

**Kingdom of Cambodia  
Ministry of Industry, Mines and Energy**

**Project for Operation and Maintenance  
of the Rural Electrification on Micro-hydropower  
in Mondul Kiri**

**Final Report  
Annex**

**March 2011**

**Japan International Cooperation Agency**

**Electric Power Development Co.,Ltd. (J-POWER)**

**The Chugoku Electric Power Co.,Inc. (ENERGIA)**

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- 2. Mid- and Long-term Plan (Revised)**
- 3. Suggested Power Tariff (First version)**

# **1. Guidelines and Manuals of Operation and Maintenance for EUMP (Revised)**



Ministry of Industry, Mines and Energy of Kingdom of Cambodia

The Project for Operation and Maintenance of Rural  
Electrification on Micro-hydropower in Mondul Kiri

Guidelines and Manuals for  
Operation and Maintenance  
of  
the Electric Unit of Mondul Kiri Province

*Volume I*

*(Administration)*

February 2011

Japan International Cooperation Agency



Electric Power Development Co.,Ltd.



The Chugoku Electric Power Co.,Inc



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## **Preface**

This Guideline and Manual for Operation and Maintenance is the second and final version modifying its first version of December 2009 by considering the practice and behavior of EUMP's staff observed thereafter by JICA project team. It is aimed for EUMP's management and staff to manage and operate their power utility by themselves. The actual conditions and circumstance of operation of EUMP in the future are likely to be changed. Therefore, it is recommended to revise details of this guideline and manual by EUMP as needed.

This document consists of following items:

Volume I : Administration Items

Volume II : Technical Items

Section I : Guideline for Operation and Maintenance

Section II : Civil Structure

Section III : Electromechanical Equipments

Section IV : Transmission and distribution Facilities

Volume III : Reference Data

In addition to the above, the completion documents such as drawings and detailed manuals submitted by the contractor shall be used. Practical way of use is described in Volume II.

It is to be noted that, once EUMP has been merged into EdC, Volume I "Administration Items" is considered to have been absorbed into the latter's bylaws and regulations because of having main points in common, so that Volume I should be treated as manual for setting up a new power utility company resulting from the outcome of JICA project.

## **Chapter 1 : Management**

### **1.1. Articles of Incorporation**

#### **Chapter 1 General**

##### **(Name of Corporation)**

Article 1 This Corporation is named as Electric Unit of Mondul Kiri Province, shortly called EUMP.

##### **(Foundation)**

Article 2 This Corporation was founded as public corporation by the Ministry of Industry Mines and Energy of Cambodian government for the purpose stated in the following article.

##### **(Purpose)**

Article 3 This Corporation has the purpose of doing the following businesses:

- (1) Generating electric power;
- (2) Transmitting and distributing electric power;
- (3) Supplying electric power to Senmonorom city and nearby areas of Mondul Kiri Province of Cambodia;
- (4) Battery charging;
- (5) Investment in such other businesses as will be approved as necessary for the business of the corporation; and,
- (6) Any other businesses associated with the above businesses.

##### **(Main Offices)**

Article 4 The main offices of the Corporation is registered at Senmonorom city of Mondul Kiri Province of Cambodia.

##### **(Organization)**

Article 5 The Corporation has the following organizations:

- (1) Joint Steering Committee
- (2) Board



## **Chapter 2 Ownership and Operation**

(Ownership)

Article 6 The Corporation is owned by Cambodian government.

(Operation)

Article 7 The Corporation shall be operated with financial independence.

## **Chapter 3 Joint Steering Committee**

(Joint Steering Committee)

Article 8 The Joint Steering Committee (shortly called JSC) is composed of the representatives from: the Ministry of Industry Mines and Energy of Cambodia, Electricity Authority of Cambodia, the Department of Industry Mines and Energy of Mondul Kiri Province, Electricite du Camodge and the Corporation.

(Convocation of a meeting of the Joint Steering Committee)

Article 9 A regular meeting of the Joint Steering Committee shall held in XXXX every year.

An extraordinary meeting may be held as necessary by the motion of any of the members of the Joint Steering Committee. A meeting, regular or extraordinary, shall be convoked by the representative of the Ministry of Industry Mines and Energy.

2 The meeting of the Joint Steering Committee shall be convoked at Senmonorom city or Phnom Penh.

(Chairmanship of a meeting of the Joint Steering Committee)

Article 10 The meeting of the Joint Steering Committee shall be chaired by the representative of the Ministry of Industry Mines and Energy.

(Resolution of the meeting of the Joint Steering Committee)

Article 11 Resolutions of the meeting of the Joint Steering Committee shall be made by majority vote.

(Agenda of the meeting of the Joint Steering Committee)

Article 12 The following issues shall be included in the agenda of the regular meeting of the Joint Steering Committee:

- (1) Appointment and dismissal of the board members of the corporation, when necessary; and,
- (2) Approval of the financial statements of the Corporation
- (3) Revision of the articles of incorporation of the Corporation, when necessary.

#### **Chapter 4 Board of the Corporation**

(Number of the board members)

Article 13 The Corporation has three (3) board members: one (1) Director and two (2) Sub-directors.

(Appointment and dismissal of the board members)

Article 14 The board members of the Corporation shall be appointed or dismissed by the resolution of the Joint Steering Committee.

(Term of office of the board members)

Article 15 The term of office of the board members shall be three (3) years and may be extended or shortened by the resolution of the Joint Steering Committee.

(Board meeting)

Article 16 A board meeting shall be convoked and chaired by the director as needed.

2 In the absence or disability of the director, other board member shall convoke and chair the board meeting in accordance with the rank order predetermined by the board meeting.

3 Resolutions of the meeting shall be made by unanimous consensus of the board members.

(Agenda of the board meeting)

Article 17 The following issues shall be included in the agenda of the board meeting as needed:

- (1) Approval of internal regulations and their improvements and elimination;

- (2) Long and mid-term planning;
- (3) Decision of important investments;
- (4) Approval of annual budget;
- (5) Approval of financial statements;
- (6) Employment and dismissal of employees of the Corporation; and,
- (7) Personnel performance evaluation and salary review.

(Representation of the Corporation)

Article 18 The Corporation shall be represented by the director of the Corporation.

2 The director of the Corporation shall supervise and control the businesses of the Corporation.

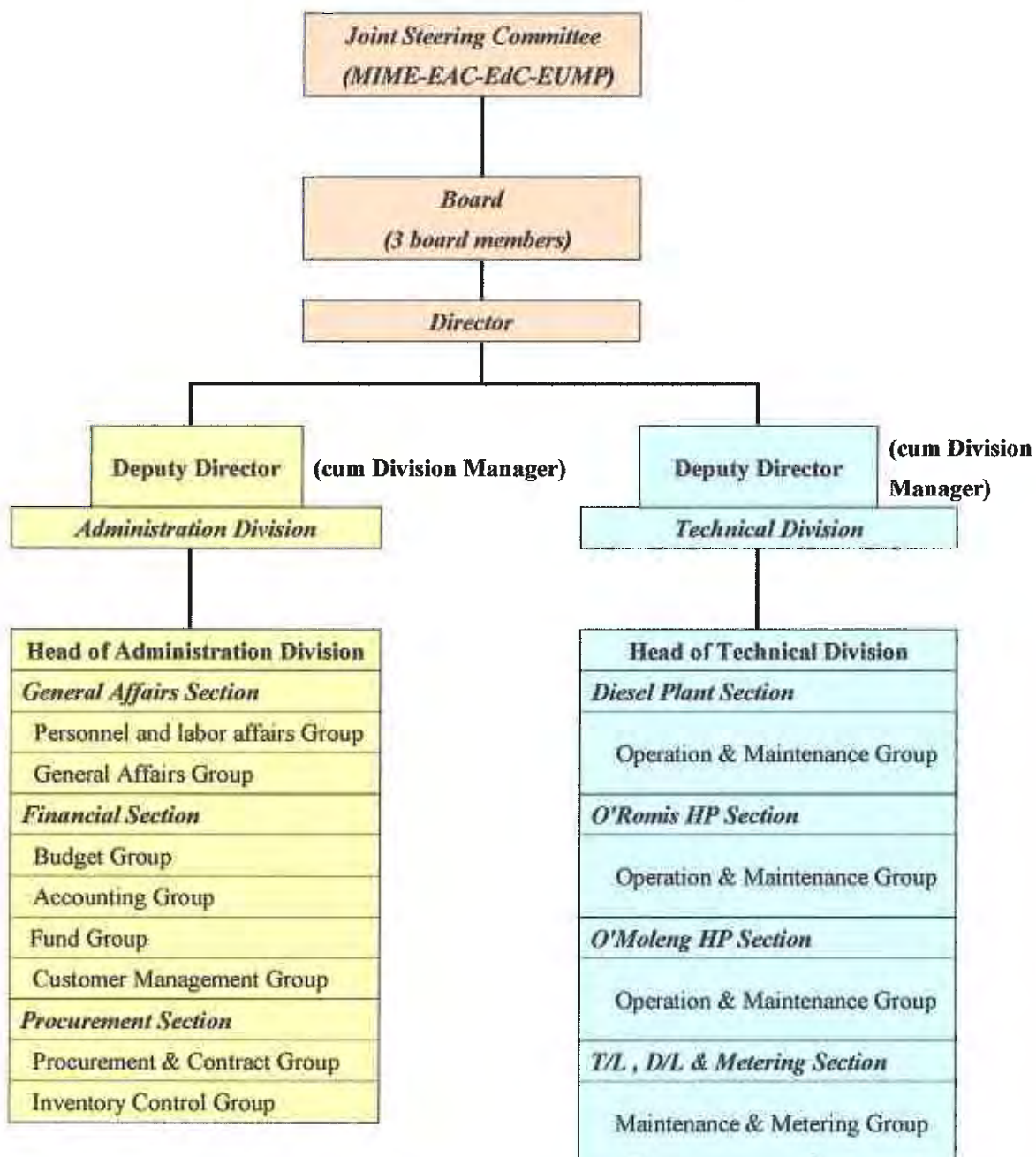
3 In the absence or disability of the director, other board member shall substitute the duties of the director in accordance with the rank order predetermined by the board meeting.

## **Chapter 5 Accounting**

(Accounting year)

Article 18 The accounting year begins on the 1<sup>st</sup> January and ends on the 31<sup>st</sup> December every year.

**Organization Chart of EUMP (Appendix AA-1-1)**

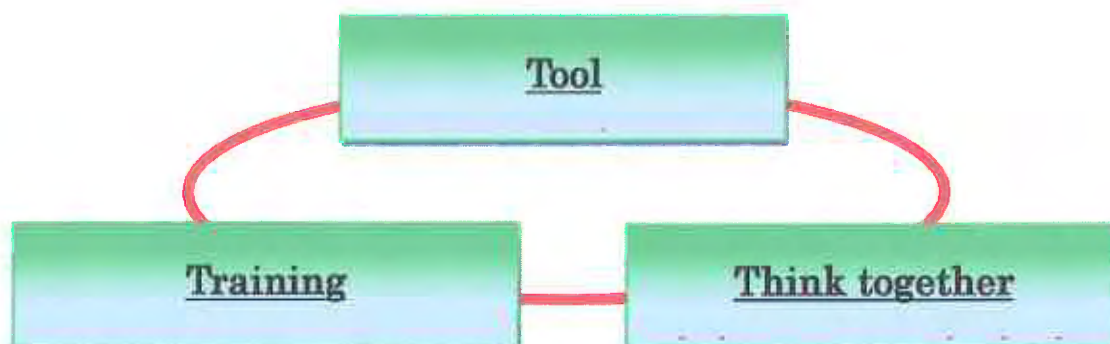


## 1.2 Management Policy

- 1) Supply stable electric energy to Sen Monorom
- 2) Increasing electrification rate
- 3) Self-sustaining financial system
- 4) Every user shall pay electric charge without exception

<p style="text-align: center;"><b>Our Mission</b></p> <p style="text-align: center;">We supply electricity to the people of Sen Monorom town in a stable and continuous manner at not-expensive, reasonable prices.</p>	<p style="text-align: center;"><b>Our Vision</b></p> <p style="text-align: center;">We are bringing up our newly-born EUMP aiming to get our baby able to stand on his feet in order to support the people of Mondul Kiri Province for their welfare.</p>
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We commit ourselves to become self-supported and independent for EUMP to continue operating in technically and financially steady manner in order to fulfill our mission and achieve our vision. For these purposes, we train ourselves by means of 3 Ts.



### **1.3 EUMP Regulations**

#### **1.3.1 Regulation on Organization and Powers and Duties**

##### **Chapter 1 General**

(Purpose)

Article 1 This regulation establishes the necessary organization for executing the Corporation's businesses and the exercise of powers and duties of each duty position.

Article 2 The organization and its operations shall be aimed to promote the Corporation's business purposes through good partnership of each Chapter of the organization based on their self-imposed responsibilities and business efficiency and streamlining.

##### **Chapter 2 Top Management**

(Director)

Article 3 The Director shall preside over the execution of the Corporation's businesses in line with resolutions of the Corporation's Board.

(Deputy Directors)

Article 4 The Deputy Directors shall assist the Director and act as his proxy when the Director is in absence or disability according to the following order:

First: Deputy Director in charge of Administration Division

Second: Deputy Director in charge of Technical Division.

The Deputy Directors shall be responsible for the execution of duties of their respective Division as Division Manager.

##### **Chapter 3 Organization for Operations**

(Organization for Operations)

Article 5 The Corporation's organization for operations shall have the organization units shown in the Appendix AA-1-1 "Organization Chart" attached hereto.

**(Duty Position)**

**Article 6** The Organization for Operations shall have the following duty positions.

Division Manager

Division Head

Section Chief

Group Leader

Group Member

The duty position of each personnel is shown in Appendix AA- 1-3 "Task Assignment of the Personnel" attached hereto.

**(Powers and Duties)**

**Article 7** Each of the duty positions shall have the powers and duties shown in Appendix AA-1-2 "Powers and Duties of Division".

The superiors shall give appropriate commands and directions as needed in the exercise of their assigned duties to their subordinates. The subordinates shall execute their assigned duties according to the commands and directions given by their superiors and shall ask for approval and report the progress and results of the execution of the duties to their superiors. The commands and directions and the approvals and reporting shall be given according to the line of command and control as shown in the Appendix AA 1-4 "Line of Command and Control" attached hereto.

**(Proxy when in absence or disability)**

**Article 8** When a superior is in absence or disability, the subordinate designated in advance by such a superior shall act as his proxy.

**Supplementary Provision**

1. This regulation shall come into force as from 01 July 2009.

## **1.3.2 Employment Regulation**

### **Chapter 1 General**

#### **(Purpose)**

**Article 1** This regulation stipulates the working conditions of the personnel of the Corporation.

#### **(Classification of the Personnel)**

**Article 2** The following is the classification of the personnel of the Corporation:

- (1) Director
- (2) Deputy Director
- (3) Division Manager
- (4) Division Head
- (5) Section Chief
- (6) Group Leader
- (7) Staff I
- (8) Staff II
- (9) Staff III

#### **(Application or Notification)**

**Article 3** When an application or notification is necessary according to this regulation, such application or notification shall be made in the prescribed form.

#### **(Relation with Law)**

**Article 4** Where there is no stipulation in this regulation or there is some infringement on the relevant laws of Cambodia, such law shall be obeyed.

### **Chapter 2 Personnel Affairs**

#### **(Employment)**

**Article 5** A newly-employed person shall submit to the Division Manager of Administration the following documents:

- (1) Curriculum vitae
- (2) Certificate of academic background and/or qualification
- (3) Other document for personnel control



**(Suspension of Employment)**

**Article 6** If an employee falls into one of the following causes, he or she shall be ordered to suspension of employment.

- (1) 3 months or longer absence from work due to accident or sickness not related with work: 1-year suspension of employment
- (2) Public service for 3 months or longer:  
Same period of public service
- (3) Punitive suspension of employment:  
Same period of punitive suspension of employment
- (4) 3 months or longer absence from work due to his or her personal circumstances: period determined by the Corporation
- (5) Unclear situation of life or death or whereabouts
- (6) Other special reason: period determined by the Corporation

**(Resumption of Employment)**

**Article 7** The employee under the suspension of employment shall notify his or her resumption of employment to the Division Manager of Administration.

**(Compulsory Retirement Age)**

**Article 8** The compulsory retirement age is 60 years old, provided that this age may be extended for a determined period when the Corporation deems necessary.

**(Retirement)**

**Article 9** If an employee falls into one of the following causes, he or she shall be deemed to do retirement.

- (1) Application for retirement due to his or her personal circumstances
  - (2) When the period of suspension of employment due to (1), (4) or (5) of Article 6 ends.
  - (3) When the compulsory retirement age is reached.
  - (4) When he or she dies.
2. In the case of (1), the employee shall make an application of retirement 2 weeks ahead indicating the day and reason of retirement to the Division Manager of Administration. He or she shall obey the instructions given by his or her superiors including handover of his or her tasks.
3. In the case of (3), the day of retirement shall be the end of the month to which the day

of the compulsory retirement age belongs.

4. In the case of (4), he or she shall be removed from the register of the Corporation.

(Dismissal)

Article 10 If the employee falls into one of the following causes, he or she shall be dismissed:

- (1) When he or she receives punitive dismissal;
- (2) When he or she is deemed to be unable to continue work because of considerable physical or mental disability;
- (3) When the Corporation falls into unavoidable circumstances.

### Chapter 3 Working Rules

(Working Discipline)

Article 11 The employees shall observe the rules and regulations and the order of the Corporation and shall perform their duties according to their superiors.

(Confidentiality)

Article 12 The employees may not disclose confidential information to any others, whether it has relations with their duties, during the period of their employment and after their retirement.

(Types of Working)

Article 13 The types of working are: Normal work and Shift work.

(Working Hours)

Article 14 The working hours are as shown in the table below.

Types of working		Working hours	Starting time	Closing time	Break time
Normal work		8 hours/day 176 hours/month	7:00	17:00	11:00-13:00
Shift work	Shift 1	9 hours/day	7:00	16:00	
	Shift 2	5 hours/day	16:00	21:00	
	Shift 3	10 hours/day	21:00	7:00	
		180 hours/month			

When the employees come to the office and leave the office, they shall record the arrival and departure time in the attendance sheet.

(Holiday)

Article 15 The followings are holidays.

- (1) Sunday
- (2) Public holidays

Notwithstanding the foregoing, the Corporation may order employees to work in holidays.

(Overtime and holiday work)

Article 16 When deemed necessary for the Corporation, the Corporation may order employees to work overtime or in holidays.

(Late Arrival and Early Departure)

Article 17 When an employee arrives one hour or less later than the starting time, this shall be deemed to be late arrival. When an employee leaves the office two hours or earlier than the closing time, this shall be deemed to be early departure.

2. Three times of late arrival or early departure shall be deemed to be one work absence.
3. If an employee wishes to do late arrival or early departure, he or she shall ask his or her superior for it beforehand. Otherwise, because of unavoidable circumstances, he or she shall notify it to the superior without delay.
4. In the case of disaster, traffic accident or other cause of force majeure, late arrival or early departure may be treated as attendance of work.

(Half-holiday)

Article 18 When an employee works only for half of the working hours, this shall be deemed to be half-holiday. Two half-holidays shall be deemed to be one work absence.

(Work Absence)

Article 19 When an employee wishes work absence or half-holiday, he or she shall ask his or her superior for it with its reason beforehand. Otherwise, because of unavoidable circumstances, he or she shall notify it to the superior without delay.

2. If work absence continues for more than five days, a medical certificate shall be submitted to the superior.

(Work Absence without Notice)

Article 20 If an employee is absent from work without asking for it beforehand or without post notification, this shall be deemed to be work absence without notice.

(Long work absence)

Article 21 If work absence continues for more than a month, the period of such work absence shall be counted including holidays within.

2. An employee who was absent from work for more than one month resumes his or her attendance but become absent again within ten days because of the same reason, the periods of long work absence shall be combined.

(Paid Leave)

Article 22 The annual paid leave is 20 days. The unused paid leave may be carried over to the next year.

2. When an employee wishes to take a paid leave, he or she shall notify it to his or her superior beforehand. If the superior consider it necessary to change the timing and period of the asked paid leave on account of smooth business of the Corporation, such timing and period may be changed.

## **Chapter 4 Salary and Allowances**

(Salary)

Article 23 The salary of the employees shall be stipulated in the pay scale determined by the Corporation.

(Retirement Allowance)

Article 24 When an employee retires or is dismissed, retirement allowance may be paid according to the pay scale determined by the Corporation.

(Travelling Expense)

Article 25 When an employee is order to do business trip, travelling expense shall be paid as determined by the Corporation.

### **Chapter 5 Compensation**

(Accident Compensation)

Article 26 When an employee may receives compensation for injury, sickness or death because of work according to the determination of the Corporation.

2. When an employee causes damage to body and/or property of others, compensation shall be paid according to the determination of the Corporation, provided that such damage is not due to willful misconduct or gross negligence of the employee.

### **Supplementary Provision**

This regulation shall come into effect as from 01 July 2009

### **1.3.3 Disciplinary Code**

#### **(Purpose)**

**Article 1** This Code is to stipulate punishment on employees of the Corporation.

**Article 2** Punition shall be determined in a cautious manner and processed without delay by the board of the Corporation.

#### **(Cause for punition)**

**Article 3** Punishment shall be given for one of the causes enumerated below:

- (1) Poor attendance to work such as prolonged absence without permission;
- (2) Disturb order and debase morale of the Corporation;
- (3) Profiteering by use of duty position or through work of the Corporation;
- (4) Leakage of confidential information of the Corporation;
- (5) Willful acts or gross negligence causing disbenefit or damage to the Corporation;
- (6) Acts causing damage to the reputation or loss of credibility of the Corporation;
- (7) Poor supervision on subordinate; and,
- (8) Other acts violating the regulations of the Corporation.

#### **(Category of punition)**

**Article 4** Punition shall fall into the following five categories and determined by the importance of the causing act:

- (1) Reprimand: caution for future;
- (2) Pay cut: monthly reduction of salary at a fixed rate for a period of one month to six months;
- (3) Suspension of attendance: daily suspension of attendance to work for a period;
- (4) Punitive suspension of employment: monthly suspension of employment for a period of one month to three months;
- (5) Punitive dismissal: Immediate dismissal

#### **(Record of punition)**

**Article 5** Punition shall be recorded officially.

(Deletion of recorded punition)

Article 6 Recorded punition may be deleted from official record of the Corporation if the employee receiving the punition woks in a diligent manner and with a high achievement for a considerable period.

Supplementary Provision

This code shall come into effect as from 01 July 2009.

### **1.3.4 Regulation for Control of the Corporation's Vehicles**

#### **(Purpose)**

**Article 1** This regulation stipulates the matters regarding the control and operation of the vehicles owned by the Corporation.

#### **(Definition of Vehicles)**

**Article 2** In this regulation, vehicle means any cars, trucks, and motorcycles, whether owned or leased by the Corporation for its conduct of business.

#### **(Controller)**

**Article 3** The general control shall be exercised by the Manager of Administration Division and the routine control shall be exercised by the General Affairs Section.

#### **(Control Book of vehicles)**

**Article 4** The General Affairs Section shall prepare a control book of vehicles to register all vehicles with the following descriptions:

- (1) Type of vehicle, major repairs with cost and cause of repair
- (2) Main purpose of use of vehicle
- (3) Major repairs: date of repair, part of repair, cost and cause of repair
- (4) Date of inspection of vehicle
- (5) Date of retirement or selling-out of vehicle
- (6) Record of accidents
- (7) Insurance
- (8) Tax

#### **(Custody of Key)**

**Article 5** The key of vehicles shall be in the custody of the General Affairs Group. The key may not be taken out without permission of the Section Chief of General Affairs.

#### **(Permission of Use of Vehicle)**

**Article 6** Before an employee uses a vehicle, he or she shall submit a permission of use of vehicle to his or her superior for approval and then shall submit it to the General Affairs Section for approval by the Manager of Administration



Division. Immediately after use of vehicle, he or she shall return the vehicle to the designated parking lot of the Corporation and shall return the key together with the permission.

(Inspection of Vehicle)

Article 7 Vehicles shall be inspected and kept in good conditions. When the driver finds some trouble or poor maintenance, he or she shall report it to the General Affairs Section.

In the case of trouble due to carelessness or rude driving of the driver, all or part of the repair cost may be charged to the driver.

(Driving of Vehicle)

Article 8 Driving shall be conducted in compliance with law.

- (2) Driving shall be permitted only to the designated drivers
- (3) When an accident occurs, the driver shall take measures stipulated by law and inform the Manager of Administration Division and the General Affairs Section for instruction.
- (4) When an accident occurs, no private settlement may be done personally without consultation with the Corporation.

(Private Use of Vehicle)

Article 9 No use of vehicle shall be permitted for commuting to work or private use except when permission is given by superior.

(Responsibility for fines)

Article 10 When an employee violates traffic law and fines are imposed on him or her, the Corporation shall not assume any responsibility for it.

(Punition)

Article 11 When an employee cause an accident of vehicle, such an employee shall be given punishment according to the Discipline Code of the Corporation. If compensatory payments are made by the Corporation, the Corporation may claim indemnity for it to the person responsible for the accident.

Supplementary Provision

This regulation shall come into effect as from 01 July 2009.

## **Appendices:**

AA-1-1. Organization Chart

AA-1-2. Powers and Duties of Division

AA-1-3. Task Assignment of the Personnel

AA-1-4. Line of Command and Control

AA-1-5. Criteria for punishment

AA-1-6. Criteria for punishment due to violation of traffic law

AA-1-7. Attendant sheet of the staffs of EUMP (Sample)

AA-1-8. Receipt of Carry-in Material/Equipment of warehouse

AA-1-9. Register sheet of EUMP's Car (Pickup type)

AA-1-10 Register sheet of EUMP's Car (Work vehicle type)

## **Chapter 2 : Billing System**

### **2.1. General**

Billing system is closely related with EAC regulations, especially application procedures.

Basic policy and idea for EUMP operation regarding Billing system is described in 2.2 and 2.3.

In order to get approval from EAC, EUMP shall prepare document described in 2.3.

### **2.2. Tariff Setting**

#### **2.2.1 Basic policy**

- 1) All the consumers shall bear the power rates without exception and EUMP shall be operated with the income from them;
- 2) Priority shall be given to maintaining the financial balance of the corporate operation for stable management;
- 3) The recovery cost of the power facilities, being donated by Japanese aid, shall not be included in the operation cost and, however, the expenses for inspection, maintenance and repair shall be secured in order to maintain the functions of the power facilities;
- 4) Capital accumulation shall be made in preparation for future demand increase; and,
- 5) Promotion of electrification of low-income group shall be made to the extent to satisfy the above conditions.

#### **2.2.2 Current Power Tariff**

Different power rates are proposed for a range of fuel costs because the generating cost, which is a basis for power rate, is governed by diesel fuel costs.

##### 1) Category

		Table- Category of Customer
	Category	Applied to
1	Residence	Regular household, Public except the Category 2 below
2	Business	Guesthouses, hotels, restaurants and karaoke bars
3	M/V	Factory...

##### 2) Power rate reflecting fuel price fluctuation

Table-3 Power rate reflecting fuel price fluctuation

Fuel price (Riel/Litter)	Residence	Business	Remark
1,000 ~1,500	1,260	1,420	-17%
1,500 ~2,000	1,340	1,510	-11%
2,001 ~2,500	1,420	1,610	-6%
2,501 ~3,000	1,500	1,700	Present
3,001 ~3,500	1,590	1,800	+6%
3,501 ~4,000	1,670	1,890	+11%
4,001 ~4,500	1,750	1,980	+17%
4,501 ~5,000	1,830	2,080	+23%
5,001 ~5,500	1,910	2,170	+28%
5,501 ~6,000	2,000	2,260	+33%

It is advisable to take the 3-month average fuel price prior to the power rate revision considering the period of storage and procurement.

### 2.2.3 Detail of Power Tariff (Sample Case)

- 1) Profit rate should be secured at 10%.
- 2) The total loss should include the station service and street lamps (some 300 pieces) of EUMP. (to be taken from the actual performance)
- 3) Diesel fuel price: 0.75 US\$/Litter( Sample case)
- 4) Diesel fuel efficiency is taken from the actual performance.

Table – 2- Summary of operation simulation results (with demand of 2009)

Item	Unit	Value	Remark
<b>I. Energy calculation</b>			
1 Annual energy produced	MWh	1,295	At the powerhouse end
2 By hydropower	MWh	927	72% Based on past records
3 By diesel power	MWh	369	28% Based on past records
4 Fuel consumption	Litter	114,100	0.31 Litter/kWh :fuel consumption rate( past records)
5 EUMP use	MWh	65	5% Station use, etc.
6 Annual energy sales	MWh	971	20% T/D loss (Past record)
<b>II. Financial costs</b>			
1 Personnel	US\$	75,250	30 persons: 14 months of monthly payroll
2 Fuel	US\$	85,570	0.75 US\$/Litter

3	Operating expenses of EUMP	US\$	64,500	100 %: proportional to personnel costs (past records)
4	Maintenance and repairs	US\$	78,500	Incl. Reserves for overhaul
5	Drought reserves	US\$	21,550	10 %: proportional to hydropower energy production
6	Total	US\$	325,370	
III. Unit cost				
7	Cost per Annual energy sales cost/kWh	US\$/kWh Riel/kWh	0.335 1,340	4,000 Riels/US\$
8	As per Effective energy consumption cost/kWh	US\$/kWh Riel/kWh	0.356 1,425	5% Commercial loss considered
9	Weighted average rate	US\$/kWh Riel/kWh	0.392 1,568	(value entered)
IV. Income from power rate		US\$	361,690	
V. Profit		US\$ %	36,690 10%	Precondition

## **2.3. Billing System Flow**

### **2.3.1. Introduction**

One of the essential systems for management of an electric power company is the procedure to receive power charges from customers for supplied electricity. This procedure starts with application and contract with customers and establishes a sequence of steps from metering of power consumption of customers to billing based on metered consumption and receipt of payment from customers. It is vital to operate the billing system according to the established procedure.

This billing system is usually called MBC —metering-billing-collection. In this report, it is simply named “billing system.”

It is also important how to cope with arrears of customers, not only in terms of revenue side but also discipline of management, so this report proposes handling of this matter as an integral part of the billing system.

### **2.3.2. Current situation**

As for application from customers, they visit EUMP offices to submit a form of application and supply agreement. By the approval of the application by EUMP, the contract will come into effect and power supply will be commenced after installing service wires and watt-hour meter.

Metering is conducted by transmission/distribution section for a few days from 20<sup>th</sup> day of every month. Meter readings are given to the billing staff of the administration section, who prepares bills with computer based on the meter readings. The bills are delivered by hand to consumers by the transmission/distribution section a few days later, that is, 25<sup>th</sup> or 26<sup>th</sup> every month. Consumers pay their bills in cash at the teller's window of EUMP offices.

Consumers must pay connection fee for 120,000 riel of (about \$30) to cover the cost of connection works and security deposit at the time of making contract. The deposit amount must be equivalent to the power charges of the estimated average monthly power consumption as stipulated in the Regulation on General Conditions in the Electricity Supply of the Kingdom of Cambodia. In the case of EUMP, the current amount of the deposit is 60,000 riel (about \$15) for the consumer category of minimum

power consumption of single phase 5A and 1,000,000 riel (about \$250) for the maximum category of three phase 20A.

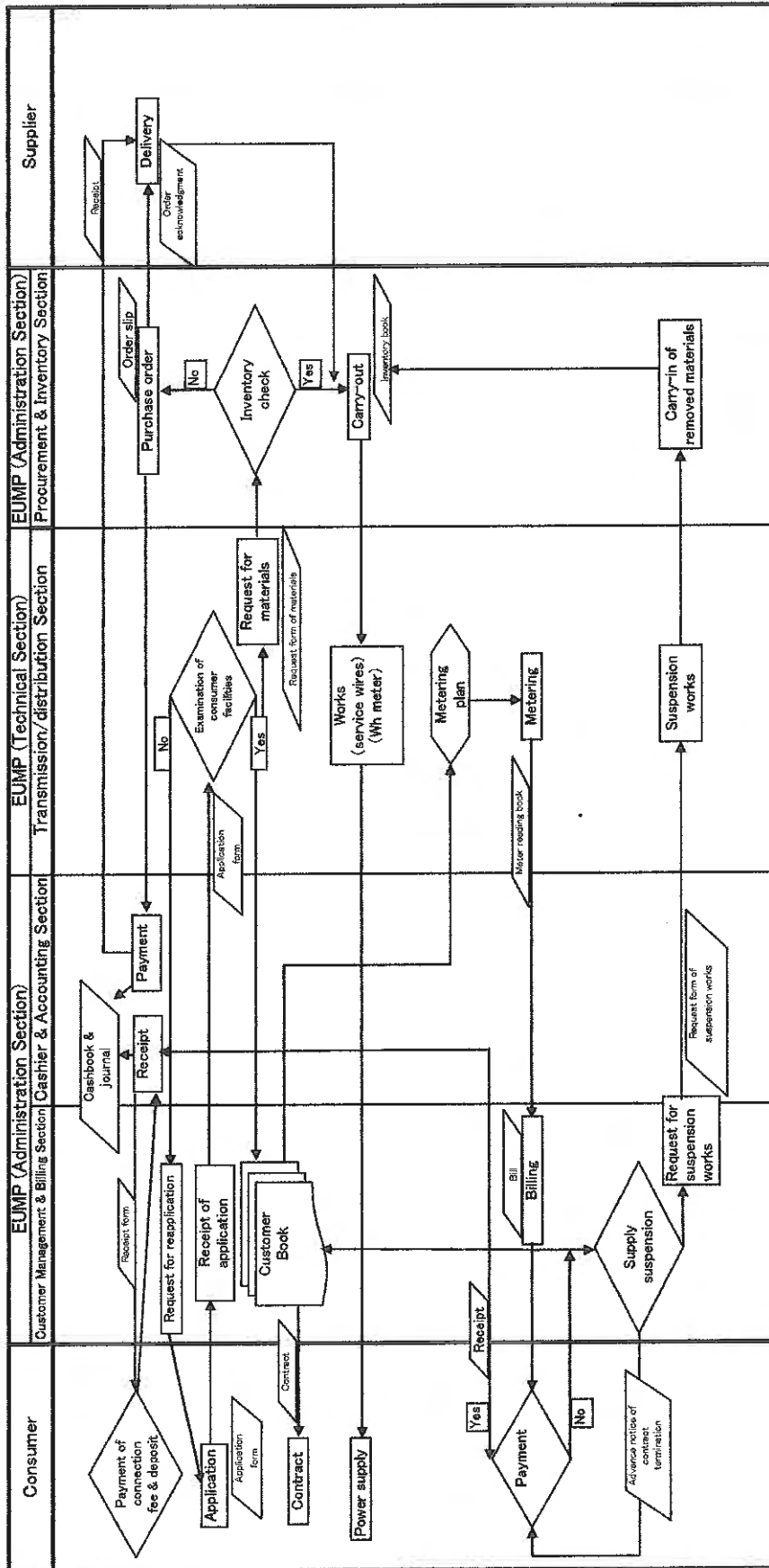
Forms are prepared for application/supply contract, bill and receipt, based on those of EdC.

#### **2.4. Proposed billing system**

A billing system is proposed as shown in the flow chart of the next page, with reference to that of a Japanese electric power company and in consideration of relevant regulations and conditions of Cambodia.



Billing System  
Procedures from Power Supply Application & Contract to Contract Termination



### 2.4.1. Application to power supply

- ① Consumer receives the form of application and supply contract at the offices of EUMP and fills in all the necessary items to submit it to the customer management and billing section and pay connection fee and security deposit to the cashier and accounting section and receive the receipt of connection fee and security deposit.  
The cashier and accounting section makes an entry of this transaction in the cashbook and the journal. The security deposit is the deposit from customer and should be entered as such in the journal in order to prevent misuse for operation cost.  
This deposit shall be used only for equivalent amount of arrears in the case of nonpayment of bills by customer.
- ② The customer management and billing section acknowledges the application from customer by putting a stamp of confirmation of the receipt of connection fee and security deposit and gives the application to the transmission/distribution section and make registration of a new customer in the customer book.
- ③ The transmission/distribution section verifies, on paper and/or at the customer's house, the customer's power-related facilities and desired supply conditions written in the application. If no problem is found, the transmission/distribution section answers affirmatively to the customer management and billing section. Otherwise, the application is returned to the customer management and billing section to request customer to make reapplication.
- ④ If no problem is found, the transmission/distribution section make a request for necessary materials for connection works to commence power supply to the procurement and inventory section with request form of materials.
- ⑤ At the request for materials, the procurement and inventory section checks the availability of the requested materials in the warehouse. If the requested materials are available, the procurement and inventory section carries them out to the transmission/distribution section and makes a record of it in the inventory book. If unavailable, the procurement and inventory section issues the order slip/order acknowledgement for purchase order and gives it to a listed supplier after the approval by the cashier and accounting section.
- ⑥ The supplier delivers the requested materials to the warehouse of EUMP. The procurement and inventory section makes an inspection for acceptance of the delivered materials. If the delivered materials are the same as those shown in the order slip, the procurement and inventory section accepts them and makes a registration in the inventory book and, otherwise, requests the supplier to make replacement.
- ⑦ The procurement and inventory section requests the cashier and accounting section to make a payment for the accepted materials with an invoice of the supplier. If there is no problem found, the cashier and accounting section makes the payment to the supplier and makes an entry of this transaction in the cashbook and the journal.
- ⑧ The transmission/distribution section visits the consumer's house with the necessary materials and carries out connection works such as installation of service wires and watt-hour meter. The transmission/distribution section records the works in the record of connection works and reports it to the customer management and billing section. The customer management and billing section records the date of commencement of power supply in the customer book. Once the connection works are completed, power starts to be supplied.

## 2.4.2. Metering to payment of power charges

①The transmission/distribution section determines how many consumers are metered in one day every month and makes zoning of the supply area for metering and then prepares a metering plan including the metering day of each month for each metering zone. For example, there are some 900 consumers and if it is possible to read meters of 300 consumers in one day, then the supply area can be divided in 3 zones. As for metering day of each zone, there are two methods: concentrated metering and distributed metering. The concentrated metering is conducted during the first 3 days of every month in principle, which will concentrate the work volume in the early days of the month. In the meantime, the distributed metering is conducted taking the first zone in the 1<sup>st</sup> to 3<sup>rd</sup> day of the month, the second zone in 10<sup>th</sup> to 12<sup>th</sup> of the month and the third zone in 20<sup>th</sup> to 22<sup>nd</sup>. This method can distribute the work volume across the month.

In either case, if the transmission/distribution section cannot do metering because of troubleshooting, tree trimming or holiday, a delay for one or two days can be allowed. In the case of the current tariff structure of EUMP of simple metered-rate system in particular, there is no problem in terms of equity of power charge calculation.

②The transmission/distribution section conducts metering periodically according to the metering plan. Meter readings are recorded in the meter reading book (MRB). Together with consumers' meter reading, the meter installed at the pole-mounted transformer supplying several consumers is read. By doing this, it is possible to detect irregularities such as power theft and leakage with comparison of those meter readings.

③The transmission/distribution section gives the meter reading book to the customer management and billing section, who prepares bills based on the meter readings recorded in the meter reading book. The due date starts from the date of issue of the bill and it is necessary to put the date of issue of the bill to agree with the date of delivery of the bill to the customer.

④The consumer who receives the bill has the obligation of payment within 12 days of the billing date (according to the Regulation on General Conditions in the Electricity Supply of the Kingdom of Cambodia), he or she makes the payment in cash at the teller's window of the cashier and accounting section of EUMP within this period. The cashier and accounting section gives the receipt to the consumer in exchange for the payment and makes an entry of this transaction in the cashbook and the journal.

## 2.4.3. Handling of arrears

If the consumer fails to pay in time, it is necessary to rigorously carry out power suspension according to the following in terms of revenue side and management discipline.

①If the consumer fails to pay exceeding 12 days<sup>1</sup> from the billing date, the customer management and billing section requests the transmission/distribution section for power suspension works with a request form of suspension works.

②Upon the request of power suspension works, the transmission/distribution section visits the consumer to conduct suspension works. It is desirable to do these works as soon as practicable considering the workload of the transmission/distribution section.

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<sup>1</sup> Art. 84 of the Regulation (English version) says "shall be at liberty to disconnect the supply" but it is proposed here to carry out suspension works as soon as practicable to eliminate arbitrariness.

- ③ Even after the power supply is suspended, the contract with the consumer is still valid. The Regulation on General Conditions in the Electricity Supply of the Kingdom of Cambodia stipulates the period from power suspension to contract termination for 2 months<sup>2</sup> and then the contract is terminated and the materials owned by the electric power company such as watt-hour meter can be removed. The customer and billing section of EUMP should follow the above regulation and give an advance notice of contract termination of 7 business days through transmission/distribution section to the customer.
- ④ If the consumer fails to pay during the above 7 days, the customer management and billing section requests the transmission/distribution section to remove the materials owned by EUMP.
- ⑤ The transmission/distribution section visits the consumer to remove the materials, which are carried into the warehouse of EUMP. In carrying-in, the procurement and inventory section attends the carrying-in and records the materials in the inventory book. The section transmission/distribution reports the completion of the removal works to the customer management and billing section. The customer management and billing section records the termination of contract in the customer book.

#### 2.4.4. Forms

Of the necessary forms for the billing system, some are already prepared and being used. As for those existing forms, some suggestions for improvement will be given and as for new forms to be prepared, some points to be considered will be mentioned below.

##### Application and supply contract

The existing form is to be followed basically but with the following additions desired.

- ① Art. 6: Billing shall be made based on monthly meter readings stipulated in Art 3.
- ② Art. 11: In the case of arrears, this article reads that the Supplier can temporarily postpone electricity supply in conformity with Regulation on General Conditions in the Electricity Supply of the Kingdom of Cambodia. It is advisable to clearly state the following in the contract.
- If the Consumer fails to pay exceeding 12 days from the billing date, the Supplier shall forthwith suspend power supply. If the Consumer fails to pay within 2 months of the suspension, the Supplier shall terminate the supply contract with the Consumer and removes the materials owned by the Supplier. The Supplier shall deliver to the Consumer an advance notice of contract termination 7 business days before the expected date of contract termination.

##### Customer book

The following items are to be added to the existing form (prepared in Excel)

- Date of receipt of security deposit
- Date of commencement of power supply
- Date of contract termination

Besides the above additions, some changes have been made as shown in the attached sheet.

##### Billing book

A new form of billing book must be prepared linked with the customer book. Monthly meter readings are to be transcribed and the corresponding billed amounts recorded with the billing date and due date. A sample is attached in Excel format.

##### Receipt of security deposit and connection fee

<sup>2</sup> Art. 85 of the Regulation (English version) stipulates 2 months, which deviates 3 months stipulated in Art. 48. 2months is taken here because of being similar to the case of Japan.

The existing form is to be used. As for connection fee, a simple receipt form can be used. For both receipts, customer ID must be shown.

#### Request form of materials

This form is used when the transmission/distribution section make a request for necessary materials of connection works for a new customer to the procurement and inventory section. The requesting party is the transmission/distribution section and the requested party the procurement and inventory section. The following items must be included in the form.

- Customer ID & place of connection works
- Date of connection works
- Description of connection works
- Necessary materials

#### Inventory book

Some improvements, if any, will be suggested after checking the existing form. The following items at least are advised to be included.

- Facilities for which the equipment/materials are to be used (hydropower station, diesel power station, administration offices, etc.)
- Name of the equipment/materials
- Quantity
- Price of purchase
- Date of carry-in
- Date of carry-out

#### Order slip/order acknowledgement

Some improvements, if any, will be suggested after checking the existing form. The following items at least are advised to be included.

- Name and quantity of the equipment/materials to be ordered
- Specifications
- Budgeted amount
- Purpose of order
- Preferred date of delivery

#### Cashbook and journal

The forms of cashbook and journal must be in conformity with the accounting practice of Cambodia and those used in electric power companies. Some improvements, if any, will be suggested after checking the existing form.

#### Record of connection works

The following items at least are to be included.

- Customer ID for whom connection works have been conducted
- Place of connection works
- Description of works and materials used
- Date of works and the name of persons engaged in the works

#### Meter reading book

The form must be prepared in such a way that one-year meter readings of each consumers can be recorded and take the form of Meter Reading Book for efficient metering for each group of consumers. It is desirable to prepare the form in such a size as to allow carrying and recording during metering works.

#### Bill and receipt

The existing form follows the form used by EdC, which is acceptable.

### Request form of suspension

This form is to make a request by the customer management and billing section to the transmission/distribution section for suspension of power supply to the consumer who fails to pay within the prescribed period. The following items at least must be included.

- Customer ID
- Place of suspension works
- Date of suspension

## **2.5. Report to EAC**

In accordance with the Electricity Law of the Kingdom of Cambodia, EUMP shall carry out some procedure to the Electricity Authority of Cambodia (EAC) as needed.

- 1) Procedure A: Annual Data Submission by Licensees and its Monitoring
- 2) Procedure B: Submission of Tariff Application
- 3) Procedure C: Review and Determination of Tariff

Documents shall be prepared in line with the "PROCEDURES for Data Monitoring, Application, Review and Determination of Electricity Tariff, under Electricity Law of the Kingdom of Cambodia, Approved by EAC session No.113 on dated October 26, 2007".

### **Appendices:**

AA-2-2-1. Annual Operation Plan (Sample case -3000)

AA-2-4-1 Sample of Customer Book

AA-2-4-2 Sample of Billing Book

AA-2-5-1 Annual data submissions by smaller licensee

AA-2-5-2 Request for tariff revision by smaller licensee

## Chapter 3 Long and Mid Term Plan (Shall be revised every year)

### 3.1 Precondition

This long and mid-term plan is aimed to serve for stable business operations of EUMP for the foreseeable future. EUMP should revise the Plan yearly by themselves in the hereafter. EUMP must do on their own everything necessary for its stable business operations including the preparation of the long and mid-term plan. This plan includes necessary points for it; and, among others, the outlook of supply and demand balance and the necessity of future addition of power supply.

EUMP started its commercial operation in August 21, 2008 and has been continuous supplying electricity from November 5, 2008 up to the present. In the future, demand will grow to require addition of power supplying capacity. This plan suggests an outlook of such necessity for later consideration by the relevant authorities of Cambodia as well as EUMP. The time horizon of this long and mid-term is set at: about 3 years for power supply with the existing capacity as mid-term and 10 years at maximum onward. This long and mid-term plan is a rolling plan to be revised yearly taking into account the actual performance and future forecast.

### 3.2. Demand Forecast (Shall be revised every year)

#### 3.2.1 Actual Demand

The power grid of EUMP covers an area with some 1,560 households. In August 2008, before electrification of the micro-hydropower rural electrification project, there used to be about 400 households receiving electricity from an IPP, while the number of the customers was 1,052 as of March 2009, translating into some 67% of coefficient of electrification. The basic design of the project assumed 70% of coefficient of electrification with 930 customers. Although the coefficient of electrification was slightly lower, the number of customers exceeded the assumed number of the basic design.

Table-1 shows the actual demands between January and March 2009.

Table- 1 Actual Demand (January through March 2009)

Item	Unit	Jan.	Feb.	Mar.	Remarks
Maximum Demand	kW	265	294	286	Demand at generation end (average of the highest 3)
Power Consumption	kWh	74,347	83,539	78,351	Total values of Wh meters
Number of Customers	Customer	1,015	1,034	1,052	Number of Wh meters
Average Consumption per Customer	Power kWh/month per Customer	70.8	78.3	79.8	Converted in 30 days

#### 1) Monthly Maximum Power Demand

The maximum demand (**peak load**) occurs around **7 to 9 o'clock** at night ranging from 290kW to 300kW **in the consumers side**. The maximum power demand is defined as the **total output recorded of 3 power stations** at the same hour. The demand forecast takes the average (equivalent to the highest) of the highest 3. Actually, the maximum demand beyond the average one occurs once a month.

2) Average power consumption

The monthly power consumption per customer remains stable at about 80kWh/month in February and March. January saw a lower consumption because the number of new customers was larger during the month.

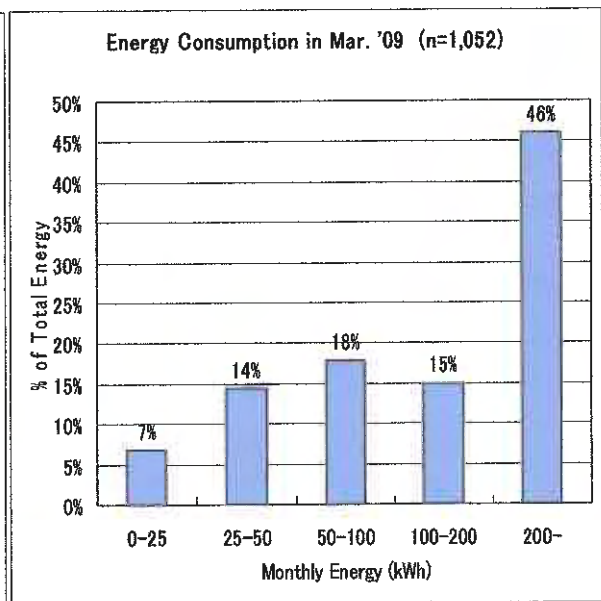
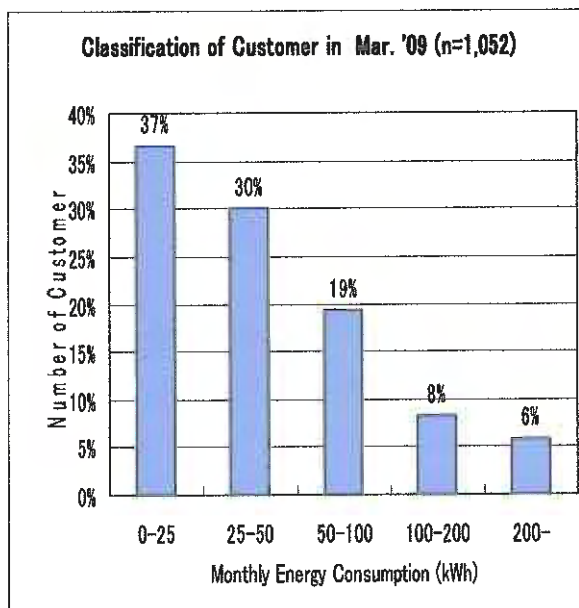
3) Consumption trend by customer classification

Graph-1 shows the ratio of the number of customers by monthly consumption and Graph-2 the ratio of the power consumption by customer classification, both as of the closing of March 2009 (between 21 February and 20 March).

Those graphs have revealed that 37% of the total customers use electricity of 25kWh or under, equivalent to only 7% of the total electricity supplied by EUMP. In the meantime, the upper 6% of the customers (mainly hotels and guesthouses) consume 46% of the total.

Graph-1 Ratio of the number of customers by monthly consumption

Graph-2 Ratio of the power consumption by customer classification



3.2.2 Demand Forecast

It is quite difficult to forecast accurately the future power demand based on the mere several months of demand records since the start of electrification of Senmonorom. This demand forecast of long and mid-range was conducted with conceivable factors.

1) Demand increase by growing coefficient of electrification

The current coefficient of electrification is about 67% and there remain some 500 households not electrified under the power grid. This is because they have physical access to the distribution lines but are not connected because of their own circumstances. Since January 2009, there has been a slight increase in new application for connection. It is not realistic to expect that those not connected will have connection in a short time; and, however, the coefficient of electrification will increase slightly and gradually. Most of new customers are expected to use 25kWh/month or under as shown in Graph-1.



Table-2 Demand increase by growing coefficient of electrification

Item	Number of customers	Consumption per customer	Increased consumption
Increased consumption of those not-electrified	500	25 kWh/month/customer	12,500 kWh
Ratio with relation to the actual increase	50%	—	16% increase
Rate of annual increase			1%(800kWh/year)

The above table shows that, if those not electrified are electrified, there would be 16% of energy increase with relation to the actual demand. The growing rate of coefficient of electrification is expected to be in the order of 2% yearly considering the actual situation of other countries. This means that it would take 10 years at least to reach 100% of coefficient of electrification. Therefore, the annual increase of power consumption is expected to be 1% of the current power demand, so that 1% of the total demand(kW) was taken as the rate of increase and as considered as such in the demand forecast.

#### 2) Demand increase by increase of the number of households

In December 2004 during the basic design of this project, there were 1,264 households in the service area, while there were 1,560 households in June 2008 according to a survey by DIME. During that period, the number of households increased by some 600 for 3 years and 6 months, translating into 6.5% of annual increase, exceeding significantly the assumed 3.5% of the basic design.

As shown in Graphs-1 and -2, the power consumption is divided in residence and business. Excepting the customers with 200kWh or above, the remaining 991 customers were taken for calculation and the actual rate of increase of 6.5% was applied.

If that rate remains unchanged, there would be about 2,500 households 10 years later, 1,000 households increase.

#### 3) Demand increase by industrial development

Improvement works of the national highway route 76 between Snoul and Senmonorom is under way. The completion date is not clear by seeing the work progress, although it is said that the works was originally to be completed in December 2012. Once completed, the access to Senmonorom will be dramatically improved, the number of tourists increased and the regional development accelerated. Those factors are unpredictable by statistical method.

This forecast assumes 3 cases: 10% of annual increase of power consumption for such customers as hotels and guesthouses with 200kWh or above (Case A: 1.6 times in 5 years), 15% (Case B: 2.0 times in 5 years) and 20% (Case C: 2.5 times in 5 years). Other conditions are common to all the cases.

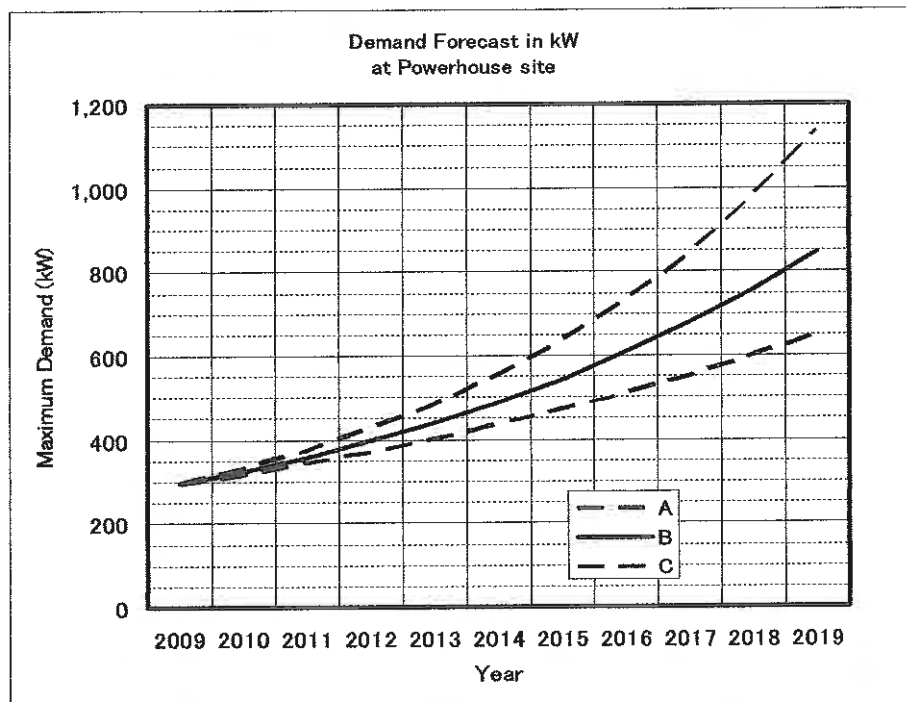
#### 4) Demand Forecast

Demand was calculated for 10 years with the above assumptions. The table and graph show the results of the calculation.

Table- 3 Demand forecast for next 10 years

Time	Year/month	Number of households	Number of customers	Coefficient of electrification (%)	Maximum demand (generation end)	Monthly power consumption (MWh)	Rate with relation to the present (%)	Monthly power consumption per household (kWh)
Present	2009/3	1,560	1,052	67	294	83.7	100	79.6
1 year later	2010/3	1,630	1,140	70	318 ~ 331	91 ~ 94	108 ~ 113	80 ~ 83
2 years later	2011/3	1,700	1,230	72	344 ~ 375	98 ~ 107	117 ~ 127	80 ~ 87
3 years later	2012/3	1,780	1,320	74	372 ~ 425	106 ~ 121	126 ~ 145	80 ~ 92
4 years later	2013/3	1,870	1,430	76	402 ~ 485	115 ~ 138	137 ~ 165	81 ~ 97
5 years later	2014/3	1,960	1,530	78	435 ~ 554	124 ~ 158	148 ~ 188	81 ~ 103
10 years later	2019/3	2,540	2,190	86	649 ~ 1,135	185 ~ 323	221 ~ 386	85 ~ 148

Graph - 3 Maximum Power Demand (generation end)



(Assumptions)

Case A : Annual increase by industry 10% (1.6 times in 5 years)

Case B : same as above 15% (2.0 times in 5 years)

Case C : same as above 20% (2.5 times in 5 years)

Coefficient of electrification(2% yearly) and rate of increase of households are common to all the cases (6.5%)

### 3.3. Supply and Demand Balance (Shall be revised every year)

#### 3.3.1 Generating Capacity (Effective Output)

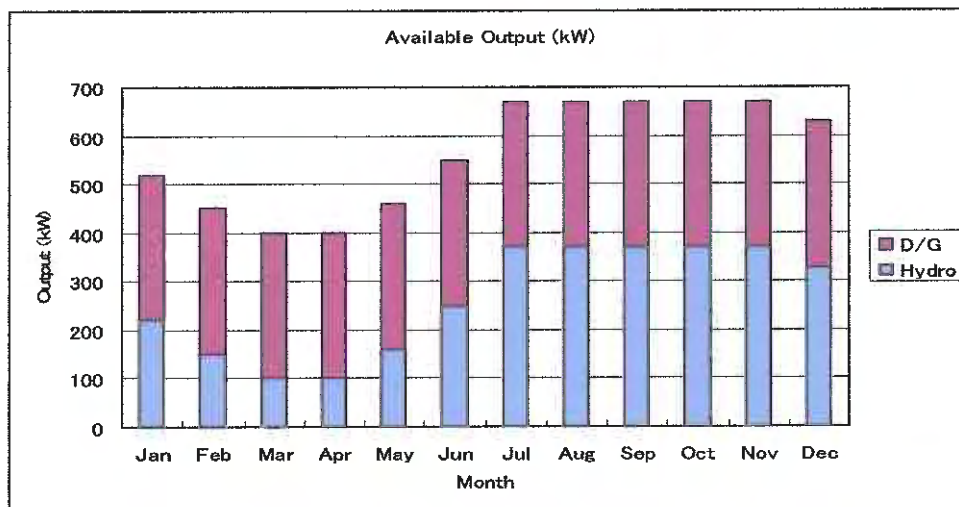
EUMP currently owns 2 hydropower plants with a total installed capacity of 370kW and 1 diesel power plant with an installed capacity of 300kW, totaling 670kW. The diesel power can operate the maximum output at all time as needed except times of periodic inspection and repair. Meanwhile, hydropower is limited in output by fluctuation of river flow. The past record shows that the firm flow for generation decrease from December to reach the driest point between February to March. The hydropower output is only about 100kW in this period. The stable output for 24 hours through the year is about 400kW at the generation end.

The table below shows the expected output by season.

Table-4 Generating Capacity and Effective Output

Period	Generating capacity (kW)			Effective output (kW)		
	Hydropower	Diesel	Total	Hydropower	Diesel	Total
Rainy season ( Jun & Jul to Nov & Dec)	370	300	670	370	300	670
Dry season (Dec to May)	370	300	670	100~370	300	400~670
Between mid-February and early April	370	300	670	100	300	400

Fig.-4 Monthly Effective Output (assumed)



### 3.3.2 Forecast of Supply and Demand Balance

The above calculation has revealed the following tendencies.

#### 3.3.2.1 Demand Analysis

- ① The demand increase due to the growth of coefficient of electrification, being small, would contribute little to the general tendency.
- ② The growth of power consumption by residences would not become large even if the number of households in the urban area of Senmonorom city continues to increase at the same pace.
- ③ Pace of growth of tourism such as hotels, guesthouse and restaurants would affect much the power demand.
- ④ The power demand per customer would remain almost unchanged even if the demand growth of the industries keeps at 10% per year. This trend justifies that Case A is deemed to be the lowest target for regional development.

#### 3.3.2.2 Mid-term Forecast (supply and demand balance with the existing capacity)

As mentioned above, the existing installed capacity by Japanese donation is 670kW and, however, the effective output decreases to about 400kW due to drop of river flow during dry season from February to March.

The demand forecast predicts that the demand would exceed 400kW a few years later or between the end of 2011 and 2013.

The basic design of the project assumed that power supply would start in 2007 and that the demand would reach the supply capacity 5 years later or 2012. The start of power supply delayed for a year but it is quite probable that the power demand would reach the supply capacity as originally assumed because of the rapid increase of the number of households of Senmonorom.

During that period, the generating portion of diesel power ranges from 10% to 60% by season, about 30% of the annual total generation.

#### 3.3.2.3 Long-term Forecast

When the maximum demand at generation end exceeds 400kW, the existing installed capacity would not be sufficient during dry season.

If no addition of generating capacity is made, there would be occur supply deficit (outage) during peak hours for 2 months from February to April for the first one or two years. The hour and period of power outage would become longer year by year and power shortage would become constant around 2015 at the earliest (Case C).

The following countermeasures are conceivable: ① Addition of generating capacity ② Connection with the grid ③Planned outage.

##### 1) Possibility of addition of generating capacity

Generally, it is necessary to take a period for design, procurement and construction for a new supply capacity, requiring several years at the shortest. At the present, Cambodian side does not have a power development plan in the area. There is still another issue of financing after a new development plan takes shape. Incorporation of such addition into the long and mid-term plan would require investigation and examination.

##### 2) Connection with the grid

This project is an isolated power system with 2 hydropower and 1 auxiliary diesel power supplying power to the urban area of Senmonorom city, provincial capital of Mondul Kiri province.

The transmission plan of MIME has a plan of transmission from Kratie to Senmonorom but does not have any concrete plan for construction up to 2020.

As for extension of transmission/distribution lines from Vietnam, Keo Sema in Mondul Kiri province has been supplied with electricity from direct connection with Vietnam (10km) since the end of 2006. Similar power supply is being made in Snoul (20km) along the national highway route 7. Other towns along that highway such as Memot Ponnea Krek are supplied by EdC's grid, actually receiving electricity from Vietnam. Those cases show geographical advantage of transmission from Vietnam.

In transmitting from Vietnam, there would be 2 routes: about 65km from Keo Sema and about 40km from the border of VN. Both cases are expected to have considerable loss of transmission due to long extension of lines if the lines are of similar specifications, which leads to think that it is not technically reasonable to make such an extension for a low demand level of this project (400kW).

In future, when power demand increases, e.g. 1,000kW or over, it would be feasible to install transmission lines of higher voltage (efficient but expensive). Here is again a financial issue as seen in the previous case.

### 3) Planned outage

In the case that the above addition or connection with the grid is not implemented, there would inevitably be occur power outage. EUMP would have to conduct planned outage.

Those 3 cases are conceivable and the likelihood is, firstly planned outage, secondly connection with Vietnam, finally addition of supplying capacity.

#### 3.3.2.4 Utilization of the Facilities Donated by Japan

To respond future increased demand, a new supplying capacity would be added. Discussed here is how the facilities donated by Japan would be utilized at that time.

##### Assumptions

- ① **Technical:** At least, maintenance such as inspections and repairs should be surely conducted to continue to use 2 hydropower and 1 diesel power and about 60km transmission and distribution lines donated by Japan.
- ② **Managerial:** An organizational system as will enable financial forecast and procurement should be established and maintained for the above technical maintenance.

When the above conditions are satisfied, the criteria for utilization of the existing facilities are economics of power generation costs, that is, the operation pattern to minimize the power generation costs. It is important not to confuse power rate as income with generation costs as expenditure.

##### 1) Future utilization of hydropower

Hydropower has such characteristics that operation and maintenance costs do not vary with respect to the amount of generated power, that is, the fixed costs are conspicuous. This means that the more power is generated, the less hydropower generation cost/kWh would become as long as water is available.

The actual demand under the existing capacity of 400kW does not utilize all the capacity during the night and the hours with small demand. In the rainy season, there is as abundant river flow as to overflow the weir at all times at night and day, causing excess power supply, equivalent to about 30% to 40%.

In the future when demand increases, such excess power supply would be utilized and revenues increased. At the same time, the hydropower costs/kWh would decrease. Hydropower is accordingly to be utilized with priority.

##### 2) Future utilization of diesel power

Diesel power has been installed as auxiliary power to respond to peak demand in dry seasons. If capacity additions are made for increased demand, diesel power would be positioned as standby power and utilized less often.

### 3) Implication in power rate

The proposed power rates basically agreed in 16<sup>th</sup> March 2009 and to be scheduled for application from June 2009 have the rate system by diesel fuel price. This rate system is variable automatically by oil price fluctuation. It is to be noted that the period of application is that the maximum power demand of the long and mid-term plan is within the effective output of 400kW, in other words, until the generating proportion of diesel power reaches 30%.

When the power demand exceeds 400kW, if no addition of power supply is made, there would occur power outage due to supply deficit in dry seasons even if diesel is operated at full capacity. In wet seasons as well, diesel power would be operated at all times. That situation would lead to over 30% of the generating proportion of diesel power and make it necessary to revise the power rates.

In the cases of additions of power supply and connection with the grid as well, revision of the power rates would be inevitable.

## 3.4. Medium & Long Term Plan for Electric Power Facilities (Shall be revised every year)

### 3.4.1 Judgment of Work priority

Regarding to draw up the M&LTP, it is necessary to evaluate the priority of repairing plans in order to optimize the preservation facilities taking keep reliability and reducing maintenance cost into consideration as follows.

As for implementation work plan, it should be ordered the priority of [Compliance] and [Society effectiveness], and then following [Condition of facilities], [Effectiveness of electric power field or owned facilities] and [Most efficiency management plan].

#### 1. Compliance(Law observance)

The following items are implemented in priority as compliance that, Measuring equipment (Measurement standards), Dangerous goods (PCB, etc.) and Detailed inspection of Circuit Breaker (Maintenance standards), but, dangerous goods may be considered the disposal period as items 3 and 4 hereinafter in advance.

#### 2. Society effectiveness (Safety and environmental)

##### (1) Asbestos abatement

In replacement of non-asbestos goods, it is considered items 3 and 4 hereinafter.

##### (2) Safety and environmental

The enterprise must make a countermeasure for oil leakages/noises in safety and social effectiveness, so that it is applied the budget of 5 % in the asset & repairing cost, but the priority may be considered items 3 and 4 hereinafter.

Prevention plan of oil leakages, safety of crane and noises

#### 3. Facility condition (maintenance, reliability, technical and functional factors)

In the case of heavy trouble, it should be measured in whole power plants based on the instruction of responsible department.

##### (1) Technical factor

Whole facilities

##### (2) Reliability

Aged damage, operation times, repair and fault experiences, decreasing function, remaining life

##### (3) Maintenance ability

Non-production parts, agency and supporting system

(4) Function ability

Increasing efficiency, function, reliability and work ability

4. Effectiveness of Electric power field or owned facilities

(1) Economical

Economic effect of replacement or renewable

(2) Risk assessments

Evaluation of effectiveness on system fault or out of services

- Black out
- Turbine/generator stop (Non, within 3 days, over 3 days)
- Spilled water (Yes or No) condition: run-off-river type with one unit and required maintenance discharge water

(3) Efficiency

Shortage of scheduled stoppage duration in considering parallel work due to reduce maintenance cost and increase operation hours

(4) Coordination

Coordination of protective relay setting in the power system

(5) Important position

Expectation of supply the power to the power system (such as effectiveness of power system by hot or cold reserves)

5. Efficiency of management

Evaluation of system analysis and maintenance management

### 3.4.2 Civil Facilities

With continuous maintenance works, concrete structures such as intake weir or waterway can be used semi-permanently. Economically speaking, repairing works should be done every when some troubles are found regardless the age of the facilities. Under the ordinal operation except for unexpected disaster, it is rare case that a civil structure suddenly breaks down without some signals. Most cases, some signals can be seen such as crack or strain before breaking down. Structural soundness of civil structures will be kept as far as periodical maintenance works are done and suitable countermeasures are done when some signals on the civil structures are found.

Considering above, it is desirable that actual repairing planning should be drawn up based on the checking results of the maintenance works. In medium- to long-term planning, equivalent price of depreciation cost per year is set for the maintenance cost per year and the disaster recovering cost is not considered since the probability is quite low (design : less than 0.01 /year).

In the view of easiness of operation and maintenance, some upgrading is preferable for some civil facilities because existing facilities have minimum of specification. For example, existing access path of O'Moleng site and O'Romis site have gravel roadbed and mortar-type ditch. After rainy season, they need some repairing such as filling up gravel or for rutting. To make the maintenance work easier, it is desirable to improve the structure, for example, upgrade to asphalt pavement or concrete U-shaped gutter. But the cost for upgrading has much effect on the company management. Aimless upgrading will incur the skyrocket tariff. Cost-benefit performance study should be carefully done. Besides that, there are so many facilities that needs upgrading, those are falling rock protection, slope protection and so on but the cost for

upgrading is eliminated in the medium- to long-term planning at this moment. In the future, considering the status of operation, maintenance and management, EUMP should make a decision of upgrading if they need.

### **3.4.3 Generating Facilities**

The budget for the 3 power stations (O'Romis, O'Moleng and Diesel ) are determined by the following estimations,

(1) **Operation and maintenance Cost**

Annual budget for repairing and replacement of the equipment is calculated based on the operation condition and fault experiences.

(2) **Consignment**

The consignment of Contractor or Inspectors' (as a supplied manufacturer or domestic inspection company) will be selected for training of advises and execution of the periodic inspection as follows.

- 1) **Periodic inspection:** ordinary inspection according to the guidance of manufacturers per year,
- 2) **Detailed inspection:** the making the inspection schedule and replacement plan of detail equipment every 5 years referring to the maintenance manual,
- 3) **Overhaul Plan**  
According to the maintenance manual and supplier's standards, the overhauling work will be carried out every 10 years, and parts to be replaced considering of aged and keeping the long life operation.

Therefore, making a budget plan and timing of the inspection may be the most considering matter for the power stations without any trouble and supplied power.

### **3.4.4 Transmission & Distribution Facilities**

The budget for Transmission & Distribution facilities are determined by the following estimations.

(1) **Operation and maintenance Cost**

Annual budget for repairing and replacement of the equipment is calculated based on the operation condition and fault experiences.

Spare parts' purchasing for early restoration of facilities' destruction by natural disasters is planned for 10 years. In this case, it is assumed that restoration works are basically conducted by EUMP staff.

Asset-Upgrade budget for improving the system operation is excluded from this plan because experience of system operation is very short, even though such improvement will be necessary for smooth management of EUMP.

(2) **Consignment**

The consignment of Contractor or Inspectors' (as a supplied manufacturer or domestic inspection company) will be selected for training of advises and execution of the periodic inspection as follows.

- 4) **Bucket Car Inspection:** ordinary inspection per year, and detail inspection per 3 years
- 5) **Switch Station Inspection:** ordinary inspection per 2 years, and detail inspection per 6 years
- 6) **Insulated Tools Inspection:** ordinary inspection per year, and detail inspection per 3 years



- 7) **Tree-Cutting & Trimming Work:** a part of tree-cutting & trimming work is planned by consignment.
- 8) **Periodical Training:** periodical training per 4 years in order to keep and increase workers' ability especially for rare experienced works

Table-5 Judgment of Work Priority for Electrical Facility on M & L Term Plan, 2009

Evaluated Items	Upper: Objective Parts										Evaluation-1	
	Lower: Evaluated Points											
<b>Compliance</b>	Not necessary										Necessary 500	
PCB, Dangerous good, Measuring, CB	0											
<b>Safety</b>	Not necessary										Necessary 200	
Asbestos, Crans, etc.	0											
<b>Environment</b>	Not necessary										Necessary 100	
Noises, Clean-up, Oil leakage	0											
<b>Maintenance</b>	Out of order					Manufacturer support system					Spare Parts	
Order stop, Support system, Spare parts	N/A	A	A	N/A	N/A	A	A	N/A	A	N/A	N/A	
	0	30	0	30	0	0	0	0	0	0	50	
<b>Reliability</b>	Run time		Ope. Times		Repaired times		Fault record		Performance		Retired age	
Past Experience, Repair, Service life, etc.	Less	Over	Less	Over	3 >	> 3	5 >	> 5	Good	Not good	> 3	3 >
	0	50	0	50	0	30	0	30	0	50	0	50
<b>Technical</b>	Not necessary											
Heavy trouble as same type	0											
<b>Functionary</b>	Improved efficiency					Improved function & reliability					Improved work ability	
Efficiency, Function, Easiness	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
	0	20	0	10	0	10	0	10	0	10	0	10
<b>Economics</b>	Ineffectiveness					Effectiveness (small)					Effectiveness (medium)	
Economical effect	0					10					30	
<b>Performance</b>	Ineffectiveness					Effectiveness					Ineffectiveness	
Stoppage, Economically	0					50					0	
<b>Valuable Power Source</b>	Expectation (small)					Expectation (medium)					Expectation (large)	
Expectation Pumping P/S, System share)	0					10					20	
<b>Management System</b>	Unnecessary											
CMMS( Analysis, Evaluation)	0											
<b>System Coordination</b>	Coordination					Kind of relays					Applied equipment	
Protective relays	Unnecessary	Necessary	B & C	A	Tr.	Bus	PSS	Line				
	0	30	10	20	20	30	40	50				
<b>Risk Assessment</b>	Black out					Turbine/generator stoppage					Spilled water	
Evaluation of effectiveness in faults	No	Yes	No	Yes	less 3 days	over 3 days	No	Yes	No	Yes	No	Yes
	0	50	0	30	30	50	0	20	0	20	0	20

Note: N/A: Not applicable A: Applicable

Evaluation 3 to 5

Table-6

**Medium & Long Term Plan**

This is Sample Case : Shall be revised every year

Unit: US\$

Powerhouse Site	Item	Total	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>Civil Structures</b>												
(1) O'Moleng		27,800	2,780	2,780	2,780	2,780	2,780	2,780	2,780	2,780	2,780	2,780
(2) O'Romis		45,400	4,540	4,540	4,540	4,540	4,540	4,540	4,540	4,540	4,540	4,540
(3) Diesel Powerhouse		0	800	800	800	800	800	800	800	800	800	800
(4) Administration		11,900	1,190	1,190	1,190	1,190	1,190	1,190	1,190	1,190	1,190	1,190
Sub-total		85,100	9,310	9,310	9,310	9,310	9,310	9,310	9,310	9,310	9,310	9,310
<b>Electric Facilities</b>												
(1) O'Moleng		153,014	4,586	4,586	4,586	4,586	22,445	4,586	4,586	22,445	4,586	76,021
(2) O'Romis		143,525	4,302	4,302	4,302	21,053	4,302	4,302	4,302	21,053	4,302	71,307
(3) Diesel Powerhouse		193,088	5,699	5,699	5,699	31,217	5,699	5,699	5,699	31,217	90,760	5,699
(4) Administration		0	0	0	0	0	0	0	0	0	0	0
(5) Common		40,468	3,035	3,035	3,035	8,094	3,035	3,035	3,035	8,094	3,035	3,035
Sub-total		530,095	17,622	17,622	17,622	82,809	17,622	17,622	17,622	82,809	102,683	156,062
<b>Transmission and Distribution Line</b>												
		277,780	27,778	27,778	27,778	27,778	27,778	27,778	27,778	27,778	27,778	27,778
<b>Total</b>		<b>892,975</b>	<b>54,710</b>	<b>54,710</b>	<b>54,710</b>	<b>54,710</b>	<b>119,897</b>	<b>54,710</b>	<b>54,710</b>	<b>119,897</b>	<b>139,771</b>	<b>193,150</b>

Table-7

This is Sample Case : Shall be revised every year

Medium & Long Term Plan for Civil Structures

Unit: US\$

Site	Item	Total	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
O'Moleng	Access path	2,000	200	200	200	200	200	200	200	200	200	200
	Rock Fence	1,200	120	120	120	120	120	120	120	120	120	120
	Slope protection	1,300	130	130	130	130	130	130	130	130	130	130
	Intake Weir	1,700	170	170	170	170	170	170	170	170	170	170
	Gate and trash rack	10,800	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080
	Penstock	3,500	350	350	350	350	350	350	350	350	350	350
	Wall at powerhouse	800	80	80	80	80	80	80	80	80	80	80
	Building of powerhouse	2,900	290	290	290	290	290	290	290	290	290	290
	Side ditch	400	40	40	40	40	40	40	40	40	40	40
	River bank protection	1,200	120	120	120	120	120	120	120	120	120	120
	Miscellaneous	2,000	200	200	200	200	200	200	200	200	200	200
		<b>Sub-total</b>	<b>27,000</b>	<b>2,780</b>	<b>2,780</b>	<b>2,780</b>	<b>2,780</b>	<b>2,780</b>	<b>2,780</b>	<b>2,780</b>	<b>2,780</b>	<b>2,780</b>
O'Romis	Access path	7,000	700	700	700	700	700	700	700	700	700	700
	Rock Fence	5,300	530	530	530	530	530	530	530	530	530	530
	Slope protection	3,100	310	310	310	310	310	310	310	310	310	310
	Side ditch	400	40	40	40	40	40	40	40	40	40	40
	Water way	3,500	350	350	350	350	350	350	350	350	350	350
	Penstock	3,900	390	390	390	390	390	390	390	390	390	390
	Gate and trash rack	12,000	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200
	Wall at powerhouse	1,100	110	110	110	110	110	110	110	110	110	110
	Building of powerhouse	3,000	300	300	300	300	300	300	300	300	300	300
	Intake Weir	1,200	120	120	120	120	120	120	120	120	120	120
	River bank protection	900	90	90	90	90	90	90	90	90	90	90
	Miscellaneous	4,000	400	400	400	400	400	400	400	400	400	400
	<b>Sub-total</b>	<b>45,400</b>	<b>4,540</b>	<b>4,540</b>	<b>4,540</b>	<b>4,540</b>	<b>4,540</b>	<b>4,540</b>	<b>4,540</b>	<b>4,540</b>	<b>4,540</b>	
Administration	Building	10,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
	Fence	900	90	90	90	90	90	90	90	90	90	90
	Miscellaneous	1,000	100	100	100	100	100	100	100	100	100	100
	<b>Sub-total</b>	<b>11,900</b>	<b>1,190</b>	<b>1,190</b>	<b>1,190</b>	<b>1,190</b>	<b>1,190</b>	<b>1,190</b>	<b>1,190</b>	<b>1,190</b>	<b>1,190</b>	
Diesel powerhouse Building	Building	800	800	800	800	800	800	800	800	800	800	800
	Fence	800	800	800	800	800	800	800	800	800	800	800
	Miscellaneous	800	800	800	800	800	800	800	800	800	800	800
	<b>Sub-total</b>	<b>2,400</b>	<b>2,400</b>	<b>2,400</b>	<b>2,400</b>	<b>2,400</b>	<b>2,400</b>	<b>2,400</b>	<b>2,400</b>	<b>2,400</b>	<b>2,400</b>	
<b>Total</b>		<b>85,100</b>	<b>8,310</b>	<b>8,310</b>	<b>8,310</b>	<b>8,310</b>	<b>8,310</b>	<b>8,310</b>	<b>8,310</b>	<b>8,310</b>	<b>8,310</b>	<b>8,310</b>

Table-8

This is Sample Case : Shall be revised every year

Medium & Long Term Plan for Electrical Facilities

As of March 2009 Unit : US\$

Power Station	Description	Total	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
			Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly
(1) Moleng												
1. Asset & Repair Cost	1.1Hydropower generating facility(Turbine/generator)	25,359	2,536	2,536	2,536	2,536	2,536	2,536	2,536	2,536	2,536	2,536
	1.2Control equipment(Control, protection relay)	5,143	514	514	514	514	514	514	514	514	514	514
	1.3Others(Aux. spare parts, etc.)	1,072	107	107	107	107	107	107	107	107	107	107
	total	31,574	3,157	3,157	3,157	3,157	3,157	3,157	3,157	3,157	3,157	3,157
2. Consignment Cost	2.1Scheduled ordinary inspection	14,287	1,429	1,429	1,429	1,429	1,429	1,429	1,429	1,429	1,429	1,429
	2.2Scheduled details inspection	35,718	0	0	0	0	0	0	0	0	0	0
	2.3Overhaul Work	71,435	0	0	0	0	0	0	0	0	0	0
	total	121,440	1,429	1,429	1,429	1,429	1,429	1,429	1,429	1,429	1,429	1,429
	Total	306,028	4,586	4,586	4,586	4,586	4,586	4,586	4,586	4,586	4,586	4,586
(2) Romis												
1. Asset & Repair Cost	1.1Hydropower generating facility(Turbine/generator)	23,787	2,379	2,379	2,379	2,379	2,379	2,379	2,379	2,379	2,379	2,379
	1.2Control equipment(Control, protection relay)	4,824	482	482	482	482	482	482	482	482	482	482
	1.3Others(Aux. spare parts, etc.)	1,005	101	101	101	101	101	101	101	101	101	101
	total	29,616	2,962	2,962	2,962	2,962	2,962	2,962	2,962	2,962	2,962	2,962
2. Consignment Cost	2.1Scheduled ordinary inspection	13,401	1,340	1,340	1,340	1,340	1,340	1,340	1,340	1,340	1,340	1,340
	2.2Scheduled details inspection	33,502	0	0	0	0	0	0	0	0	0	0
	2.3Overhaul Work	67,005	0	0	0	0	0	0	0	0	0	0
	total	113,908	1,340	1,340	1,340	1,340	1,340	1,340	1,340	1,340	1,340	1,340
	Total	287,049	4,302	4,302	4,302	4,302	4,302	4,302	4,302	4,302	4,302	4,302
(3) Diesel Plant												
1. Asset & Repair Cost	1.1Dieselpower generating facility(Diesel/generator)	29,771	2,977	2,977	2,977	2,977	2,977	2,977	2,977	2,977	2,977	2,977
	1.2Control equipment(Control, protection relay)	6,465	646	646	646	646	646	646	646	646	646	646
	1.3Others(Aux. spare parts, etc.)	3,743	374	374	374	374	374	374	374	374	374	374
	total	39,979	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000
2. Consignment Cost	2.1Scheduled ordinary inspection	17,012	1,701	1,701	1,701	1,701	1,701	1,701	1,701	1,701	1,701	1,701
	2.2Scheduled details inspection	51,037	0	0	0	0	0	0	0	0	0	0
	2.3Overhaul Work	85,081	0	0	0	0	0	0	0	0	0	0
	total	153,110	1,701	1,701	1,701	1,701	1,701	1,701	1,701	1,701	1,701	1,701
	Total	233,067	5,699	5,699	5,699	5,699	5,699	5,699	5,699	5,699	5,699	5,699
(4) Common Items	Test equipment and Tools, etc.	10,117	0	0	0	0	0	0	0	0	0	0
	Contingency	30,351	3,035	3,035	3,035	3,035	3,035	3,035	3,035	3,035	3,035	3,035
	Total	40,468	3,035	3,035	3,035	3,035	3,035	3,035	3,035	3,035	3,035	3,035
	Total of Asset & Repair Cost	101,189	10,117	10,117	10,117	10,117	10,117	10,117	10,117	10,117	10,117	10,117
	Total of Consignment Cost	380,458	4,470	4,470	4,470	4,470	4,470	4,470	4,470	4,470	4,470	4,470
	Grand total	530,095	17,622	17,622	17,622	17,622	17,622	17,622	17,622	17,622	17,622	17,622

Table-9

### Medium & Long Term Plan for Transmission & Distribution Facilities

This is Sample Case : Shall be revised every year

		As for April 2009 Unit: US\$									
Description	Total	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
		Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly	Yearly
<b>Transmission &amp; Distribution Facilities</b>											
<b>1. Asset &amp; Repair Cost</b>											
1. 22kV Overhead Lines	32,876	3,288	3,288	3,288	3,288	3,288	3,288	3,288	3,288	3,288	3,288
2. 22kV Underground Cable	1,805	181	181	181	181	181	181	181	181	181	181
3. Pole-mounted Transformer	9,746	975	975	975	975	975	975	975	975	975	975
4. Watt-hour Meter & accessory	29,128	2,913	2,913	2,913	2,913	2,913	2,913	2,913	2,913	2,913	2,913
5. VHF FM Radio Set, etc.	31,894	3,189	3,189	3,189	3,189	3,189	3,189	3,189	3,189	3,189	3,189
<b>Subtotal</b>	<b>105,450</b>	<b>10,545</b>	<b>10,545</b>	<b>10,545</b>	<b>10,545</b>	<b>10,545</b>	<b>10,545</b>	<b>10,545</b>	<b>10,545</b>	<b>10,545</b>	<b>10,545</b>
<b>2. Consignment Cost</b>											
1. Bucket Car Inspection	11,600	1,160	1,160	1,160	1,160	1,160	1,160	1,160	1,160	1,160	1,160
2. Switch Station Inspection	5,900	590	590	590	590	590	590	590	590	590	590
3. Insulated Tools Inspection	3,650	365	365	365	365	365	365	365	365	365	365
4. Tree-Cutting & Trimming Work	4,000	400	400	400	400	400	400	400	400	400	400
5. Periodical Training	5,000	500	500	500	500	500	500	500	500	500	500
<b>Subtotal</b>	<b>30,150</b>	<b>3,015</b>	<b>3,015</b>	<b>3,015</b>	<b>3,015</b>	<b>3,015</b>	<b>3,015</b>	<b>3,015</b>	<b>3,015</b>	<b>3,015</b>	<b>3,015</b>
<b>Total</b>	<b>135,600</b>	<b>13,560</b>	<b>13,560</b>	<b>13,560</b>	<b>13,560</b>	<b>13,560</b>	<b>13,560</b>	<b>13,560</b>	<b>13,560</b>	<b>13,560</b>	<b>13,560</b>
<b>3. Common Items</b>											
Test equipment and tools, etc.	10,545	1,054	1,054	1,054	1,054	1,054	1,054	1,054	1,054	1,054	1,054
Spare parts for disaster restoration	100,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Contingency	31,635	3,163	3,163	3,163	3,163	3,163	3,163	3,163	3,163	3,163	3,163
<b>Total</b>	<b>142,180</b>	<b>14,218</b>	<b>14,218</b>	<b>14,218</b>	<b>14,218</b>	<b>14,218</b>	<b>14,218</b>	<b>14,218</b>	<b>14,218</b>	<b>14,218</b>	<b>14,218</b>
<b>Total of Asset &amp; Repair Cost</b>											
<b>Total of Consignment Cost</b>	<b>30,150</b>	<b>3,015</b>	<b>3,015</b>	<b>3,015</b>	<b>3,015</b>	<b>3,015</b>	<b>3,015</b>	<b>3,015</b>	<b>3,015</b>	<b>3,015</b>	<b>3,015</b>
<b>Grand Total</b>	<b>277,760</b>	<b>27,778</b>	<b>27,778</b>	<b>27,778</b>	<b>27,778</b>	<b>27,778</b>	<b>27,778</b>	<b>27,778</b>	<b>27,778</b>	<b>27,778</b>	<b>27,778</b>

## **Appendices:**

AA-1-1. Organization Chart

AA-1-2. Powers and Duties of Division

AA-1-3. Task Assignment of the Personnel

AA-1-4. Line of Command and Control

AA-1-5. Criteria for punishment

AA-1-6. Criteria for punishment due to violation of traffic law

AA-1-7. Attendant sheet of the staffs of EUMP (Sample)

AA-1-8. Receipt of Carry-in Material/Equipment of warehouse

AA-1-9. Register sheet of EUMP's Car (Pickup type)

AA-1-10 Register sheet of EUMP's Car (Work vehicle type)

AA-2-2-1. Annual Operation Plan (Sample case -3000)

AA-2-4-1 Sample of Billing Book

AA-2-4-2 Sample of Invoice

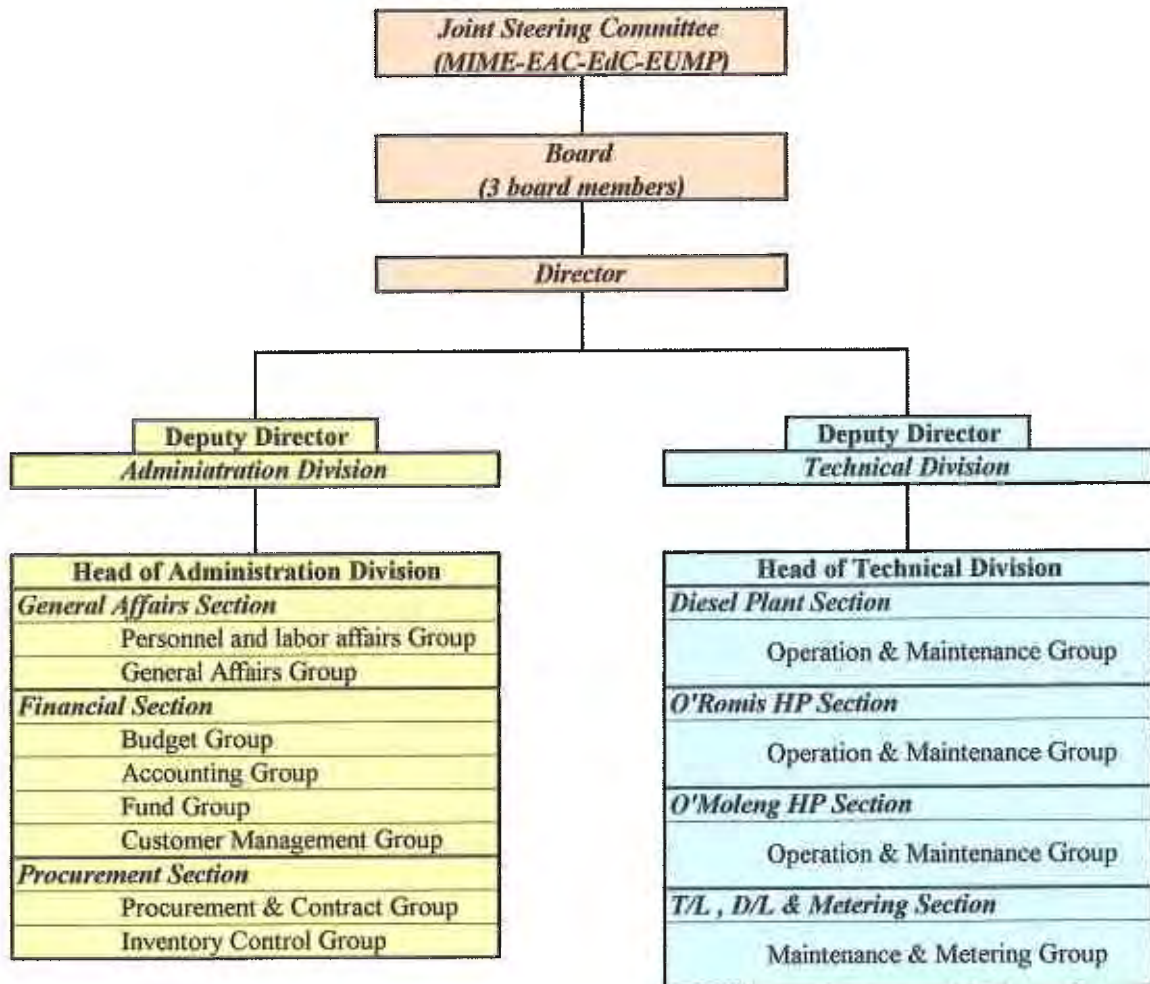
AA-2-5-1 Annual data submissions by smaller licensee

AA-2-5-2 Request for tariff revision by smaller licensee

## AA-1-1.Organization Chart



**Organization Chart of EUMP**



## AA-1-2.Power and Duties of Division

## Appendix AA-1-2-1 Power and Duties for Administration Division

Administration Division				
Section	Group	Task Code	Task Description	
General Affairs Section	Personnel and Labor Affairs Group	AG		
		AGP		
		AGP 1	Employment i) recruit ii) promotion iii) dismissal iv) retirement	
		AGP 2	Pay control i) pay regulation ii) pay raise iii) payroll	
		AGP 3	Working control i) working regulation ii) attendance sheet	
	General Affairs Group	AGA		
		AGA 1	Meeting affairs i) meeting arrangement ii) minutes of meeting	
		AGA 2	Document control i) internal regulations ii) filing & storing	
		AGA 3	Control of office equipment & consumables i) office equipment & furniture ii) consumables iii) car dispatch	
		AGA 4	Safety control i) power plant ii) working safety iii) safety regulation iv) disciplinary code	
		AGA 5	Miscellaneous affairs i) entrusting works ii) mail operations iii) public relations iv) others	
	Financial Section		AF	
		Budget Group	AFB	
AFB 1			Business planning i) Long & mid-term planning policy ii) Long & mid-term planning iii) Report to EAC iv) Power rate change	
AFB 2			Fiscal budget i) budgeting policy ii) budgeting	

## Appendix AA-1-2-1 Power and Duties for Administration Division

Administration Division				
Section	Group	Task Code	Task Description	
	Accounting Group	AFB 3	Control of revenues and expenses i) check of receivables & payables ii) examination of expenses	
		AFA		
		AFA 1	Bookkeeping i) journal ii) ledger	
		AFA 2	Account settlement i) Balance sheet ii) Income statement iii) Financial report to MIME	
	Fund Group	AFA 3	Asset management i) Fixed asset register ii) Inventory book	
		AFF		
		AFF 1	Cashier i) cash receipt ii) cash payment iii) cashbook keeping iv) cash safekeeping & bank deposit	
	Customer Management Group	AFF 2	Fund administration i) cash planning ii) borrowing	
		AFC		
		AFC 1	Customer management i) customer book ii) billing book	
	Procurement Section	Procurement Group	AFC 2	Bill collection i) record of meter measurements ii) issue of electricity bill & receipt
			AP	
			APP	
APP 1			Contracts for construction works	
APP 2		Contracts for maintenance works		
APP 3		Purchases		
Inventory Control Group		API		
	API 1	Warehouse control i) warehouse bookkeeping ii) record of carrying-in and - out		
	API 2	Control of inventory goods and fuel i) periodical inventory check ii) inventory count for account closing		

### Appendix AA-1-2-2 Power and Duties for Technical Division

Technical Division			
Section	Group	Task Code	Task Description
General Technical Section		TG	
		TG	
		TG 1	General matter i) employment ii) evaluation of staff activities iii) working control iv) safety control v) metering
		TG 2	Document control i) operation records ii) maintenance records iii) fault & emergency records iv) daily, monthly and yearly operation plan
		TG 3	Long & Mid-term plan and budget i) maintenance plan ii) scheduled inspection plan iii) tool & spare parts procurement plan
		TG 4	Asset management i) fixed asset register ii) inventory book iii) maintenance of Administration office building
O' Moleng HP Section		TM	
		TM	Safety and quality control of operation and maintenance work at O'Moleng HP
		TM 1	Working control i) working regulation ii) attendance sheet iii) operators shift schedule
		TM 2	Data/records control i) operation records ii) Water level at Intake weir and Sedimentation iii) maintenance records iv) fault & emergency records v) daily, monthly and yearly operation plan vi) Long & Mid-term Plan
		TM 3	Operation and maintenance i) daily operation ii) daily, monthly and yearly maintenance iii) trouble shooting
		TM 4	Operation of civil facilities i) Intake gate ii) Sand flushing gate
		TM 5	Maintenance of civil facilities i) Removing the garbage in front of the screen ii) Small repairment
		TM 6	Daily, weekly, monthly Patrol for the civil structures i) Concrete structure, gate, penstock, access road and slope protection ii) Safety check around the area (Gate lock, keeping off outsiders, etc.)
O' Romis HP Section		TR	
		TR	Safety and quality control of operation and maintenance work at O'Romis HP
		TR 1	Working control i) working regulation ii) attendance sheet iii) operators shift schedule

**Appendix AA-1-2-2 Power and Duties for Technical Division**

Technical Division			
Section	Group	Task Code	Task Description
		TR 2	Data/records control i) operation records ii) Water level at Intake weir and Water way and Head Tank iii) maintenance records iv) fault & emergency records v) daily, monthly and yearly operation plan vi) Long & Mid-term Plan
		TR 3	Operation and maintenance i) daily operation ii) daily, monthly and yearly maintenance iii) trouble shooting
		TR 4	Operation of civil facilities i) Intake gate ii) Sand flushing gate
		TR 5	Maintenance of civil facilities i) Removing the garbage in front of the screen ii) Small repairment
		TR 6	Daily, weekly, monthly Patrol for the civil structures i) Concrete structure, gate, penstock, access road and slope protection ii) Safety check around the area (Gate lock, keeping off outsiders, etc.)
		TR 7	Repairment planning of civil facilities
		Diesel Plant Section	
TD	Safety and quality control of operation and maintenance work at Diesel Plant		
TD 1	Working control i) working regulation ii) attendance sheet iii) operators shift schedule		
TD 2	Data/records control i) operation records ii) maintenance records iii) fault & emergency records iv) daily, monthly and yearly operation plan		
TD 3	Long & Mid-term plan and budget i) maintenance plan ii) scheduled inspection plan iii) tool & spare parts procurement plan		
TD 4	Operation and maintenance i) daily operation ii) daily, monthly and yearly maintenance iii) trouble shooting		
TD 5	Maintenance of civil and building facilities		
T/L, D/L and Metering Section		TT	
		TT	Safety and quality control of operation and maintenance work of T/L and D/L facilities
		TT 1	Working control i) working regulation ii) attendance sheet
		TT 2	Planning of T&D activity i) Long & Mid-term Plan, Budget ii) Daily Activity Plan (Operation, Maintenance and Construction)

**Appendix AA-1-2-2 Power and Duties for Technical Division**

Technical Division			
Section	Group	Task Code	Task Description
		TT 3	<p>Check of T&amp;D operation</p> <ul style="list-style-type: none"> <li>i) Analyzing of operating condition (Load, T&amp;D Loss, Voltage drop)</li> <li>ii) Measuring of Current &amp; Voltage</li> </ul>
		TT 4	<p>Scheduled Outage Operation</p> <ul style="list-style-type: none"> <li>i) Making a switching procedure</li> <li>ii) Notification to customers</li> <li>iii) Ordering switching operations</li> <li>iv) Doing switching operations</li> <li>v) Record of result</li> </ul>
		TT 5	<p>Fault Outage Operation</p> <ul style="list-style-type: none"> <li>i) Decision of the method how to restore</li> <li>ii) Ordering each action to restore</li> <li>iii) Searching and restoration of fault</li> <li>iv) Record of result</li> </ul>
		TT 6	<p>Maintenance of T&amp;D facilities</p> <ul style="list-style-type: none"> <li>i) Patrol &amp; inspection</li> <li>ii) Record of result</li> <li>iii) Negotiation with owner of obstruct close to T&amp;D line</li> <li>iv) Control of spare parts</li> <li>v) Maintaining of working tools</li> </ul>
		TT 7	<p>Customer's request or claim</p> <ul style="list-style-type: none"> <li>i) interruption of power supply</li> <li>ii) abnormal voltage</li> <li>iii) Wh Meter broken</li> <li>iv) Wh Meter checking</li> </ul>
		TT 8	<p>Construction of T&amp;D facilities</p> <ul style="list-style-type: none"> <li>i) Making a specification of constructions</li> <li>ii) Constructing</li> <li>iii) Supervising construction work</li> <li>iv) Inspection of the result</li> <li>v) Revising Facility book</li> </ul>
		TT 9	<p>Customer contract issues</p> <ul style="list-style-type: none"> <li>i) Technical review of supply application</li> <li>ii) Connection work</li> <li>iii) Metering</li> <li>iv) Delivery of invoices</li> <li>v) Temporary disconnection &amp; re-connection</li> <li>vi) Removal of Wh meter from ex-customers</li> </ul>

### AA-1-3.Task Assignment of the Personnel



**Appendix 1-3-1 Duty Position & Task Assignment of the Personnel (Administration Division)**

Administration Division																					
Name	Duty Position	Section/Group	Task Description																		
San Darith	Deputy Director cum Division Manager	Administration Division	<table border="1"> <thead> <tr> <th>Task Code</th> <th>Task Description</th> </tr> </thead> <tbody> <tr> <td>AGP 1</td> <td> <b>Employment</b>                      i) recruit                      ii) promotion                      iii) dismissal                      iv) retirement                 </td> </tr> <tr> <td>AGP 2</td> <td> <b>Pay control</b>                      i) pay regulation                      ii) pay raise                 </td> </tr> <tr> <td>AGP 3</td> <td> <b>Working control</b>                      i) working regulation                 </td> </tr> <tr> <td>AGA 2</td> <td> <b>Document control</b>                      i) internal regulations                 </td> </tr> <tr> <td>AGA 4</td> <td> <b>Safety control</b>                      ii) working safety                      iii) safety regulation                      iv) disciplinary code                 </td> </tr> <tr> <td>AGA 5</td> <td> <b>Miscellaneous affairs</b>                      iii) public relations                 </td> </tr> <tr> <td>AFB 1</td> <td> <b>Business planning</b>                      i) Long &amp; mid-term planning policy                      iii) Report to EAC                      iv) Power rate change                 </td> </tr> <tr> <td>AFB 2</td> <td> <b>Fiscal budget</b>                      i) budgeting policy                 </td> </tr> </tbody> </table>	Task Code	Task Description	AGP 1	<b>Employment</b> i) recruit ii) promotion iii) dismissal iv) retirement	AGP 2	<b>Pay control</b> i) pay regulation ii) pay raise	AGP 3	<b>Working control</b> i) working regulation	AGA 2	<b>Document control</b> i) internal regulations	AGA 4	<b>Safety control</b> ii) working safety iii) safety regulation iv) disciplinary code	AGA 5	<b>Miscellaneous affairs</b> iii) public relations	AFB 1	<b>Business planning</b> i) Long & mid-term planning policy iii) Report to EAC iv) Power rate change	AFB 2	<b>Fiscal budget</b> i) budgeting policy
			Task Code	Task Description																	
			AGP 1	<b>Employment</b> i) recruit ii) promotion iii) dismissal iv) retirement																	
			AGP 2	<b>Pay control</b> i) pay regulation ii) pay raise																	
			AGP 3	<b>Working control</b> i) working regulation																	
			AGA 2	<b>Document control</b> i) internal regulations																	
			AGA 4	<b>Safety control</b> ii) working safety iii) safety regulation iv) disciplinary code																	
			AGA 5	<b>Miscellaneous affairs</b> iii) public relations																	
			AFB 1	<b>Business planning</b> i) Long & mid-term planning policy iii) Report to EAC iv) Power rate change																	
			AFB 2	<b>Fiscal budget</b> i) budgeting policy																	
Pong Samnak	Division Head	Administration Division																			
		Financial Section	<table border="1"> <tbody> <tr> <td>AFB 1</td> <td> <b>Business planning</b>                      ii) Long &amp; mid-term planning                 </td> </tr> <tr> <td>AFB 2</td> <td> <b>Fiscal budget</b>                      ii) budgeting                 </td> </tr> </tbody> </table>	AFB 1	<b>Business planning</b> ii) Long & mid-term planning	AFB 2	<b>Fiscal budget</b> ii) budgeting														
AFB 1	<b>Business planning</b> ii) Long & mid-term planning																				
AFB 2	<b>Fiscal budget</b> ii) budgeting																				

**Appendix 1-3-1 Duty Position & Task Assignment of the Personnel (Administration Division)**

Administration Division			
Name	Duty Position	Section/Group	Task
		Task Code	Description
Pong Samnak			AFB 3 Control of revenues and expenses i) check of receivables & payables ii) examination of expenses
			AFF 1 Cashier iv) cash safekeeping & bank deposit
			AFF 2 Fund administration ii) borrowing
			AFA 2 Account settlement iii) Financial report to MIME
			AGP 2 Pay control iii) payroll
			AGP 3 Working control ii) attendance sheet
			AGA 1 Meeting affairs i) meeting arrangement ii) minutes of meeting
			AGA 2 Document control ii) filing & storing
			AGA 3 Control of office equipment & consumables i) office equipment & furniture ii) consumables iii) car dispatch
			AGA 5 Miscellaneous affairs i) entrusting works ii) mail operations iv) others
Im Vichet	Section Chief	General Affairs Section	APP 1 Contracts for construction works
			APP 2 Contracts for maintenance works
			APP 3 Purchases
Im Vichet	Section Chief	Procurement Section	

**Appendix 1-3-1 Duty Position & Task Assignment of the Personnel (Administration Division)**

Administration Division			
Name	Duty Position	Section/Group	Task
			Task Code      Description
Im Vichet			AP 1      Warehouse control i) warehouse bookkeeping ii) record of carrying-in and -out
			AP 2      Control of inventory goods and fuel i) periodical inventory check ii) inventory count for account closing
Ty Soyatra	Group Member	Accounting Group	AFA 1      Bookkeeping i) journal ii) ledger
			AFA 2      Account settlement i) Balance sheet ii) Income statement
			AFA 3      Asset management i) Fixed asset register ii) Inventory book
Chres Malout	Group Leader	Fund Group	AFF 1      Cashier i) cash receipt ii) cash payment iii) cashbook keeping
			AFF 2      Fund administration i) cash planning
Kong Botrachhany	Group Member	Customer Management Group	AFC 1      Customer management i) customer book ii) billing book
			AFC 2      Bill collection i) record of meter measurements ii) issue of electricity bill & receipt
Hong Leakhena	Group Member	Fund Group	

**Appendix 1-3-1 Duty Position & Task Assignment of the Personnel (Administration Division)**

Administration Division			
Name	Duty Position	Section/Group	Task Description
Hong Leakhena			Task Code: AFF 1 Cashier i) cash receipt ii) cash payment iii) cashbook keeping
Roerum Navy	Group Member	General Affairs Group	Task Code: AGA 3 driving of company car
Ny Sopor	Group Member	General Affairs Group	Task Code: AGA 5 office cleaning

## Appendix AA-1-3-2 Duty Position & Task Assignment of the Personnel

Technical Division			
Name	Duty Position	Task	
		Code	Description
Chin Sokhun	Deputy Director cum Division Manager	TG	
		TG 1	General matter i) employment ii) evaluation of staff activities iii) working control iv) safety control
		TG 2	Document control i) operation records ii) maintenance records iii) fault & emergency records iv) daily, monthly and yearly operation plan
		TG 3	Long & Mid-term plan and budget i) maintenance plan ii) scheduled inspection plan iii) tool & spare parts procurement plan
		TG 4	Asset management i) fixed asset register ii) inventory book iii) maintenance of Administration office building
		TM 3	Operation and maintenance iii) trouble shooting
		TR 3	Operation and maintenance iii) trouble shooting
		TD 4	Operation and maintenance iii) trouble shooting
		TT 4	Scheduled Outage Operation i) Making a switching procedure iii) Ordering switching operations
		TT 5	Fault Outage Operation i) Decision of the method how to restore ii) Ordering each action to restore
		TT 6	Maintenance of T&D facilities iii) Negotiation with owner of obstruct close to T&D line
		Thai Khin	Head of Technical Division
TG 2	Document control i) operation records ii) maintenance records iii) fault & emergency records iv) daily, monthly and yearly operation plan		
TG 3	Long & Mid-term plan and budget i) maintenance plan ii) scheduled inspection plan iii) tool & spare parts procurement plan		
TG 4	Asset management iii) maintenance of Administration office building		
TM 3	Operation and maintenance ii) daily, monthly and yearly maintenance iii) trouble shooting		

## Appendix AA-1-3-2 Duty Position & Task Assignment of the Personnel

Technical Division			
Name	Duty Position	Task	
		Code	Description
Thai Khin	Head of Technical Division	TR 3	Operation and maintenance ii) daily, monthly and yearly maintenance iii) trouble shooting
		TD 4	Operation and maintenance ii) daily, monthly and yearly maintenance iii) trouble shooting
		TT 3	Check of T&D operation i) Analyzing of operating condition (Load, T&D Loss, Voltage drop) ii) Measuring of Current & Voltage
		TT 4	Scheduled Outage Operation i) Making a switching procedure iii) Ordering switching operations
		TT 5	Fault Outage Operation i) Decision of the method how to restore ii) Ordering each action to restore iii) Searching and restoration of fault
		TT 6	Maintenance of T&D facilities iii) Negotiation with owner of obstruct close to T&D line
		TT 7	Customer's request or claim i) interruption of power supply ii) abnormal voltage iii) Wh Meter broken iv) Wh Meter checking
		TT 8	Construction of T&D facilities i) Making a specification of constructions ii) Constructing iii) Supervising construction work iv) Inspection of the result v) Revising facility books
		TT 9	Customer contract issues i) Technical review of supply application
Yeb Thav	Diesel Plant Section Chief Diesel Plant Section Chief Operator	TD 1	Working control i) working regulation ii) attendance sheet iii) operators shift schedule
		TD 2	Document control i) operation records ii) maintenance records iii) fault & emergency records iv) daily, monthly and yearly operation plan
		TD 3	Long & Mid-term plan and budget i) maintenance plan ii) scheduled inspection plan iii) tool & spare parts procurement plan
		TD 4	Operation and maintenance i) daily operation ii) daily, monthly and yearly maintenance iii) trouble shooting
		TD 5	Maintenance of civil and building facilities

## Appendix AA-1-3-2 Duty Position & Task Assignment of the Personnel

Technical Division			
Name	Duty Position	Task	
		Code	Description
Theng Setha	Diesel Plant Section Operator	Assistance for TG 1, 2, 4 & TD 3	
		TG 1	General matter iv) safety control
		TG 2	Document control i) operation records ii) maintenance records iii) fault & emergency records iv) daily, monthly and yearly operation plan
		TG 4	Asset management i) fixed asset register ii) inventory book
		TD 2	Document control i) operation records ii) maintenance records iii) fault & emergency records iv) daily, monthly and yearly operation plan
		TD 3	Long & Mid-term plan and budget i) maintenance plan ii) scheduled inspection plan iii) tool & spare parts procurement plan
		TD 4	Operation and maintenance i) daily operation ii) daily, monthly and yearly maintenance iii) trouble shooting
		TD 5	Maintenance of civil and building facilities
Soth Sarim	Diesel Plant Section Operator	TD 2	Document control i) operation records ii) maintenance records iii) fault & emergency records
		TD 4	Operation and maintenance i) daily operation ii) daily, monthly and yearly maintenance iii) trouble shooting
		TD 5	Maintenance of civil and building facilities
Sam Dara	Diesel Plant Section Operator	TD 2	Document control i) operation records ii) maintenance records iii) fault & emergency records
		TD 4	Operation and maintenance i) daily operation ii) daily, monthly and yearly maintenance iii) trouble shooting
		TD 5	Maintenance of civil and building facilities
Heng Sokhon	O' Moleng HP Section Chief O' Moleng HP Section Chief Operator	TM 1	Working control i) working regulation ii) attendance sheet iii) operators shift schedule
		TM 2	Data/records control i) operation records ii) Water level at Intake weir and Sedimentation iii) maintenance records iv) fault & emergency records v) daily, monthly and yearly operation plan vi) Long & Mid-term Plan

## Appendix AA-1-3-2 Duty Position & Task Assignment of the Personnel

Technical Division			
Name	Duty Position	Task	
		Code	Description
Heng Sokhon	O' Moleng HP Section Chief O' Moleng HP Section Chief Operator	TM 3	Operation and maintenance i) daily operation ii) daily, monthly and yearly maintenance iii) trouble shooting
		TM 4	Operation of civil facilities i) Intake gate ii) Sand flushing gate
		TM 5	Maintenance of civil facilities i) Removing the garbage in front of the screen ii) Small repairment
		TM 6	Daily, weekly, monthly Patrol for the civil structures i) Concrete structure, gate, penstock, access road and slope protection ii) Safety check around the area (Gate lock, keeping off outsiders, etc.)
		TM 7	Repairment planning of civil facilities
Eng Rithy	O' Moleng HP Section Assistant Chief O' Moleng HP Section Operator	TM 1	Working control iii) operators shift schedule
		TM 2	Data/records control i) operation records ii) Water level at Intake weir and Sedimentation iii) maintenance records iv) fault & emergency records
		TM 3	Operation and maintenance i) daily operation ii) daily, monthly and yearly maintenance iii) trouble shooting
		TM 4	Operation of civil facilities i) Intake gate ii) Sand flushing gate
		TM 5	Maintenance of civil facilities i) Removing the garbage in front of the screen ii) Small repairment
		TM 6	Daily, weekly, monthly Patrol for the civil structures i) Concrete structure, gate, penstock, access road and slope protection ii) Safety check around the area (Gate lock, keeping off outsiders, etc.)
		TM 7	Repairment planning of civil facilities
Heang Vandy	O' Moleng HP Section Operator	TM 2	Data/records control i) operation records ii) Water level at Intake weir and Sedimentation iii) maintenance records iv) fault & emergency records
		TM 3	Operation and maintenance i) daily operation ii) daily, monthly and yearly maintenance iii) trouble shooting
		TM 4	Operation of civil facilities i) Intake gate ii) Sand flushing gate
		TM 5	Maintenance of civil facilities i) Removing the garbage in front of the screen ii) Small repairment



## Appendix AA-1-3-2 Duty Position & Task Assignment of the Personnel

Technical Division			
Name	Duty Position	Task	
		Code	Description
Heang Vandy	O' Moleng HP Section Operator	TM 6	Daily, weekly, monthly Patrol for the civil structures i) Concrete structure, gate, penstock, access road and slope protection ii) Safety check around the area (Gate lock, keeping off outsiders, etc.)
		TM 7	Repairment planning of civil facilities
Chheoum Kosal	O' Moleng HP Section Operator	TM 2	Data/records control i) operation records ii) Water level at Intake weir and Sedimentation iii) maintenance records iv) fault & emergency records
		TM 3	Operation and maintenance i) daily operation ii) daily, monthly and yearly maintenance iii) trouble shooting
		TM 4	Operation of civil facilities i) Intake gate ii) Sand flushing gate
		TM 5	Maintenance of civil facilities i) Removing the garbage in front of the screen ii) Small repairment
		TM 6	Daily, weekly, monthly Patrol for the civil structures i) Concrete structure, gate, penstock, access road and slope protection ii) Safety check around the area (Gate lock, keeping off outsiders, etc.)
		TM 7	Repairment planning of civil facilities
Um Munichetra	O' Moleng HP Section Operator	TM 2	Data/records control i) operation records ii) Water level at Intake weir and Sedimentation iii) maintenance records iv) fault & emergency records
		TM 3	Operation and maintenance i) daily operation ii) daily, monthly and yearly maintenance iii) trouble shooting
		TM 4	Operation of civil facilities i) Intake gate ii) Sand flushing gate
		TM 5	Maintenance of civil facilities i) Removing the garbage in front of the screen ii) Small repairment
		TM 6	Daily, weekly, monthly Patrol for the civil structures i) Concrete structure, gate, penstock, access road and slope protection ii) Safety check around the area (Gate lock, keeping off outsiders, etc.)
		TM 7	Repairment planning of civil facilities
Pen Pidu	O' Romis HP Section Chief	TR 1	Working control i) working regulation ii) attendance sheet iii) operators shift schedule

### Appendix AA-1-3-2 Duty Position & Task Assignment of the Personnel

Technical Division					
Name	Duty Position	Task			
		Code	Description		
Pen Pidu	O' Romis HP Section Chief Operator	TR 2	Data/records control i) operation records ii) Water level at Intake weir and Water way and Head Tank iii) maintenance records iv) fault & emergency records v) daily, monthly and yearly operation plan vi) Long & Mid-term Plan		
		TR 3	Operation and maintenance i) daily operation ii) daily, monthly and yearly maintenance iii) trouble shooting		
		TR 4	Operation of civil facilities i) Intake gate ii) Sand flushing gate		
		TR 5	Maintenance of civil facilities i) Removing the garbage in front of the screen ii) Small repairment		
		TR 6	Daily, weekly, monthly Patrol for the civil structures i) Concrete structure, gate, penstock, access road and slope protection ii) Safety check around the area (Gate lock, keeping off outsiders, etc.)		
		TR 7	Repairment planning of civil facilities		
		TR 6	Daily, weekly, monthly Patrol for the civil structures i) Concrete structure, gate, penstock, access road and slope protection ii) Safety check around the area (Gate lock, keeping off outsiders, etc.)		
		TR 7	Repairment planning of civil facilities		
		Yang Soyen	O' Romis HP Section Assistance Chief O' Romis HP Section Operator	TR 1	Working control iii) operators shift schedule
				TR 2	Data/records control i) operation records ii) Water level at Intake weir and Water way and Head Tank iii) maintenance records iv) fault & emergency records
TR 3	Operation and maintenance i) daily operation ii) daily, monthly and yearly maintenance iii) trouble shooting				
TR 4	Operation of civil facilities i) Intake gate ii) Sand flushing gate				
TR 5	Maintenance of civil facilities i) Removing the garbage in front of the screen ii) Small repairment				
TR 6	Daily, weekly, monthly Patrol for the civil structures i) Concrete structure, gate, penstock, access road and slope protection ii) Safety check around the area (Gate lock, keeping off outsiders, etc.)				

## Appendix AA-1-3-2 Duty Position & Task Assignment of the Personnel

Technical Division			
Name	Duty Position	Task	
		Code	Description
Yang Soyen		TR 7	Repair planning of civil facilities
Thim Seanghi	O' Romis HP Section Operator	TR 2	Data/records control i) operation records ii) Water level at Intake weir and Water way and Head Tank iii) maintenance records iv) fault & emergency records
		TR 3	Operation and maintenance i) daily operation ii) daily, monthly and yearly maintenance iii) trouble shooting
		TR 4	Operation of civil facilities i) Intake gate ii) Sand flushing gate
		TR 5	Maintenance of civil facilities i) Removing the garbage in front of the screen ii) Small repairment
		TR 6	Daily, weekly, monthly Patrol for the civil structures i) Concrete structure, gate, penstock, access road and slope protection ii) Safety check around the area (Gate lock, keeping off outsiders, etc.)
		TR 7	Repair planning of civil facilities
		Sin Simeng	O' Romis HP Section Operator
TR 3	Operation and maintenance i) daily operation ii) daily, monthly and yearly maintenance iii) trouble shooting		
TR 4	Operation of civil facilities i) Intake gate ii) Sand flushing gate		
TR 5	Maintenance of civil facilities i) Removing the garbage in front of the screen ii) Small repairment		
TR 6	Daily, weekly, monthly Patrol for the civil structures i) Concrete structure, gate, penstock, access road and slope protection ii) Safety check around the area (Gate lock, keeping off outsiders, etc.)		
TR 7	Repair planning of civil facilities		
Toch Phally	O' Romis HP Section Operator		

## Appendix AA-1-3-2 Duty Position & Task Assignment of the Personnel

Technical Division			
Name	Duty Position	Task	
		Code	Description
Toch Phally		TR 3	Operation and maintenance i) daily operation ii) daily, monthly and yearly maintenance iii) trouble shooting
		TR 4	Operation of civil facilities i) Intake gate ii) Sand flushing gate
		TR 5	Maintenance of civil facilities i) Removing the garbage in front of the screen ii) Small repairment
		TR 6	Daily, weekly, monthly Patrol for the civil structures i) Concrete structure, gate, penstock, access road and slope protection ii) Safety check around the area (Gate lock, keeping off outsiders, etc.)
		TR 7	Repair planning of civil facilities
Savuth Sothea	Section Chief Group Leader	TT 1	Working control i) working regulation ii) attendance sheet
		TT 2	Planning of T&D activity i) Long & Mid-term Plan, Budget ii) Daily Activity Plan (Operation, Maintenance and Construction)
		TT 3	Check of T&D operation i) Analyzing of operating condition (Load, T&D Loss, Voltage drop) ii) Measuring of Current & Voltage
		TT 4	Scheduled Outage Operation i) Making a switching procedure ii) Notification to customers iii) Ordering switching operations iv) Doing switching operations v) Record of result
		TT 5	Fault Outage Operation i) Decision of the method how to restore ii) Ordering each action to restore iii) Searching and restoration of fault iv) Record of result
		TT 6	Maintenance of T&D facilities i) Patrol & inspection ii) Record of result iii) Negotiation with owner of obstruct close to T&D line iv) Control of spare parts v) Maintaining of working tools
		TT 7	Customer's request or claim i) interruption of power supply ii) abnormal voltage iii) Wh Meter broken iv) Wh Meter checking

**Appendix AA-1-3-2 Duty Position & Task Assignment of the Personnel**

Technical Division			
Name	Duty Position	Task	
		Code	Description
Savuth Sothea		TT 8	Construction of T&D facilities i) Making a specification of constructions ii) Constructing iii) Supervising construction work iv) Inspection of the result v) Revising fixed asset register
		TT 9	Customer contract issues i) Technical review of supply application ii) Connection work iii) Metering iv) Delivery of invoices v) Temporary disconnection & re-connection vi) Removal of Wh meter from ex-customers
Raur Samnang	Group Member	TT 3	Check of T&D operation i) Analyzing of operating condition (Load, T&D Loss, Voltage drop) ii) Measuring of Current & Voltage
		TT 4	Scheduled Outage Operation ii) Notification to customers iv) Doing switching operations v) Record of result
		TT 5	Fault Outage Operation iii) Searching and restoration of fault iv) Record of result
		TT 6	Maintenance of T&D facilities i) Patrol & inspection ii) Record of result iii) Negotiation with owner of obstruct close to T&D line iv) Control of spare parts v) Maintaining of working tools
		TT 7	Customer's request or claim i) interruption of power supply ii) abnormal voltage iii) Wh Meter broken iv) Wh Meter checking
		TT 8	Construction of T&D facilities i) Making a specification of constructions ii) Constructing iii) Supervising construction work iv) Inspection of the result v) Revising Facility book
		TT 9	Customer contract issues i) Technical review of supply application ii) Connection work iii) Metering iv) Delivery of invoices v) Temporary disconnection & re-connection vi) Removal of Wh meter from ex-customers
So Sovannarith	Group Member	TT 3	Check of T&D operation i) Analyzing of operating condition (Load, T&D Loss, Voltage drop) ii) Measuring of Current & Voltage
		TT 4	Scheduled Outage Operation ii) Notification to customers iv) Doing switching operations v) Record of result

## Appendix AA-1-3-2 Duty Position & Task Assignment of the Personnel

Technical Division			
Name	Duty Position	Task	
		Code	Description
So Sovannarith		TT 5	Fault Outage Operation iii) Searching and restoration of fault iv) Record of result
		TT 6	Maintenance of T&D facilities i) Patrol & inspection ii) Record of result iii) Negotiation with owner of obstruct close to T&D line iv) Control of spare parts v) Maintaining of working tools
		TT 7	Customer's request or claim i) interruption of power supply ii) abnormal voltage iii) Wh Meter broken iv) Wh Meter checking
		TT 8	Construction of T&D facilities i) Making a specification of constructions ii) Constructing iii) Supervising construction work iv) Inspection of the result v) Revising Facility book
		TT 9	Customer contract issues i) Technical review of supply application ii) Connection work iii) Metering iv) Delivery of invoices v) Temporary disconnection & re-connection vi) Removal of Wh meter from ex-customers
Ret Soksamdy	Group Member	TT 3	Check of T&D operation i) Analyzing of operating condition (Load, T&D Loss, Voltage drop) ii) Measuring of Current & Voltage
		TT 4	Scheduled Outage Operation ii) Notification to customers iv) Doing switching operations v) Record of result
		TT 5	Fault Outage Operation iii) Searching and restoration of fault iv) Record of result
		TT 6	Maintenance of T&D facilities i) Patrol & inspection ii) Record of result iii) Negotiation with owner of obstruct close to T&D line iv) Control of spare parts v) Maintaining of working tools
		TT 7	Customer's request or claim i) interruption of power supply ii) abnormal voltage iii) Wh Meter broken iv) Wh Meter checking
		TT 8	Construction of T&D facilities i) Making a specification of constructions ii) Constructing iii) Supervising construction work iv) Inspection of the result v) Revising Facility book

### Appendix AA-1-3-2 Duty Position & Task Assignment of the Personnel

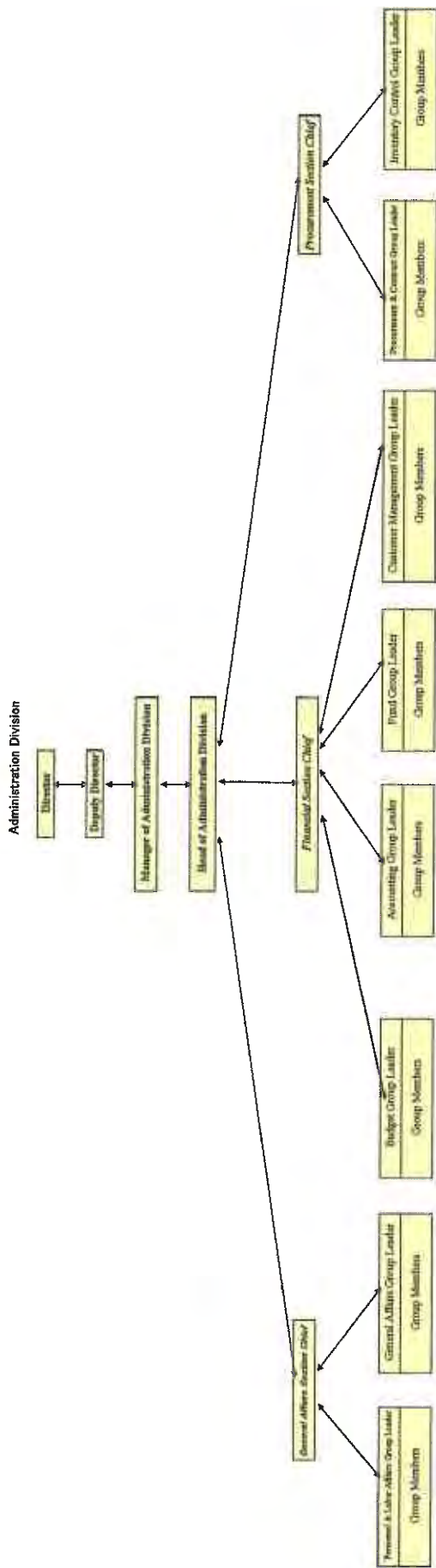
Technical Division			
Name	Duty Position	Task	
		Code	Description
Ret Soksandy		TT 9	Customer contract issues i) Technical review of supply application ii) Connection work iii) Metering iv) Delivery of invoices v) Temporary disconnection & re-connection vi) Removal of Wh meter from ex-customers

## AA-1-4.Line of Command and Control

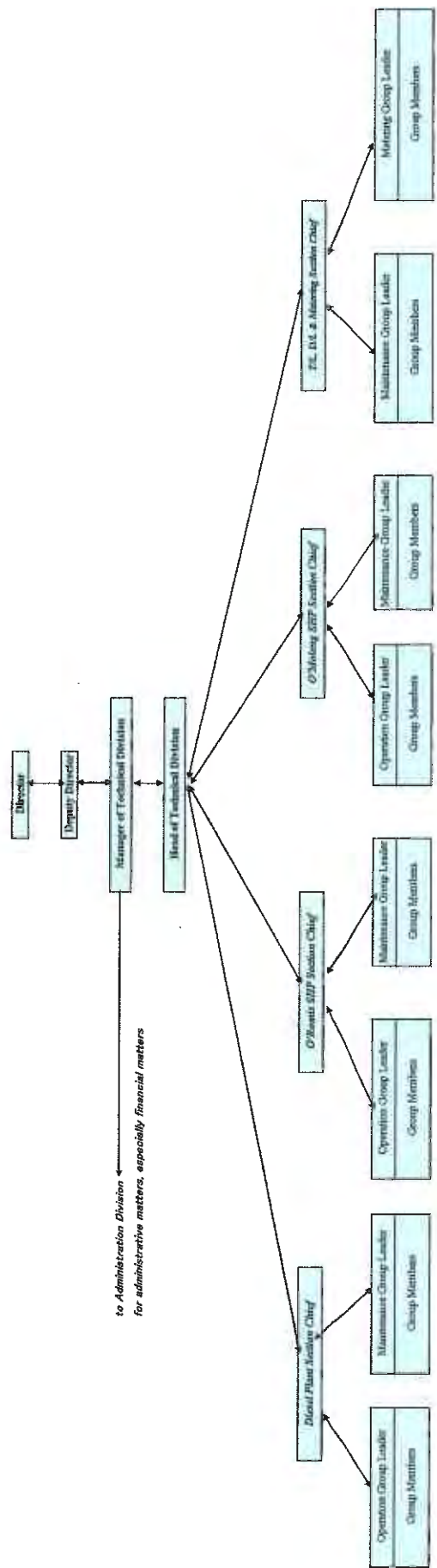


Line of Command and Control

Commands, directions and approval requests/reporting must follow this line of command and control



Technical Division



to Administration Division for administrative matters, especially financial matters

AA-1-5. Criteria for puniton

**AA-1-5 : Criteria for punishment**

Cause for Punition		Punition
1. Violation of regulations, poor work performance		Reprimand or pay cut according to the degree of breach of discipline Suspension of attendance in the case of important breach
2. Fraudulent handling of money or property of the Corporation	by accident or negligence	Reprimand
	by negligent conduct of work	Reprimand or pay cut
	by fraudulent handling	
3. Fraudulent procurement of money or property of the Corporation	by fraud	Dismissal
	by abstraction	Dismissal or suspension of attendance
	by common bribery	Suspension of attendance, pay cut or reprimand
4. Bribery	in the case of small sum or other relievable considerations	Dismissal, suspension of attendance or pay cut
	by common act to lose credibility of the Corporation	Suspension of attendance, pay cut or reprimand
5. Credibility	by act leading to the considerable loss of credibility of the Corporation	Reprimand
6. Poor supervision	by common poor supervision	Suspension of attendance or dismissal
	by considerably poor supervision	Reprimand
7. Violation of traffic law	See the Annex 2 for detail	Pay cut
		Reprimand, pay cut, suspension of attendance or dismissal

AA-1-6.Criteria for punishment due to violation of traffic law

**AA-1-6 : Criteria for punishment due to violation of traffic law**

Cause for punishment	Punition
1. Accident causing bodily injury or death by unlicensed or drinking driving	Dismissal or suspension of attendance for 6 months or less
2. Accident causing property damage by unlicensed or drinking driving	Suspension of attendance for 6 months or less
3. Unlicensed and drinking driving	Suspension of attendance for 4 months or less
4. Unlicensed driving exceeding the legal maximum speed	Suspension of attendance for 3 months or less
5. Unlicensed driving	Pay cut for 3 months or less, 1-month suspension of attendance or reprimand
6. Drinking driving exceeding the legal maximum speed	Suspension of attendance for 6 months or less
7. Drinking driving	1-month suspension of attendance or pay cut for 3 months or less
8. Driving exceeding the legal maximum speed	50km/hr or more
	30km/hr to 50km/hr
	less than 30km/hr
9. Violation of either of the above causing malicious accident	Reprimand or light reprimand
10. Willful failure to report of the above violations or accidents	Light reprimand or warning
11. Violation of either of the above causing malicious accident	Dismissal
12. Willful failure to report of the above violations or accidents	Dismissal or suspension of attendance for 3 months or less
13. Other malicious violation and accident than the above	1-month suspension of attendance or pay cut for 3 months or less
14. Accident by gross negligence due to other cause than the above	Dismissal or suspension of attendance for 2 months or less
15. Accident by carelessness due to other cause than the above	Pay cut for 1 month or reprimand
16. Willful failure to report of other violations or accidents than the above	Light reprimand or warning
17. Ride together knowing the drinking driving of the driver	Light reprimand or warning
18. Drinking driving causing death or serious injury, failing to aid victims	1-month suspension of attendance or pay cut for 3 months or less
19. Drinking driving causing death or serious injury, failing to aid victims	Dismissal or suspension of attendance for 6 months or less

AA-1-7. Attendant sheet of the staffs of EUMP (Sample)



Ministry of Industry, Mine and Energy  
Electric Unit of Monduliri Province, EUMP

Kingdom of Cambodia  
Nation Religion King



Attendant sheet of the staffs of EUMP  
Administration Division

Date: .....July, 2009

No.	Name	Sex	Position	start time	Sign	End time	Sign	Over time	Sign	Remark
AM										
01	Kong Plaiith	M	Director							
02	San Darth	M	Deputy Director ( Administration and Accounting Section)							
03	Chin Sokhun	M	Deputy Director ( Technical Section)							
04	Pong Sarnnak	M	Accounting Chief							
05	Im Vichet	M	Administration and Procurement							
06	Kong Eutrachany	M	Billing and Costumer Management							
07	Chres Malbut	F	Cashier							
08	Ty Suyatra	F	Accounting Assistant							
09	Hong Leakena	F	Cashier Assistant							
10	Fouern Navy	M	Driver							
11	Ny Sopor	F	Cleaner							

No.	Name	Sex	Position	start time	Sign	End time	Sign	Over time	Sign	Remark	
				PM							
01	Kong Pisith	U	Director								
02	San Darith	U	Deputy Director ( Administration and Accounting Section)								
03	Chin Sokhun	U	Deputy Director ( Technical Section)								
04	Pong Samnack	U	Accounting Chief								
05	In Vichet	U	Administration and Procurement								
06	Kong Eutrachany	U	Billing and Costumer Management								
07	Chres Malout	M	Cashier								
08	Ty Suyatra	M	Accounting Assistant								
09	Hong Leakena	M	Cashier Assistant								
10	Rouem Navy	U	Driver								
11	Ny Sopor	M	Cleaner								

Inspection and Approval

Date: .....July, 2009

Deputy Director of Administration and Accounting section

Semmonom town, Date: .....July, 2009  
Administration and Procurement



AA-1-8. Receipt of Carry-in Material/Equipment of warehouse



**Electric Unit of Mondulkiri Province**  
**Administration and Procurement**  
**Receipt of Carry-in Material/Equipment of warehouse**

No: .....

Date: .....Month: .....Year: .....

Transmit from: .....

No.	Goods Equipment	Unit	Amount		Unit Price	Cash
				Actual carry-in		
01						
02						
03						
04						
05						
06						
07						
08						
09						
10						
11						
<b>Total</b>						

Latir: (.....)

Date: .....Month: .....Year: .....

Person in charge

Acceptor

Warehouse Keeper



**Electric Unit of Mondulkiri Province**  
**Administration and Procurement**  
**Receipt of Carry-in Material/Equipment of warehouse**

No: .....

Date: .....Month: .....Year: .....

Transmit from: .....

No.	Goods Equipment	Unit	Amount		Unit Price	Cash
			In Bill	Actual carry-in		
01						
02						
03						
04						
05						
06						
07						
08						
09						
10						
11						
<b>Total</b>						

Latir: (.....)

Date: .....Month: .....Year: .....

Person in charge

Acceptor

Warehouse Keeper



**Electric Unit of Mondulakiri Province  
Administration and Procurement**

No: .....  
Date: .....Month: .....Year: .....

**Receipt of Carry-out Material/Equipment of warehouse**

No.	Goods Equipment	Unit	Amount		Unit Price	Cash
			In Bill	Actual carry-out		
01						
02						
03						
04						
05						
06						
07						
08						
09						
10						
<b>Total</b>						

Latin: (.....)  
Date: .....Month: .....Year: .....  
Person in charge: .....  
Warehouse Keeper: .....



**Electric Unit of Mondulakiri Province  
Administration and Procurement**

No: .....  
Date: .....Month: .....Year: .....

**Receipt of Carry-out Material/Equipment of warehouse**

No.	Goods Equipment	Unit	Amount		Unit Price	Cash
			In Bill	Actual carry-out		
01						
02						
03						
04						
05						
06						
07						
08						
09						
10						
<b>Total</b>						

Latin: (.....)  
Date: .....Month: .....Year: .....  
Person in charge: .....  
Warehouse Keeper: .....

AA-1-9. Register sheet of EUMP's Car (Pickup type)



Kingdom of Cambodia  
 Nation Religion King  
 <<<<<<<<<<<<<<<<<<<<<<<<<<<>>>>>>>>>>>>>>>

Ministry of Industry, Mine and Energy  
 Electric Unit of Mondulakiri Province

The sheet name of the person who use the car model (Triton)  
 In July 2009

No.	Date	description	Local	Out Time	Long (Km)	Signature of Asker	Signature of Approval	End Time	Long (Km)	Signature of Provider	Signature of Inspector	Total Km
01												
02												
03												
04												
05												
06												
07												
08												
09												
10												
11												
12												
13												
14												

AA-1-10. Register sheet of EUMP's Car (Work vehicle type)

