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RURAL ELECTRIFICATION PROJECTS

INDONESIA



NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION

JAKARTA, INDONESIA

NRECA TEAM REPORT

PLN

INDONESIA

(DECEMBER 1981)

MONTHLY REPORT

NRECA INDONESIAN TEAM REPORT

UNITED STATES AGENCY FOR
INTERNATIONAL DEVELOPMENT

Contract No. AID/ASIA C1347
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 25 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: 0721-53701

* 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.

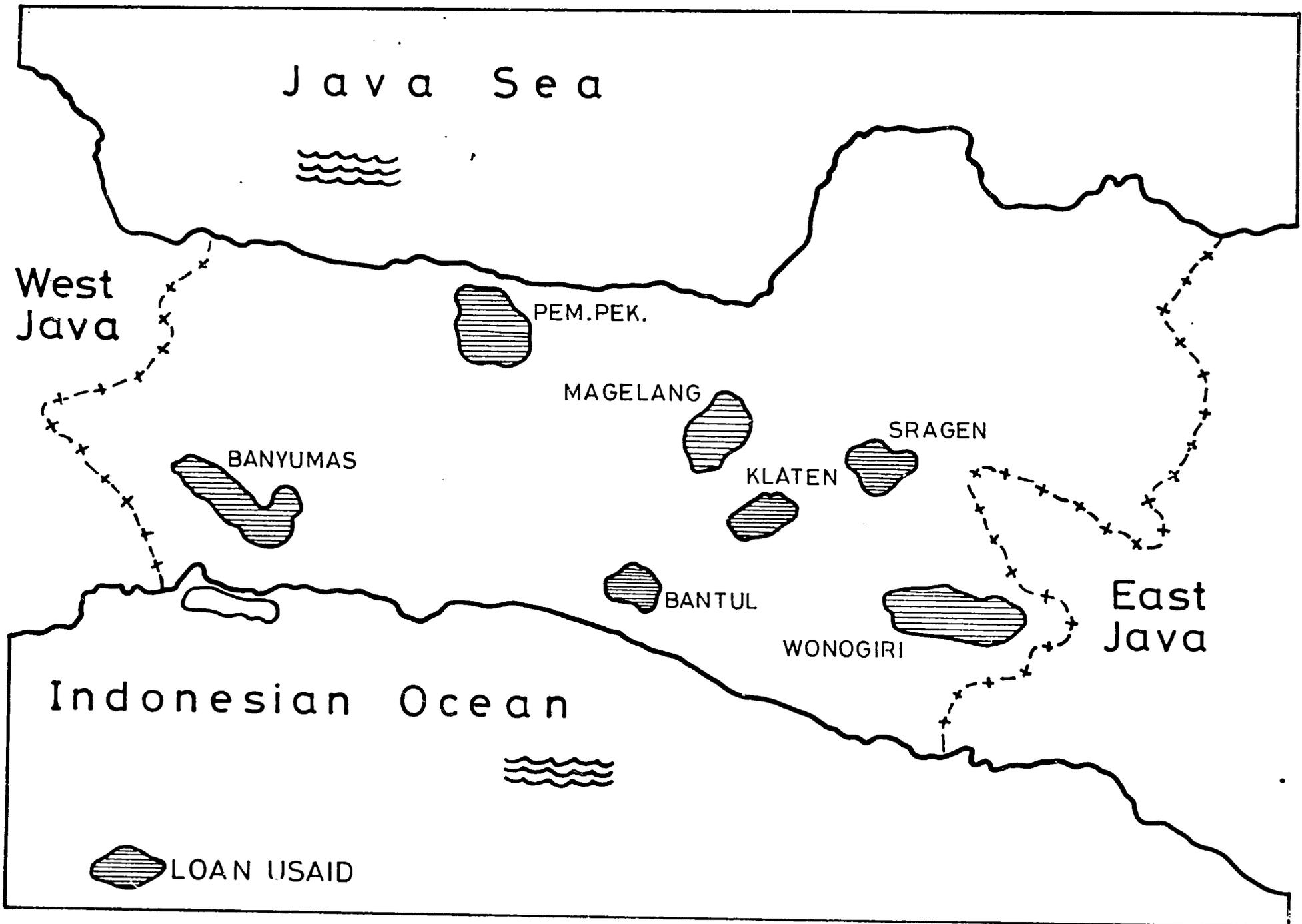
The National Rural Electric Cooperative Association through their International Programs Division is serving as consultant to PLN in organization, management and technical areas. Services for PLN includes providing assistance in organization of staffs to operate the systems in Central Java, as well as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



II. PROJECT ACTIVITIES

General

--- The bi-monthly NRECA team meeting was held in Jakarta this month with representatives of USAID/PTE and co-consultants C.T. Main in attendance. R.E. project status was reviewed and plans formulated for continuing assistance to project-implementation in the new year.

--- The NRECA team leader visited the PLN Small Hydro Laboratory located near Ciawi, Central Java. The purpose of the visit was to assess the capability and inspect the various types of equipment being tested. This activity relates to planning which is in progress for USAID/NRECA assistance in developing small hydro installations in Indonesia.

--- Discussions were held with PLN-RE representatives in Jakarta on the subject of KUD (local cooperatives) assistance to PLN in R.E. project implementation and operation. It is recognized that training will be required to achieve maximum benefits from the use of an outside entity. Possibilities of NRECA assistance in training programs were explored.

--- During another meeting at PLN-RE Jakarta, results of training courses held in Central Java were reviewed. The most recent course was training of trainers for housewiring/service entrance installation, held in November. Schedules for follow-up training of installers at each of the seven R.E. Projects are in the preparation stage.

--- NRECA team members met with C.T. Main staff to discuss material and equipment deliveries in Central Java. Numerous items, procured through the USAID Loan/IFB process, were erroneously shipped to Ujung Pandang rather than Semarang. Corrective action and remedies to prevent re-occurrence were subjects for discussion.

--- At the request of the PLN-RE division, NRECA is planning a seminar on R.E. Project Feasibility Study. Manila has been selected as a tentative location for a seminar, to be held in the first quarter of 1982. It is envisioned that participants for this four-week seminar will come from several countries in east Asia. NRECA/Washington office is responsible for planning and implementation.

NRECA Central Java Activities

A. Organization/Management

--- The NRECA office in Central Java began assembling data for preparation of a "Operations and Maintenance" manual for use in the R.E. Projects. Manual contents will be in the form of recommendations to PLN Management for use in the day-to-day operation of the Seven R.E. Projects.

Material for this operational-tool is being developed from; research into the present PLN operational procedures in Central Java; standard operations and maintenance practices from other utilities; and information extracted from U.S. Rural Electrification Administration Bulletins on Operations and Maintenance Procedures for Rural Electric Systems.

The content of the Manual will include suggestions on the subjects of; Buildings & Grounds; Public & Customer Contact; Service & Metering; Distribution Lines & Equipment; Material Storage & Use; Vehicles and Equipment; Switching Procedures; and Safety. In each subject, procedures are recommended which should encourage a productive and economical operation, insure compliance with recommended maintenance practices, and establish historical data for use in comparing actual and desired results.

--- The NRECA advisor, a PLN management trainee, and the PLN sub-branch manager at Wonosobo revisited the PLN R.E. Project on the Dieng Plateau in Central Java. The purpose of the visit was to view distribution system construction, housewiring, type of buildings, etc.. for the purpose of comparisons with the PLN Demonstration R.E. Project at Klaten. Statistics from this comparison will be useful in the continuing-preparations for the PLN/USAID R.E. Program.

The Geothermal Generating Facility in the Dieng Plateau was also visited and statistical data obtained. (Pictures on page 14.)

B. Training

--- During the reporting period, the NRECA office in Central Java began preparing teaching plans for a PLN R.E. Training Course on "Meter Reading". The course will consist of fourteen (14) sessions designed to prepare the participants to; read kilowatt hour meters; function in the role of public relations; and inspect the distribution system as a part of meter-reading routine.

Experience has convinced utility management that meter-readers can provide valuable services in their monthly visits through the service area. With a broad and thorough knowledge of the PLN Billing & Collection System, the meter reader can function as a source of information for customers, handle general complaints, and keep the utility informed of the information desired by consumers and the general public. Inspection of PLN distribution system, as a part of meter-reading functions, will be an integral part of operation and maintenance routine.

NRECA is suggesting that all persons who are presently working as meter-readers, or who will perform this function in the future in Central Java, attend this training course. This would include both contract and direct-hire meter readers.

--- A training course schedule may be found on page 11 of this report. Approximately 40% of scheduled in-country training courses have been completed.

C. Klaten R.E. Demonstration Project

--- After thirty-two (32) months of operation of the demonstration project, billing statistics continue to indicate that electricity is becoming a natural part of life-style. Energy consumption in the area, which is

located approximately half-way between the cities of Solo and Yogyakarta, averaged forty-two (42) kwhs per month in the last quarter of 1981. (Statistics on page 12 .)

The electrical distribution system in the project area, which was constructed by PLN crews, was designed to serve approximately two thousand consumers. Ironically, as we enter the calendar year 1982, billing statistics reflect that one thousand nine hundred and eighty-two (1982) consumers were included in the latest billing.

It is recognized that the economy in the Klaten R.E. area is above-average for the rural areas of Central Java. This is reflected in kwh consumption at a level almost twice the feasibility study projections. By comparison, the PLN consumers in the Dieng R.E. Project consume an average of twenty-three (23) kwhs per month, closer to the average consumption-level expected for the Seven R.E. Projects.

D. Meetings & Trips

- Dec. 3 Semarang: Meeting at the office of C.T. Main, Inc., with the project coordinator. Discussed requirements for metering of an additional 20 kv circuit at the Magelang R.E. Project.
- Dec. 4 Semarang: Meeting with the chief of R.E., Wilayah XIII, to discuss arrival dates of housewiring materials.
- Dec. 9-10 Traveled to Jakarta to attend NRECA Team Meeting.
- Dec. 12 Semarang: Meeting with the deputy director, PLN Wilayah XIII, to discuss details of a proposed trip to view the PLN Dieng R.E. Project.
- Dec. 16 Semarang: Meeting with construction supervisor at C.T. Main, Inc. Reviewed proposed primary (20 kv) metering arrangement at four of the Seven R.E. Projects in Central Java.

- Dec. 17 Semarang: Meeting with director of PLN Wilayah XIII. Discuss progress of R.E. Projects.
- Dec. 18 Semarang: Meeting at Wilayah XIII with PLN sub-branch manager from Kudus. Provided technical assistance relative to voltage regulator installation and provided copies of REA Bulletins on Regulators.
- Dec. 21 Traveled to Wonosobo with a PLN management trainee. Visited with PLN sub-branch manager at Wonosobo and viewed the Dieng R.E. Project and Geothermal Generating Facility.
- Dec. 23 Semarang: Meeting with PLN/USAID Productive Use consultant to discuss PLN installation and capacity charge for small industry.

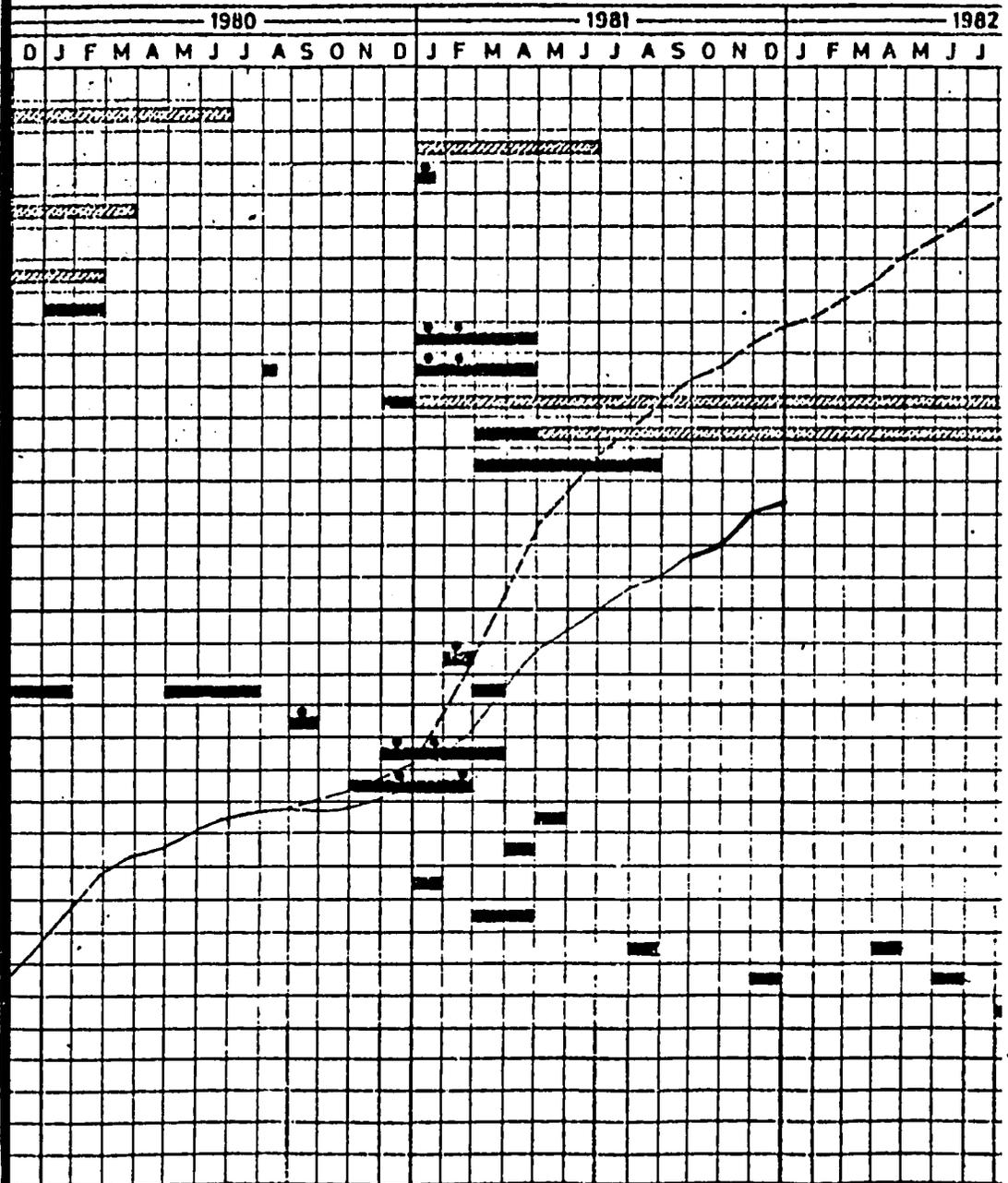
INDICATES PERIOD OF PERFORMANCE
 INDICATES PERIOD OF EVALUATION

ORGINIZATION MANAGEMENT
 RURAL ELECT

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

LEGEND: WORK SCHEDULED - 89%
 WORK COMPLETED - 64%

MANAGEMENT TRAINING PROGRESS SCHEDULE RURAL ELECTRIFICATION-I-P.L.N.



11A

PLN-CENTRAL JAVA RURAL
TRAINING

COURSE	TITLE	1979				1980
		25	10	11	12	
	LANGUAGE TR.-MANAGEMENT	■	■	■		
	OUT-OF-COUNTRY TRAINING				■	
I	INTRODUCTION SUPERVISION	■				
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

- 12 -
KLATEN RE DEMONSTRATION UNIT

BILLING STATISTICS 13 MONTH PERIOD

COLUMN NUMBER								
1	2	3	4	5	6	7	8	9
DECEMBER 1980	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	2810	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	76,004	1960	39	5,712,755	2915	1781	1134	69
SEPTEMBER	86,202	1960	43	5,932,410	3027	1919	1108	69
OCTOBER	83,335	1964	42	5,806,480	2956	1880	1076	70
NOVEMBER	84,129	1972	43	5,820,160	2952	1886	1066	69
DECEMBER 1981	81,762	1982	41	5,711,000	2912	1854	1058	70

COLUMN NUMBER

1. MONTH

2. TOTAL KWH BILLED

3. TOTAL CUSTOMERS BILLED

4. AVERAGE KWH PER CUSTOMER

5. TOTAL RUPIAH BILLED

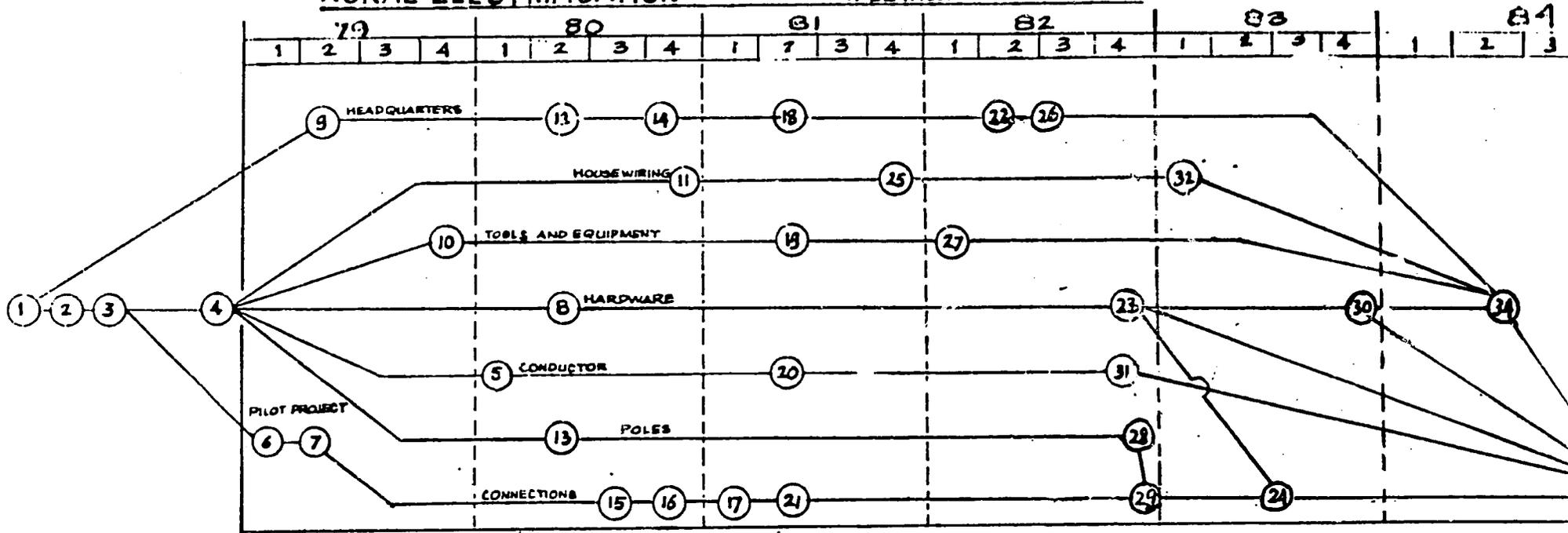
6. AVERAGE RUPIAH PER CUSTOMER (TOTAL)

7. AVERAGE ENERGY CHARGE PER CUSTOMER

8. INSTALLATION & HOUSEWIRING CHARGE

9. COST PER KWH (RUPIAH)

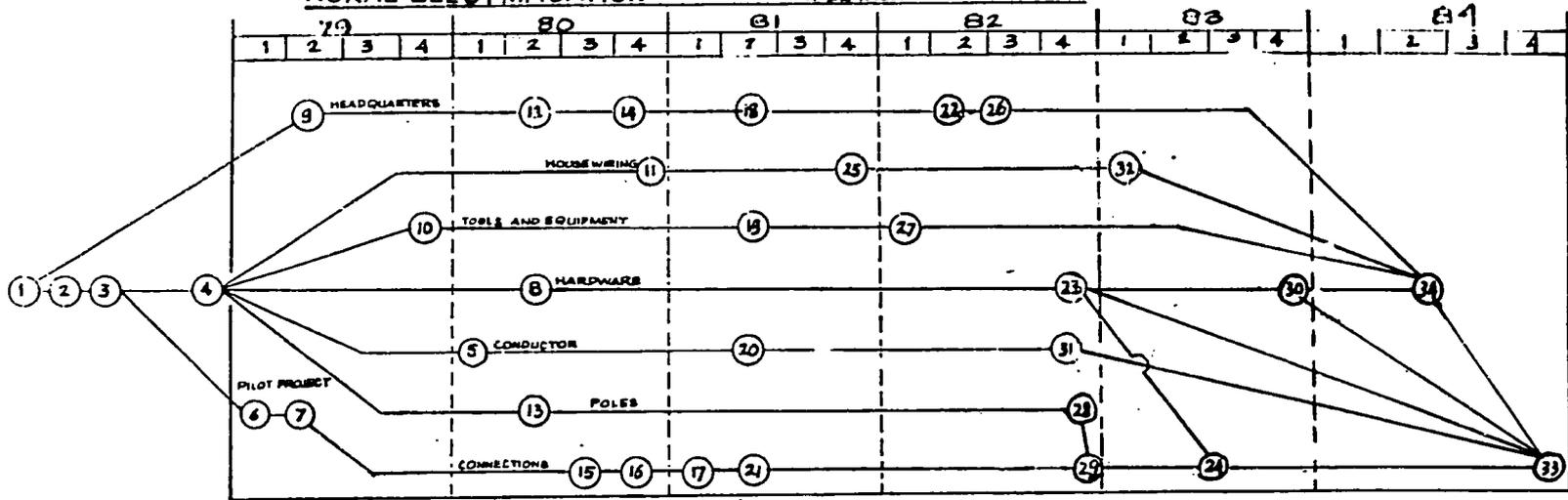
RURAL ELECTRIFICATION - PLN IMPLEMENTATION PLAN



LEGEND

- | | |
|--|---|
| 1 FEASIBILITY REPORTS COMPLETED (8/77) | 22. WAREHOUSES COMPLETED |
| 2 LOAN AGREEMENT SIGNED (5/78) | 23. FIRST DELIVERY OF HARDWARE & MATERIALS |
| 3 AE & O.M. 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 ISSUED - CONDUCTOR | 26. HQ'S COMPLETED |
| 6 BEGIN CONSTRUCTION OF KIATEN PILOT PROJECT | 27. FINAL DELIVERY OF TOOLS |
| 7 BEGIN OPERATION OF KIATEN PILOT PROJECT | 28. ALL POLES DELIVERED |
| 8 IFB ISSUED - HARDWARE | 29. COMPLETE SETTING OF POLES |
| 9 BEGIN PURCHASE OF HQ SITES | 30. FINAL DELIVERY OF HARDWARE |
| 10 IFB ISSUED TOOLS AND EQUIPMENT | 31. FINAL DELIVERY OF CONDUCTOR |
| 11 IFB ISSUED HOUSE WIRING | 32. FINAL DELIVERY OF HOUSE WIRING |
| 12 SURVEY PROPERTY GOUL 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 BEGIN (STAKING) COMPL. | |
| 18 SITES PREPARED | |
| 19 FIRST DELIVERY OF TOOLS & EQUIPMENT | |
| 20 FIRST DELIVERY OF CONDUCTOR | |
| 21 BEGIN MARKING RIGHT OF WAY | |
| 22 BEGIN DELIVERY OF POLES | |

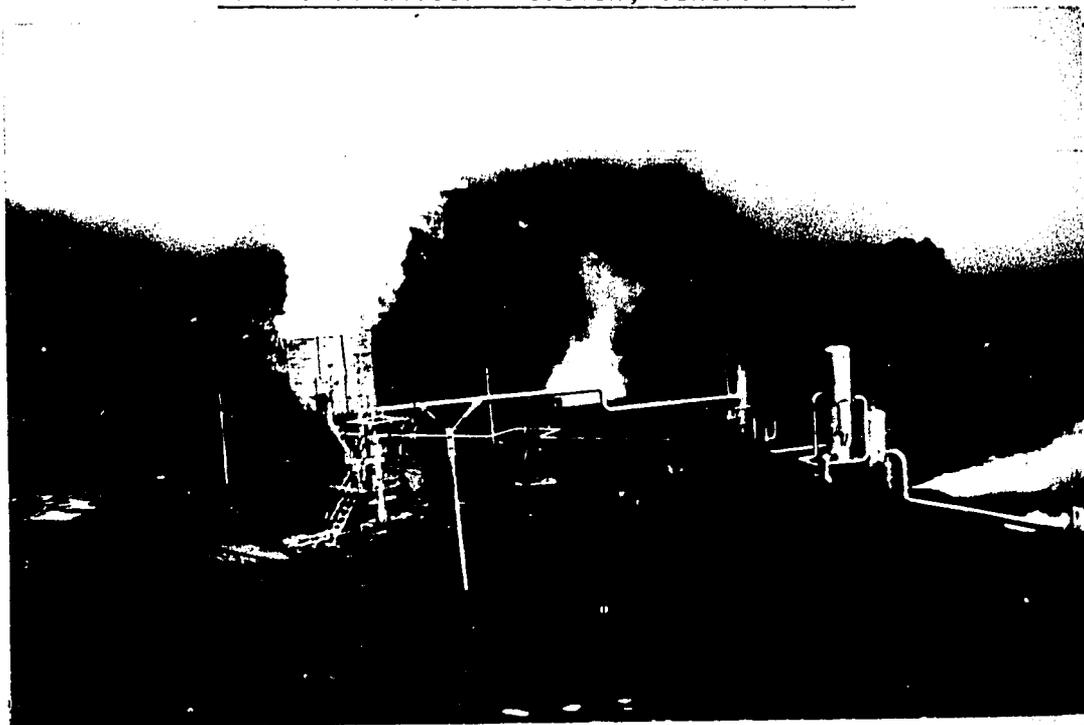
RURAL ELECTRIFICATION - PLN IMPLEMENTATION PLAN



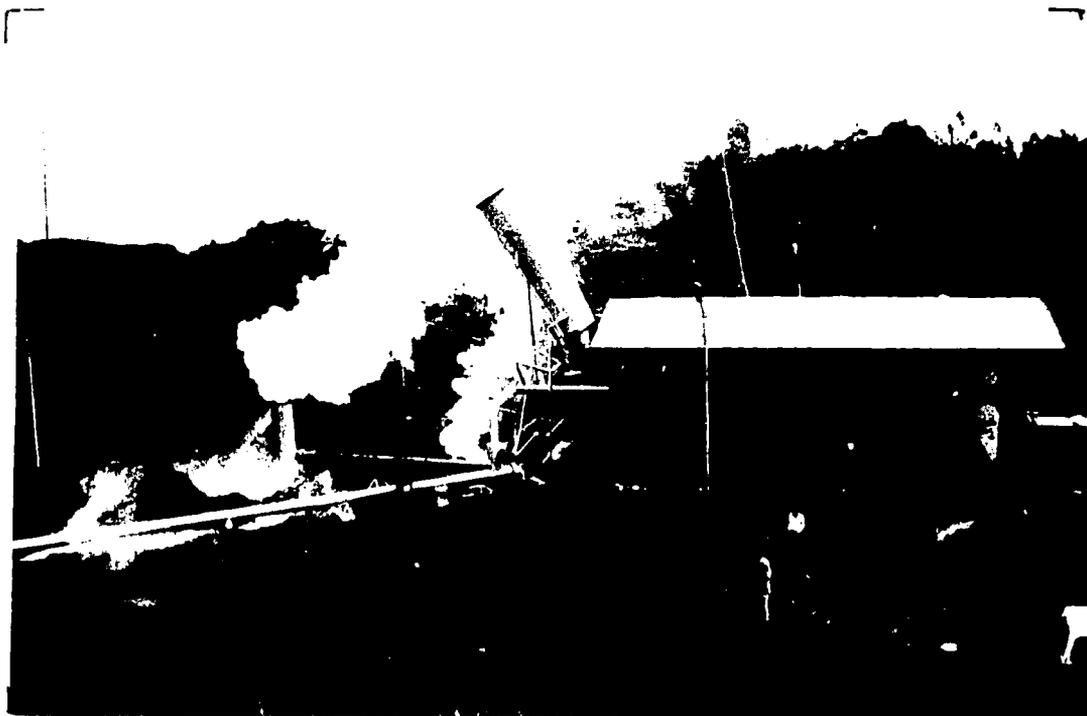
LEGEND

- | | |
|--|--|
| <ul style="list-style-type: none"> 1 FEASIBILITY REPORTS COMPLETED (8/77) 2 LOAN AGREEMENT SIGNED (5/78) 3 AE & O.M. CONTRACTS SIGNED (9/78 & 8/78) 4 CENTER LINE STAKING BEGINS (10/78) 5 IFB^a ISSUED - CONDUCTOR 6 BEGIN CONSTRUCTION OF KIATEN PILOT PROJECT 7 BEGIN OPERATION OF KIATEN PILOT PROJECT 8 IFB^a ISSUED - HARDWARE 9 BEGIN PURCHASE OF HQ SITES 10 IFB^a ISSUED - TOOLS AND EQUIPMENT 11 IFB^a ISSUED - HOUSE WIRING 12 SURVEY PROPERTY BOUND TESTING 13 FIRST DELIVERY OF POLES 14 CONTRACTS LET FOR SITE PREPARATION 15 CENTER LINE STAKING COMPLETED 16 SYSTEM DESIGN COMPLETED 17 PRODUCTION DESIGN (STAKING) COMPLETED 18 SITES PREPARED 19 FIRST DELIVERY OF TOOLS & EQUIPMENT 20 FIRST DELIVERY OF CONDUCTOR 21 BEGIN CONSTRUCTION OF RIGHT OF WAY 22 FIRST DELIVERY OF POLES | <ul style="list-style-type: none"> 22. WAREHOUSE'S COMPLETED 23 FIRST DELIVERY OF HARDWARE & MATERIALS 24 FIRST TESTING AND ENERGIZATION OF SYSTEM 25 FIRST DELIVERY OF HOUSE WIRING 26 HQ^a COMPLETED 27 FINAL DELIVERY OF TOOLS 28 ALL POLES DELIVERED 29 COMPLETE SETTING OF POLES 30 FINAL DELIVERY OF HARDWARE 31 FINAL DELIVERY OF CONDUCTOR 32 FINAL DELIVERY OF HOUSE WIRING 33 SYSTEM COMPLETION 34 HOUSE CONNECTIONS IN PROGRESS SYSTEM OPERATING |
|--|--|

PLN Rural Electrification, Central Java

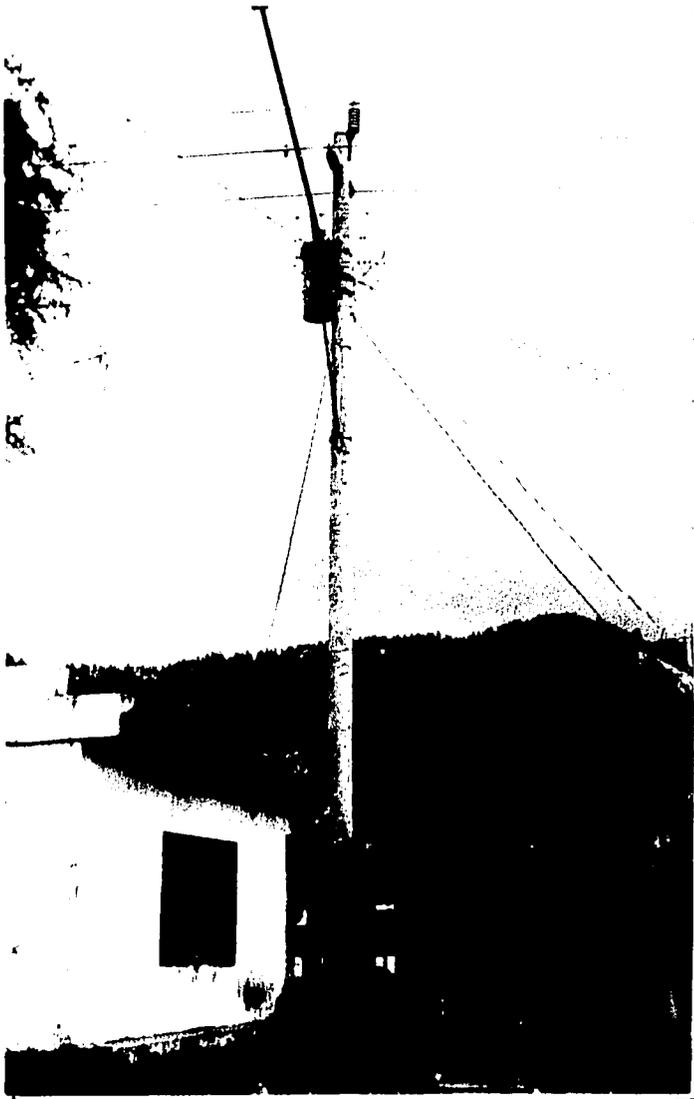


The well location for the geothermal power installation on the Dieng Plateau, at an elevation of nearly 1,500 meters above sea level.



The turbine-generator installation, 2,500 kw capacity, geothermal power on the Dieng Plateau.

PLN Rural Electrification, Central Java



Distribution system service-lines to consumers premises, typical Central Java electric service installations.



The end result --- safe and efficient energy source, for lighting and power requirements, in rural homes of Indonesia.

Summary of Expenditures

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

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

	Budget	Total Expense To Date	Prior Billings	Current Billings
Salaries - Field	\$ 1,095,000	\$ 745,272.52	\$ 721,061.02	\$ 24,211.50
Salaries - Home	187,000	118,902.83	116,465.10	2,437.73
Fringe Benefits	416,000	271,789.88	264,754.01	7,035.87
Consultant Fees	34,706	33,906.25	33,906.25	
Allowances	398,000	264,973.34	254,814.46	10,158.88
Travel and Transportation	386,470	258,725.52	250,683.15	8,042.37
Other Direct Costs	140,000	80,978.35	78,956.50	2,021.85
Overhead	292,000	197,949.38	191,819.60	6,129.78
Equipment and Materials	28,000	18,292.46	18,292.46	
TOTAL	\$ 2,977,176	\$ 1,990,790.53	\$1,930,752.55	\$ 60,037.98

PERSON-MONTHS BY POSITION, NRECA CONSULTANT TEAM

POSITION	PRESENTLY FILLED BY	CONTRACT PERSON-MONTHS	EXPENDED THIS PERIOD	EXPENDED		PERCENT OF CONTRACT
				THROUGH PLN	DEC. PDO	
Team Leader	Peter McNeill	54	1	7	32	72
Training Officer	Louie Sansing	45	1	7	28	78
Administrative Officer	Ray Shoff	33	1	4	22	79
PLN Advisor	Sam Adkins	42	1	33.5	.5	81
Lampung Advisor	Claude Franke	54	1	.5	38.5	72
Lombok Advisor	Paul Swanson	50	1	0	35	70
Luwu Advisor	John DeFoor	49	1	0	34	69
Short-term Advisors		19	0	14	3	89
Consultants		8	0	7.5	.5	100
		354	7	73.5	193.5	75