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RURAL ELECTRIFICATION PROJECTS

INDONESIA



NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION

JAKARTA, INDONESIA

NRECA TEAM REPORT

PLN

INDONESIA

(SEPTEMBER 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: 713850
*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: 712034
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.

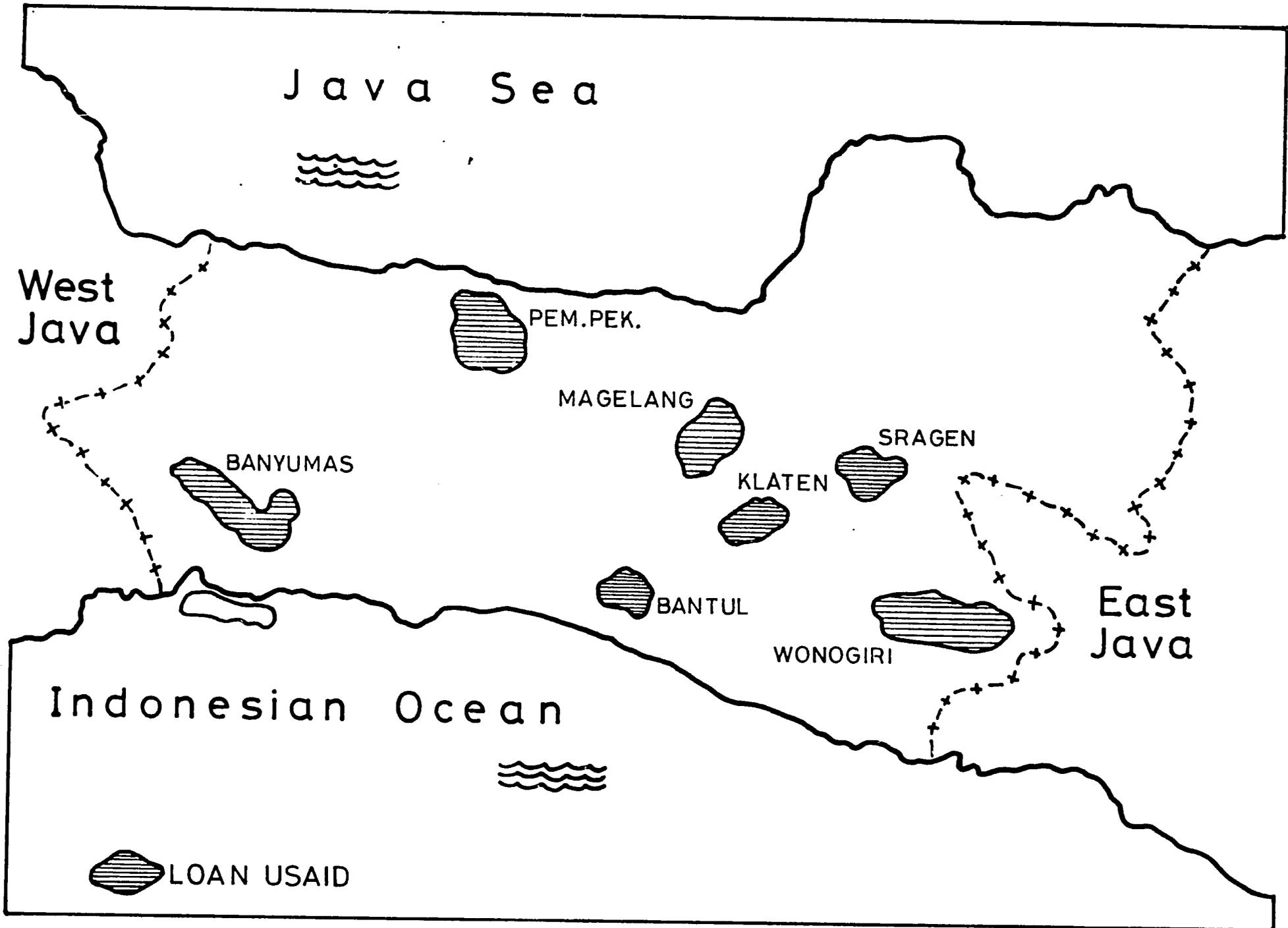
SEVEN PLN PROJECTS

<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	35	15,000	135,000
TOTALS	440	130,000	1,170,000

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

CENTRAL JAVA

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II. PROJECT ACTIVITIES

A. Organization/Management

NRECA-Jakarta Staff --- The NRECA team leader made a field trip to Central Java this month and accompanied NRECA's PLN advisor on R.E. project visitations. Distribution-system and Headquarters construction activities were observed at the Sragen, Wonogiri, Klaten and Magelang projects. Plans were reviewed for staffing and monitoring the operation of the projects after energization.

--- NRECA administrative/finance officer and NRECA-PLN advisor maintained contact with training department officials and department heads in PLN's RE office in Jakarta. Major subjects for discussion were training course schedules and contents with special attention given to training courses for housewiring.

--- The NRECA team leader met with Ir. John Rumondor, Deputy Director of Rural Electrification, on two occasions to review the program of electrifying 37 villages in the Central Java R.E. project areas by March 31, 1982. Connection charges and project connection rates were major subjects for discussion.

--- Two meetings were held with Professor Suryono, Senior Advisor to PLN, on the subject of small-hydro development in Indonesia. USAID/PTE and NRECA representatives in attendance at these meetings were appraised of general location and site selection procedures. The Small Decentralized Hydro (SDH) division of NRECA will assist in developing a procedure for pre-feasibility site evaluation.

--- NRECA team members participated in a PLN-coordination meeting held in Jakarta on September 28th. Included in the discussion was the subject of tool requirements for housewiring activities. It was recommended that tools be made available through local procurement and NRECA was assigned the task of developing a list of requirements.

NRECA-Central Java Office --- NRECA prepared recommendations for identifying and controlling distribution system equipment and apparatus. The recommendations, which covered such items as transformers and oil circuit reclosers, were forwarded to PLN's Central Java construction and operations offices. The establishment of control numbers is proposed as the initial step with numbers to be placed on the equipment when items are received from the various suppliers. A card-file would indicate location and pertinent data. PLN operations division (Wilayah XIII) would receive the card-file from the construction division (P.I. Ring) and maintain a history of equipment items throughout their useful life.

--- Assistance was given to Wilayah XIII in determining tool requirements for housewiring activities in the 1981-82 R.E. project construction program. Tools being procured through the IFB process may not be received until late 1982 (referred to earlier in this report) and therefore, tools must be procured locally in quantities sufficient to complete thirteen thousand (13,000) housewiring installations by April 1982.

--- Wilayah XIII and NRECA staff reviewed tool and equipment listings which are included in the U.S. dollar-loan procurement. Lists include hand tools and work equipment to be used for overhead-line construction, housewiring tools and headquarters and laboratory equipment that will be required for the normal operation of the seven systems.

The recommendations that were formulated and forwarded to PLN's Jakarta Headquarters include the categorizing of tools and equipment as follows:

- 1) New tools and equipment to be furnished to P.I. Ring for use during the construction of the R.E. projects.
- 2) New tools and equipment to be provided to Wilayah XIII at the time received. Some items will be used in the R.E. system housewiring program and other items will be reserved for use in operating and maintaining the R.E. systems.

- 3) Used tools and equipment, which are originally included in category #1, to be turned-over to Wilayah XIII by P.I. Ring at the end of the construction program. Wilayah XIII will use these tools for system maintenance.

--- Other NRECA activities included contact with Binnie & Partners, a British Firm doing ground water studies in Central Java for the Department of Water and Irrigation. It was determined that the possibility exists for the installation of a number of water pumping facilities, in the 40hp. to 60hp. class, in some of the R.E. project areas in Central Java. At present, the areas just north of the Klaten R.E. Project location and the Pekalongan R.E. Project are being considered for extensive water pumping.

Binnie & Partners representatives estimate that the hours-use of irrigation pumps will range from five to eight hours per day. If pumping loads can be served off-peak, sizable increases in revenue for the R.E. projects could be realized without much change in investment. In view thereof, NRECA is recommending direct communication between PLN and the Department of Water and Irrigation to quickly explore the benefits of installing electric motors versus diesel engines.

B. Training

--- During this period, training materials were prepared for a trainors-training course. The participants will be PLN employees who will train personnel in each of the seven R.E. project areas in the art of customer contact and the administrative functions relating to applications for service and housewiring-contracts.

--- Planning sessions were held with representatives of PLN-Pusat, PLN Wilayah XIII and NRECA in attendance. All facets of the housewiring program were discussed. Emphasis was placed on the importance of reliable construction principles, economics, and the assurance that training in all seven project areas will be consistent. November 2nd was set as the target date to begin housewiring training courses.

C. Klaten PLN R.E. Demonstration Unit.

--- The PLN R.E. Demonstration Project constructed by PLN in early 1979 to monitor the acceptability of electric service by the rural population is now serving 1960 customers. The project was built with provision for service to approx. 2000 customers. The average consumption per customer for the month of September, 1981, was 43 kilowatt-hours as compared to a consumption of 31 kilowatt-hours for the same period the previous year. (See pages 9 and 10).

The kilowatt demand for the demonstration project is not known since metering equipment does not have kw demand registers. Therefore, Wilayah XIII technical department personnel and NRECA Staff will monitor the kilowatt-hour consumption on an hourly basis for a 24-hours period to obtain information to calculate the kw demand. Kw load-curves will be prepared and this information, combined with other data from the demonstration project, will be useful in projecting load and load factors in the seven R.E. projects .

D. Meeting, Conferences and Trips (NRECA advisor in Central Java).

- September 1 --- Attended an NRECA Team meeting in Jakarta.
- September 2 --- Conference with PLN Wilayah XIII officials to discuss socket type and bottom connected metering for R.E. project.
- September 10 --- Conference with officials of Bennie & Associates, British Firm in Semarang doing ground water surveys.
- September 11 --- Field trip to concrete pole plant at Boyolali, Central Java, R.E. Project at Sragen and R.E. Project at Wonogiri.
- September 12 --- Field trip to R.E. Project at Magelang, Central Java.
- September 17 --- Conference at PLN Wilayah XIII in Semarang with representatives from PLN Pusat present to discuss housewiring training.

- September 19 --- Field trip to Klaten, PLN R.E. Demonstration project visitation and a meeting with PLN Productive Use Consultant. Visited the Klaten Sub-station to observe watt-hour meter on the Klaten Demonstration Project 20 kv circuit.
- September 22 --- Conference at Wilayah XIII in Semarang to discuss labor requirements to complete housewiring for R.E. Projects in Central Java.
- September 28 --- Attended a PLN Coordination Meeting in Jakarta.
- September 29 --- Conference at PLN Pusat with PLN training officials to discuss training of instructors for the housewiring program.

KLATEN RE DEMONSTRATION UNIT

BILLING STATISTICS 13 MONTH PERIOD

COLUMN NUMBER								
1	2	3	4	5	6	7	8	9
SEPT. 1980	60,791	1903	31	5,311,065	2790	1592	1198	87
OCTOBER	62,316	1903	32	5,347,175	2890	1611	1198	86
NOVEMBER	62,020	1912	32	5,482,130	1872	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	75,154	1950	39	5,652,455	2899	1770	1129	75
JULY	81,678	1955	42	5,825,330	2980	1864	1116	71
AUGUST	76,007	1960	39	5,712,755	2915	1781	1134	75
SEPT. 1981	86,202	1960	43	5,932,410	3027	1919	1108	69

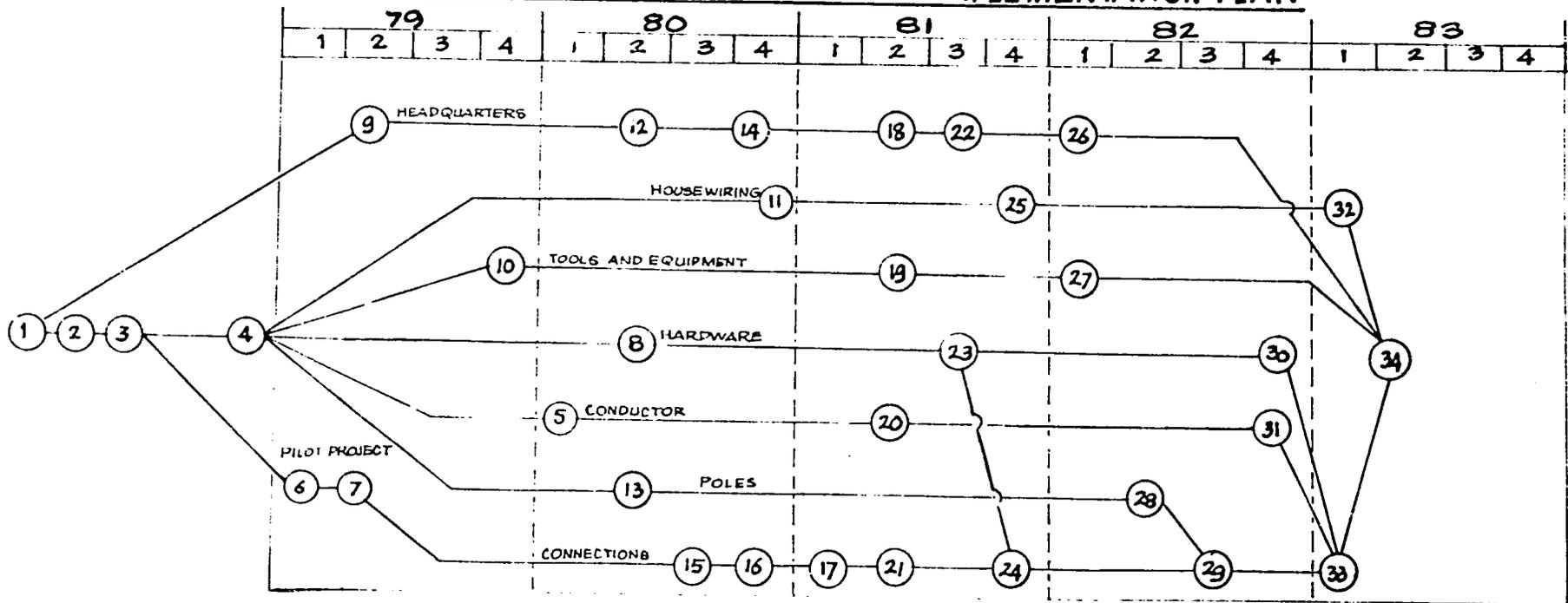
COLUMN NUMBER

- | | |
|-----------------------------|----------------------------------------|
| 1. MONTH | 5. TOTAL RUPIAH BILLED |
| 2. TOTAL KWH BILLED | 6. AVERAGE RUPIAH PER CUSTOMER (TOTAL) |
| 3. TOTAL CUSTOMERS BILLED | 7. AVERAGE ENERGY CHARGE PER CUSTOMER |
| 4. AVERAGE KWH PER CUSTOMER | 8. INSTALLATION & HOUSEWIRING CHARGE |
| | 9. COST PER KWH (RUPIAH) |

KLATEN R.E. DEMONSTRATION PROJECT
CUSTOMER USEAGE COMPARSION

MARCH 1981, AVG. 40 KWH PER. MO.			SEPTEMBER 1981, AVG. 43 KWH PER. MO.		
KWH Per. Month	Number Of Customers	Percent Of Total	KWH Per. Month	Number Of Customers	Percent Of Total
0 - 10	196	10.2	0 - 10	211	10.76
			11 - 15	156	7.96
11 - 19	430	22.2	16 - 20	208	10.61
20 - 24	209	10.8	21 - 25	208	10.61
25 - 29	181	9.4	26 - 30	197	10.05
30 - 34	178	9.2	31 - 35	181	9.24
35 - 40	164	8.5	36 - 40	147	7.50
41 - 50	162	8.3	41 - 50	188	9.59
51 - 60	116	6.0	51 - 60	120	6.12
61 - 75	88	4.6	61 - 75	109	5.56
76 - 100	106	5.5	76 - 100	95	4.85
101 - 149	55	2.9	101 - 149	73	3.72
150 - 200	22	1.1	150 - 200	33	1.68
200 - UP	25	1.3	201 - 250	18	.92
			251 - 300	4	.21
			301 - 500	8	.41
			500 - UP	4	.21
TOTAL	1932	100.0	TOTAL	1960	100.00

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 HOUSEWIRING |
| 5 IFB'S ISSUED - CONDUCTOR | 26. HQ'S COMPLETED |
| 6 BEGIN CONSTRUCTION OF KHATEN PILOT PROJECT | 27. FINAL DELIVERY OF TOOLS |
| 7 BEGIN OPERATION OF KHATEN PILOT PROJECT | 28. ALL POLES DELIVERED |
| 8 IFB'S ISSUED - HARDWARE | 29. COMPLETE SETTING OF POLES |
| 9 BEGIN PURCHASE OF HQ SITES | 30. FINAL DELIVERY OF HARDWARE |
| 10 IFB'S ISSUED - TOOLS AND EQUIPMENT | 31. FINAL DELIVERY OF CONDUCTOR |
| 11 IFB'S ISSUED - HOUSE WIRING | 32. FINAL DELIVERY OF HOUSEWIRING |
| 12. SURVEY PROPERTY GOIL TESTING | 33. SYSTEM COMPLETION |
| 13 FIRST DELIVERY OF POLES | 34. HOUSE CONNECTIONS IN PROCESS SYSTEM OPERATING |
| 14 CONTRACTS LET FOR SITE PREPARATION | |
| 15 CENTER LINE STAKING COMPLETED | |
| 16 SYSTEM DESIGN COMPLETED | |
| 17. CONSTRUCTION LINDIN (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 | |

12A

INDICATES PERIOD OF PERFORMANCE
 INDICATES PERIOD OF EVALUATION

ORGANIZATION MANAGEMENT RURAL ELECT

DESCRIPTION		1979												1980					
		J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J
ORGANIZATION & MANAGEMENT	PROJECT IMPLEMENTATION PLAN - PREPARATION	[Work Scheduled]																	
	MANPOWER REQUIREMENTS - CONST. - PLANNING	[Work Scheduled]												[Work Completed]					
	MANPOWER REQUIREMENTS - OPERATING - PLANNING	[Work Scheduled]												[Work Completed]					
	SELECTION OF MANAGEMENT PERSONNEL - ADVISING	[Work Scheduled]																	
	HEADQUARTERS COMPLEX REQUIREMENT - ADVISING	[Work Scheduled]												[Work Completed]					
	TOOLS-WORK EQUIPT. REQUIREMENTS - ADVISING	[Work Scheduled]																	
	BILLING-ACCOUNTING REQUIREMENTS - ADVISING	[Work Scheduled]												[Work Completed]					
	SELECTION OF SERVICE/HOUSEWIRING DESIGN-PERFORMING	[Work Scheduled]												[Work Completed]					
	SELECTION OF SERVICE/HOUSEWIRING PERSNL-ADVISING	[Work Scheduled]												[Work Completed]					
	SELECTION OF CONSUMER-CONTACT PERSONNEL-ADVISING	[Work Scheduled]																	
	PRODUCTIVE USE PROGRAM - ADVISING	[Work Scheduled]																	
	REPORTING & MONITORING SYSTEMS - PREPARATION	[Work Scheduled]																	
	SELECTION OF R.E. SYSTEM EMPLOYEES' - ADVISING	[Work Scheduled]																	
TRAINING COURSES	MANAGEMENT PERSONNEL - IN COUNTRY	[Work Scheduled]												[Work Completed]					
	MANAGEMENT PERSONNEL - OUT OF COUNTRY	[Work Scheduled]												[Work Completed]					
	CONSUMER CONTACT PERSONNEL	[Work Scheduled]												[Work Completed]					
	SERVICE/HOUSEWIRING PERSONNEL	[Work Scheduled]												[Work Completed]					
	ENGINEERING/CONSTRUCTION PERSONNEL	[Work Scheduled]												[Work Completed]					
	METER READING/BILLING PERSONNEL	[Work Scheduled]												[Work Completed]					
	PRODUCTIVE-USE DEPT. PERSONNEL	[Work Scheduled]												[Work Completed]					
	MATERIALS/EQUIPMENT PERSONNEL	[Work Scheduled]												[Work Completed]					
	ACCOUNTING DEPT. PERSONNEL	[Work Scheduled]												[Work Completed]					
	OPERATIONS AND MAINTENANCE PERSONNEL	[Work Scheduled]												[Work Completed]					
	SAFETY AND TRAINING INFORMATION	[Work Scheduled]												[Work Completed]					
	EMPLOYEE INFORMATION SEMINAR	[Work Scheduled]												[Work Completed]					

LEGEND:
 - - - - - WORK SCHEDULED - 75%
 _____ WORK COMPLETED - 50%
 ● NOT COMPLETED

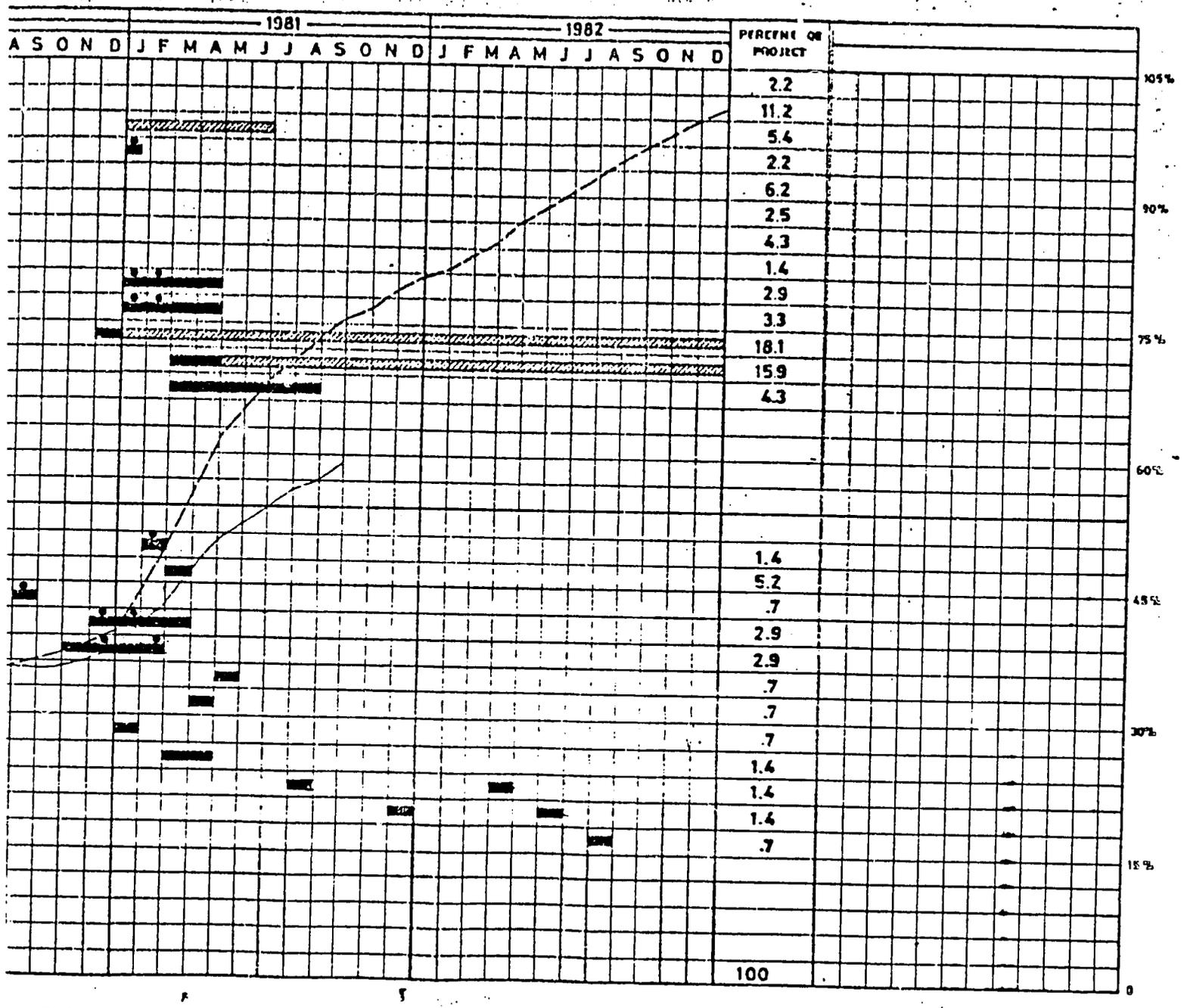
12 B

12 -

TRAINING PROGRESS SCHEDULE

IFICATION-I-PLN.

NRECA



13 A

PLN-CENTRAL JAVA RURAL
TRAINING COURSE

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

Central Java activities



Headquarter facilities under construction at the Magelang RE Project including an office for operations personnel and warehousing facilities.



Poles stored at the Magelang headquarters site on permanent pole-racks.

After the basic construction is completed, these facilities will continue to serve their intended purpose, storing poles for maintenance and RE system expansion.

Summary of Expenditures

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

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

	Budget	Total Expense To Date	Prior Billings	Current Billings
Salaries - Field	\$ 874,520	\$ 695,732.16	\$ 668,637.52	\$ 27,094.64
Salaries - Home	140,050	113,618.37	110,836.53	2,781.84
Fringe Benefits	256,664	256,439.76	247,768.74	8,671.02
Consultant Fees	95,800	33,906.25	33,906.25	-
Allowances	366,145	258,497.44	249,891.49	8,605.95
Travel and Transportation	310,000	231,662.54	223,983.26	7,679.28
Other Direct Costs	125,900	77,183.93	75,342.65	1,341.28
Overhead	225,960	185,339.70	178,468.10	6,871.60
Equipment and Materials	15,000	18,292.46	18,292.46	-
TOTAL	\$ 2,410,000	\$ 1,870,672.61	\$ 1,807,627.00	\$ 63,045.61

PERSON-MONTHS BY POSITION, NRECA CONSULTANT TEAM
(Contract as amended September 11, 1981)

POSITION	PRESENTLY FILLED BY	CONTRACT PERSON-MONTHS	EXPENDED THIS PERIOD	EXPENDED THROUGH SEPTEMBER	PERCENT OF CONTRACT
Team Leader	Peter McNeill	54	1	36	67
Training Officer	Louie Sansing	45	1	32	71
Administrative Officer	Ray Shoff	33	1	23	70
PLN Advisor	Sam Adkins	42	1	31	74
Lampung Advisor	Claude Franke	54	1	36	67
Lombok Advisor	Paul Swanson	50	1	32	64
Luwu Advisor	John DeFoor	49	1	31	63
Short-term Advisors		19	0	17	89
Consultants		8	0	8	100
		354	7	246	69