:00	464	279	185
	17:30	442	285	157		03:00	460	260	200
	17:45	584	346	238		04:00	487	295	192
	18:00	702	388	314		04:30	516	314	202
	18:15	743	415	328		05:00	532	337	195
	18:30	752	424	328		05:30	460	312	148
	18:45	758	424	334		06:00	385	274	111
	19:00	763	433	330		06:30	321	239	82
	19:15	761	433	328		07:00	275	222	53
	19:30	749	433	316		07:30	258	205	53

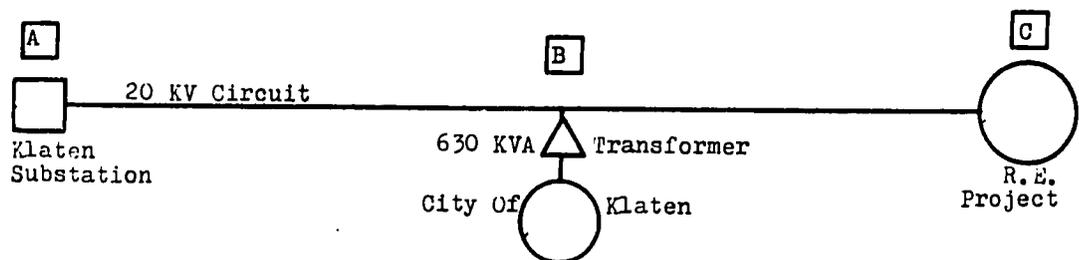
1. Max. demand (KW) Demonstration Project (C) 334KW, 18:45HRS.
2. Min. demand (KW) Demonstration Project (C) 37KW, 12:00HRS.
3. Total customers in Project - 1964
4. Max. demand per customer (average) - 170 watts.
5. Min. demand per customer (average) - 19 watts.
6. Load Factor this period - 43.6%



DATA
KILOWATT DEMAND
KLATEN RE DEMONSTRATION PROJECT

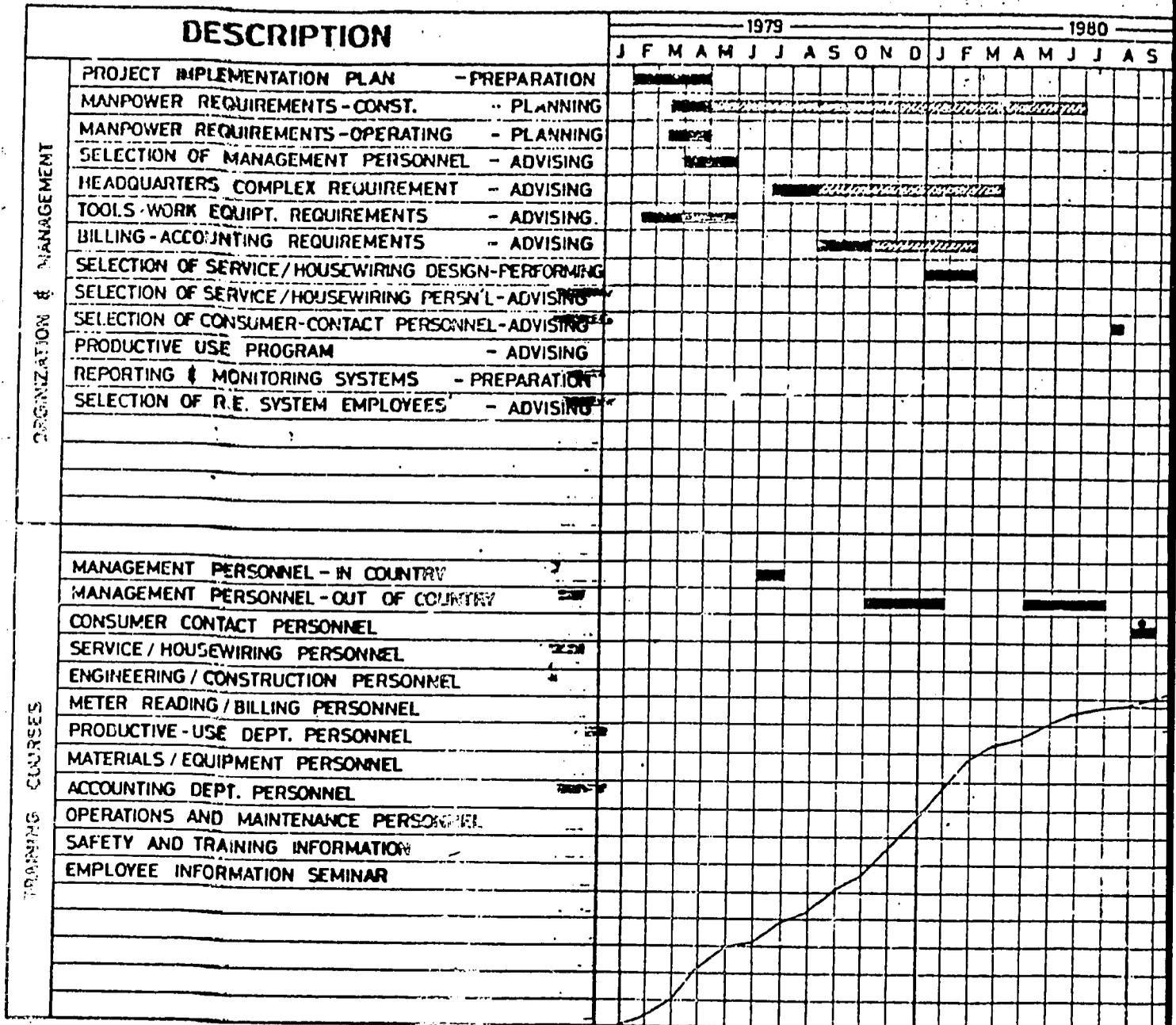
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INDICATES PERIOD OF PERFORMANCE
 INDICATES PERIOD OF EVALUATION

ORGANIZATION MANAGEMENT TR RURAL ELECTRIFI



LEGEND:
 - - - - - WORK SCHEDULED - 78%
 _____ WORK COMPLETED - 63%

NA

PLN-CENTRAL JAVA RURAL
TRAINING COUR

COURSE	TITLE	1979			1980		
	LANGUAGE TR.-MANAGEMENT		25	10		11	
	OUT-OF-COUNTRY TRAINING					12	13
I	INTRODUCTION SUPERVISION		25				
II	ORIENTATION-CUSTOMER CONTACT						
III	CONSTRUCTION SUPERVISION						
IV	TRAINERS TRAINING-HOUSEWIRING						
V	DISTRIBUTION PLAN-DESIGN						
VI	APPRENTICE LINEMAN						
VII	HOUSEWIRING						
VIII	MATERIAL LOGISTICS						
IX	ACCNT. REPORTING-CONST.						
X	ELECTRIC APPARATUS						
XI	METER READING						
XII	PRODUCTIVE USE-OJT						
XIII	ENGINEERING DIST. SYSTEM						
XIV	MATERIAL WAREHOUSE						
XV	ACCNT. REPORTING-OPERATIONS						
XVI	SECTIONALIZING-PROTECTION						
XVII	OPERATIONS-MAINTENANCE						
XVIII	SUPERVISION						
XIX	SAFETY						
XX	EMPLOYEE INFO. SEMINAR						
XXI	COMM. SYSTEMS OPERATIONS						
XXII	LINE MAINT. TECHNIQUES						

COURSES COMPLETED — ■
COURSES SCHEDULED — ▨

PARTICIPANTS — ■

25

KLATEN RE DEMONSTRATION UNIT

BILLING STATISTICS 13 MONTH PERIOD

COLUMN NUMBER								
1	2	3	4	5	6	7	8	9
NOVEMBER 1980	62,020	1912	32	5,482,130	2867	1609	1262	88
DECEMBER	61,533	1922	32	5,436,135	2828	1593	1234	88
JANUARY 1981	63,133	1927	33	5,488,030	2848	1610	1238	87
FEBRUARY	64,127	1927	34	5,424,930	2815	1624	1189	85
MARCH	77,843	1932	40	5,753,450	2978	1816	1162	74
APRIL	67,780	1932	35	5,411,925	2801	1655	1147	80
MAY	77,873	1946	40	5,753,855	2856	1808	1148	74
JUNE	75,153	1950	39	5,652,455	2899	1770	1129	75
JULY	81,678	1955	42	5,825,330	2980	1864	1116	71
AUGUST	76,007	1961	39	5,712,755	2915	1781	1134	75
SEPTEMBER	86,202	1969	43	5,932,410	3027	1919	1108	69
OCTOBER	85,335	1964	42	5,806,480	2955	1880	1076	70
NOVEMBER 1981	84,129	1972	43	5,820,160	2952	1886	1066	69

COLUMN NUMBER

1. MONTH

2. TOTAL KWH BILLED

3. TOTAL CUSTOMERS BILLED

4. AVERAGE KWH PER CUSTOMER

5. TOTAL RUPIAH BILLED

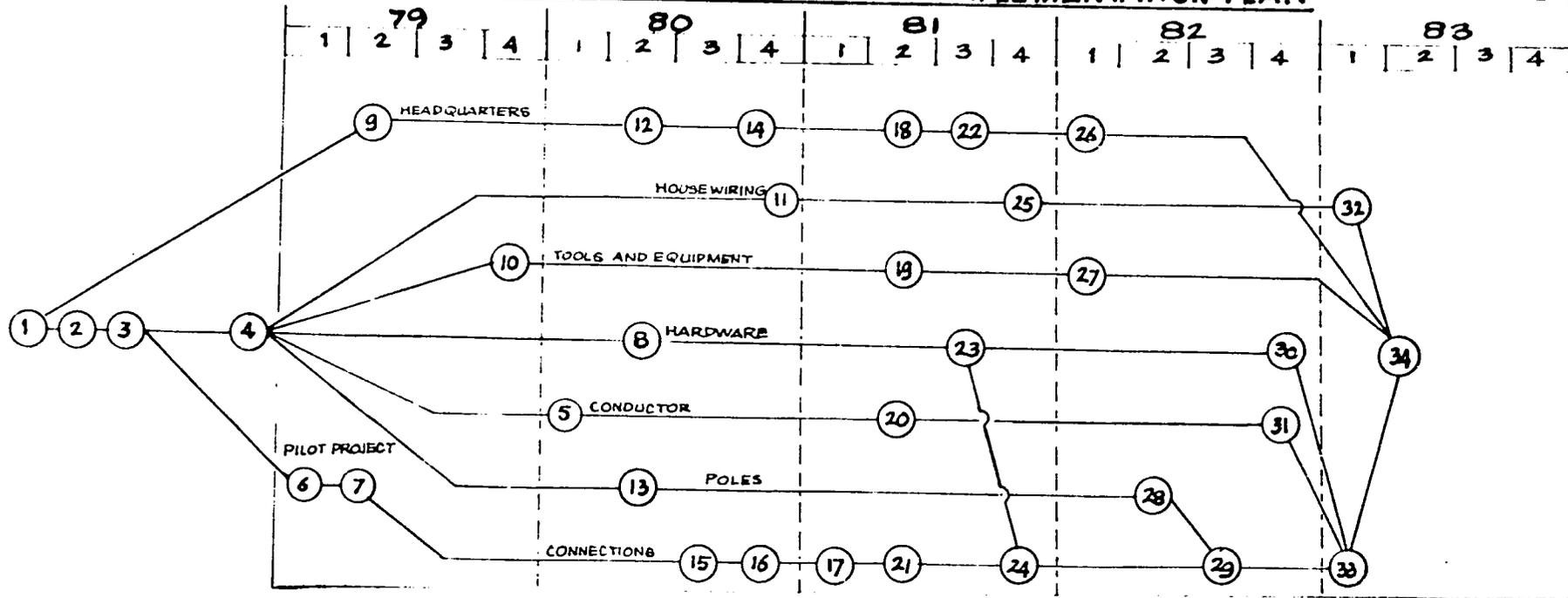
6. AVERAGE RUPIAH PER CUSTOMER (TOTAL)

7. AVERAGE ENERGY CHARGE PER CUSTOMER

8. INSTALLATION & HOUSEWIRING CHARGE

9. COST PER KWH (RUPIAH)

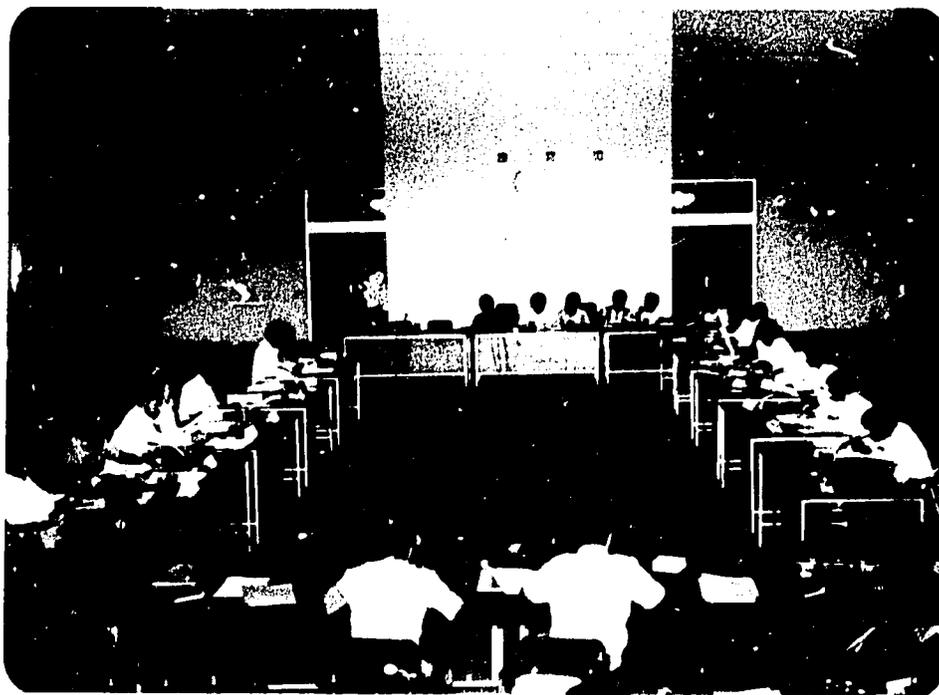
RURAL ELECTRIFICATION - PLN IMPLEMENTATION PLAN



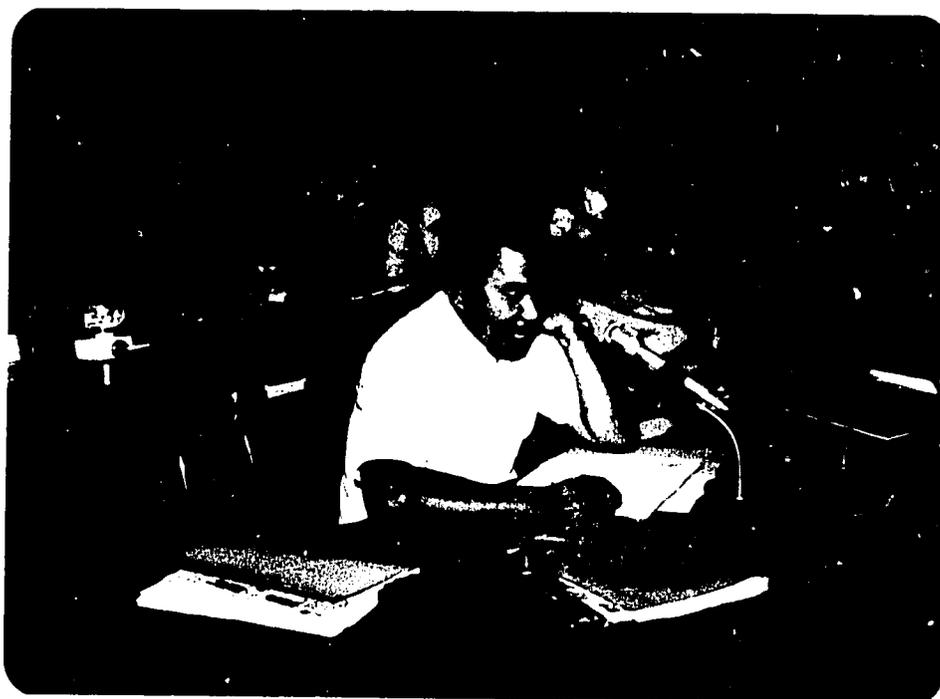
LEGEND

- | | |
|--|--|
| 1. FEASIBILITY REPORTS COMPLETED (8/77) | 22. WAREHOUSES COMPLETED |
| 2. LOAN AGREEMENT SIGNED (5/78) | 23. FIRST DELIVERY OF HARDWARE & MATERIALS |
| 3. AE & OM CONTRACTS SIGNED (9/78 & 8/78) | 24. FIRST TESTING AND ENERGIZATION OF SYSTEM |
| 4. CENTER LINE STAKING BEGINS (10/78) | 25. FIRST DELIVERY OF HOUSE WIRING |
| 5. IFB ^a ISSUED - CONDUCTOR | 26. HQ ^b COMPLETED |
| 6. BEGIN CONSTRUCTION OF KLATEN PILOT PROJECT | 27. FINAL DELIVERY OF TOOLS |
| 7. BEGIN OPERATION OF KLATEN PILOT PROJECT | 28. ALL POLES DELIVERED |
| 8. IFB ^b ISSUED - HARDWARE | 29. COMPLETE SETTING OF POLES |
| 9. BEGIN PURCHASE OF HQ SITES | 30. FINAL DELIVERY OF HARDWARE |
| 10. IFB ^c ISSUED - TOOLS AND EQUIPMENT | 31. FINAL DELIVERY OF CONDUCTOR |
| 11. IFB ^d ISSUED - HOUSE WIRING | 32. FINAL DELIVERY OF HOUSE WIRING |
| 12. SURVEY PROPERTY & SOIL TESTING | 33. SYSTEM COMPLETION |
| 13. FIRST DELIVERY OF POLES | 34. HOUSE CONNECTIONS IN PROCESS |
| 14. CONTRACTS LET. FOR SITE PREPARATION | 35. SYSTEM OPERATING |
| 15. CENTER LINE STAKING COMPLETED | |
| 16. SYSTEM DESIGN COMPLETED | |
| 17. CONSTRUCTION ENGIN. (STAKING) COMPL. | |
| 18. SITES PREPARED | |
| 19. FIRST DELIVERY OF TOOLS & EQUIPMENT | |
| 20. FIRST DELIVERY OF CONDUCTOR | |
| 21. BEGIN TRIMMING RIGHT OF WAY SETTING AND FRAMING OF POLES | |

PLN Central Java Activities
"Housewiring TRAINORS-TRAINING COURSE"

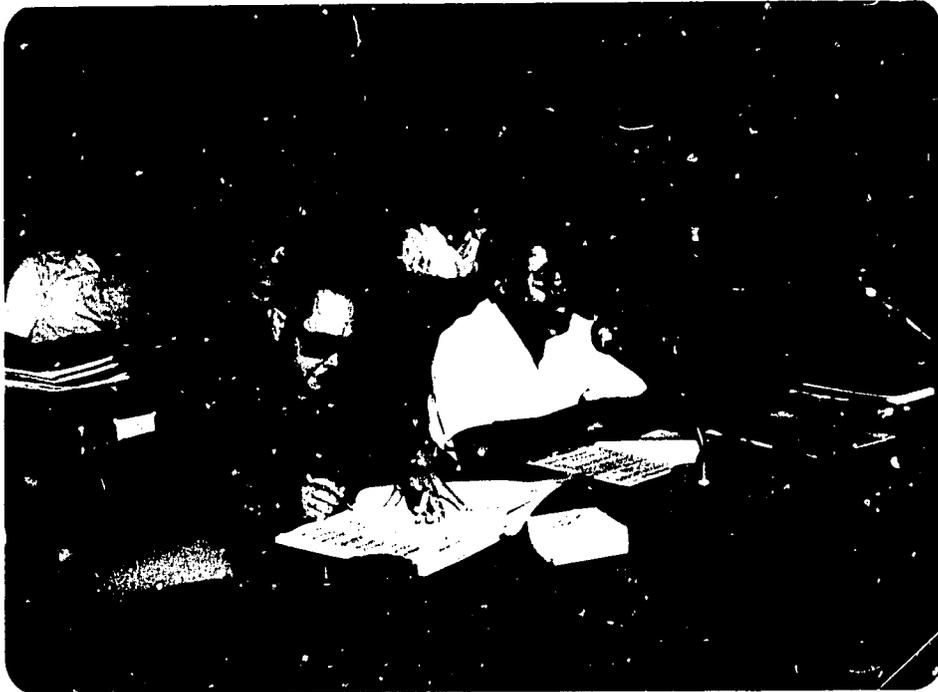


Participants in the training course held in Semarang, November 2, 3, 4 1981.



Training course instructor, Mr. Trijono (in the foreground), Mr. Adi Wardoyo, Deputy Director of PLN Wilayah XIII, Semarang and Mr. Soemarto Soedirman, Chief of Training, PLN-RE, Jakarta.

Housewiring Trainors-Training Course



Mr. Ristam, Chief of Wilayah XIII RE Department, addressing the participants, flanked by Mr. Eddie Slamet, Chief of Program, PLN Training Department, Jakarta (left), and Mr. Soemarto Soedirman, Chief of Training PLN-RE, Jakarta.



Ir. John Rumondor, Deputy Director for Rural Electrification, PLN-Jakarta, addresses the participants during the closing ceremony.

Summary of Expenditures

National Rural Electrification Cooperative Association
1800 Massachusetts Ave., N.W.
Washington, D.C. 20036

AID/ASIA - C 1347
Date: September, 1981
Period of contract: 8/25/78 - 8/25/82

	Budget	Total Expense To Date	Prior Billings	Current Billings
Salaries - Field	\$ 1,095,000	\$ 721,061.02	\$ 695,732.16	\$ 25,328.86
Salaries - Home	187,000	116,465.10	113,618.37	2,846.73
Fringe Benefits	416,000	264,754.01	256,439.76	8,314.25
Consultant Fees	34,706	33,906.25	33,906.25	
Allowances	398,000	254,814.46	258,497.44	(3,682.98)
Travel and Transportation	386,470	250,683.15	231,662.54	19,020.61
Other Direct Costs	140,000	78,956.50	77,183.93	1,772.57
Overhead	292,000	191,819.60	185,339.70	6,479.90
Equipment and Materials	28,000	18,292.46	18,292.46	
TOTAL	\$ 2,977,176	\$ 1,930,752.55	\$ 870,672.61	\$ 60,079.94

PERSON-MONTHS BY POSITION, NRECA CONSULTANT TEAM

POSITION	PRESENTLY FILLED BY	CONTRACT PERSON-MONTHS	EXPENDED THIS PERIOD	EXPENDED THROUGH NOV.		PERCENT OF CONTRACT
				PLN	PDO	
Team Leader	Peter McNeill	54	1	7	31	70
Training Officer	Louie Sansing	45	1	7	27	76
Administrative Officer	Ray Shoff	33	1	3.5	21.5	76
PLN Advisor	Sam Adkins	42	1	32.5	.5	79
Lampung Advisor	Lloyd Lake	54	1	.5	37.5	70
Lombok Advisor	Paul Swanson	50	1	0	34	68
Luwu Advisor	John DeFoor	49	1	0	33	67
Short-term Advisors		19	0	14	3	
Consultants		8	0	7.5	.5	
		354	7	72	188	73