

## ***CHAPTER 5 IMPLEMENTATION SCHEDULE***



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This Project is to install, in answer to the request of the Government of the Lao RPD, digital telephone exchanges and ancillary facilities, such as power system and air-conditioner, in the 6 major cities including the capital city, Vientiane, under the Second Telecommunications Project (TELECOM II).

Function and capacity of the exchanges to be installed are summarized below:

Exchange	Function	Capacity
a. Vientiane Municipality		13,500 lines
Namphou Ex.	Int/toll/local Charging Remote Main/Op	5,400
Houaxang Ex.	RSU (to be accommodated in Numphou Ex.)	200
Nongteng Ex.	RSU (to be accommodated in Numphou Ex.)	200
Airport Ex.	RSU (to be accommodated in Numphou Ex.)	200
Kaiseththa Ex.	Local	2,900
Donnoun Ex.	RSU (to be accommodated in Kaiseththa Ex.)	200
Thangon Ex.	RSU (to be accommodated in Kaiseththa Ex.)	200
Sisattanak Ex.	Local	3,800
Nahai Ex.	RSU (to be accommodated in Sisattanak Ex.)	200
Thadua Ex.	RSU (to be accommodated in Sisattanak Ex.)	200

Exchange	Function	Capacity
b. Louang Phabang City		
Louang Phabang Ex.	Toll/Local	1,000
c. Pakxan City		
Pakxan Ex.	RSU (to be accommodated in Numphou Ex.)	200
d. Thakhek City		
Thakhek Ex.	Toll/local	500
e. Khanta Bouli City		
Khanta Bouli Ex.	Toll/local Remote Mainte/Op.	1,000
f. Pakxe City		
Pakxe Ex.	Toll/local	1,000

#### 5-1 Implementing Organization

This Project is to be implemented by the Entreprise d'Etat des Postes et Telecommunications Lao (EPTL), with the assistance of an engineering consultant in Japan.

This Project aims to construct a digital telecommunications network in the Lao PDR for the first time, and the implementation of this Project requires advanced knowhow and technologies. Besides, close and minute coordination will have to be made among all the correlated projects from time to time. To ensure satisfactory implementation of this Project, EPTL is required to appoint a Project Manager, i.e., the representative of EPTL responsible for all the matters related to the implementation of the Project, including the communication and coordination with the Consultant, management and supervision of construction works, as well as contract signing, etc.

## 5-2 Demarcation of Works and Responsibility

### 5-2-1 Exchange Installation Work

Demarcation of the exchange installation work under this Project is as follows:

- a. The main distribution frame (MDF) in the exchange is to be the demarcation of works and responsibility with the Local Cable Network Construction Project, on condition that all the terminal strips and jumper wires necessary for subscriber connection, and other parts and materials to be required in relation to the MDF be provided by the Local Cable Network Construction Project. This Project is responsible for distribution cable between the switching system and MDF, and the relevant cable termination on MDF only.
- b. The digital distribution frame (DDF) in the exchange is to be the demarcation of works and responsibility with the Long Distance and Local Transmission Network Project, on condition that all the terminal strips and jumper wires necessary for junction cable connection, and other parts and materials to be required in relation to DDF be provided by the Long Distance and Local Transmission Network Project. This Project is responsible for distribution cable between switching system and DDF and the relevant cable termination on DDF only.

In case the junction cable runs through MDF, the same provisions as specified above should apply.

### 5-2-2 Ancillary Works

- a. The main power distribution panel is to be the demarcation of works and responsibility with the Building Construction Project, on condition that the breaker on distribution panel be provided by the Building Construction Project. This Project is responsible for termination of the equipment supplied under this Project only.

The power system to be constructed under this Project is required to feed power for the transmission facilities, also. The d.c. distribution panel to be installed in the exchange room is the demarcation with the Long Distance and Local Transmission Project, on condition that the cable installation between the transmitting equipment and the d.c. distribution panel including the termination of the relevant cables to the panel are to be undertaken by the Long Distance and Local Transmission Project. This Project is responsible for the provision of the breaker necessary for the transmission facilities, only.

- b. The air-conditioning of the exchange room is under the responsibility of this Project. The Building Construction Project will be held responsible for the air-conditioning of other rooms.

- c. Earthing works are to be undertaken by the Building Construction Project, in principle. When the earth resistance of 5 ohm obtained by the Building Construction Project is not sufficient enough for the switching system, additional works should be done under this Project. As for the exchanges employing RSU, all the earthing works are under the responsibility of this Project.
- d. The foundation of the emergency (prime, in case of Pakxan) engine generators should be provided by this Project.
- e. The foundation for installing a container for the container-type RSU is to be constructed by this Project, on condition that the temporary land adjustment of the site and installation of fence around the site are under the responsibility of the Lao Government.

### 5-3 Implementation Plan

#### 5-3-1 Phasing of Implementation Work

For adjustment and coordination of schedules with other correlated projects, this Project is divided into two phases in implementation, and started with the works in Vientiane according to the priority of the objective areas, though all the local cable network construction works are to be completed during the period from early 1992 to March 1994.

The works of each phase are outlined below:

- |    |          |                          |                         |
|----|----------|--------------------------|-------------------------|
| a. | Phase I  | Namphou Exchange         | 5,400 lines             |
|    |          | Xaisettha Exchange       | 2,900 lines             |
|    |          | Sisattanak Exchange      | 3,800 lines             |
|    |          | RSU                      | 2 systems (400 lines)   |
|    |          | Billing Computing System | 1 system                |
|    |          | Centralized Operation    |                         |
|    |          | and Maintenance System   | 1 system                |
|    |          | Manual Switchboard       | 7 pcs                   |
|    |          | Relevant Ancillary       |                         |
|    |          | Facilities               | 1 system                |
| b. | Phase II | RSU (including Pakxan)   | 6 systems (1,200 lines) |
|    |          | Louang Phabang Exchange  | 1,000 lines             |
|    |          | Thakhek Exchange         | 500 lines               |
|    |          | Khanta Bouli Exchange    | 1,000 lines             |
|    |          | Pakxe Exchange           | 1,000 lines             |
|    |          | Centralized Operation    |                         |
|    |          | and Maintenance System   | 1 system                |

#### 5-3-2 Installation Practice

The telephone exchanges and ancillary facilities to be installed under this Project is the digital system to be introduced into the Lao PDR for the first time and its installation requires advanced technologies. To ensure efficient and successful execution of the work within a limited period, the Project should be materialized on a full turn-key basis contract. That is, this Project is to be implemented by a Japanese General Contractor (?) on a full turn-key basis contract.

#### 5-3-3 Items to be Taken into Account

The digital telephone exchanges to be introduced under this Project are conspicuously superior to the conventional exchanges in stability and reliability after installation. On the other hand, the digital exchange is made of precision parts and accessories, like electronic computer, and cannot be free from fragility peculiar to the electronic equipment. Therefore, great care should be given to the following all through the period of Project implementation:

- a. Equipment should be handled and kept in custody very careful-

ly, especially during transportation, so that no deterioration due to humidity, etc. will develop.

- b. If any damage is detected on the packing, etc. during transportation or while being kept in custody, the equipment in the damaged packing should be examined visually before installation. If there is any possibility of damage, further examination be carried out to confirm its satisfactory operation before installation.
- c. In order to protect the equipment from dust, the installation site should be cleaned after the setting up of the basic frame and before mounting the individual electronic package on the frame.
- d. During the installation works, attention should be given to the prevention of static electricity. Static electricity proof mat, etc. should be spread around the equipment, whenever necessary, with a view to protecting electronic equipment from damage due to static electricity.
- e. In order to verify reliability of the software to operate the exchange, stability test should be carried out for a long enough period until the reliability can be confirmed, by utilizing call simulator, etc.
- f. Overall connection test should be executed, not only for the facilities of this Project but also covering all the relevant facilities of other projects to confirm the stable function of the network as a whole.
- g. Implementation schedule should be checked and adjusted at all times for coordination with other projects, with a view to elimination of problems that may arise between contractors.
- h. The training for technology transfer should be conducted during the implementation period concerning the diversified items so that the EPTL maintenance staff can maintain the facilities completed satisfactorily.

#### 5-3-4 Installation and Supervision Plan

This Project is to proceed as follows:

(1) Signing of Exchange of Note (E/N)

Exchange of Note on the grant aid for this Project is signed by and between the Government of the Lao PDR and the Government of Japan.

(2) Banking Arrangement

The Government of the Lao PDR appoints a Japanese bank who deals with the disbursements of grant aid under the E/N, from among Japanese banks officially approved by the Japanese Government.



(3) Contract with Consultant

The Government of the Lao PDR selects a Consultant (Japanese consultants only are eligible) who assists the Government in design and supervision of installation works for this Project, and concludes the consultant contract with the Consultant. The contract becomes effective, subject to the approval of the Japanese Government.

(4) Field Survey and Preparation of Tender Documents

The Consultant thus selected by the Government of the Lao PDR carries out the field survey at all the objective sites of this Project (15 exchanges/telephone switching units) in Vientiane Municipality and 5 major provincial capitals, to investigate the matters related to the installation of exchanges and ancillary facilities. Detail design is drawn up based on the field survey findings, and then the tender documents are prepared. The tender documents are finalized subject to the approval of the Government of Lao PDR.

(5) Tender Evaluation and Conclusion of Implementation Contract

Evaluation is carried out in compliance with the evaluation criteria previously prepared by the consultant and approved by the Government of the Lao PDR. Then the negotiation with the Successful Tenderer (first ranking tenderer) is stated with the assistance of the Consultant, after obtaining the approval of JICA. When an agreement is reached between the Successful Tenderer and the Government of the Lao PDR after clarification on negotiated items, implementation contract is made, in compliance with the guidance on contract documents preparation published by JICA, with the assistance of the Consultant. The implementation contract becomes effective subject to the approval of the Japanese Government.

(6) Examination of Installation Drawings for Approval

On behalf of the Government of the Lao PDR, the Consultant checks and examines the installation drawings submitted by the Contractor to finalize the Bill of Quantity, and reports the examination results to the Government of the Lao PDR.

(7) Witness to Factory Inspection

Prior to the shipping of the equipment and materials to be supplied by the Contractor, the Consultant inspects the equipment and materials to be shipped to confirm their compliance with the contracted specifications, particularly with respect to the mechanical and electrical characteristics and quantities.

(8) Installation Work Supervision

The Consultant checks the time schedule of the installation works submitted by the Contractor, and gives instructions and directions, where necessary. The Consultant visits the

sites periodically and supervise the works and the progress.

(9) Delivery of Completed System

The Consultant carries out the witness to acceptance tests, and examination of as-built drawings (documents). After confirming that the examination results satisfy the specifications and that the spares/accessories, measuring equipments, operation manuals, etc. supplied by the Contractor are in compliance with the relevant specifications in number, etc., the Consultant recommends the acceptance of the completed system to the Government of the Lao PDR.

5-3-5 Equipment/Material Procurement Plan

Out of the equipment and materials necessary for implementation of this Project, main equipment and materials including digital telephone switching systems are procured from Japan and/or other industrialized countries, since they are difficult to obtain in the Lao PDR or its neighboring countries.

The undermentioned primary products are to be procured in the Lao PDR.

a. Fossil Fuel

Gasoline, diesel engine oil, lubrication oil, etc.

b. Building Materials

Sand, gravel, crushed stones, concrete blocks, frame materials (lumber, plywood board, flat plate, etc.)

5-3-6 Works to be Undertaken by the Government of the Lao PDR

The Government of the Lao PDR is responsible for the following:

- a. Procurement of the land for building construction sites and land leveling works, wherever necessary.
- b. Fences around RSUs, with doors, etc.
- c. Preparation of the warehouse to keep equipment and materials (in the premises of new exchanges, existing telephone office buildings, etc.)
- d. Clearing up of spaces/rooms wherein exchanges are installed.
- e. Removal of the existing exchanges and ancillary facilities, which have become disused after accommodation of circuits in new exchanges.
- f. Provision of room(s), desks, chairs, etc. necessary for class room and on-the-job trainings for EPTL staff under the Project.

#### 5-4 Implementation Time Schedule

Implementation period of this Project is 33 months from the signing of the Exchange of Note for the Phase I Work (expected to be end June or early July, 1991). The provisional implementation time schedule for this Project is given in Table-18.

Table-18 Project Implementation Schedule

Item	1991				1992				1993				1994											
	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4		
Exchange of Notes	△																							
Banking Arrangement																								
Consultant Contract																								
Contract Approval																								
Field Survey & Approval for Tender Document																								
Tender Document																								
Tender Announce																								
Tender Close																								
Tender Evaluation																								
Approval for Tender Evaluation																								
Contract Negotiation & Contract																								
Contract Approval																								
Contract Effective																								
Manufacturing																								
Transportation																								
Installation																								
Testing																								
Hand over																								

1st Stage: △ === 2nd Stage: ▲ -----

## *CHAPTER 6 OPERATION AND MAINTENANCE*



## CHAPTER 6 OPERATION AND MAINTENANCE

This chapter deals with the operation and maintenance management organization for the digital telephone switching facilities to be required after installation under this Project. Maintenance management plan including the staffing plan is also studied.

### 6-1 Operation and Maintenance Management Organization

The operation and maintenance of the new digital telephone switching network including the facilities constructed by this Project are to be carried out by the Telecommunications Department of EPTL.

However, the present operation and maintenance management organization of EPTL seems to be not so well systematized and not adequate enough to execute satisfactory operation and maintenance of the new nationwide telephone switching network to be established over 6 major nodes in the country under the TELECOM II, including this Project.

In view of the above, the following is recommended:

- To strengthen the management institution in the Headquarters.
- To reshuffle and integrate the organization in regional offices into simplified institution.

The recommendation is given in Figure-17.

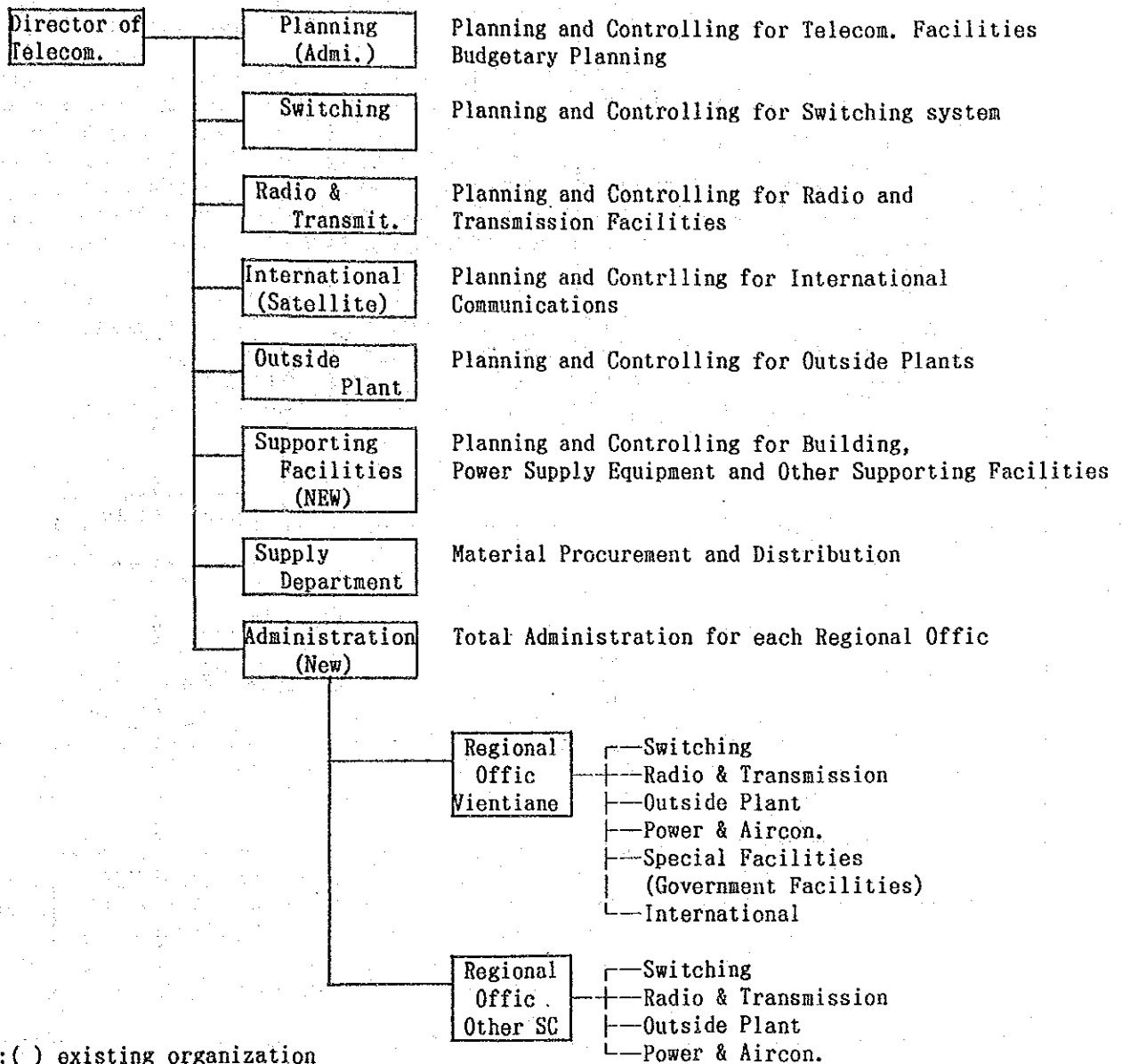
Points in the recommendation are:

- To establish an independent operation and maintenance department responsible for the management of facilities in Vientiane Municipality, so as to simplify the Headquarters institution and streamline the management system.
- To convert the present Administrative Department into Planning Department, and newly establish Administrative Department responsible for management of operation/maintenance in each regional office. By this arrangement, the planning division in charge of overall operation/maintenance programs can be clearly separated from the administrative division, leading to the reinforcement of the management institution of the Headquarters.
- To accommodate the present 16 regional and branch offices in 7 Administrative Bureaus (regional offices) including Vientiane (SC locations). The organization thus simplified can streamline the commands channels, facilitating effective management of the overall system.

- To establish Supply Department independent of other departments, so that efficient and effective utilization of goods can be achieved, leading to increase in management efficiency of EPTL as a whole.

Figure-18 presents the flow of works under the recommended Operation and Maintenance Organization.





Note: ( ) existing organization

Figure-17 Recommendable Organization Chart for Facility Management

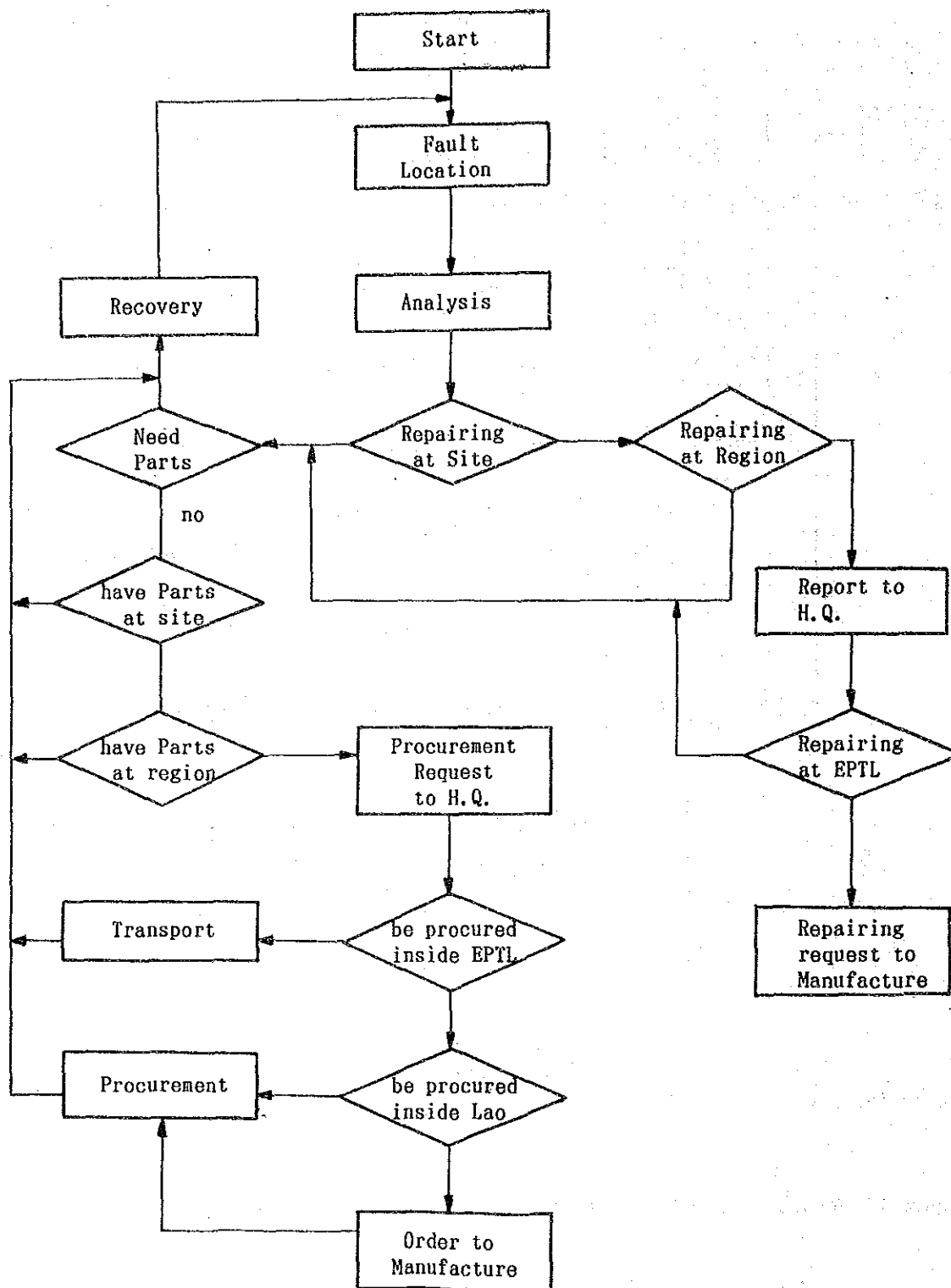


Figure-18 Work Flow on Operation and Maintenance for Switching System

## 6-2 Maintenance Management Plan

### 6-2-1 Staffing Plan

The engineering staff engaged in the operation and maintenance of the telecommunications facilities of EPTL number 643 in total, out of whom 245 are in Vientiane Municipality (including H/Q staff), and 398 in provincial cities. The number of staff who will be assigned to the operation and maintenance of the digital telephone exchanges installed under this Project is 69 in Vientiane and approx. 180 in provincial cities.

In the objective areas of this Project, engineering staff are stationed as follows at present:

Objective Areas	Engineer	Technician & A. Technician	Worker	Total
Numphou	2	13		15
Pakxan		1		1
Louang Phabang		1	6	7
Thakhek		1	6	7
Khanta Bouli		1	9	10
Pakxe	1	1	9	11
-----				
Total	3	18	30	51

On the other hand, the number of technical employees necessary for operation and maintenance of new digital exchanges amounts to approx. 85 (See Figure-19).

Among them, 10 at the maximum, and 6 at the least, must be Engineer class personnel. Presently, however, only 3 Engineers are available as can be seen from the above table, that is, short of 3 to 7 Engineers. As for Technician and A. Technicians of which required number amounts to 71, only 18 personnel are available, with the shortage of 53.

EPTL is now proceeding with the human resource development program including the training plan, with the assistance of ITU. According to this program, 13 staff will be trained into Chief Engineers and 33 into Technicians, so as to make available a total of 67 technical staff consisting of 16 Chief Engineers and 51 Technicians, under TELECOM II. For this purpose, assistance in the amount of 1.2 million dollars is to be extended.

Even after the realization of the above program, 7 to 14 staff are short of the target number of 74-81. However, the staff in short are technicians. Usually, this class of technical staff can be obtained through the training during the installation works, inclusive of equipment test and inspection works. That is, if the necessary training is conducted during the Project implementation period, the shortage of the maintenance staff can be cleared.

## 6-2-2 Training Plan

### (1) Introductory Training on New Digital Technology

The digital telecommunications technology to be introduced under TELECOM II including this Project is quite a new technology for the Lao PDR. In order to maintain and manage the digital telephone switching network after completion by this Project, therefore, training of digital technology, both basic and applications, is requisite. The former, i.e., the basic training on digital technology, is included in the human resource development program by ITU as mentioned above.

The ITU's training schedule is as follows:

- Dispatch of one ITU expert for 42 months to assist the EPTL in enforcing its telecommunications policy.
- Dispatch of one ITU expert for 12 months to assist the EPTL in promoting the human resource development.
- Dispatch of ITU experts as the basic technology instructor, one each for switching, transmission, and outside plant facilities, for 12 months.  
(Total: 3 experts x 12 months = 36 months)
- Training in switching, transmission and outside plant engineering in the neighboring countries.

These trainings are to be covered by the proceeds of the aid in the amount of 1.2 million dollars as mentioned in Item 6.2.1 above. However, the said amount is not sufficient enough to realize the whole plan, and the provision of additional fund is now under study.

All of these trainings are limited to the basic training only.

### (2) Application Training

Technologies adopted for individual digital switching facilities vary with switching types and manufacturers. Therefore, application training should be done so that the staff concerned can obtain the technologies particularly necessary for the operation/maintenance of the system introduced. This training to apply the basic technologies practically to the exchanges newly introduced usually comprises two parts.

The first is the training in technology of switching operation itself for the staff to be engaged in operation and maintenance. The staff concerned are trained through the actual switching installation and testing works during the Project implementation. The staff subject to this training amount to 101 in total, consisting of 81 for operation/maintenance, 20 for manual switchboard operation. The training period should be long enough to meet the purpose.

The second is the training in advanced technology for the limited number of staff.

When an switching system in operation suddenly becomes out of order due to the operational error by staff concerned, etc., the technologies higher than the ordinary level are required to clear the fault. These technologies, however, may exert adverse effect on the equipment, if misused and, in the worst case, result in the unrecoverable damage to the equipment.

That is, the advanced technologies are indispensable for satisfactory maintenance of the installed systems but not required in the ordinary daily works and, therefore, should be mastered only by a limited number of responsible persons for the respective systems concerned.

The training of the overall advanced technologies on the introduced switching systems is conducted by the engineers of the manufacturing company by utilizing the working switching system, usually in the manufacturing company's factory. Under this Project, at least 3 engineers responsible for the maintenance of the completed systems (one each for H/Q, Vientiane and Khanta Bouli) should be trained. For this training, the technical cooperation by the Japan International Cooperation Agency is expected to be extended. (An application has already been submitted.)

### 6-2-3 Financial Source for Operation and Maintenance Expenses

The operation and maintenance expenses of and revenue from the digital switching facilities installed by this Project are estimated as in Table-20.

The estimated expenses can be summarized as follows:

- Approx. 943,000 dollars in fiscal 1992
- 1,578,000 dollars in fiscal 1993
- 1,556,000 dollars in fiscal 1994

On the other hand, the estimates of the revenues are:

- Approx. 1,693,000 dollars in fiscal 1992
- 2,405,000 dollars in fiscal 1993
- 2,259,000 dollars in fiscal 1994

As can be seen from the above, the revenues from the newly installed facilities can sufficiently afford the operation and maintenance expenses. Therefore, the operation expenses are to be covered by the operation revenues.

Table-19(1/3) Manpower Schedule for Operation and Maintenance  
of New Digital Switching System

Exchange	Engineer	Technician	Assistant		Total
			Technician	Worker	
Numphou(Switching)	1	3	7		11
Numphou (Billing Center)	1	1	3	4	8
Numphou (O/M Center)	(1)	3	5		9
Xaisettha	(1)	3	5		9
Sisattanak	(1)	3	5		9
Louang Phabang	1	3	3		7
Thakhek	1	3	3		7
Khantabouli (Switching)	1	3	4		8
Khantabouli (O/M Center)	(1)	3	5		9
<u>Pakxe</u>	<u>1</u>	<u>3</u>	<u>3</u>		<u>7</u>
	10	28	43	4	85

Table-19(2/3)

Staff	0	3	6	9	12	15	18	21	24
<u>Vientiane</u>									
<u>Numphou (SW)</u>				8			17		
Engineer				_____					
Technician A				_____					
Technician B				_____					
Technician C				_____					
A. Technician A				_____					
A. Technician B				_____					
A. Technician C				_____					
A. Technician D				_____					
A. Technician E				_____					
A. Technician F				_____					
A. Technician G				_____					
Total 11				_____					
<u>Vientiane</u>									
<u>Numphou (Billing)</u>				8			17		
Engineer				_____					
Technician A				_____					
A. Technician A				_____					
A. Technician B				_____					
A. Technician C				_____					
Worker A				_____					
Worker B				_____					
Worker C				_____					
Worker D				_____					
Total 9				_____					

Table-19(3/3)

Staff	Hour											
	0	3	6	9	12	15	18	21	24			
<u>Numphou</u> <u>Khantabouli</u> (O/M Center) Engineer Technician A Technician B Technician C A. Technician A A. Technician B A. Technician C A. Technician D A. Technician E Total 9x2	S/By		8		17		RSU		RSU			
<u>Xaisettha</u> <u>Sisattanak</u> Engineer Technician A Technician B Technician C A. Technician A A. Technician B A. Technician C A. Technician D A. Technician E Total 9x2	S/By		8		17							
<u>Other Cities</u> Engineer Technician A Technician B Technician C A. Technician A A. Technician B A. Technician C Total 7x3 (KITB 7 + 1)	S/By		8		17							



Table-20(1/3) Estimated Financial Condition of EPTL  
(Year 1992)

	Vientiane City	Other Cities
No. of Subscribers	12,300	-
Residence	2,025	-
Business	9,175	-
Forigner	1,000	-
Public	100	-
Income	1,693,449	-
Basic Charge	22,318	-
Installation charge	245,700	-
Call Charge	1,425,431	-
Expenditures	943,017	-
Operation/Maintenace	249,000	-
Depreciation	340,000	-
Administration cost	100,000	-
Tax	254,017	-
Benefit	750,431	-

(Unit:US Dollar)

Table-20(2/3) Estimated Financial Condition of EPTL  
(Year 1993)

	Vientiane City	Other Cities
No. of Subscribers	13,500	3,700
Residence	2,025	270
Business	10,375	3,280
Forigner	1,000	100
Public	100	50
Income	1,698,091	706,493
Basic Charge	41,104	8,239
Installation charge	36,000	109,500
Call Charge	1,620,987	588,754
Expenditures	943,714	633,974
Operation/Maintenace	249,000	188,000
Depreciation	340,000	220,000
Administration cost	100,000	120,000
Tax	254,714	105,974
Benefit	754,377	72,519

(Unit:US Dollar)

Table-20(3/3) Estimated Financial Condition of EPTL  
(After year of 1993)

	Vientiane City	Other Cities
No. of Subscribers	13,500	3,700
Residence	2,025	270
Business	10,375	3,280
Forigner	1,000	100
Public	100	50
Income	1,662,091	596,993
Basic Charge	41,104	8,239
Installation charge	-	-
Call Charge	1,620,987	588,754
Expenditures	938,314	617,549
Operation/Maintenace	249,000	188,000
Depreciation	340,000	220,000
Administration cost	100,000	120,000
Tax	249,314	89,549
Benefit	723,777	-20,556

(Unit:US Dollar)



## ***CHAPTER 7 EVALUATION OF THE PROJECT***



## CHAPTER 7 EVALUATION OF THE PROJECT

### 7-1 Effect of Project Implementation

As described in Section 3-3 Effects and Benefits, the effects of this Project after completion are twofold: the internal effect on the telecommunications sector in a sense of the realization of TELECOM II, and the external effect on social and economic development in the nation.

#### 7-1-1 Internal Effect

The facilities to provide telephone services are composed of various indispensable components: the telephone set which is a direct access for a subscriber to the telephone service network; local outside plant facilities which connect subscribers to the telephone exchange; the telephone exchange in the telephone office to control the traffic switching; the junction cable network which connects exchanges; the power system which feeds power to all of these facilities, the air-conditioning system which controls environmental conditions for the telecommunications equipment; and the building to accommodate these facilities. If any one of them is crucial for services provisioning.

The existing switching facilities in the Lao PDR are too obsolete to provide satisfactory services. By replacing such deteriorated facilities with new digital exchanges by this Project, and thus materializing TELECOM II, the telephone network required in the country can be completed.

#### 7-1-2 External Effect

Today, telecommunications services, particularly telephone services, are playing a very important role in the social and economic development. Enterprises and organizations supporting the social and economic development are extending their activities not only domestically but also internationally. For them, the means of efficient communications is requisite for rapid transmission of information among the parties concerned. The role of Telecommunications in their activities is similar to that of nervous in a human body, without which no substantial activities can be expected.

On the other hand, social and economic development of a nation requires the vigor of big enterprises and organizations. In the current industrialized society, the source of such vitality is usually the direct and indirect investments from major foreign enterprises or their consortiums. To encourage such investments, the rehabilitation and improvement of telecommunications services, particularly telephone services, are a pressing need. That is, the role of the telephone network to be realized by this Project is supremely important.

Practically conceivable external effects of this Project are:

- a. Provision of employment opportunities through promotion of business activities.
- b. Promotion of economies with the foreign investments and loans, including provision of employment opportunities.
- c. Upgrading of living standard as the results of economic development and increase of employment opportunities.
- d. Upgrading of social and cultural levels as the result of the upgrading of living standard.
- e. Expansion of economic activities basis as the result of the upgrading of social and cultural levels.
- f. Stabilization of national welfare as the result of the upgrading of social and economic levels.

## 7-2 Justification of Project Implementation

Provision of telecommunication services through construction of necessary facilities can bring about significant benefits for the national prosperity as mentioned above. Therefore, the implementation of this Project, which means the materialization of TELECOM II, can be fully justified.



**CHAPTER 8**  
**CONCLUSION AND RECOMMENDATIONS**



## CHAPTER 8 CONCLUSION AND RECOMMENDATIONS

### 8-1 Conclusion

As mentioned in the foregoing Chapters, the implementation of this Project will not only serve for the modernization of the telecommunications services in the Lao PDR, but also serve as the most effective economic support for the national development now the Government of the Lao PDR is vigorously promoting, and at the same time, for promoting the friendship and good will between both the countries.

### 8-2 Recommendations

In order to ensure the successful materialization of this important Project, we would like to recommend the following:

#### (1) Institutional Strengthening of EPTL

Presently, EPTL's nationwide organizations are not necessarily operating systematically, with some unsuitable manning arrangements, perhaps because it is only short time since EPTL became an autonomous enterprise. It is, therefore, strongly recommended to strengthen its organizations with some modifications, where necessary, so that the digital telephone exchange network constructed anew can be operated and maintained satisfactorily.

#### (2) Negotiations with Other Countries Regarding International Call Connection

The existing international telephone circuits to connect the Lao PDR with other countries are so designed that all the international calls have to be handled at the telephone switchboards in either countries. To use the international telephone switching function equipped in Vientiane Numphou Exchange, some adjustments including circuit switchover, etc. are necessary in respective countries. The International Telecommunication Charter established by the ITU specifies that such adjustment be done by competent operating organizations of respective countries. Consequently, MCTPC or EPTL should contact the countries concerned (Australia and Thailand, for the time being) to discuss the matters related to the realization of the international direct dialling service. Preferably, the necessary work be done before the completion of the Phase I Work, i.e., by the end of 1992. It is recommended that care should be taken by MCTPC and/or EPTL for realization of the above.

#### (3) Coordination Among Correlated Projects

In implementing TELECOM II, it has been planned to hold the meeting among IDA, ITU, EPTL and respective Project Consult-

ants periodically, i.e., once in every two months. In case of a project comprising a number of independent but mutually correlated projects, like this TELECOM II, closer and frequent meetings be held among the responsible persons of individual projects. Such meetings should preferably be incorporated in the respective project implementation schedules. It is recommended, therefore, to draw up the meeting schedule, including commencement date, period, frequency, responsible persons, etc. and inform it to the respective project consultants immediately.

(4) Human Resource Development Plan

Under TELECOM II, 46 technical persons specializing in switching engineering are to be recruited from the departments other than Operation/Maintenance Department. Further, approx. 7 - 14 persons are in need additionally as mentioned in Chapter 6. In consequence, it is recommended that a total of 53 - 60 technicians specializing in switching engineering be recruited from the departments other than Operation/Maintenance Department.

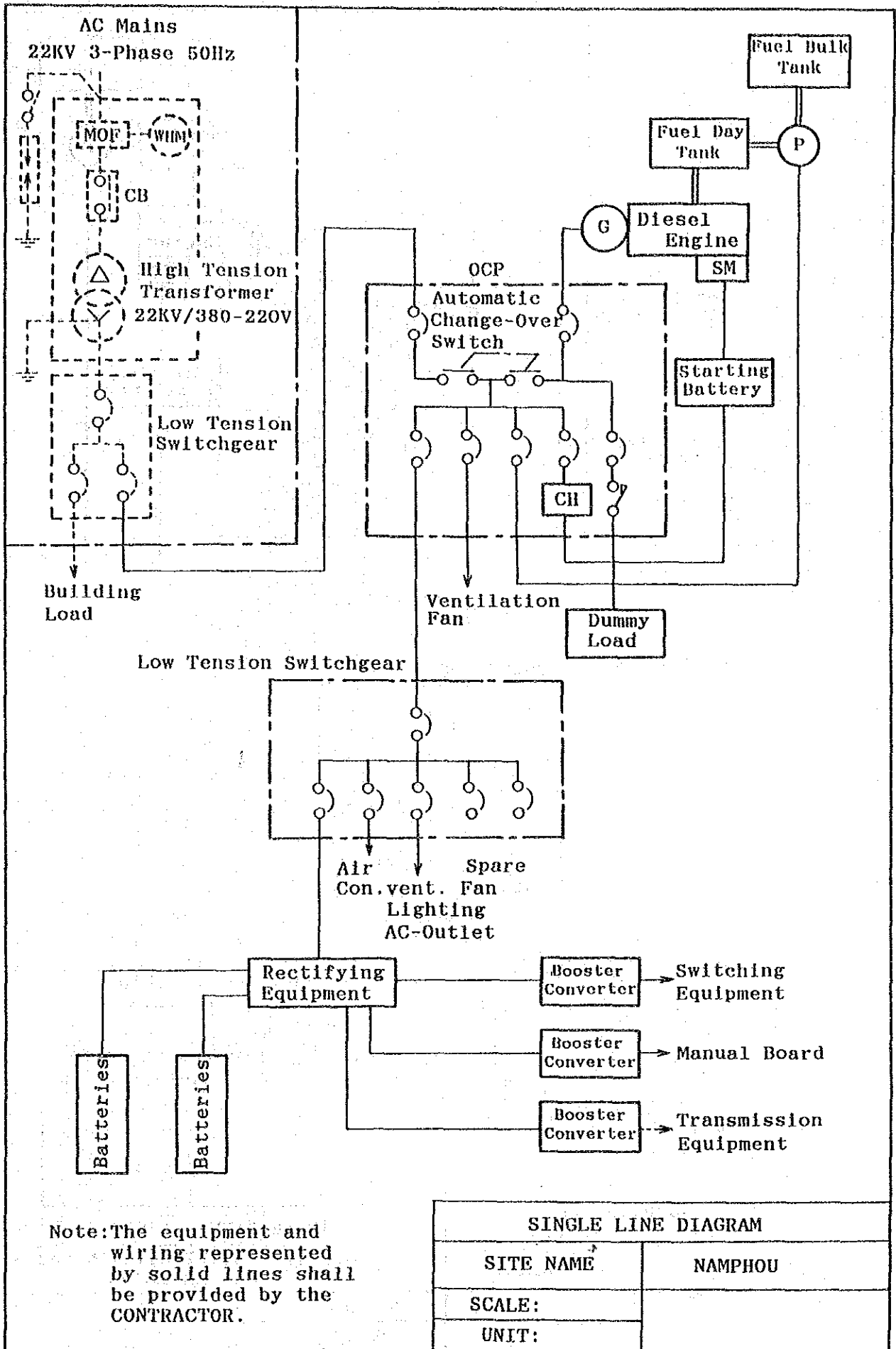
In this connection, the human resource development plan should be drawn up urgently, so that the sufficient lead time can be taken to enable the recruitment of the most suitable and capable persons.

**Attachment**

**Single Line Diagram for Power Supply System**

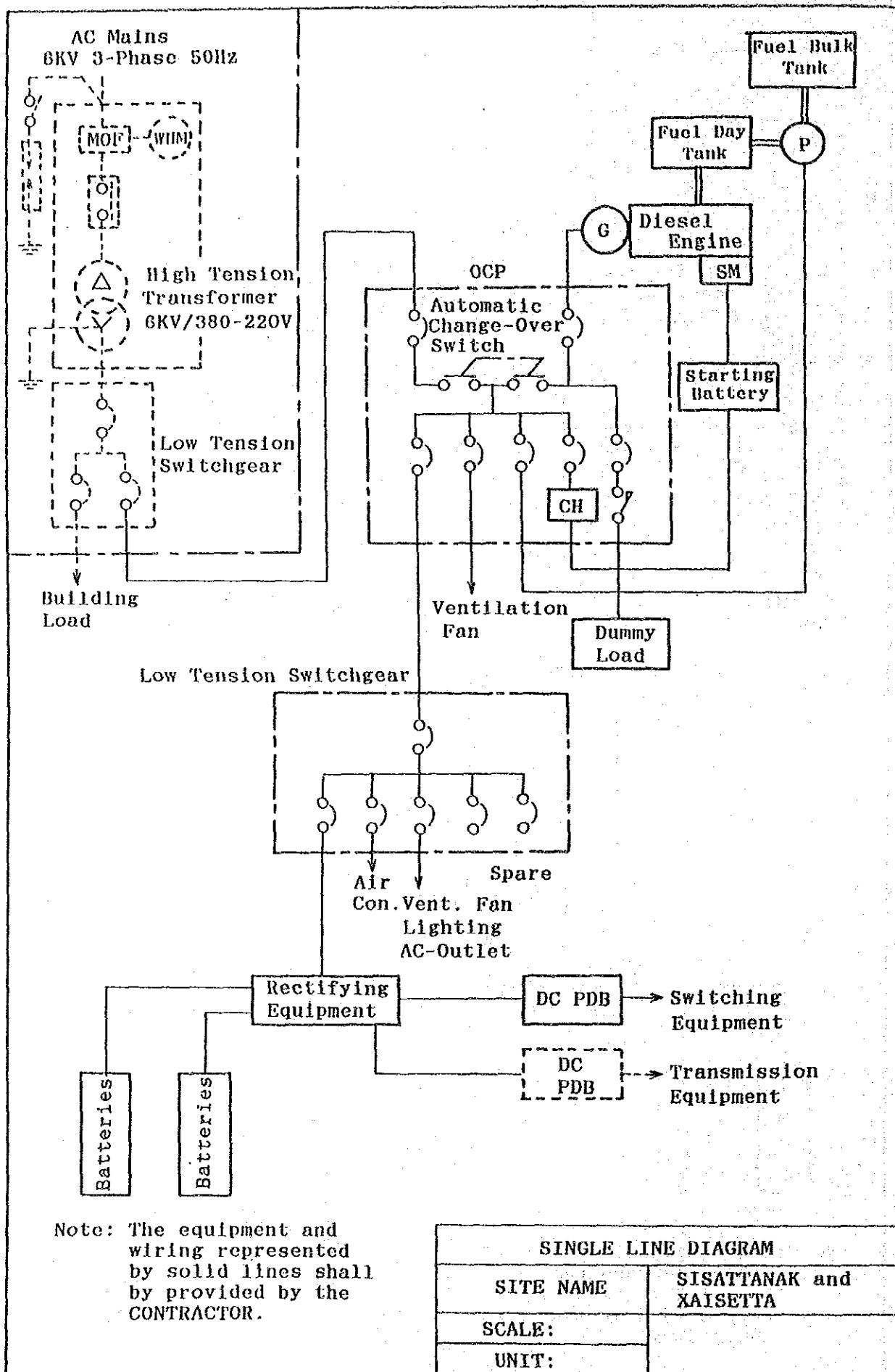
**(Draft)**





Note: The equipment and wiring represented by solid lines shall be provided by the CONTRACTOR.

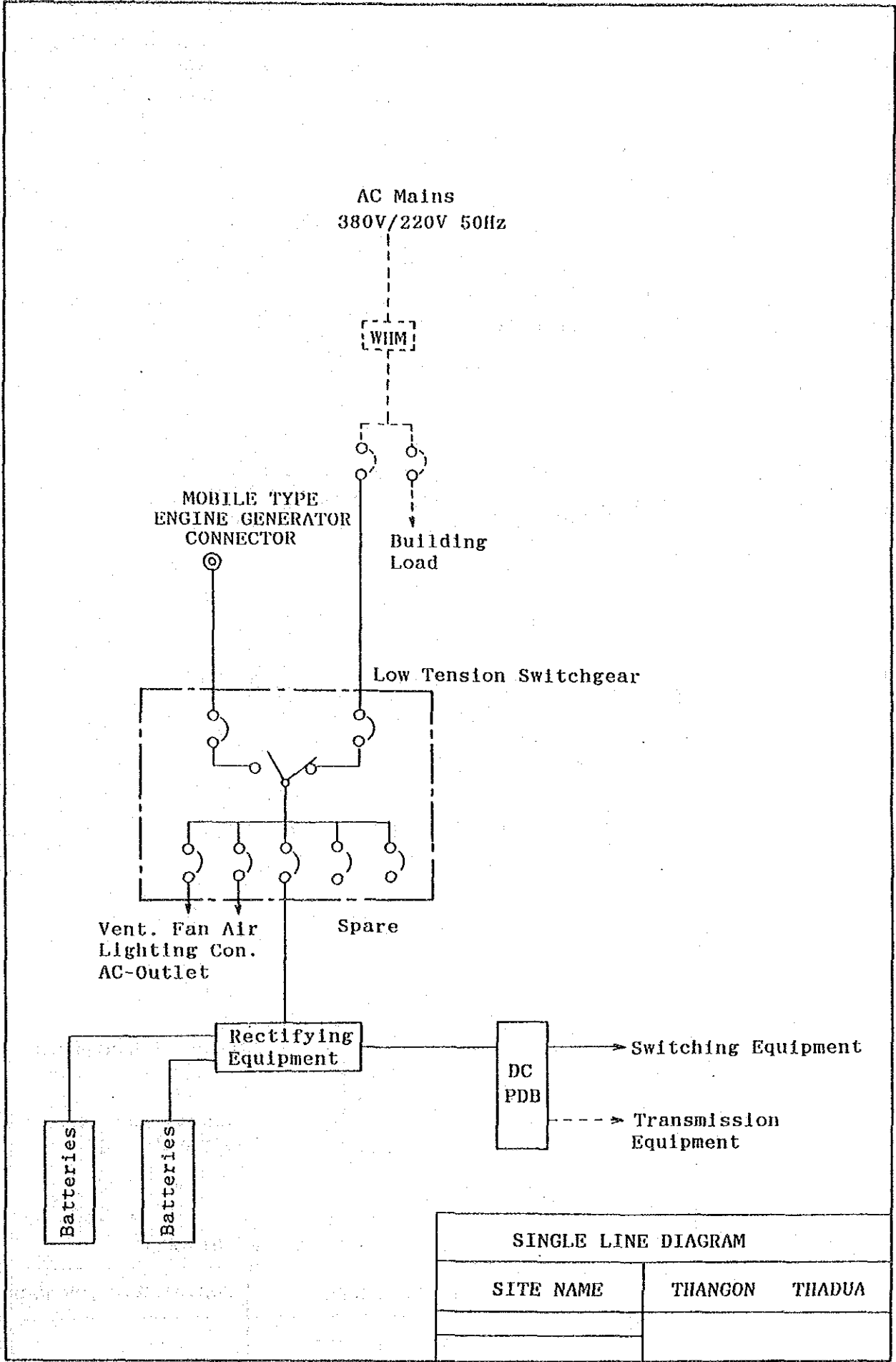
SINGLE LINE DIAGRAM	
SITE NAME	NAMPHOU
SCALE:	
UNIT:	

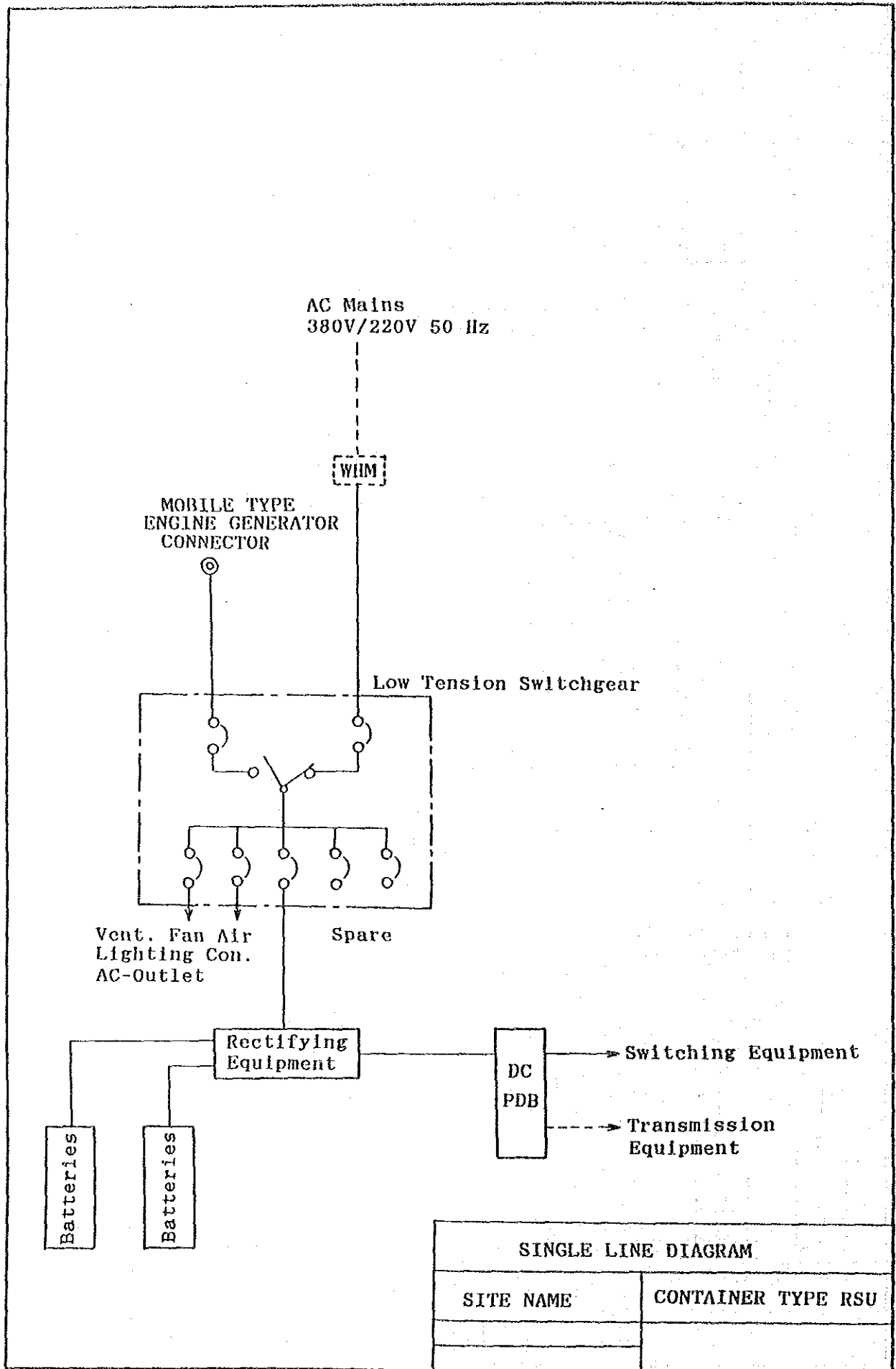


Note: The equipment and wiring represented by solid lines shall be provided by the CONTRACTOR.

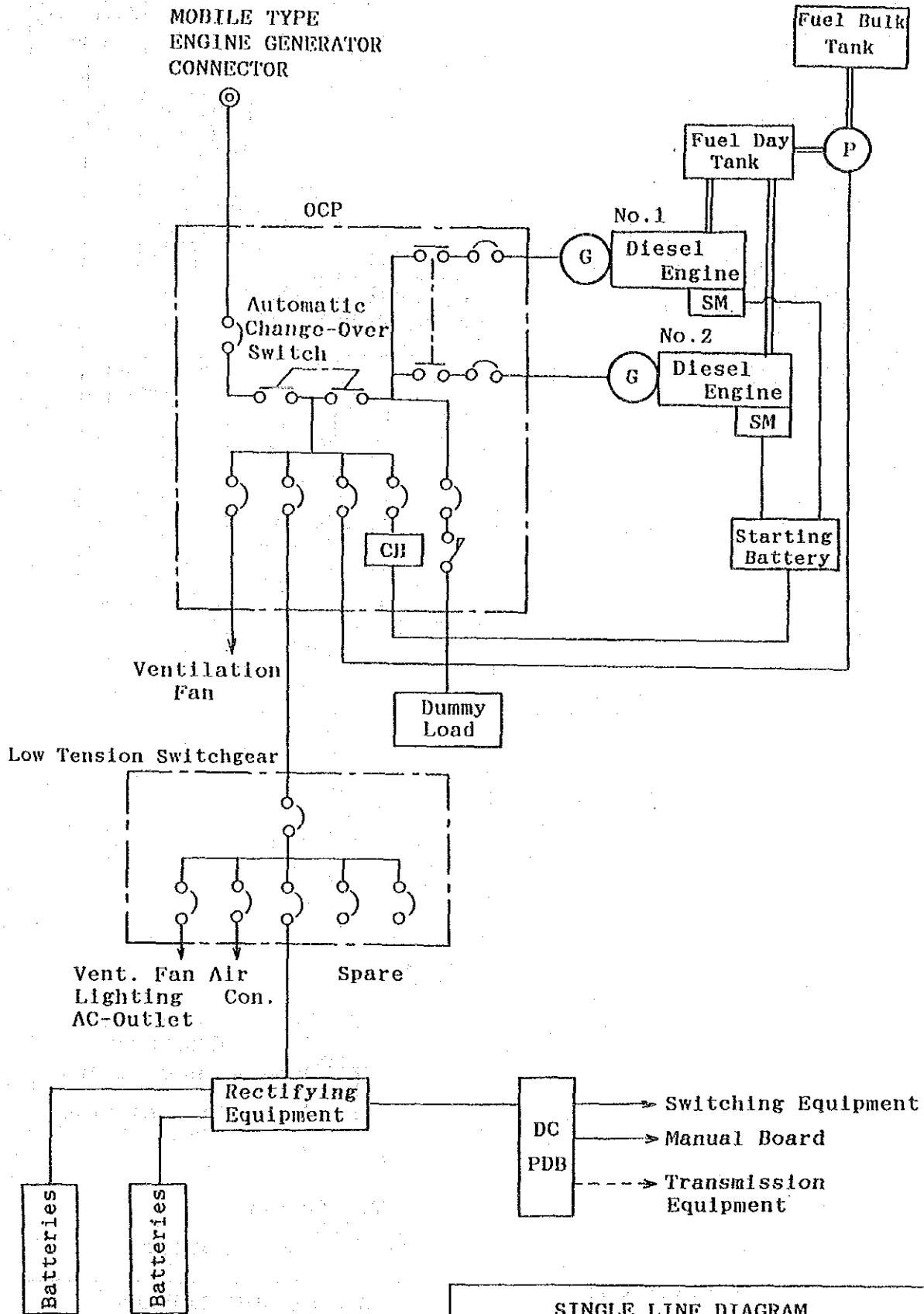
SINGLE LINE DIAGRAM	
SITE NAME	SISATTANAK and XAISETTA
SCALE:	
UNIT:	





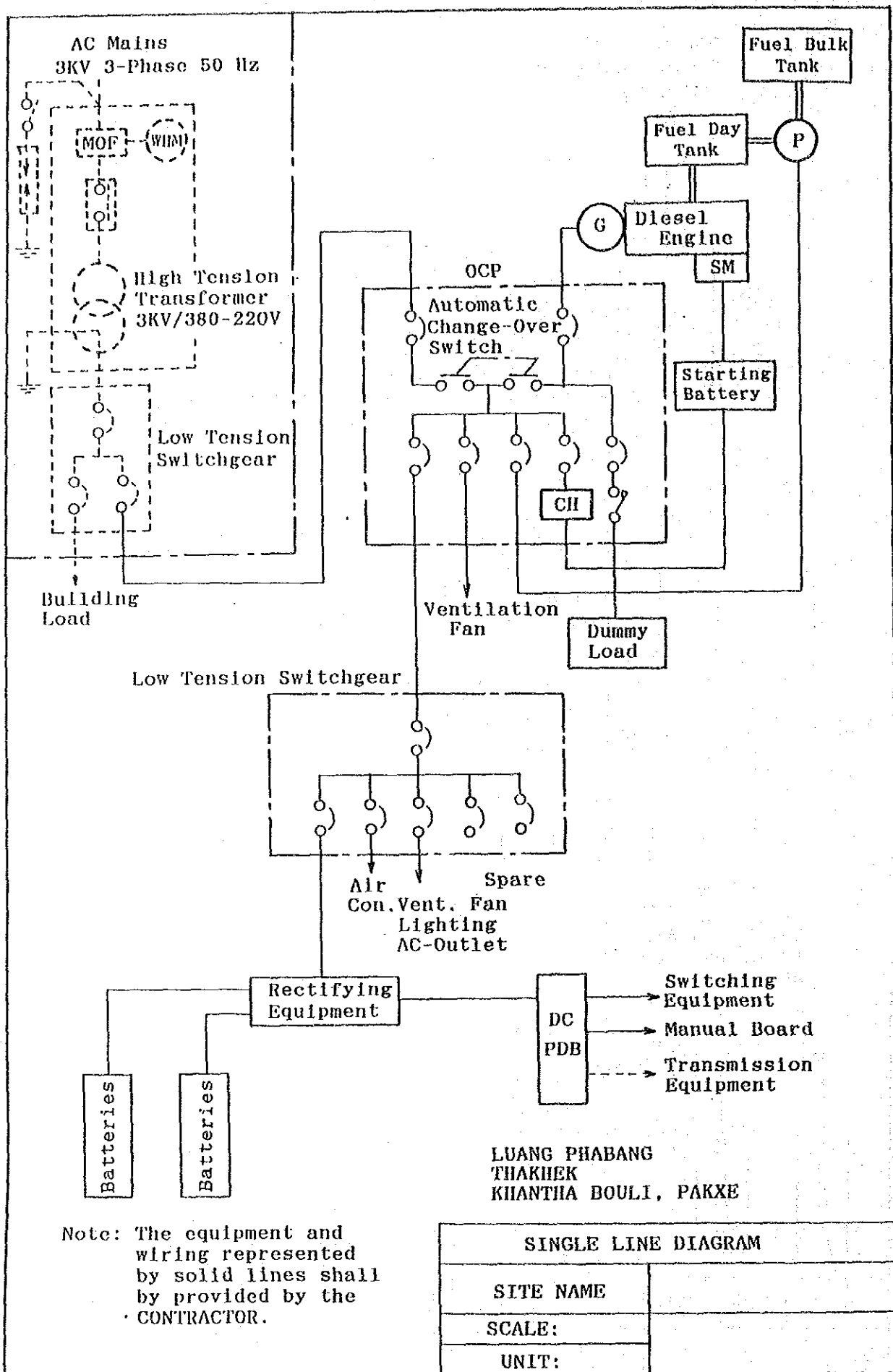


MOBILE TYPE  
ENGINE GENERATOR  
CONNECTOR



SINGLE LINE DIAGRAM

SITE NAME		PAKXAN	



LUANG PHABANG  
THAKHEK  
KHANTHA BOULI, PAKXE

Note: The equipment and wiring represented by solid lines shall be provided by the CONTRACTOR.

SINGLE LINE DIAGRAM	
SITE NAME	
SCALE:	
UNIT:	







JICA