

VIII. COST ESTIMATION

APPENDIX 1

VIII. COST ESTIMATION

1. Premises and Conditions of Estimation

The cost estimation of this project has been made on the following premises and conditions.

- (1) The foreign exchange component of this project is to be implemented on the turn-key basis.
 - (2) Detailed design, examination of tenders, supervising in installation work, management of implementation schedule, acceptance test, etc., are to be conducted by the consultant to be employed for this project.
 - (3) In this study detailed design of telecommunications facilities by each office/station has not been made, so that cost estimation has been made by assuming standard or typical conditions of telecommunications facilities of offices/stations.
 - (4) Costs have been estimated based on the existing world prices today.
 - (5) The conversion rates between yen and US dollars and between yen and Philippine pesos are as follows:
1 US dollar = 215 yen
1 peso = 28.3 yen
- These rates are as of May, 1981. Since the conversion rates fluctuate, please recalculate by using the current conversion rates whenever required.

- (6) The foreign exchange and local cost components of various items are given in Table VIII-1-1. All items to be manufactured or produced outside the Philippines are to be added up to foreign currency. For every item to be manufactured or produced in the Philippines, the percentage of the foreign exchange component for manufacturing or producing the item has been estimated and all such foreign currency components have been added to the foreign exchange component and the remaining component has been added to the local currency component, as requested by the Government of the Philippines.
- (7) To estimate the cost at the time of implementation of Phase I and II, contingencies including a reserve fund for the expected price rise has been calculated. The implementation periods for Phases I and II are assumed to be 1983 and 1986, respectively.
- (8) The contingency fund includes the pure reserve fund which is equivalent to 2% of the amount in item J, a rise in foreign currency cost at an annual rate of 4%, and a rise in local currency cost at an annual rate of 13%. To be more definite, the values in J are multiplied by 0.102 for foreign currency and 0.297 for local currency in Phase I, and by 0.237 for foreign currency and 0.862 for local currency in Phase II.

Table VIII-1-1 Foreign Exchange and Local Cost Components

Item	Foreign Exchange Component (%)	Local Cost Component (%)
Exchange equipment	100	0
Radio and transmission equipments	100	0
Telegraph equipment	100	0
Power plants	100	0
Trunk cables (for telephone and telegraph)	100	0
Antennas and feeders	100	0
Various test equipments	100	0
Telephone sets	100	0
Local cables	30	70
Subscriber's facilities (not including telephone sets)	30	70
Poles and related items	50	50
Antenna towers	40	60
Office/station buildings	50	50
Access roads	40	60
Inland transportation	50	50
Site acquisition and rents	0	100
Storing charges	20	80
Maintenance of vehicles for construction	60	40
Provision of laborers	0	100
Payment for foreign specialists	100	0
Living costs for foreign specialists	0	100
Training in the Philippines	0	100
Trip to overseas country	100	0

(9) Items A through J are shown by the world price level as of May, 1981. H is the sub-total excluding the consultant fee and J is the sub-total including the consultant fee. Refer to the sub-total required for the particular purpose.

2. Details of Estimation

2-1 Switching Equipment

All LE and TS offices are to introduce digital electronic switching equipment and maintenance facilities and test equipments have been included upon cost estimation. The cost estimation of switching equipment for use at LE and IPTS has been made by assuming standard conditions by numbers of terminals and cost estimation of switching equipment for use at TS by calculating necessary equipment capacity for estimated traffic. Each TS is to be provided with a detailed billing function.

2-2 Radio and Multiplex Equipments

For the radio system, a digital radio system is to be employed in principle. The cost for radio equipments has been obtained by multiplying the unit price of each type of radio equipment by the necessary quantity. The costs for test equipments, etc., have been included. The cost for multiplex equipments have been obtained by multiplying the unit price of each type of multiplex

equipment or PCM/FDM translating equipment (transmultiplexer) by the necessary quantity.

2-3 Outside Plants and Subscriber's Facilities

The cost for telephone and telegraph trunk cables has been estimated by multiplying a standard unit price for each pair per km for different systems such as PCM, LC and NL by necessary distance.

The cost for local cables has been obtained by multiplying the sum of each standard cable length by the unit price per km.

The estimated cost for subscriber's facilities has been obtained by multiplying the unit installation cost per subscriber by the number of subscribers to be served.

2-4 Telegraph

The cost for telex exchange equipment has been estimated from the price for necessary terminals on the assumption that digital electronic switching equipment is to be introduced. The cost for concentrators has been estimated by multiplying the unit price by the necessary quantity of concentrators.

2-5 Power Plant

The cost for power plants has been obtained by first roughly estimating the total power capacity of telephone, transmission, and telegraph facilities,

then estimating the capacities of necessary rectifiers, batteries, and engine generators, and multiplying the unit price of each capacity by necessary quantity.

2-6 Office/Station Buildings, Antenna Towers and Access Roads

The cost for the construction of office/station buildings has been estimated by multiplying the price necessary for constructing an unit area including costs for all materials, construction work, and building facilities and other necessary costs by the total area of construction. The cost for antenna towers has been estimated by first obtaining the total quantity of steel frame materials in tons by multiplying the quantities of steel frame materials of different heights and different types in tons by the number of towers and then multiplying the total quantity of steel frame materials in tons by the construction cost per ton. The cost for the construction of access roads has been estimated by multiplying the unit cost of road per km by the necessary distance.

2-7 Consultant Fee

The consultant fee is assumed to include costs for the following items.

(1) Communication equipment

1) Detailed design

2) Preparation of tender specifications

- 3) Examination of tenders
 - 4) Supervising
 - 5) Acceptance test
- (2) Construction of buildings, access roads, towers, etc.
- 1) Setting of design criteria
 - 2) Implementation schedule control

3. Results of Cost Estimation

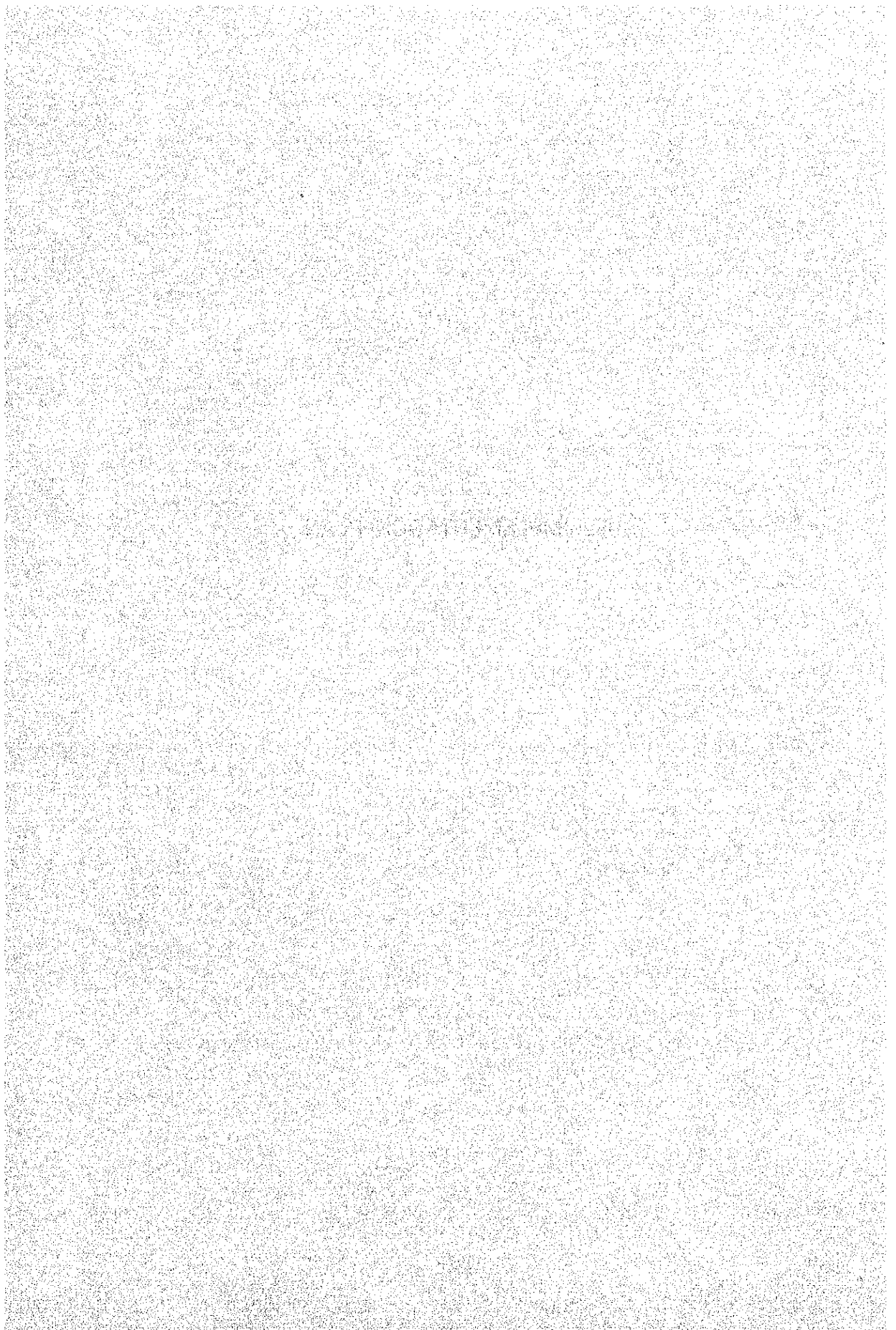
The results of cost estimation are given in Table VIII-3-1.

Table VIII-3-1 Construction Costs

Item	Phase I		Phase II	
	Foreign currency (million yen)	Local currency (million pesos)	Foreign currency (million yen)	Local currency (million pesos)
A Exchange	1,617 (1)*	4.6	907 (8)*	2.2
B Radio and transmission	2,270 (32)	10.0	3,000 (75)	13.4
C Telegraph	323 (41)	1.7	292 (45)	1.6
D Local cable and subscriber facilities	440 (275)	24.6	465 (219)	19.2
E Power plant	941 (23)	1.9	1,333 (65)	4.5
F Buildings, access roads, towers, etc.	505 (450)	28.6	618 (570)	19.9
G Others	—	4.1	—	9.2
H Sub-total	6,096 (822)	75.5	6,615 (982)	70.0
I Consultant fee	460	3.7	443	3.6
J Sub-total	6,556 (822)	79.2	7,058 (982)	73.6
K Contingency (including price rise)	666	23.5	1,673	63.4
L Grand total	7,222 (822)	102.7	8,731 (982)	137.0

() shows the foreign currency requiring portions of the products and services supplied in the Philippines.

IX. IMPLEMENTATION PLAN



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1. Implementation Systems

The construction work of the Central Luzon Project is to be implemented in about 2 years after that of the Northern Luzon Project and the experience acquired with the Northern Luzon Project should be effectively utilized in this project. However, since this project is to introduce latest technical methods in the fields of switching, radio transmission, outside plants, etc., particularly by the adoption of digital electronic switching equipment and digital transmission equipment, the experience to be acquired in the Northern Luzon Project will not be sufficient and thus the following measures should be taken in the Central Luzon Project as in the Northern Luzon Project.

- (1) The function of the Northern Luzon Project implementation headquarters set up in the main office of the BUTEL is to be expanded to cover the Central Luzon Project also. In addition, project implementation groups are to be set up at regional offices of Regions III and IV so as to control construction works in the individual regions.
- (2) The study team suggests that the foreign exchange component of this project can be implemented on the turn-key basis in consideration of the present situation of BUTEL. In this case, it is desirable

to assign as many personnel to the field of construction for training them in the field.

- (3) It is also recommendable to employ a consulting company for detailed design, preparation of tender specifications, examination of tenderers, supervising in installation work, tests and inspections, etc., if desired. In this case, it is desirable that some works will be accomplished under the direct management of the applicable construction enforcement division in BUTEL.

BUTEL is expected to execute the following items in addition to the overall management of the project.

- (1) Procurement of sites for telephone exchange offices and radio repeater stations to be constructed newly, access roads for new radio repeater stations, etc.
- (2) Agreement with private operating companies on the following items
 - 1) Interconnection and related technical requirements
 - 2) Charge adjustment
 - 3) Service modes such as DDD and semi-automatic connections
- (3) Leading in of commercial power to radio repeater stations atop hills/mountains
- (4) Instructions to be given to the consultant regarding important item on the project
- (5) Determination of radio frequencies to be employed

- (6) Training of BUTEL personnel in installation work
- (7) Arrival of goods and countermeasures against delay in construction work
- (8) Countermeasures to be taken upon occurrence of unexpected disaster or trouble to affect the progress of construction work

2. Implementation Schedule

2-1 Phase I

The Implementation schedule of this project is shown in Fig. IX-2-1-1. The service is expected to be commenced in May, 1986. In order to commence the service as scheduled, it is necessary to progress the individual items of work in the required order and in the required time.

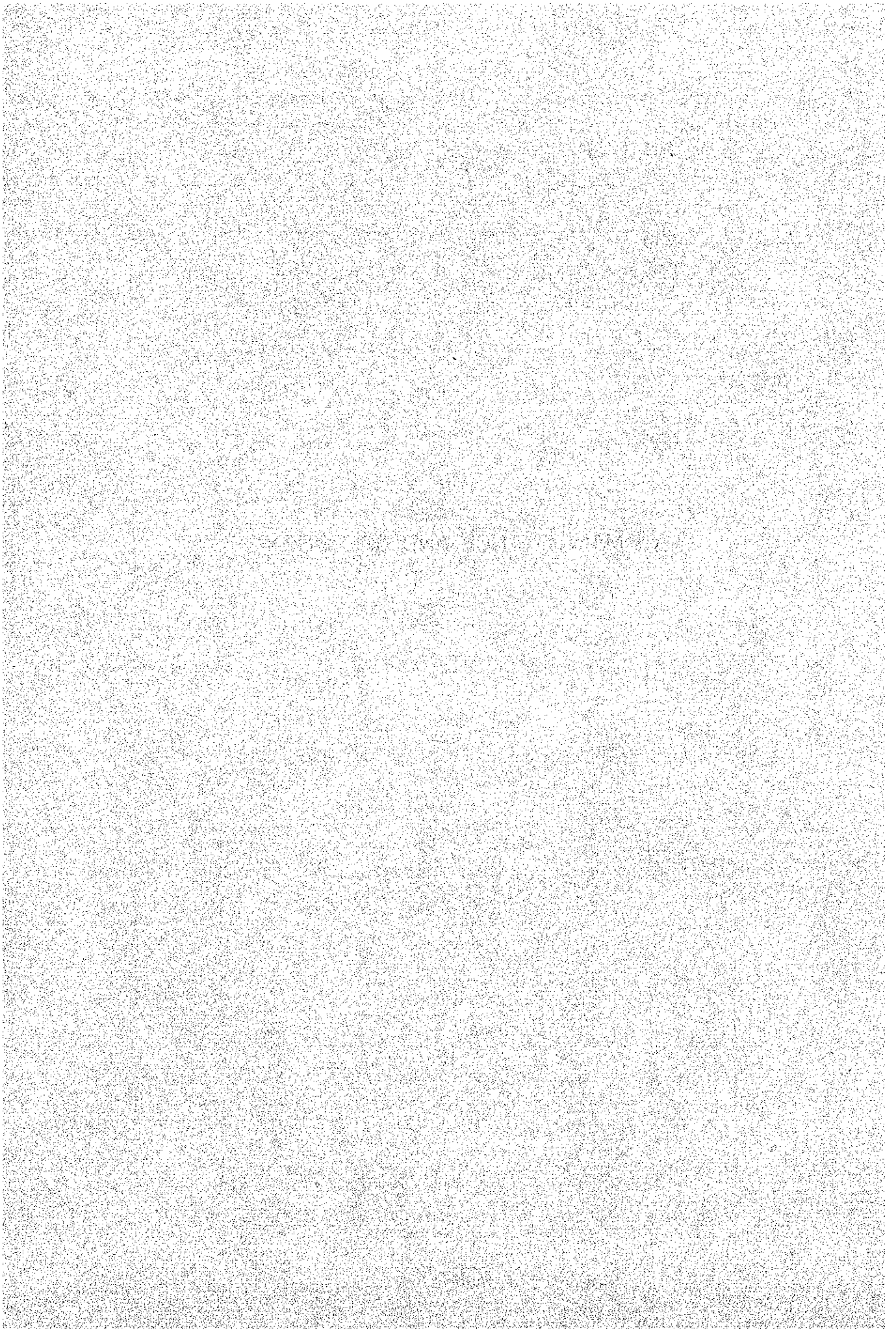
2-2 Phase II

Phase II of this project should be initiated as early as possible so as to provide telecommunication service in all cities/municipalities in Regions III and IV. In this report, estimation of facilities and economic analysis are made on the assumption that the service by Phase II is to be commenced in about 3 years after the commencement of service in Phase I, that is, in 1989 or 1990.

Year	1981	1982	1983	1984	1985	1986
Item						
Preparation of Feasibility Report	3 4					
Engineer Service Detailed Design		2 10				
Tendering			1 8			
Construction						
Site Survey			9 1			
Manufacture			12 9			
Installation				12 5		
Civil Work						
Procurement of Sites			1 8			
Access Roads			4 4	11		
Building and Towers					6	

Fig. IX-2-1 Project Implementation Schedule

X. MAINTENANCE AND OPERATION



X. MAINTENANCE AND OPERATION

1. General

The following offices/stations are to require maintenance and operation for the telegraph and telephone facilities to be introduced by this project.

Phase Office/Station	Number of Offices/Stations	
	Phase I	Phase II
LE (including PC)	34	5
IPTS	10	103
Radio repeater station (including radio facilities to be installed at PC, LE and IPTS)	43	94
Telex exchange station and concentrator	11	5
Gentex station (single)	27	79

In order to maintain these great numbers of telegraph and telephone facilities as high performance while free exhibiting their capabilities, it is indispensable to establish an up-to-date operating organization and maintenance system.

This section describes a maintenance and operation system and personnel plan necessary for achieving this purpose.

2. Necessary Maintenance and Operation System

2-1 Regional Offices

At present a regional office is set up in each region for controlling the maintenance and operation activities of field organizations therein.

Since the telegraph and telephone facilities to be introduced by this project are much higher in their technical levels than conventional facilities, advanced technical knowledge and techniques are to be required for operating them and maintaining their performance as required. Under these circumstances, the study team recommends to set up technical sections in charge of switching, outside plant, radio, and telegraph in each regional office so as to manage various maintenance centers, secure coordination among maintenance centers, and prepare training plans.

2-2 Maintenance Centers

Maintenance areas are to be allocated for individual technical fields and maintenance centers are to be set up at representative field organizations in each area for the purposes of concentrative control of maintenance materials in the area, arrangement for repair works, patrol maintenance to unattended offices/stations, and technical training in the field. Maintenance centers to be set up in

the individual technical fields are given in Tables X-2-1 ~ X-2-3. Here, the fields of switching and outside plant are to cover common maintenance areas. Maintenance in the fields of the transmission and power plant for radio are to be performed by the field of radio.

3. Personnel Plan

3-1 Regional Offices

The following personnel are to be assigned to each existing regional office for the reason stated in paragraph X-2-1.

Engineers: 4 fields x 1 engineer x 2 organizations
= 8 engineers

Technicians: 4 fields x 3 technicians x 2 organizations
= 24 technicians

(The four fields mentioned above are to be: switching, outside plant, radio, and telegraph.)

3-2 Maintenance Centers

The personnel plan of maintenance centers for individual technical fields is to be prepared on the basis of the personnel estimation materials given in Table X-3-1. Personnel plans for individual maintenance centers are given in Table X-3-2.

3-3 Field Organizations

Table X-2-1 Maintenance Areas and Number of Offices to be Maintained by Telephone Switching and Outside Plant Fields

Maintenance Center	Maintenance Area	Province	Phase I			Phase II		
			LE	IPTS	Total	LE	IPTS	Total
Phase I	Cabanatuan	Nueva Ecija	6	2	10		5	17
		Tarlac	2			4		
		Quezon (Aurora)				8		
	Dinalupihan	Zambales	2		8		0	3
		Pampanga	2	1		1		
		Bataan	3			2		
	Pandi	Bulacan	5		5			15
		Laguna				8		
		Quezon				7		
	Batangas	Batangas	2	2	5		11	14
		Cavite				2		
		Occ. Mindoro		1		1		
	Calapan	Or. Mindoro	4	3	7		5	5
San Jose	Occ. Mindoro	3		3		6	7	
	Or. Mindoro				1			
Romblon	Romblon	2	1	3		12	12	
Phase II	Unisan	Quezon				5	13	18
	Puerto Princesa	Palawan					17	17
Total			31	10	41	5	103	108

Note 1: Maintenance of trunk cables on Manila RS. ~ Manila T.S. ~ Manila P.O. sections are to be performed at Pandi.

Note 2: Maintenance of trunk cable on Lucena R.S. ~ Lucena PC section is to be performed at Batangas in Phase I.

Table X-2-2 Maintenance Areas and Number of Offices/Stations
to be Maintained by Radio Field

Maintenance Center	Maintenance Area	Province	Phase I				Phase II			
			(*) LE+R	(*) IPTS+R	(*) R	Total	(*) LE+R	(*) IPTS+R	(*) R	Total
Phase I	Cabanatuan	Nueva Ecija	3	2		5		5		5
	Tarlac R.S.	Tarlac	2			2		4		4
	San Fernando R.S.	Pampanga	1	1	1	5		1		4
		Bataan	2					2	1	
	Manila R.S.	Bulacan	3		2	5				11
		Laguna						8	1	
		Quezon						2		
	Batangas	Batangas	2	2	1	7		11		14
		Cavite			1			2		
		Occ. Mindoro		1				1		
	Lucena R.S.	Quezon (Southern Part)					2	10	5	17
	(Sub) Marinduque	Marinduque			1	1				
San Jose R.S.	Occ. Mindoro	2		4	6	1	6		9	
	Or. Mindoro (Southern Part)						1	1		
Calapan R.S.	Or. Mindoro	3	2	3	8		5		5	
Romblon R.S.	Romblon	1	1	1	3		10		10	
Phase II	(Sub) Baler	Quezon (Aurora)						6	1	7
	(Sub) Polillo	Quezon (Polillo Isl. etc)						4	1	5
	(Sub) El Nido	Palawan (Northern Part)						8	3	11
	Puerto Princesa	Palawan (Southern Part)						5	3	8
Total			19	9	14	42	3	91	16	110

(*) LE+R and IPTS+R indicate radio facilities in telephone offices and R indicates a single repeater station.

Table X-2-3 Maintenance Areas and Number of Offices
to be Maintained by Telegraph Field

Maintenance Area Maintenance Center	Province	Phase I				Phase II				
		Gentex Station				Gentex Station				
		A	B	C	Total	A	B	C	Total	
Phase I	Cabanatuan	Nueva Ecija		1	7			8	9	
		Quezon					1			
	Tarlac	Tarlac			1			5	5	
	Olongapo	Zambales						2	2	
	Iba	Zambales					1	1	2	
	S. Fernando	Bataan			1	4				2
		Pampanga	1		2				2	
	Balanga	Bataan		1		1			2	2
	Malolos	Bulacan		1	2	3			9	9
	Batangas	Batangas	1		3	4			7	7
	Calapan	Or. Mindoro			2	2				
	Romblon	Romblon		1		1		1	3	4
San Jose	Occ. Mindoro		1	1	2			2	2	
Phase II	Taytay	Rizal						3	3	
	Calamba	Laguna					1	2	10	13
	Cavite	Cavite					1	1	1	3
	Lucena	Quezon				1			11	13
		Marinduque	1*						1	
P. Princesa	Palawan							3	3	
Total			3	5	19	27	3	6	70	79

* Maintenance of Boac is to be performed by the home station,
in Phase I.

Table X-3-1 (1/2) Personnel Estimation Materials

Field in Charge	Type of Office/Station	Maint. Personnel			Operator			Remarks
		Engl-neer	Technician	Telephone Op.	Teletype Op.	Telex Delivery man	Manager	
Exchange	Maintenance Center *2	2	*3 8	*3 10			5	*1 Including the head and sales staff. 2) In the case of a composite office the larger number is to be taken. *2 Maintenance of exchange equipment in the maintenance area including the home exchange office (TS) and service order work in the area *3 Work in 3 shifts *4 Test and maintenance *5 Window for service (in 3 shift) *6 Maintenance of toll and local cables and subscriber facility work in the area. *7 Estimated by assigning one (person) per LE and one (person) per 5 IPTSS. *8 Maintenance of radio, transmission and power facilities in the maintenance area including the home office/station. Shift work is not to be employed at the sub-maintenance centers. *9 Work in 3 shifts.
	LE		*4 1	*5 3			3	
	IPTS				*5 3			
Outside Plant	Maintenance Center *6	1	*7 x					
	Maintenance Center *8	1	*9 6				1	
Radio	Sub Maintenance Center *8		2					

Table X-3-1 (2/2) Personnel Estimation Materials

Field in Charge	Type of Office/Station	Maint. Personnel			Operator			Remarks	
		Engi- neer	Techni- cian	Tele- phone Op.	Tele- type Op.	Telex Delivery- man	Manager		
Telegraph	Main- tenance Center*10	*11 RTC	*12 6		7	4	5	*10 Maintenance of telex equipment in maintenance area including the home station and patrol to and installation work at telex subscribers. *11 Regional Telex Center Service hours: 7 a.m. ~ 11 p.m. *12 Including two repair personnel. *13 Telex Concentrator A. Service hours: 7 a.m. ~ 11 p.m. (in 2 shifts) B. Service hours: 8 a.m. ~ 10 p.m. (in 2 shifts) C. Service hours: 8 a.m. ~ 5 p.m. *14 To be determined by the quantity to be delivered. When there is no deliveryman, operator is to deliver. *15 Gentex are classified into 3 types by the amount of service to be handled in estimating the required number of personnel. *16 The number of operator, 7 corresponds to the case of 5 local terminators in CONC-A.	
		*13 CONC-A	2		*16 7 or 5	*14 0 ~ 4	2		
		*13 CONC-B	2		4	*14 0 ~ 3	2		
	*13 CONC-C	1		2	*14 0 ~ 1	1			
	Gentex*15 Station	A				3	2		
		B				2	1		
		C				1	0		

Table X-3-2 (1/5) Personnel Plan for Maintenance Centers (Region III, Phase I)

Technical Field & Personnel Maintenance Center	In Charge of				Maintenance Personnel										Operator		Total												
	Switching & Outside Plant		Radio & Transmission	Telegraph	Switching		Outside Plant & Sub. Facilities		Radio & Transmission		Telegraph		Telephone Operator	Telex Operator	Delivery man	Manager													
	Engi- neer	Techni- cian	Engi- neer	Techni- cian	Engi- neer	Techni- cian	Engi- neer	Techni- cian	Engi- neer	Techni- cian	Engi- neer	Techni- cian	Engi- neer	Techni- cian	Engi- neer	Techni- cian		Engi- neer											
Cabanatuan	PC	0	0	CONC-A	2	8	1	9	1	6	2	10	5	3	5	5	52												
Pandi	PC+LE	0			2	9	1	5				13			5	5	35												
Dinalupihan	PC+LE	0			2	9	1	8				13			5	5	38												
Tarlac R.S.		0							1	6					1	1	8												
San Fernando R.S.		0		RTC					1	6	2	6	7	4	2	2	28												
Tarlac				CONC-A									5	3	2	2	12												
Olongapo				CONC-A									5	4	2	2	13												
Balanga				CONC-A									5	3	2	2	12												
Malolos				CONC-A									5	0	2	2	9												
Iba				CONC-A									5	0	2	2	9												
Total																	6	26	3	22	3	18	2	18	36	37	17	28	216

Table X-3-2 (2/5) Personnel Plan for Maintenance Centers (Region IV, Phase I)

Technical Field & Personnel Maintenance Center	In Charge of				Maintenance Personnel										Operator			Total											
	Switching & Outside Plant	Radio & Transmission	Telegraph	Telegraph	Switching		Outside Plant & Sub. Facilities		Radio & Transmission		Telegraph		Telephone Operator	Telex Operator	Telex Delivery man	Manager													
					Engi- neer	Techni- cian	Engi- neer	Techni- cian	Engi- neer	Techni- cian	Engi- neer	Techni- cian																	
Batangas	PC O	O	RTC O		2	8	1	3	1	6	2	6	10	7	4	5	55												
Calapan	PC+LE O		CONC-A O		2	8	1	5			2	13	5	0		5	41												
San Jose	PC+LE O		CONC-C O		2	9	1	3			1	13	2	1		5	37												
Romblon	LE O		CONC-A O		2	8	1	3			2	3	5	0		3	27												
Manila R.S.		O							1	6						1	8												
San Jose R.S.		O							1	6						1	8												
Calapan R.S.		O							1	6						1	8												
Romblon R.S.		O							1	6						1	8												
Iacena R.S.		O							1	6						1	8												
Marinduque		Sub-O								2							2												
Total																	8	33	4	14	6	38	2	11	39	19	5	23	202

Table X-3-2 (4/5) Personnel Plan for Maintenance Centers (Region IV, Phase II)

Technical Field & Personnel	In Charge of				Maintenance Personnel							Operator			Total		
	Switching & Outside Plant	Radio & Trans-mission	Tele-graph	Switching	Outside Plant & Sub.Facilities		Radio & Trans-mission		Telegraph		Tele- phone Opera- tor	Telex		Manager			
					Engi- neer	Techni- cian	Engi- neer	Techni- cian	Engi- neer	Techni- cian		Telex Operator	Delivery- man				
Maintenance Center																	
Batangas*	PC O		RTC O			+3					+2						5
Calapan*	PC O		CONC-A O			+1											1
San Jose*	PC+LE O		CONC-C O			+2											2
Romblon*	LE O		CONC-A O			+2											2
Unisan	PC+LE O			2	9	1	8			13							38
Puerto Princesa	O	O	CONC-B O	2	8	1	4	1	6		2	4	0	5			33
Baller		Sub O							2								2
Polillo		Sub O							2								2
El Niño		Sub O							2								2
Taytay			CONC-C O								1	2	1	1			5

* Offices/Stations to commence service in Phase I.

3-3-1 Switching

The following personnel are to be assigned to LE and IPTS on the basis of the personnel estimation materials given in Table X-3-1.

<u>LE</u>	<u>Phase I</u>			<u>Phase II</u>		
	<u>Persons</u>	<u>Offices</u>	<u>Persons</u>	<u>Persons</u>	<u>Offices</u>	<u>Persons</u>
Technicians (Region III)	1	x 18	= 18		-	
Technicians (Region IV)	1	x 10	= 10	1	x 4	= 4
Telephone operators (Region III)	3	x 18	= 54		-	
Telephone operators (Region IV)	3	x 10	= 30	3	x 5	= 15
Managers (Region III)	3	x 18	= 54		-	
Managers (Region IV)	3	x 10	= 30	3	x 5	= 15
<u>IPTS</u>						
Telephone operators (Region III)	3	x 3	= 9	3	x 11	= 33
Telephone operators (Region IV)	3	x 7	= 21	3	x 92	= 276

3-3-2 Outside Plant

Necessary personnel are to be assigned to each maintenance area.

3-3-3 Radio

Radio stations, excluding maintenance centers are to be unattended.

3-3-4 Telegraph

The following personnel plan is proposed for gentex stations on the basis of the personnel estimation materials given in Table X-3-1.

<u>Gentex Station A</u>	Phase I				Phase II			
	<u>Persons</u>	<u>Offices</u>	<u>Persons</u>	<u>Persons</u>	<u>Persons</u>	<u>Office</u>	<u>Persons</u>	
Telex operators (Region III)	3	x 1	= 3					
Telex operators (Region IV)	3	x 2	= 6	3	x 3	= 9		
Deliverymen (Region III)	2	x 1	= 2					
Deliverymen (Region IV)	2	x 2	= 4	2	x 3	= 6		

<u>Gentex Station B</u>	Phase I				Phase II			
	<u>Persons</u>	<u>Offices</u>	<u>Persons</u>	<u>Persons</u>	<u>Persons</u>	<u>Office</u>	<u>Persons</u>	
Telex operators (Region III)	2	x 3	= 6	2	x 2	= 4		
Telex operators (Region IV)	2	x 2	= 4	2	x 4	= 8		

<u>Gentex Station B</u>	<u>Phase I</u>			<u>Phase II</u>		
	<u>Persons</u>	<u>Offices</u>	<u>Persons</u>	<u>Persons</u>	<u>Offices</u>	<u>Persons</u>
Deliverymen (Region III)	1	x 3	= 3	1	x 2	= 2
Deliverymen (Region IV)	1	x 2	= 2	1	x 4	= 4

<u>Gentex Station C</u>	<u>Phase I</u>			<u>Phase II</u>		
	<u>Persons</u>	<u>Offices</u>	<u>Persons</u>	<u>Persons</u>	<u>Offices</u>	<u>Persons</u>
Telex operators (Region III)	1	x 13	= 13	1	x 29	= 29
Telex operators (Region IV)	1	x 6	= 6	1	x 41	= 41

<u>Gentex Station (Total)</u>	<u>Phase I</u>	<u>Phase II</u>
Telex operators (Region III)	22 persons	33 persons
Telex operators (Region IV)	16 persons	58 persons
Deliverymen (Region III)	5 persons	2 persons
Deliverymen (Region IV)	6 persons	10 persons

3-3-5 Total Personnel

The required number of personnel for each technical field which has been obtained on the basis of personnel plan of each field is given in Table X-3-3. It may be concluded as the result of estimation that a total of 718 personnel is to be required in Phase I including 558 personnel in the field of telephone and 160 personnel in the field of telegraph and a

Table X-3-3 (1/2) Required Number of Maintenance Personnel (Phase I)

Region	Category		No. of Organization	Maintenance Personnel		Operator			Total	
				Engineer	Technician	Telephone Operator	Telex			Manager
							Telex Operator	Delivery man		
Region III	Regional Office		1	4*1	12*2				16	
	Telephone Switching	Maintenance Center	3	6	26	36		28*3	96	
		LE	18		18	54		54	126	
		IPFS	3			9			9	
	Outside Plant	Maintenance Center	3	3	22				25	
	Radio	Maintenance Center	2	2	12				14	
	Telegraph	Maintenance Center	7	2	18		37	17	74	
		Gentex Station	17				22	5	27	
	Subtotal				17	108	99	59	22	82
Region IV	Regional Office		1	4*1	12*2				16	
	Telephone Switching	Maintenance Center	4	8	33	39		23*3	103	
		LE	10		10	30		30	70	
		IPFS	7			21			21	
	Outside Plant	Maintenance Center	4	4	14				18	
	Radio	Maintenance Center	6 Sub. 1	6	38				44	
	Telegraph	Maintenance Center	4	2	11		19	5	37	
		Gentex Station	10				16	6	22	
	Subtotal				24	118	90	35	11	53
Total				41	226	189	94	33	135	718

*1 One person for each field of telephone switching, outside plant, radio and telegraph.

*2 Three persons for each field of telephone switching, outside plant, radio and telegraph.

*3 Total managing personnel of all maintenance centers

Table X-3-3 (2/2) Required Number of Maintenance Personnel (Phase II)

Region	Category		No. of Organization	Maintenance Personnel		Operator			Total	
				Engineer	Technician	Tele- phone Operator	Telex			Manager
							Telex Operator	Delivery- men		
Region III	Regional Office		1							
	Telephone Switching	Maintenance Center								
		LE								
		IPTS	11			33			33	
	Outside Plant	Maintenance Center			7				7	
	Radio	Maintenance Center								
	Tele- graph	Maintenance Center			2			3	5	
		Gentex Station	31				33	2	35	
Subtotal					33	33	5	80		
Region IV	Regional Office		1							
	Telephone Switching	Maintenance Center	2	4	17	13		17 ^{*3}	51	
		LE	4		4	15		15	34	
		IPTS	92			276			276	
	Outside Plant	Maintenance Center	2	2	20				22	
	Radio	Maintenance Center	Sub 2 3	1	12				13	
		Maintenance Center	5		10		22	7	39	
	Tele- graph	Gentex Station	48				58	10	68	
Subtotal				7	63	304	80	17	32	503
Total				7	72	337	113	22	32	583

*1 One person for each field of telephone switching, outside plant, radio and telegraph.

*2 Three persons for each field of telephone switching, outside plant, radio and telegraph.

*3 Total managing personnel of all maintenance centers

total of 583 personnel in Phase II including 436 personnel in the field of telephone and 147 personnel in the field of telegraph.

It is to be noted that this maintenance plan is a tentative one for estimating the scale of the project and in actual maintenance arrangement it is important to carefully analyze the actual conditions of personnel arrangement and execute minute personnel assignment depending on the scale of service of each field organization.

4. Training System

Personnel training is essential for securing personnel as mentioned in the preceding paragraph prior to the commencement of service by this project. This training should be performed as follows.

(1) Training to be planned by Telecommunication

Training Institute (TTI)

(2) Training by participating in construction work

The training of item (1) above has been prepared on the basis of the proposal for the Northern Luzon Project and is expected to cover training for the Central Luzon Project. The training item (2) above is intended for training the required number of personnel among future maintenance personnel in actual construction work while enhancing construction work in this project.

Training in Phase I of this project has been planned as follows.

1) Training of engineers (about 40 engineers)

Training of engineers for acquiring high technical levels in the individual fields is to be performed at the site or in Japan.

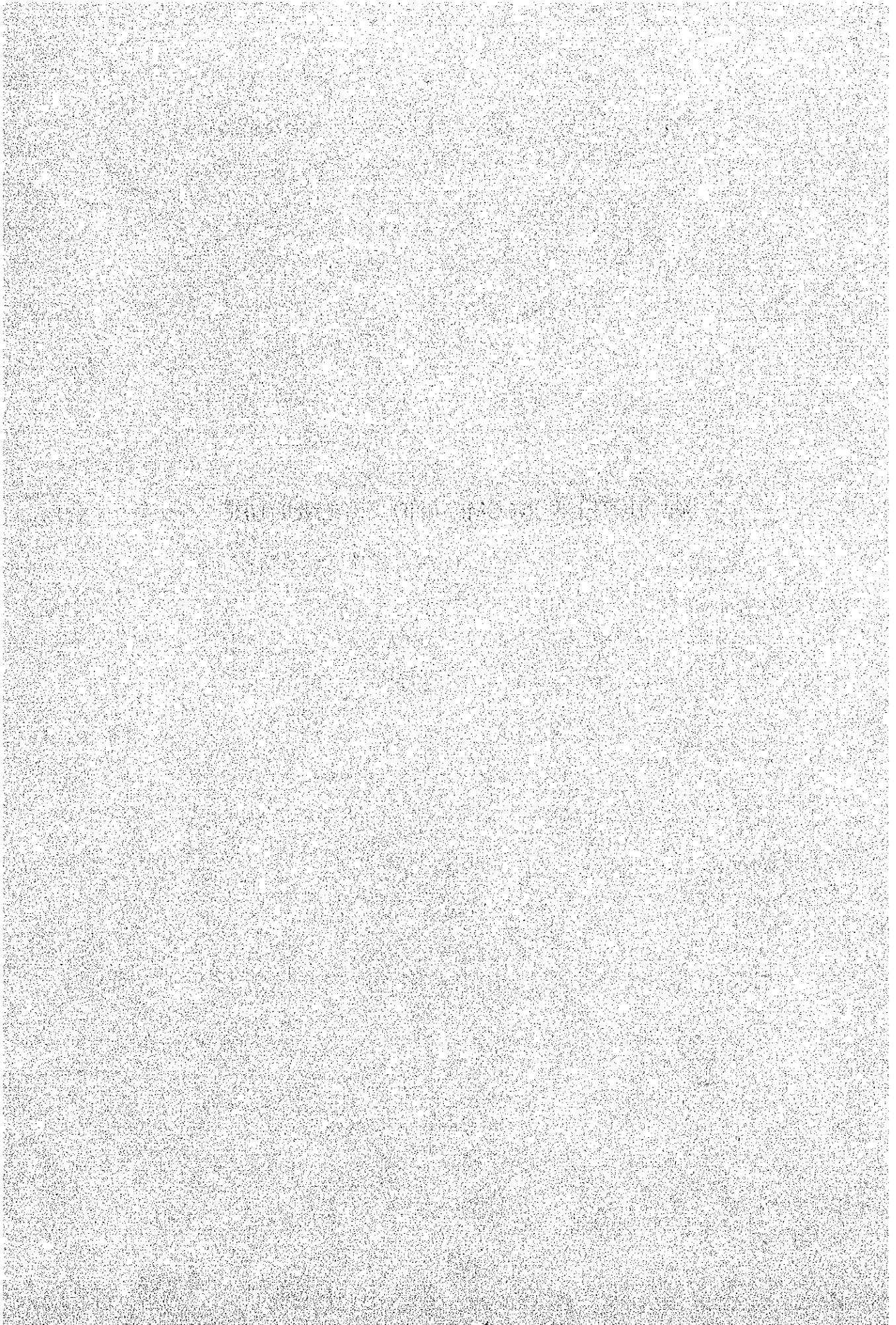
2) Technicians (about 230 technicians)

These technicians are to be trained at sites to acquire necessary techniques in the respective fields.

3) Operators (about 70 operators)

These operators are to be trained at the sites to acquire necessary techniques in the fields of telephone and telegraph.

XI. BUTEL'S INCOME AND EXPENDITURE



XI. BUTEL'S INCOME AND EXPENDITURE

1. Income and Expenditure

BUTEL's recent trends of income and expenditure are given in Table XI-1-1, resulting in causing an annual deficit of about 60 million pesos in average. The deficit is appropriated from the National Treasury.

Although the rate of income and expenditure was somehow improved upon introducing a revision of charges in October 1979, it became worse again and reached about 700% in 1979. In four years afterward (1980), the last revision of charges was made.

BUTEL's trends of the rate of income and expenditure are as follows.

<u>Year</u>	<u>Rate of Income and Expenditures</u>
1975	690%
1976	580%
1977	499%
1978	551%
1979	699%

Here, the rate of income and expenditure is given by $\frac{\text{Expenditure}}{\text{Income}} \times 100(\%)$ and indicates how much cost is required for earning, for example, 100 pesos.

Both telegraph and telephone incomes have decreased and particularly the income from toll calls has

Table XI-1-1 BUREL's Income and Expenditure

(Unit: in pesos)

	1975	1976	1977	1978	1979
Income					
Income from telegraph	3,840,770	7,473,925	6,448,958	6,365,762	4,851,834
Income from telephone	5,083,155	8,019,989	7,359,557	7,423,508	5,937,600
Installation fee	-----	794	1,526	1,605	2,825
Rental fee	-----	1,341,415	2,156,373	2,296,935	2,895,707
Toll call fee	2,047,543	4,048,533	3,982,965	3,345,429	1,961,550
Miscellaneous income	-----	-----	821,415	-----	-----
Total	8,923,926	15,493,913	14,629,930	13,789,269	10,789,434
Expenditure					
Personnel cost	38,662,532	65,924,864	54,620,429	56,411,178	56,719,707
Maintenance and operation	22,934,630	23,935,608	18,310,054	19,604,403	18,681,738
Total	61,597,163	89,878,473	72,930,484	76,015,581	75,401,445
Balance	Δ52,673,237	Δ74,384,560	Δ58,300,554	Δ62,226,312	Δ64,612,011

Note 1: Incomes from installation fee, rental fee and toll call fee are included in the "Income from telephone."

Note 2: The total income did not include "Miscellaneous income" excepted that of 1977.

Note 3: Calendar years are used as fiscal years.

decreased conspicuously. This is partly because of the withdraw of franchaised private operating companies from Manila where the investment effeciency is considerably high on a count of extremely high need of telephone but partly because of frequent occurrence of troubles in the existing facilities and diffulties and encountered in providing secured service continuously. The income of 1979 was only 57% of the aimed sum. BUTEL's annual report specifies the obsolescence in facilities, frequent occurrence of troubles due to shortage of spare parts, and incompleteness of projects due to insufficiency of funds for the purchase of facilities as the major causes for this. The installation of highly reliable facilities and the construction of a high-reliability network will gain the popularity of users and accordingly lead to increase in the use of telephone and thus increase income.

On the other hand, the personnel cost amounts to 3/4 of the total expenditure. Although it may be said that telecommunication service is a typical concentrated facility industry, yet the degree of BUTEL's dependence to human power is rather high for the time being and future capital investment and expansion of facilities are anticipated.

BUTEL's trends of productivity which indicates the efficiency of human resources are shown in Table XI-1-2.

Table XI-1-2 BUTEL's Indices regarding Human Resources

	1975	1976	1977	1978	1979
Personnel cost (pesos)	38,662,532	65,924,864	54,620,429	56,411,178	56,719,707
Rate of personnel cost in total expenditure (%)	62.8%	73.3%	74.9%	74.2%	75.2%
Number of employees { Fulltime Parttime Total	3,708	5,595	6,058	-----	6,506
	3,555	3,316	2,211	-----	1,487
	7,263	8,911	8,269	8,131*	7,993
Average personnel cost per person (pesos)	5,323	7,398	6,605	6,938	7,096
Productivity (pesos)	1,229	1,739	1,769	1,696	1,350

Note 1: The figure marked * indicates an estimated one.

Note 2: Productivity = Incom/Number of employees

where the productivity tends to decrease gradually.

2. Financial Conditions

BUTEL's financial condition as of the end of 1979 is shown in Table XI-2-1 where the fixed assets of telegraph and telephone facilities amount to 252 million pesos. The capital investment applied to the construction of telephone offices and relocation, modification and repair of telephone exchange equipment during the period of five years from 1975 to 1979 amounted to 135 million pesos.

Funds necessary for the construction of telegraph and telephone facilities have been raised by loans from the government and from the Overseas Economic Cooperation Fund (OECF), not including any loan from local financial institutions. The amount of loan approved in the national budget is rather small.

BUTEL employs an accounting method employed by other organization of the Philippines and has not introduced the depreciation of fixed assets.

Balance sheet analysis consists of profitability analysis for measuring the profitabilities of undertakings and liquidity analysis for measuring financial safeness.

BUTEL's major indices regarding liquidity analysis are as follows.

Table XI-2-1 BUTEL's Balance Sheet (1979)

(Unit: in thousand pesos)

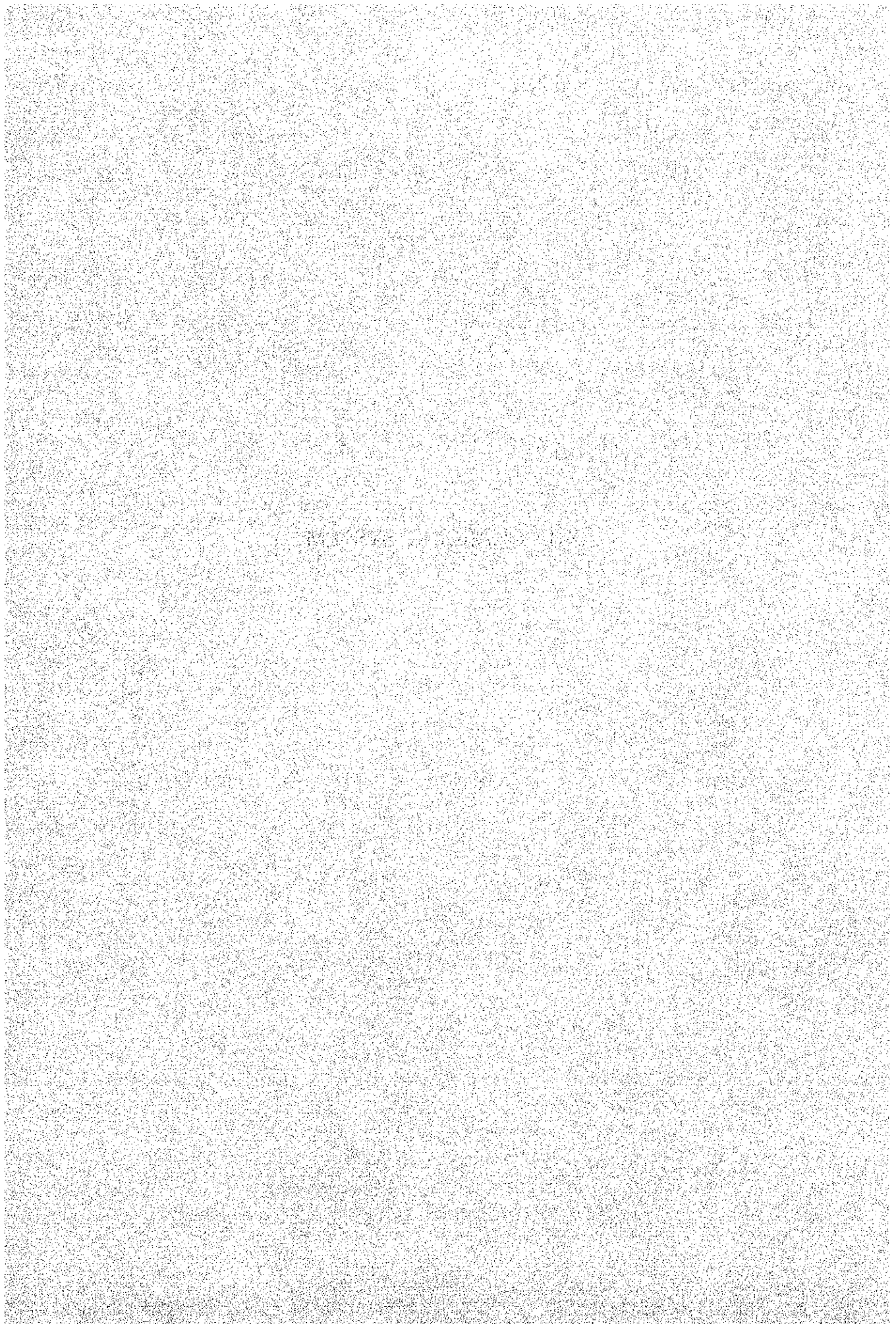
Assets		Liabilities and Capital	
Liquid assets		Liabilities	
Cash	92,467	Account payable	132,570
Account receivable	11,004	Other liabilities	7,040
Stored goods	176	Total	139,610
Deposite	43,018	Capital account	
Other liquid assets	12	Capital from national budget	9,101
Total	146,677	Unpaid allotment	(-)2,034
Fixed assets		Owmed capital	252,276
Total	252,276	Total	259,343
Total of assets	398,953	Total of liabilities and capital	398,953

$$\text{Liquidity ratio} = \frac{\text{Liquid assets}}{\text{Current liabilities}} \times 100 = 105.1 (\%)$$

$$\text{Fixed assets ratio} = \frac{\text{Fixed assets}}{\text{Capital}} \times 100 = 97.3(\%)$$

$$\begin{array}{l} \text{Ratio of total liabilities} \\ \text{to net worth} \end{array} = \frac{\text{Liabilities}}{\text{Total Capital}} \times 100 = 35.0 (\%)$$

XII. CHARGING SYSTEM



XII. CHARGING SYSTEM

1. Charging System of BUTEL

The telegram and telephone charges of BUTEL were raised on October 1st, 1980, which was the revision of charges made four years after the preceding revision made in October 1976. The last revision was made mainly because of increased maintenance costs, increased personnel cost due to surprising rise of consumer prices, and upward revision of charges of private operating companies such as PLDT.

1-1 Telegram Charges

(1) Plain telegrams

Ordinary - up to 10 words	3.80 pesos
For every additional word	0.35 Pesos
Rush or urgent - up to 10 words	6.55 pesos
For every additional word	0.65 pesos

(2) Code telegrams

Ordinary - up to 10 words	5.05 pesos
For every additional words	0.50 pesos
Rush or urgent - up to 10 words	10.20 pesos
For every additional word	1.00 pesos

(3) Citygram

Ordinary - up to 20 words	2.50 pesos
For every additional words	0.10 pesos
Rush or urgent - up to 20 words	5.05 pesos
For every additional word	0.20 pesos

Rental for residential use

Single line telephone: 41 pesos/month

Two-party line telephone: 24 pesos/month

Rental for business use

Single line telephone: 54 pesos/month

Two-party line telephone: 41 pesos/month

Additional telephone set

With bell: 10 pesos/set

Without bell: 8 pesos/set

(3) Toll call rate

Toll calls are manually connected and charged by a 2 minutes/1 minute system. Nighttime discount (ranging from 7 p.m. to 7 a.m. in the following morning) and holiday discount systems are employed. Toll call rates are enumerated in Table XII-1-1.

(4) Charge for move and charge for changing type of telephone

Move within a building: 7 pesos

Change in installation place: same as new installation

Charge for change of type of telephone: 10 pesos

(5) Deposites

The whole sums of deposits are to be returned to the subscriber when the subscription contract is cancelled in principle. When the subscriber

Table XII-1-1 (1/2) Message Rates for Toll Calls (BUTEL)

Air Distance		Station-to-Station Call		Person-to-Person Call	
From	To	Weekdays	Night & Holiday	Weekdays	Night & Holiday
km	km	pesos	pesos	pesos	pesos
0	20	.25	.25	.40	.25
21	30	.45	.40	.55	.50
31	40	.70	.50	.95	.80
41	50	.95	.85	1.45	1.15
51	60	1.30	.95	1.90	1.45
61	70	1.55	1.20	2.20	1.75
71	80	1.80	1.45	2.60	2.00
81	90	2.10	1.60	3.00	2.40
91	100	2.35	1.90	3.45	2.60
101	120	2.60	2.00	3.70	2.90
121	140	2.95	2.35	4.15	3.30
141	160	3.20	2.55	4.55	3.65
161	180	3.45	2.75	5.00	3.95
181	200	3.70	3.00	5.35	4.30
201	225	4.05	3.20	5.70	4.55
226	250	4.30	3.45	6.10	4.90
251	275	4.55	3.65	6.55	5.20
276	300	4.80	3.85	6.90	5.50
301	325	5.05	4.10	7.30	5.85
326	350	5.40	4.30	7.65	6.10
351	375	5.65	4.55	8.10	6.45
376	400	5.90	4.75	8.45	6.75
401	425	6.15	4.95	8.85	7.10
426	450	6.45	5.20	9.10	7.40
451	475	6.75	5.40	9.70	7.65
476	500	7.00	5.65	10.00	8.00
501	525	7.20	5.70	10.25	8.20
526	550	7.35	5.90	10.55	8.45
551	575	7.55	6.00	10.80	8.65
576	600	7.75	6.20	11.05	8.85

Table XII-1-1 (2/2) Message Rates for Toll Calls (BUTEL)

Air Distance in km		Station-to-Station Call		Person-to-Person Call	
From	To	Weekdays	Night & Holiday	Weekdays	Night & Holiday
km	km	pesos	pesos	pesos	pesos
601	625	7.95	6.35	11.30	9.00
626	650	8.10	6.45	11.55	9.20
651	675	8.25	6.65	11.85	9.50
676	700	8.45	6.75	12.10	9.70
701	725	8.65	6.90	12.35	9.90
726	750	8.85	7.10	12.60	10.05
751	775	9.05	7.20	12.85	10.25
776	800	9.15	7.35	13.15	10.50
801	825	9.35	7.50	13.40	10.70
826	850	9.55	7.65	13.65	10.90
851	875	9.75	7.80	13.90	11.10
876	900	9.95	7.95	14.15	11.30
901	925	10.05	8.10	14.45	11.55
926	950	10.25	8.20	14.70	11.75
951	975	10.45	8.40	14.95	11.95
976	1000	10.65	8.60	15.20	12.15
1001	1050	10.85	8.65	15.45	12.35
1051	1100	11.00	8.85	15.75	12.60
1101	1150	11.20	8.90	16.00	12.80
1151	1200	11.40	9.10	16.25	13.00
1201	1250	11.50	9.30	16.50	13.20
1251	1300	11.75	9.35	16.75	13.40
1301	1350	11.90	9.55	17.05	13.65
1351	1400	12.10	9.60	17.30	13.85
1401	1450	12.30	9.80	17.55	14.05
1451	1500	12.50	10.00	17.80	14.20
1501	1550	12.70	10.10	18.05	14.40
1551	1600	12.80	10.25	18.35	14.70

Each of the above rates is charged for the first 2 minutes and one half of the rate is added for every additional one minute.

has not yet paid any rental as required upon cancelling the subscription contract, the sum that remains after deducting the unpaid amount is returned to the subscriber. Of the two types of deposits, the deposit for facilities will not be returned if the telephone set is broken.

Deposit for instruments: 140 pesos
 Deposit for guaranty: Twice as large as the rental per month

(6) Others

Although BUTEL has set up IPTSSs, it has not installed public stations for local telephone calls. PLDT has public stations and its local toll rate from a public station is 0.4 pesos per call.

2. Charging Systems of Private Operating Companies

The charging systems of the two major private operating companies, that is, PLDT and RETERCO, among various private operating companies have been examined.

(1) Telephone installation charge (initial cost)

The initial costs of these two private operating companies are higher than that of BUTEL, as follows.

		<u>PLDT</u>	<u>RETELCO</u>	<u>(BUTEL)</u>
Telephone for	Single line:	1418.01	1418.00	242.00
residential use	Party line:	1406.07	1154.00	208.00

		<u>PLDT</u>	<u>RETELCO</u>	<u>(BUTEL)</u>
Telephone for	Single line:	1457.73	1969.00	268.00
business use	Party line:	1435.69	1438.00	242.00

(in pesos, in Regions III & IV)

Let us now consider a PLDT's single line telephone for residential use for example.

Installation charge:	145.00
Deposit for subscriber's facility:	220.00
Rental for one month (in advance):	53.01
Stock investment:	1000.00
Total:	1418.01

(2) Rentals

(per month in pesos)

		<u>PLDT</u>	<u>RETELCO</u>
Telephone for	Single line:	53.01	45.01
residential use	Party line:	41.07	35.00
Telephone for	Single line:	92.73	91.00
business use	Party line:	70.69	65.00

PLDT's telephone rentals depend on the area and the above-mentioned rates are those in the Luzon area (excluding Metro Manila). rentals in Metro Manila are still higher than these rates. For RETELCO, data for determining whether the rentals depend on the area was not obtained. The above-mentioned rates are those for Region III.

(3) Message rate

The major two private operating companies employ a flat rate system for local call rates as is the case with BUTEL.

A 2 minutes/1 minute system is employed for toll call rates and nighttime discount and holiday discount systems are employed as is the case with BUTEL.

PLDT's toll rates were raised 30% in December 1979 and the current toll rates are given in Table XII-2-1.

3. Charging System of This Project

3-1 Telegram

The current charging system is to be employed. However, from the standpoint of business management it is desirable to cover costs required for service in principle from charges and for this purpose it is recommendable to improve the rates of special rate telegrams, nominal rate telegrams, and free telegrams to proper ones.

3-2 Telex

A similar charging system as used for telephone is to be employed.

3-3 Telephone

The study team recommends to employ a new message rate for local calls and, at the same time, introduce

Table XII-2-1 Toll Call Rates (PLDT)

Air Distance		Person-to-Person Call		Station-to-Station Call	
From	To	Weekdays	Night & Holiday	Weekdays	Night & Holiday
km	km	pesos	pesos	pesos	pesos
0	— 20	.40	.30	.30	.30
20	— 28	.80	.40	.50	.30
28	— 36	1.00	.80	.80	.50
36	— 44	1.50	1.00	1.00	.80
44	— 52	1.80	1.20	1.30	.80
52	— 60	2.10	1.50	1.50	1.00
60	— 68	2.50	1.80	1.80	1.30
68	— 76	2.90	2.10	2.00	1.50
76	— 84	3.30	2.30	2.30	1.50
84	— 92	3.70	2.70	2.50	1.80
92	— 100	3.90	2.70	2.80	2.00
100	— 110	4.40	2.90	3.10	2.00
110	— 120	4.70	3.30	3.30	2.30
120	— 130	5.10	3.50	3.60	2.50
130	— 140	5.50	3.80	3.80	2.50
140	— 150	5.90	4.10	3.90	2.80
150	— 160	6.20	4.40	4.30	3.10
160	— 170	6.60	4.70	4.60	3.30
170	— 180	6.80	4.70	4.80	3.30
180	— 190	7.30	5.00	5.10	3.60
190	— 200	7.60	5.30	5.30	3.80
200	— 220	8.00	5.60	5.60	3.80
220	— 240	8.40	5.90	5.90	4.00
240	— 260	8.80	6.20	6.10	4.30
260	— 280	9.10	6.40	6.40	4.30
280	— 300	9.60	6.80	6.60	4.60
300	— 325	9.80	6.80	6.80	4.80
325	— 350	10.30	7.00	7.10	5.10
350	— 375	10.50	7.30	7.30	5.10
375	— 400	10.90	7.60	7.60	5.30
⋮	⋮	⋮	⋮	⋮	⋮

Each of the above rates is charged for the first 2 minutes and one half of the rate is added for every additional one minute.

a detailed billing system based on the periodic pulse metering method for toll calls.

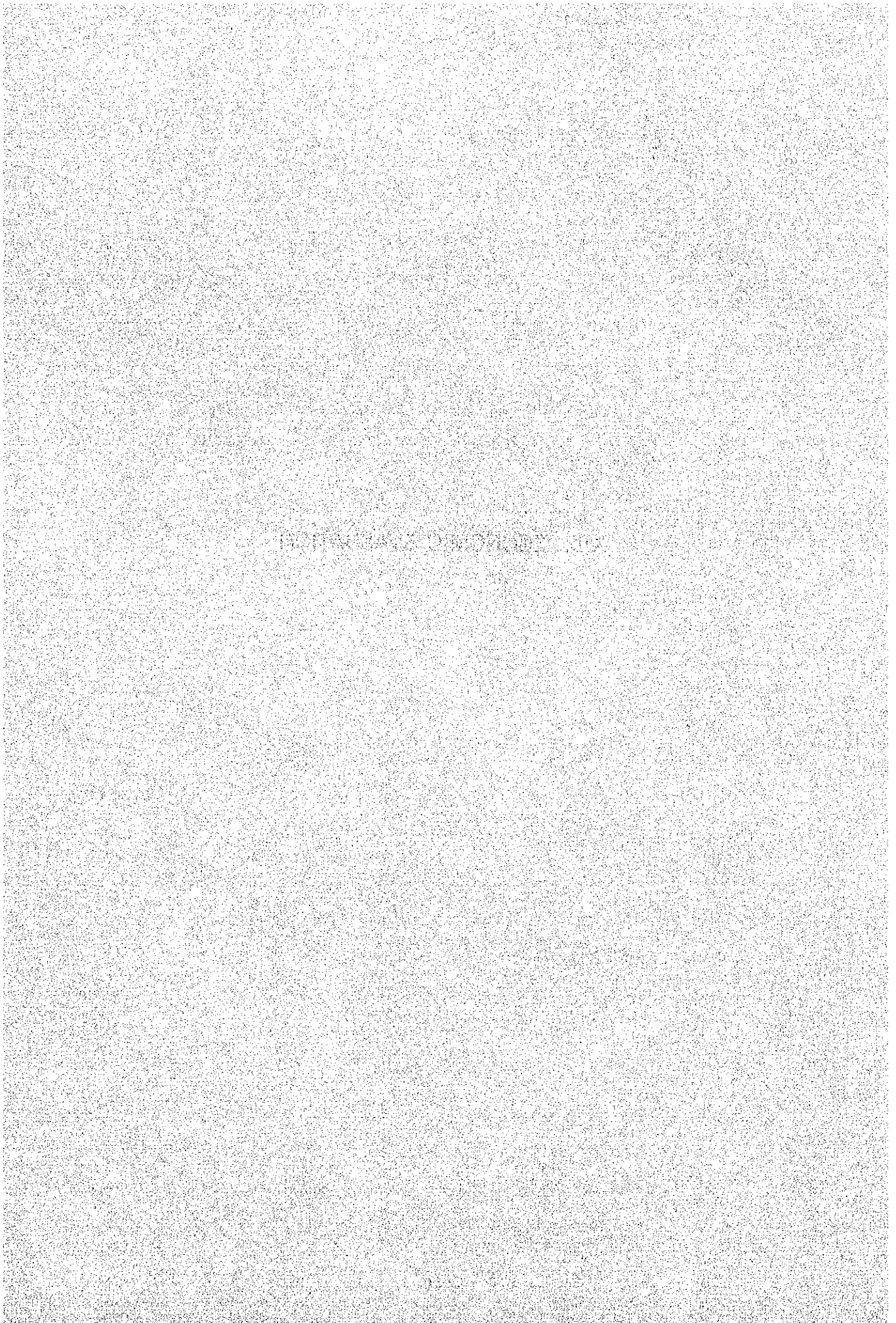
Although local calls are currently charged by a flat rate system, it is desirable to change it to a message rate system for the following reasons.

- 1) It is fair to charge calls depending on the amount of use of telephone.
- 2) In order to minimize loads to subscribers and make telephone be easily used, the usage rate should be as much low as practicable.

Accordingly, the charge for local calls should not be included in the usage rate but should be set separately.

In the detailed billing system based on the periodic pulse metering method, a given unit charge is set as the base and the duration for which the call can be continued by the unit charge is determined by the distance. This method provides such an advantage that allows long-distance calls at low charges so far as these calls are short in the duration of call. For rentals, such effects as network effect will be caused because of the introduction of DDD connection in toll calls and increase in the number of subscribers. But, on the other hand, in consideration of the

XIII. ECONOMIC EVALUATION



XIII. Economic Evaluation

1. Financial Analysis

In this section, estimated effect of this project are analyzed and evaluated by the profit rate method. Analysis has been made for Phase I separately and for the entire project including Phase II.

1-1 Premises

In the profit rate method, there is a discount rate where the total present expenditure subtracted from total present revenues during the service life of the project equals 0. The project is evaluated by this discount rate.

Revenues consist of telegraph revenues, telephone revenues and the leased circuit revenues from the execution of the project. Expenditures consist of the investment required for construction of the project, operating capital necessary to run the project, the maintenance costs, the administrative expenses and the leased circuit rental fee. Twenty years is used as the service life of the project after the examples of analysis by the World Bank, etc.

Taxes including the telephone use tax are excluded from calculations because revenues and expenditures are of the same amount and do not affect the discount rate.

The number of telephone subscribers, the number of telegrams, the number of telex service subscribers, the telephone call rate and the construction cost, etc. that provide the basic data for the analysis were calculated in accordance with the construction plan, construction cost, etc. mentioned earlier in this report. (See