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**RURAL ELECTRIFICATION PROJECTS
INDONESIA**



NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION

JAKARTA, INDONESIA

NRECA TEAM REPORT

PLN

INDONESIA

(APRIL 1981)

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NRECA TEAM MEMBERS AS OF FEBRUARY, 1981

<u>NAME</u>	<u>TITLE</u>	<u>ADDRESS</u>
Peter McNeill	Team Leader	Pondok Indah Bukit Hijau VIII/31 PH: 761132
Lloyd Lake	Sr. RE Specialist	P.O. Box 88 Tanjungkarang Lampung PH: 0721-52058
Louie Sansing	Sr. RE Specialist	Jl. Dukuh Patra II/73 Jakarta Selatan PH: 824308 ext. 394
*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 Jl. Jenderal Sudirman PH: 712034
* PLN Advisor		

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. (See tabulation below.)

The National Rural Electric Cooperative Association through their International Programs Division are 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.

<u>SERVICE AREA</u>	<u>VILLAGES TO BE SERVED</u>	<u>APPROXIMATE NO. OF CONNECTIONS</u>	<u>ESTIMATED NO. OF RECIPIENTS</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 reflect project expectations after the first three years of commercial operation.

NRECA Jakarta Office

The NRECA Team Leader, Mr. Peter McNeill, continued team representation at PLN Pusat (PLN's Headquarters in Jakarta) by maintaining contact with Ir. John Rumondor, Deputy Director for Rural Electrification. Mr. Sam Bunker, Administrator for NRECA International Programs Division was in Indonesia during this reporting period and participated in one of the conferences with Ir. Rumondor. The status of the PLN-RE Program, NRECA team assistance, present and future, were subjects for discussion at this conference.

--- Two coordination meeting's first and second of a scheduled series, were held at PLN Pusat during this reporting period with Ir. Rumondor serving as moderator. Representatives of USAID-PTE, C.T. Main, PLN-Semarang Branch, PLN Pusat and NRECA exerted maximum effort to arrive at the most feasible method of increasing the activity on the PLN-RE projects. Most of the emphasis was centered on attempting to speed-up the delivery of much needed construction material. It is expected that these meetings will continue throughout the project with emphasis on coordinating all functions.

--- A meeting was held at USAID offices for the purpose of reviewing a report on Rural Electrification in Indonesia. This report was prepared by Mr. Steven C. Tourkin, U.S. Bureau of Census office as an evaluation of the RE Program. USAID, CLUSA (Cooperative League of the USA) and NRECA representatives in attendance at this meeting generally agreed that Mr. Tourkin's report confirmed the findings of a previous evaluation -- Consumers of electric energy in the Klaten area of Central Java are financially able to pay for their electric service and to procure electric appliances and equipment to use electric service productively.

NRECA Central Java Activities

Operation and Management

--- The NRECA Advisor in Central Java, Sam Adkins, continued to work closely with PLN's operations branch (Wilayah XIII). Planning for operations and maintenance of the seven RE projects was a continuing activity. Different departments within Wilayah XIII, branch and sub-branch offices were visited and operating procedures were observed. It is planned that existing PLN procedures will be followed for O&M of the seven RE projects with modifications where deemed advisable.

--- Coordination was maintained with PLN's construction branch in Central Java, P.I. Ring. The NRECA advisor reviewed the construction plans of P.I. Ring and related this to NRECA team efforts and responsibilities. Construction materials from PLN's existing stock are being utilized to extend electric service to additional desas at the earliest possible date. Material quantities in stock, to be replaced when materials ordered through IFB procedures arrive in 1982, may be sufficient to serve thirty-seven (37) of the four hundred forty (440) desas included in the RE projects.

Productive Uses, Irrigation Potential

--- The NRECA advisor spent considerable time during this reporting period exploring irrigation potential. Although Java is an island of abundant agricultural activity, during the dry season in some areas there is not an adequate supply of surface water to provide water for rice farming.

As a part of this exploration, the advisor visited with Italian consultants in Madiun, East Java, who are conducting a ground water survey for the Department of Water and Irrigation in that area. The survey will extend into Central Java where water wells will be located in the Sragen RE Project Area. The purpose of the ground water survey is to locate water supplies and develop by installing pumps to bring this water to the surface to be used during periods of minimum surface water. Through this procedure, it is projected that a third rice crop can be harvested each year.

--- The NRECA advisor also visited with Bennie & Associates, a British Firm in Semarang, conducting a ground water survey, in Central Java. The survey is in the very early stages but it is expected that some of their activity will be within the designated areas of the RE projects.

PLN's interest in this activity centers on providing electricity for the pumps to be used to lift the water to the surface. Each pump location requires approximately 100 horsepower and from 6 to 10 pumps are required in each ground water area. It is estimated that the complete ground water project will require at least 3000 pumps.

This type of electrical load is ideal for PLN since it can be switched-off during the peak loading periods. The pumps could be operated during a time when PLN has adequate capacity and additional generation for irrigation purposes could be supplied at a relatively low kWh unit cost. PLN officials are now studying pumping costs, electricity versus diesel fuel.

NRECA is encouraging a very close association between the Department of Water & Irrigation and PLN because of the many advantages to be gained. Water can be pumped more economically and conveniently with electrical power and PLN can sell excess power at the most ideal time. This would raise the system load-factor and utilize the facilities to the best advantage. The Javanese rice farmer could have a third crop each year and additional jobs would result from the increased activity.

Training

--- The linemens training course which began in Semarang in March continued throughout this reporting period. Thirty-one (31) PLN employees are being trained in operating principles, care and use of transformers, voltage regulators and oil circuit reclosers. Pole setting, framing, grounding and conductor stringing are other subjects in this training course which is scheduled to continue through May 1981.

--- The NRECA advisor met with RE officials at PLN Pusat to discuss training courses that will be conducted during the second quarter of 1981. The two courses discussed were Accounting and Reporting and Housewiring Instructor Training. (Training course schedules may be found on page 13 of this report.)

Demonstration Project

--- The Rural Electrification Demonstration Project at Klaten continues to provide information relative to the acceptability of electric service in the rural areas of Central Java. During the last billing period, 1932 customers received electric service using an average of 40 kWh's per month.

Since the average use increased substantially, an investigation was deemed advisable. A field check of the customers consuming in excess of 200 kWh per month revealed an increase in business's that provide battery charging service and that small stores are staying open longer at night and using more lights. Also, most of the larger users have electric irons and some of the new houses have refrigerators. These are factors contributing to the increase in system average kWh consumption (see page 8 of this report).

TRIPS AND CONFERENCES

- April 1 - Coordination meeting in Jakarta at PLN Pusat to review the status of the RE Program, ways of improving material delivery and project progress.
- April 2 - Meeting at USAID to discuss possible assistance from USAID in providing a study of the PLN computer billing system in Central Java.
- April 7 and 8 - NRECA Team Meeting at PDO office in Jakarta.
- April 11 - Meeting with C.T. Main, Inc. in Semarang. Discussed housewiring material arrival dates.

- April 13 - Meeting in Madiun, East Java, with consultant conducting ground water survey in area of the Sragen RE Project.
- April 15 - Second Coordination Meeting at PLN Pusat.
- April 16 - Meeting with PLN Training and RE Development officials at PLN Pusat in Jakarta. Discussed training courses.
- April 23 and 25 - Visited the Klaten RE Demonstration project to investigate consumer kWh usage.

KLATEN R.M. DEMONSTRATION PROJECT
CUSTOMER USEAGE COMPARSION

<u>FEBRUARY</u> 1981, Avg. 34 KWH Per. Mo.			<u>MARCH</u> 1981, Avg. 40 KWH Per. Mo.		
KWH Per. Month	Number Of Customers	Percent Of Total	KWH Per. Month	Number Of Customers	Percent Of Total
0 - 10	256	13.3	0 - 10	196	10.2
11 - 19	474	24.5	11 - 19	430	22.2
20 - 24	256	13.1	20 - 24	209	10.8
25 - 29	204	10.4	25 - 29	181	9.4
30 - 34	191	9.9	30 - 34	178	9.2
35 - 40	142	7.4	35 - 40	164	8.5
41 - 50	132	6.9	41 - 50	162	8.3
51 - 60	77	4.0	51 - 60	116	6.0
61 - 75	62	3.2	61 - 75	88	4.6
76 - 100	56	2.9	76 - 100	106	5.5
101 - 149	43	2.3	101 - 149	55	2.9
150 - 200	15	.8	150 - 200	22	1.1
200 -	19	1.0	200 -	25	1.3
T O T A L	1927		T O T A L	1932	

KLATEN RE DEMONSTRATION UNIT
BILLING STATISTICS, 13 MONTHS PERIOD

COLUMN NUMBER								
1	2	3	4	5	6	7	8	9
APRIL- 1980	54,152	1846	29	3,734,457	2033	988	1035	70
MAY	58,514	1844	32	5,929,585	3216	2181	1035	101
JUNE	54,406	1877	29	6,011,450	3202	2106	*1097	110
JULY	53,969	1879	29	4,894,580	2605	1498	1107	91
AUGUST	56,150	1893	30	5,080,895	2684	1532	1152	90
SEPTEMBER	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	5,492,130	2872	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

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) |

* Some customers began paying out installation & housewiring charge in 12 months rather than 48 months

Summary of Expenditures

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

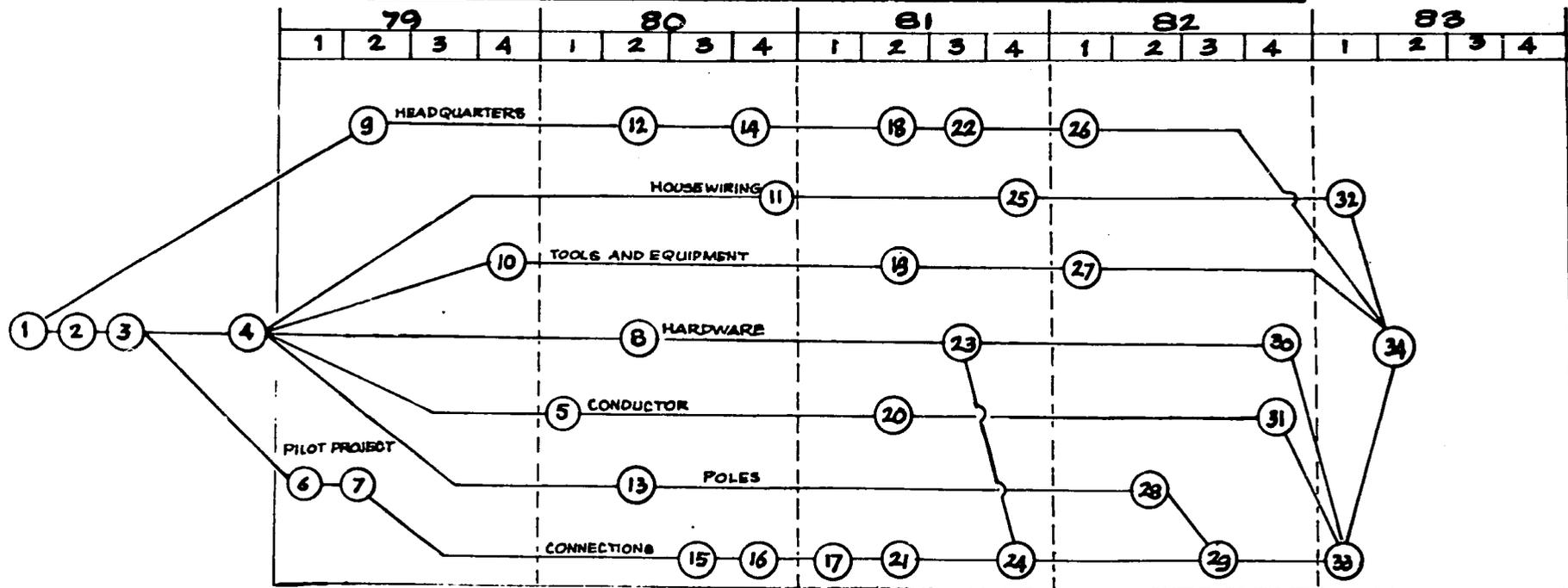
AID/ASIA - C 1347
Date: March 1981
Period of contract: 8/25/78 - 8/25/82

	Budget	Total Expense To Date	Prior Billings	Current Billings
Salaries - Field	\$ 874,520	576,487.86	554,283.88	22,203.98
Salaries - Home	140,050	98,720.49	95,689.18	3,031.31
Fringe Benefits	256,664	217,147.18	208,834.19	8,312.99
Consultant Fees	95,800	33,906.625	33,906.25	
Allowances	366,145	219,851.94	215,294.34	4,557.60
Travel and Transportation	310,000	206,094.91	196,736.19	9,358.72
Other Direct Costs	125,900	69,886.08	67,727.47	2,158.61
Overhead	225,960	154,486.97	148,682.85	5,804.12
Equipment and Materials	15,000	15,705.27	15,705.27	-
TOTAL	\$ 2,410,000	1,592,286.95	1,536,859.62	55,427.33

PERSON-MONTHS BY POSITION, NRECA CONSULTANT TEAM

POSITION	PRESENTLY FILLED BY	CONTRACT PERSON-MONTHS	EXPENDED THIS PERIOD	EXPENDED THROUGH APRIL	PERCENT OF CONTRACT
Team Leader	Peter McNeill	36	1	31	86
Training Officer	Louie Sansing	36	1	27	75
Administrative Officer	Ray Shoff	19	1	18	95
PLN Advisor	Sam Adkins	42	1	26	62
Lampung Advisor	Lloyd Lake	44	1	31	70
Lombok Advisor	Paul Swanson	44	1	27	61
Luwu Advisor	John DeFoor	44	1	26	59
Short-term Advisors		27	0	18	67
Consultants		31	0	0	0
		323	7	204	63

RURAL ELECTRIFICATION - PLN IMPLEMENTATION PLAN

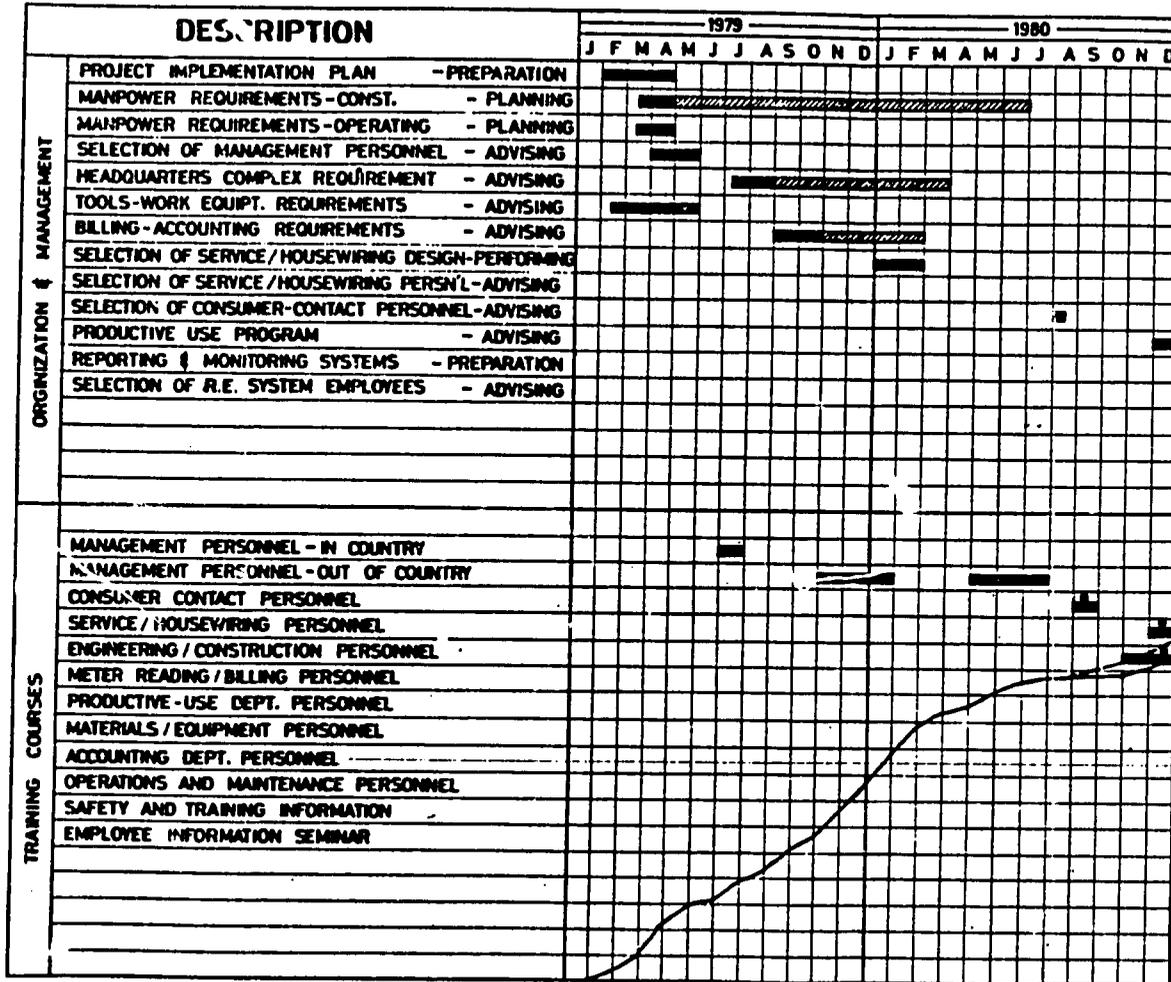


LEGEND

- | | |
|--|---|
| 1. FEASIBILITY REPORTS COMPLETED (8/77) | 22. WAREHOUSES COMPLETED |
| 2. LOAN AGREEMENT SIGNED (3/78) | 23. FIRST DELIVERY OF HARDWARE & MATERIALS |
| 3. A.E & O.M. CONTRACTS SIGNED (3/78 & 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 KLATEN PILOT PROJECT | 27. FINAL DELIVERY OF TOOLS |
| 7. BEGIN OPERATION OF KLATEN 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 SOIL 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 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 | |

█ INDICATES PERIOD OF PERFORMANCE
 ▨ INDICATES PERIOD OF EVALUATION

ORGANIZATION MANAGEMENT TRAINING RURAL ELECTRIFICATION

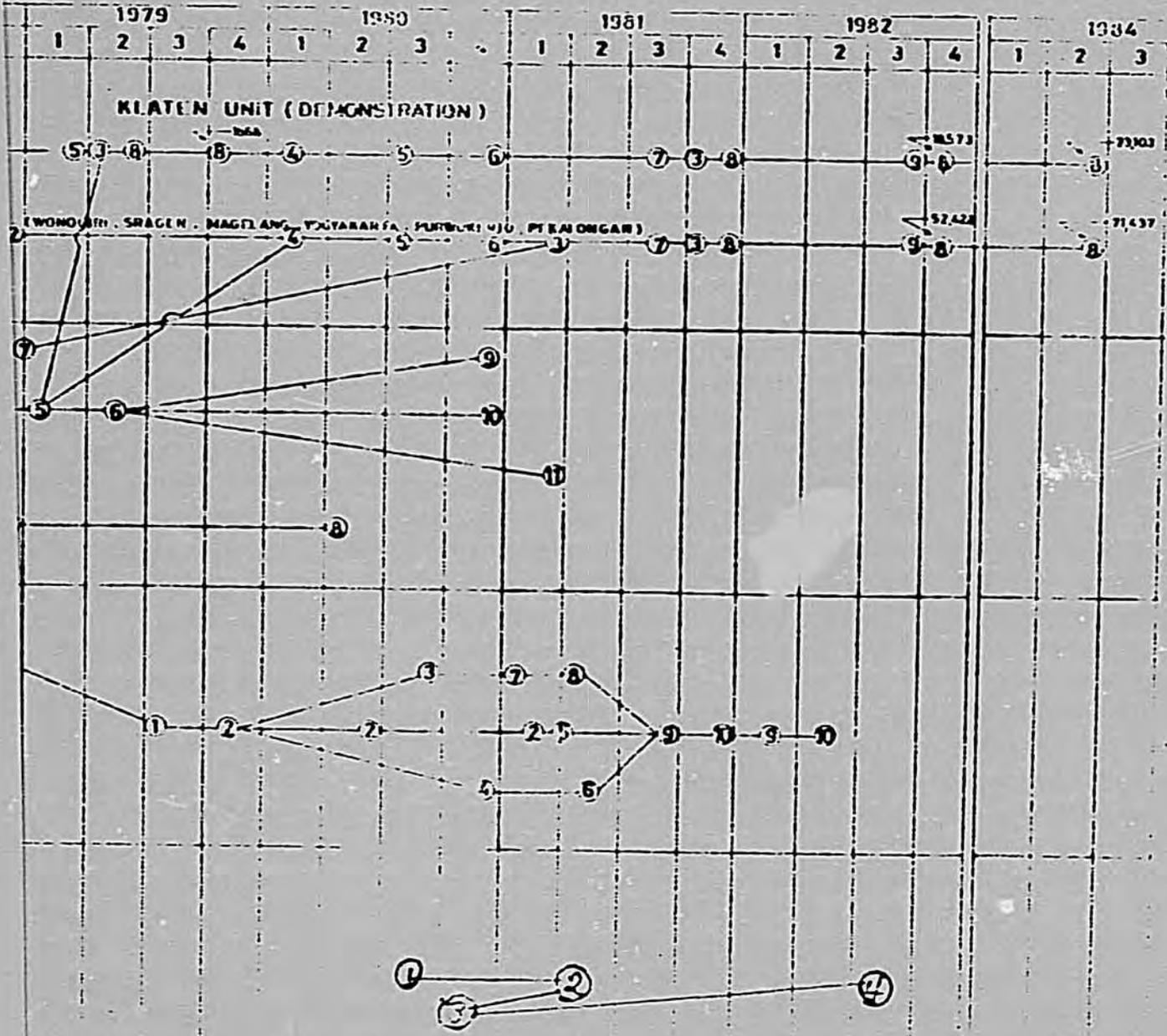


LEGEND : WORK SCHEDULED - 55%
 WORK COMPLETED - 40.5%
 . NOT COMPLETED.

IAYA CPM



NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION



1. A & E CONTRACT SIGNED
2. A & E STARTS DESIGN WORK
3. START CONSTRUCTION HOUSE WIRING
4. HEADQUARTERS COMPLETE DESIGN
5. MATERIAL PURCHASEMENT
6. START HEADQUARTERS CONSTRUCTION
7. COMPLETE HEADQUARTERS
8. CUSTOMER CONNECTIONS
9. CONSTRUCTION COMPLETED

1. GRANT AGREEMENT SIGNED
2. LOAN AGREEMENT SIGNED
3. NRECA AGREEMENT SIGNED
4. NRECA FIELD ADVISOR IN SEMARANG
5. CONDITIONS FOR AGREEMENT
6. MANPOWER REQUIREMENTS CONSIDERED
7. DUTY LOAN SIGNED
8. HOUSE WIRING PERSONAL COMPLETED
9. SELECTION OF WIRING PERSONNEL
10. SELECTION CUSTOMER SERVICE PERSONNEL
11. SELECTION REPAIR SYSTEM EMPLOYEES

1. MANAGEMENT PERSONNEL IN COUNTRY
2. MANAGEMENT PERSONNEL OUT COUNTRY
3. CUSTOMER CONTRACTS SIGNED
4. SERVICE & REPAIR WIRING PERSONNEL
5. ENGINEER CONTRACT SIGNED
6. MATERIALS & EQUIPMENT PERSONNEL
7. MATERIALS & EQUIPMENT
8. ACCOUNTING DEPT
9. OPERATIONS & MAINTENANCE
10. SAFETY & TRAINING

1. PROTECTIVE USE CONTRACT SIGNED
2. SCOPES OF WORK PROG APPROVED
3. TEAM STARTS WORK
4. TEAM COMPLETES WORK

CENTRAL JAVA

