E4780 V2

POWER GRID IMPROVEMENT PROJECT

(Project ID: P149599)

Draft

Environmental Code of Practices (ECoP)

Electricité du Laos

The World Bank

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Project's Environmental Code of Practices (ECoP)

Power Grid Improvement Project

1. Intend of the ECoP

This Environmental Code of Practice (ECOP) has been prepared to define methods and/or procedures to be followed by consultants, designers and contractors for the avoidance or mitigation of adverse environmental effects that may arise out of the Power Grid Improvement Project. This ECOP recognizes the need to additionally comply with the provisions of the Policy Framework for Compensation, Resettlement and Rehabilitation of Displaced Persons (RPF) for **Power Grid Improvement Project** of which implementation will start in the second half of 2015 in the Lao People's Democratic Republic. EDL has agreed to apply World Bank environmental and social safeguard policies in the design and implementation of this project, including OP 4.12, "Involuntary Resettlement". For this project, design and scheduling considerations make it impossible to determine the extent of resettlement planning requirements at appraisal.

2. Project Description

The geographical scope of the project is limited to the urban and suburban area of Vientiane. Specifically, the intended project area is located in Xaythany district of Vientiane capital, about 10 kilometers north of Vientiane city center, with a distribution loss of almost 25 percent at present.

The Vientiane capital area accounts for about 40 percent of the country's demand for electricity. The Xaythany district comprises low-and high-income residential customers, commercial, and industrial customers. There are currently about 46,000 residential and 1,100 non-residential customers in Xaythany.

No land acquisition or physical relocation of existing residences is expected as construction work will be done on the existing power distribution infrastructure. However, a due diligence work is required to review in situ the power lines identified for rehabilitation, including access routes to associated facilities such as sub-stations, as relevant, for encroachments or other types of land use or informal land occupation which may hinder access to a safe working space or pose a safety risk to people living or working in the right-of-way. EDL will notify affected customers for any power cut requirements during project implementation in accordance with its established procedure.

3. Code Format

This code sets out its objective and contains a description of minimum practices that are to be applied to the planning, design, construction and operation and maintenance phases of the Power Grid Improvement Project. The ECoP also presents sample design directives for inclusion in terms of reference for planning and design and suggested specification clauses for insertion in project construction and specifications.

4. Impact Matrix

The following table will generally introduced the Potential impacts on environment and social that may result from the construction or operation of the proposed PGI project.

Table 1: Environmental and Social Impacts Matrix

Issue Concerned	Potential Impacts	Initiating Project Action	Impact Duration
Environmental Issues			
1.) Clearing of trees and bushes under 22kV distribution line/ROW	Resulting in loss of local resources and vegetation debris from clearance work	Cutting of trees and bushes under distribution line/ROW. Burning of vegetation waste will not be permitted.	Permanent
2.) Disposal of packaging wastes from electrical equipment and replaced electrical equipment (conductors, meters, capacitors, etc.) during construction phase and disposal of waste materials generated from maintenance activities during project operation phase	Resulting impacts on the surrounding villages from packaging wastes from electrical equipment.	Replaced electrical equipment (conductors, meters, capacitors, etc. will be taken to EDL Warehouse and Storage or substations or branch offices and sort for reuse/recycling or discard.	Temporary
3.) Disposal of fuel oil and other chemical wastes (including PCBs based transformer) and hazardous materials	Resulting impacts on human and animal health	The project will identify disposal sites for fuel oil and other chemical wastes (including hazardous material such as PCBs).	Temporary
4.) Health, safety and security	Injury and sickness of workers	Construction, electrical equipment installation and maintenance activities follow EDL-ECoP. Provide safe working space for workers.	Temporary
	Construction hazard	Construction, installation and maintenance activities and transportation of material and equipment should be conducted by well trained workers, officers and drivers	Temporary
	Road accident	Road accident caused by traffic congestion and divert of traffic flow out of the working space of the workers, officers and drivers. Proper traffic management and warning sign will be provided.	Temporary

	Electrocution	Installation of electrical equipment activities	Temporary
	Fire Hazard and safety of household under transmission line	Construction, electrical equipment installation and maintenance activities will follow EDL-ECoP and emergency response in case of fire hazard. EDL will consult with concerned agencies to avoid construction of infrastructure in the transmission line right of way in the future.	
Social Issues			
5.) Land donation for additional poles (no involuntary land acquisition/ resettlement)	Permanent land use change for new or upgraded power poles	Installation of new or upgraded power poles	Permanent
6.) Interference on local villagers activities, including temporary economic displacement	Disconnection of power lines, interruption of service, temporary economic displacement to beneficiaries during installation works	Construction, installation activities of material and equipment	Temporary
7.) Gender impacts, increased role of women in decision making, empowerment of women	For women headed households, interruption of service, temporary economic displacement to this group of people. Possible temporary disruption on daily income (days of installations) for both male and female-owned businesses along the road that are affected by the installation activities.	Distribution line structures	Temporary

5. Mitigation Measures

As impacts from project development are unavoidable, all approaches of mitigation measures are essential and needed in order to protect the affected environmental quality. Thus, this part's structure aiming to specified necessary mitigation measures that impacts are potentially contributed from project implementation during design, planning,

construction and operation periods. The specific measures have been proposed according to each project component of PGI project.

Environmental protection measures are designed to:

- Mitigate environmental impacts,
- Achieve compliance with national environmental regulations, and World Bank operational policies,
- Provide compensation for lost environmental resources (if any), and
- Enhance environmental resources.

The matrix of impacts supplemented with management and monitoring activities and assigned responsibilities for implementing those activities, forms the core of the ECoP.

6. Biological-Agriculture Resources in the Project Area

The activities involved in PGI project would include small scale installation works pertain to the rehabilitation of distribution of medium voltage (127 km of 22kV MV system) and low-voltage (239 km of 0.4 kV LV system) lines and the installation of electronic meters, replacement of capacitors (LV line), upgrading of conductors (on LV and MV lines) and replacement and upgrading of transformers (for MV). Given the nature of the rehabilitation works the project is proposed as category B as certain mitigation measures and monitoring actions will have to be implemented during the civil works in order to minimize, prevent and reduce possible temporary impacts on the environment.

Maximum requirement for the right-of-way (ROW) of 22 kV distribution lines is 8 meters, where most of the distribution lines is the existing distribution ROW and located along or within the existing road ROW. Regular maintenance of vegetation within the 22kV distribution ROW is necessary to avoid disruption to overhead power lines and poles.

The planned activities within the project do not include construction of new transmission or distribution electrical lines. The physical installations of meters, power distribution equipment, communication links, computing hardware, testing equipment are expected to be done on existing power poles, power lines, and buildings owned by EDL or by electricity customers.

Figure 1: Existing 22 kV Distribution ROW

The additional impact of the clearance of a 22 kV transmission line ROW and additional poles will likely to only have a minor impact. The potential impact on biological-agriculture resources are likely related to clearing of trees and bushes under 22 kV distribution ROW while almost is the existing distribution ROW along the existing roads (e.g. National Road 13South).

7. Disposal of Construction Debris and Wastes

The generation of waste materials by the project result from replacement activities and maintenance during project operation.

The primary waste generated by the vegetation waste created by clearing of trees and bushes of the ROW. Burning of vegetation waste will not be permitted. Waste will be piled and provided opportunity to use the vegetation waste for firewood or other use (e.g. making fences). Secondary, the presence of the project employees and constructors will increase in the generation of litter and waste from construction camps.

In addition to above wastes, there could be an increase in the generation of packaging wastes from electrical equipment.

All the wastes are likely to include:

- Electrical equipment replacement;
- Vegetation waste;
- Food waste;
- Packaging materials.

Solid waste remaining from construction activities will be collected on site and transported off-site for disposal and/or reuse/recycling. Recycling and reuse of waste material will be maximized where possible. While the potential for litter will be minimized by the presence of waste bins at the site, as well as the regular clean up of the terminal by maintenance staff.

Wastes that are uncontrolled or improperly disposed of could have adverse effects on human and environmental health. The project will identify spoil disposal sites in construction with District Authority and/or EDL-Vientiane Branch Office. Spoil disposal area will be located at least 100m from surface water resources (streams, rivers, ponds).

8. Disposal of Replaced Electrical Equipment, Fuel Oil and Other Chemical Wastes (including PCBs) and Hazardous Materials

Pollution due to disposal of replaced electrical equipment, fuel oils and other chemicals related to works and disposal of waste materials from installations to be replaced, and physical hazards to workers. Special attention will be given to management of hazardous electrical waste (old transformers) including handling, transportation and final disposal of materials contaminated by Polychlorinated Biphenyls (PCBs), as well as to impacts from disconnection of power lines and interruption of service to beneficiaries during works. These potential impacts could be managed through clear environmental due diligence obligations of contractors (which will be stipulated in this ECoP) and use of adequate technical construction standards.

Polychlorinated Biphenyls (PCB) were widely used as a dielectric fluid to provide electrical insulation, although their use has been largely discontinued due to potential harmful effects on human health and the environment. Recommendations for the management of PCB include:

- Replacing existing transformers and other electrical equipment containing PCB, and ensuring appropriate storage, decontamination, and disposal of contaminated units;
- Prior to final disposal, retired transformers and equipment containing PCB should

be stored on a concrete pad with curbs sufficient to contain the liquid contents of these containers should they be spilled or leaked. The storage area should also have a roof to prevent precipitation from collecting in the storage area. Disposal should involve facilities capable of safely transporting and disposing of hazardous waste containing PCB;

- Surrounding soil exposed to PCB leakage from equipment should be assessed, and appropriate removal and/or remediation measures should be implemented.

Figure 2: EDL Warehouse for Replaced Electrical Equipment

The project will identify spoil disposal sites of fuel oil and other chemical wastes (including PCBs) and hazardous materials. The existing warehouse and storage located within Phonetong Substation are proposed as disposal of these hazardous wastes which include hazardous electrical equipment, 150 units of possible PCBs Based Old Transformers and other chemical wastes.

Figure 3: Proposed EDL Storage for PCBs Based Old Transformers

9. Health, Safety and Security

The objective of Health, Safety and Security management is to prevent nuisance, health and safety effects on the community and impacts on the natural environment, particularly during project construction.

Most occupational health and safety issues during the construction, operation, maintenance,

and decommissioning of electric power distribution projects are common to those of large industrial facilities. These impacts include, among others, exposure to physical hazards from use of heavy equipment and cranes; trip and fall hazards; exposure to dust and noise; falling objects; work in confined spaces; exposure to hazardous materials; and exposure to electrical hazards from the use of tools and machinery.

Occupational health and safety hazards specific to electric power transmission and distribution projects primarily include:

- Live power lines;
- Working at height;
- Electric and magnetic fields;
- Exposure to chemicals (including PCBs) and hazardous materials.

Additional, Community health and safety impacts during the construction and decommissioning of distribution power lines are common to those of industrial facilities, these impacts include, among others, dust, noise, and vibration from construction vehicle transit, and communicable diseases associated with the influx of temporary construction labors. The operation of live power distribution lines may generate the following industry-specific impacts:

- Electrocution;
- Electromagnetic interference.

Provide appropriate driver training and careful planning of haulage routes and times to minimize risks to the local community.

The WBG Environmental, Health and Safety (EHS) Guidelines for Power Transmission and Distribution will be followed during project implementation, including provisions for beneficiaries and worker health and safety. The ECoP should include specifications for the proper disposal of excess/discarded electric materials, lubricants, etc. In addition, proper dissemination of service disruption, traffic management, etc. should be required of all contractors.

10. Land Donation for Additional Poles

The additional of 12-14 m concrete poles for the low-medium voltage line (0.4-22 kV) under 22 kV distribution ROW while almost is the existing distribution ROW along the existing roads. About 50 poles along the 9 km section are expected to be replaced/added or replaced along the provincial public road and located in the field paddy where belong to sub-urban and rural area with low density population or in less populated areas.

The project will not require to finance the physical installations of additional poles which are expected to be done on existing power poles, power lines ROW, and buildings owned by EDL or by electricity customers.

Initial surveying indicated that construction, installation activities where almost are under the existing 22 kV distribution ROW where located in conjunction or alongside with existing national and provincial roads (e.g. National Road 13 South), meanwhile almost the existing 22 kV distribution ROW is within the rights-of-way of existing national and provincial roads to minimize both costs and disturbance to ecological, socio-economic and cultural resources.

According to Article 20, Law on Public Road, the road limit (right-of-way) refers to the total area of the road, which includes the road surface, the road shoulder, footpaths,

drainage channels, the road slope and the delimitation area for public roads. The width of the road limit for each kind of public road is as follows:

1. National public road: 25 meters on each side, measured from the centre line of the road;
2. Provincial public road: 15 meters on each side, measured from the centre line of the road;
3. District public road: 10 meters on each side, measured from the centre line of the road;
4. Rural road: 5 meters on each side, measured from the centre line of the road;
5. Municipal road: in compliance with the master urban plan;
6. Specific road: in compliance with technical standards specifically imposed for such road.

Figure 4: Requirement of Land Donation for Additional 12-14 m Concrete Poles

Therefore, no land acquisition or physical relocation of existing residences is expected as construction work will be done on the existing power distribution infrastructure. Permanent structures for the 22 kV distribution line poles will require the land donation (about 30cm x 30cm per pole in maximum) from residential owners; for this process specific procedures will be applied based on the existing EDL procedures, summarized as follows:

1.) Step 1: Detail survey to identify the location of additional poles;
2.) Step 2: Official letter to inform the village head and villagers or land owner where additional pole to be installed will require land donation;
3.) Step 3: Template/Note on the land donation will be prepared for land owner, village head and EDL, as this project will be directly benefited to the people in the area, land donation for additional poles shall be volunteer donation;
4.) Step 4: EDL's Best practices or operational guidelines may be referred during lines upgrading and new poles installment, includes a planning and verification framework to ensure that any land acquisition is well-documented both in terms of its voluntary nature and the lack of any significant economic impact on villagers.

11. Interference on Households Structures and other Infrastructures and on Local Villagers Activities

Initial surveying indicated that construction, installation activities and transportation of material and equipment will interfere on household structures and other infrastructures due to encroach to household structures/properties. In addition, disconnection of power lines and interruption of service to beneficiaries during installation works. In general, EDL notifies villagers well in advance of upcoming power cut. This provides time for villagers to plan their household or commercial activities to minimize temporary economic displacement accordingly. In addition, EDL also plans to minimize the duration of each power cut through routing electricity through alternative distribution lines that are available in Xaythany district. Although there will be temporary disruption from power cuts, the benefits of having more reliable power supply in the longer term for households and businesses are expected.

Figure 5: Encroachment of Household Structures to Distribution ROW

12. Interference on Households Structures and other Infrastructures and on Local Villagers Activities

From initial surveying indicated that construction, installation activities where almost are under the existing 22 kV distribution ROW and located along the existing roads (e.g. National Road 13 South). Otherwise, the project is located in the urban and sub-urban area where closed to the district town.

At the present, the potential impacts on stupas, pagodas or other cultural and historical resources were not found. Detail survey to identify the location of additional poles will be done during planning phase. In case of there are historical place or physical cultural resources along the right of way, digging for new poles will be suspended and will be reported to the Provincial Culture and Tourism Directorate for further instruction in case anything with archaeological value found.

13. Environmental Code of Practices (ECoP)

ECoP will consist of routine systematic checking that all mitigations specified in the following table that are effectively implemented during the relevant periods of the project. Detailed ECoP is shown in Table 2 for relevant periods of the project, while Table 3 illustrates the ECoP's monitoring plan for design, planning and construction phases

Table 2: Environmental Code of Practices for Power Grid Improvement Project

Issue Concerned / Potential Impacts	Mitigation Measures	Significant of Mitigation	Responsibility	Start Date	End Date
Design, Planning and Construction Phases					
Environmental Issues					
1.) Clearing of trees and bushes under 22kV distribution line/ROW	- Cleared trees and bushes shall be disposed only to areas permitted by Authorities concerned, - Ensure that vegetation is not cleared beyond predefined project boundaries. Prohibit herbicides and incineration for the ROW clearing, - Made felled trees and other cleared or pruned vegetation available to the owner (individual or village) or removed if requested by the owner, - Stacked vegetation debris from the ROW will be outside the ROW, - Burning of vegetation debris will not be permitted, - Install suitable sign boards to make people aware about potential construction hazard at construction site. And place the warning barriers around the construction/installation areas. Inform households that might have elderly people and children to be extra careful around the installation time.	Minor	Contractor	Before construction is started	After construction activities are completed
2.) Disposal of packaging wastes from electrical equipment and replaced electrical equipment (conductors, meters, capacitors, etc.) during construction phase and disposal of waste materials generated from maintenance activities during project operation phase	- Recycle packaging wastes from electrical equipment as much as possible otherwise dispose of in designated waste disposal areas, - Remove all surplus materials and left in a clean and tidy condition after erection, - The project will identify disposal site with District Authority and/or EDL-Vientiane Branch Office for wastes that can have adverse effects on human health and environment.	Minor	Contractor	Before construction is started	After construction activities are completed
3.) Disposal of fuel oil and other chemical wastes (including PCBs	- Install garbage bins at construction site and make arrangement to dispose of recyclable waste such as paper,	Minor	Contractor	Before construction	After construction

based transformer) and hazardous materials		cans, tins, bottles cardboard and polythene as appropriate, - Make arrangement to waste collecting points and disposed of complying with local authority's regulations, - On completion of the works, left clean and tidy the site - Label hazardous materials with appropriate signage in both English and Lao, - Maintain an inventory of all hazardous materials on site and update regularly, - Install suitable sign boards to make people aware about potential construction hazard at construction site, - Remove all surplus material, and left in a clean and tidy condition after completion of the works, - Proper management of hazardous electrical waste (oil, lubricant, old transformer) including handling, transportation and final disposal of materials contaminated by PCBs, as specified in ECoP including store retired transformers and equipment containing PCB on a concrete pad with curbs sufficient to contain the liquid contents of these containers should they be spilled or leaked. The storage area should have a roof to prevent precipitation from collecting in the storage area. Disposal should involve facilities capable of safely transporting and disposing of hazardous waste containing PCB, - Identify disposal site of fuel oil and other chemical wastes (including 150 units of PCBs based old transformers) at the existing warehouse and storage located nearby Phonetong Substation; - Maintenance shops and other facilities, and activities may involve potential contact with PCB or PCB-contaminated machinery, - Provide training and appropriate personal protection equipment for Contractor's employ.			is started	activities are completed
4.) Health, safety and	Injury and	- Elaboration and enforcement of safety regulation, - Implementation of an emergency digging/evacuation	Minor	Contractor	Before	After

security	sickness of workers	procedure.			construction is started	construction activities are completed
	Construction hazard	- Install suitable sign boards to make people aware about potential construction hazard at construction site, - Provide training and appropriate personal protection equipment for Contractor's employ, - Maintain construction equipment in good condition, - Testing structures for integrity prior to undertaking work, - Implementation of a fall protection program that includes training in climbing techniques and use of fall protection measures; inspection, maintenance, and replacement of fall protection equipment ; and rescue off all-arrested workers, among others, - Hoisting equipment should be properly rated and maintained and hoist operators properly trained, - Safety belts should be of not less than 16 millimeters (5/8inch) two-in-one nylon or material of equivalent strength. Rope safety belts should be replaced before signs of aging or fraying of fibers become evident, - When operating power tools at height, workers should use a second (backup) safety strap, - Signs and other obstructions should be removed from poles or structures prior to undertaking work.				
	Road accident	- Minimize transportation activities from 7:00 pm to 6:00 am, - Vehicles to be maintained in good condition to minimize exhaust emissions, - A speed limit of 20km/hour imposed on construction traffic through the villages; - Share knowledge on regulations of traffic and traffic police directives among drivers.				
	Electrocution	- Implement regular inspection of the distribution line for clearing vegetation/obstructions, - Install appropriate warning signs on facilities, - Carry out electricity safety awareness raising in project				

		areas. Coverage of households with men, women, elderly people. - Only allowing trained and certified workers to install, maintain, or repair electrical equipment.				
	Fire Hazard and safety of household under transmission line	- Construction, electrical equipment installation and maintenance activities will follow EDL-ECoP and emergency response in case of fire hazard. EDL will consult with concerned agencies to avoid construction of infrastructure in the distribution line right of way in the future.				
Social Issues						
5.) Land donations and land use change due to installation of new or upgraded poles (no involuntary land acquisition/ resettlement)		- Permanent structures for the upgraded 22 kV power poles will require small land donation (about 30cm x 30cm) from residential owners. For Land Donation, under this project community contributions are voluntary and frequent as standard practice of EDL. SOPs (operational guidelines) during line upgrading and new polesinstalmentincludes a planning and verification framework to ensure that any land acquisition is well-documented both in terms of its voluntary nature and the lack of any significant economic impact on villagers. Several approaches will be used to be obtain information: a. Information will be disseminated to community members on applicable rules and consultations will be conducted at key stages of the sub-project planning process, b. Check willingness for donations and provide written documentation, c. Train project staff how to conduct effective consultations during the proposed works planning process.	Minor	EDL	Before construction is started	After construction activities are completed

6.) Interference on local villagers' activities (temporary economic displacement)	- Erect danger and warning signs on every poles as well as conductors where the line is crossing a road or river, - Disconnection of power lines shall be noticed on newspaper and inform to local villagers 1 week before starting of installation works, - Disconnection of power lines and interruption of service to beneficiaries during installation works shall be allowed only on daytime (between 8.00 am to 17.00 pm).	Minor	Contractor	Before construction is started	After construction activities are completed
7.) Gender impacts, increased role of women in decision making, empowerment of women	- Disconnection of power lines shall be noticed on newspaper and inform to local villagers 1 week before starting of installation works, - Disconnection of power lines and interruption of service shall be allowed only on daytime (between 8.00 am to 17.00 pm), which is gender-sensitive to the household responsibilities of women.	Minor	Contractor	Before construction is started	After construction activities are completed
Operation Phase					
Environmental Issues					
8.) Right-of-way maintenance	- Regular maintenance of vegetation within the rights-of-way is necessary to avoid disruption to overhead power distribution lines and poles, - No herbicides used in the control of vegetation within the rights-of-way, - Tree plantation and crops with higher than 3 metres will not be allowed, - Rather, local people living along the distribution line route also will be participated under mutual contract to clear or cut vegetation along right-of-way, - Scheduling activities for right-of-way maintenance.	Minor	EDL (Xaythany Branch Office)	After construction activities are completed	During Project Life
9.) Safety maintenance of distribution power lines, meters, capacitors, transformers and other electrical	- Ensuring that live-wire maintenance works are conducted by trained workers with strict adherence to specific safety and insulation standards, - Where maintenance and operation is required within	Minor	EDL (Xaythany Branch	After construction activities are	During Project Life

equipment	minimum set back distances, specific training, safety measures, personal safety devices, and other precautions should be defined in a health and safety plan, - Scheduling for maintenance activities.		Office)	completed	
Social Issues					
10.) Community health and safety	- Use of signs, dangerous warning signs, barriers, and education/public outreach to prevent public contact with potentially dangerous equipment particularly with households that have little children; - Grounding conducting objects (e.g. fences or other metallic structures) installed near power lines, to prevent shock.	Minor	EDL (Xaythany Branch Office)	After construction activities are completed	During Project Life

Table 4-2: ECoP's Monitoring Plan For Design, Planning and Construction Phases

Phase	Issue Concerned	What Parameter to be Monitored	Where Parameter to be Monitored	How Parameter to be Monitored	When Parameter to be Monitored	Responsible Agencies	Start Date	End Date
DESIGN PLANNING AND CONSTRUCTION PHASES	**Environmental Issues**							
	1.) Clearing of trees and bushes under 22kV distribution line/ROW	Clearing of trees and bushes under 22kV distribution line ROW	22kV distribution line ROW	Visual observation and interview with contractor	Monthly	EO Office/EDL	Start of Construction	End of Construction
	2.) Disposal of packaging wastes from electrical equipment and replaced electrical equipment (conductors, meters, capacitors, etc.) during construction phase	Way of disposal of conductors, meters, capacitors, etc. Repair and recycle and reuse of such electrical equipment above	At construction site and warehouse nearby Phonetong substation	Visual observation and interview with warehouse manager	Monthly	EO Office/EDL	Start of Construction	End of Construction
	3.) Disposal of fuel oil and other chemical wastes (including PCBs based transformer) and hazardous materials	Way of disposal of fuel oil and other chemical wastes (including PCBs based transformer) and hazardous materials	At construction site and storage nearby Phonetong substation	Visual observation and interview with storage manager	Monthly	EO Office/EDL	Start of Construction	End of Construction
	4.) Health, safety and security	EHSS plan by contractor; Use of protection equipment and vehicles. Injury of workers and public	At construction site	Visual observation and interview with contractor	Monthly	EO Office/EDL	Start of Construction	End of Construction

Table 4-2: ECoP's Monitoring Plan For Design, Planning and Construction Phases

Phase	Issue Concerned	What Parameter to be Monitored	Where Parameter to be Monitored	How Parameter to be Monitored	When Parameter to be Monitored	Responsible Agencies	Start Date	End Date
	Social Issues							
	5.) Land donations and land use change due to installation of new or upgraded poles (no involuntary land acquisition/ resettlement)	Land donation from residential owners, Land rehabilitation after completion of works	At construction site (additional pole location)	Visual observation and interview with contractor/ residential owners	Monthly	EO Office/EDL	Start of Construction	End of Construction
	6.) Interference on local villagers' activities (temporary economic displacement)	Temporary economic displacement by disconnecting of power lines; Villager complaints; Traffic control measures	At construction site where to be affected by disconnecting of power line	Visual observation and interview with villagers	Monthly	EO Office/EDL	Start of Construction	End of Construction
	7.) Gender impacts, increased role of women in decision making, empowerment of women	Interruption of service, temporary economic displacement to group of women headed households	Group of women headed households which to be affected by disconnecting of power line	Visual observation and interview with women headed household	Monthly	EO Office/EDL	Start of Construction	End of Construction

Table 4-3: Environmental and Social Monitoring Plan For Operation Phase

Phase	Issue Concerned	What Parameter to be Monitored	Where Parameter to be Monitored	How Parameter to be Monitored	When Parameter to be Monitored	Responsible Agencies	Start Date	End Date
OPERATION PHASE	**Environmental Issues**							
	8.) Right-of-way maintenance	Clearing of trees and bushes under 22kV distribution line ROW	22kV distribution line ROW	Visual observation	As per Scheduling activities for right-of-way maintenance	EO Office/EDL	End of Construction	End of Project life
	9.) Safety maintenance of distribution power lines, meters, capacitors, transformers and other electrical equipment	Use of protection equipment and vehicles. Injury of workers and public	Placement of maintenance activities	Visual observation	As per scheduling for maintenance activities	EO Office/EDL	End of Construction	End of Project life
	Social Issues							
	10.) Community health and safety	Use of signs, dangerous warning signs, to prevent public contact with potentially dangerous equipment	At every distribution poles and replaced/added electrical equipment	Visual observation	Quarterly	EO Office/EDL	End of Construction	End of Project life