MEPCO 6th STG and ELR Project
Environmental and Social Guidelines

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Prepared for
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Executive Summary

The Multan Electric Power Company (MEPCO) is planning to undertake the 6th Secondary Transmission and Grid (STG) and Energy Loss Reduction (ELR) project in various parts of its territory. MEPCO is seeking financing from the World Bank (WB) for a three-year slice of this 5-year project. In line with the prevailing legislation in the country, and the WB safeguard policies, an environmental and social assessment (ESA) for the first year of the project has been carried out.

In addition to the ESA, the environmental and social guidelines (ESG) have also been developed for the project components to be undertaken during the subsequent years of the project, for which enough details are not known at this stage. This document presents the ESG for the proposed project.

Legislative and Policy Framework

The Pakistan Environmental Protection Act, 1997 (PEPA 1997) requires the proponents of every development project in the country to conduct environmental assessment and submit its report to the environmental protection agency.

In addition, the World Bank Operational Policy 4.01 (OP 4.01) requires that environmental assessment be carried out before commencing projects such as the 6th STG. Other OPs relevant to this project include OP 4.12, OP 4.04, OP 4.36, OP 4.10, OP 4.11, and OP 7.60.

Project Overview

The overall objective of the MEPCO's 6th STG and ELR project is to help increase the efficiency, reliability, and quality of its electricity supply. The project seeks to decrease technical as well as commercial losses, increase electricity availability, and improve the voltage profile within the MEPCO's electricity network.

The 3-year slice of the 6th STG project – for which MEPCO is seeking the WB financing – consists of establishing 14 new grid stations, converting 3, augmenting 11, extending 20 existing grid stations, and laying of 450 km transmission lines.

ESA

An ESA has been conducted for the project components that will be undertaken during the Year 2006-07. The STG works for this year include the establishment of 5 new grid stations, in addition to the conversion of 3, extension of 12, and augmentation of 5 existing grid stations. A total of about 272 km of new transmission line will also be added to the existing MEPCO system during this period.

The ESA identifies the potential impacts of the proposed activities on the social, physical as well as biological environment of the area, and also recommends mitigation measures to minimize these impacts. The ESA includes an environmental management plan (EMP), which provides the implementation mechanism for the mitigation measures.
identified during the assessment. A Resettlement Plan (RP) has also been prepared to address the involuntary resettlement issues identified during the ESA.

The ESA and RP are stand-alone documents and provided under separate covers.

**ESG**

As described above, the ESA has been conducted for the project components to be undertaken during the first year of the WB financing. For the remaining two years of the proposed project, for which project details are not known at this stage, the present ESG has been prepared. The ESG provides a broad framework to address the environmental and social concerns during the years 2007-08 and 2008-09 of the 6th STG project.

The ESG includes guidelines for stakeholder consultation, impact assessment, analysis of alternatives, preparing environmental management plan and developing resettlement plan/resettlement policy framework. The ESG will essentially guide MEPCO and its consultants to perform the site-specific environmental and social assessment of the 6th STG project (2007-08 and 2009-09), once the project details are known in sufficient detail. The ESG also includes an environmental and social management framework, which provides an outline of the environmental and social management system to be implemented during project execution.
# Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADB</td>
<td>Asian Development Bank</td>
</tr>
<tr>
<td>AEB</td>
<td>Area Electricity Board</td>
</tr>
<tr>
<td>AJK</td>
<td>Azad Jammu and Kashmir</td>
</tr>
<tr>
<td>BOD</td>
<td>Biological Oxygen Demand</td>
</tr>
<tr>
<td>CITES</td>
<td>Convention on International Trade in Endangered Species</td>
</tr>
<tr>
<td>COD</td>
<td>Chemical Oxygen Demand</td>
</tr>
<tr>
<td>dB(A)</td>
<td>Decibels ('A' scale)</td>
</tr>
<tr>
<td>DISCO</td>
<td>Distribution Company</td>
</tr>
<tr>
<td>EA</td>
<td>Environmental Assessment</td>
</tr>
<tr>
<td>EIA</td>
<td>Environmental Impact Assessment</td>
</tr>
<tr>
<td>ELR</td>
<td>Energy loss reduction</td>
</tr>
<tr>
<td>EMP</td>
<td>Environmental Management Plan</td>
</tr>
<tr>
<td>EPA</td>
<td>Environmental Protection Agency</td>
</tr>
<tr>
<td>ESA</td>
<td>Environmental and Social Assessment</td>
</tr>
<tr>
<td>ESG</td>
<td>Environmental and Social Guidelines</td>
</tr>
<tr>
<td>ESMF</td>
<td>Environmental and Social Management Framework</td>
</tr>
<tr>
<td>FESCO</td>
<td>Faisalabad Electric Supply Company</td>
</tr>
<tr>
<td>GENCO</td>
<td>Generating Companies</td>
</tr>
<tr>
<td>GEPCO</td>
<td>Gujranwala Electric Power Company</td>
</tr>
<tr>
<td>GoP</td>
<td>Government of Pakistan</td>
</tr>
<tr>
<td>GRM</td>
<td>Grievance Redressal Mechanism</td>
</tr>
<tr>
<td>GS</td>
<td>Grid Station</td>
</tr>
<tr>
<td>HESCO</td>
<td>Hyderabad Electric Supply Company</td>
</tr>
<tr>
<td>ICT</td>
<td>Islamabad Capital Territory</td>
</tr>
<tr>
<td>IEE</td>
<td>Initial Environmental Examination</td>
</tr>
<tr>
<td>IESCO</td>
<td>Islamabad Electric Supply Company</td>
</tr>
<tr>
<td>KESC</td>
<td>Karachi Electric Supply Company</td>
</tr>
<tr>
<td>KV</td>
<td>Kilo volts</td>
</tr>
<tr>
<td>KWh</td>
<td>Kilo watt hour</td>
</tr>
<tr>
<td>Acronym</td>
<td>Definition</td>
</tr>
<tr>
<td>---------</td>
<td>------------</td>
</tr>
<tr>
<td>LAA</td>
<td>Land Acquisition Act (of 1894)</td>
</tr>
<tr>
<td>LESCO</td>
<td>Lahore Electric Supply Company</td>
</tr>
<tr>
<td>LOS</td>
<td>Law of Seas</td>
</tr>
<tr>
<td>MEA</td>
<td>Multilateral Environmental Agreements</td>
</tr>
<tr>
<td>MEPCO</td>
<td>Multan Electric Power Company</td>
</tr>
<tr>
<td>NEQS</td>
<td>National Environmental Quality Standards</td>
</tr>
<tr>
<td>NGO</td>
<td>Non Governmental Organization</td>
</tr>
<tr>
<td>NOx</td>
<td>Oxides of nitrogen</td>
</tr>
<tr>
<td>NTDC</td>
<td>National Transmission and Dispatch Company</td>
</tr>
<tr>
<td>NWFP</td>
<td>North Western Frontier Province</td>
</tr>
<tr>
<td>OP</td>
<td>Operational Policy</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>Operation and Maintenance</td>
</tr>
<tr>
<td>PAPs</td>
<td>Project Affected Persons</td>
</tr>
<tr>
<td>PCB</td>
<td>Poly Chlorinated Biphenyl</td>
</tr>
<tr>
<td>PEPC</td>
<td>Pakistan Encl Protection Council</td>
</tr>
<tr>
<td>PESCO</td>
<td>Peshawar Electric Supply Company</td>
</tr>
<tr>
<td>PEPA</td>
<td>Pakistan Environmental Protection Act</td>
</tr>
<tr>
<td>PM</td>
<td>Particulate matter</td>
</tr>
<tr>
<td>POP</td>
<td>Persistent Organic Pollutants</td>
</tr>
<tr>
<td>QESCO</td>
<td>Quetta Electric Supply Company</td>
</tr>
<tr>
<td>RP</td>
<td>Resettlement Plan</td>
</tr>
<tr>
<td>RPF</td>
<td>Resettlement Policy Framework</td>
</tr>
<tr>
<td>STG</td>
<td>Secondary transmission and grid</td>
</tr>
<tr>
<td>ToR</td>
<td>Terms of Reference</td>
</tr>
<tr>
<td>UNFCCC</td>
<td>UN Framework Convention on Climate Change</td>
</tr>
<tr>
<td>USEPA</td>
<td>United States Environmental Protection Agency</td>
</tr>
<tr>
<td>WAPDA</td>
<td>Water and Power Development Authority</td>
</tr>
<tr>
<td>WB</td>
<td>World Bank</td>
</tr>
<tr>
<td>WBG</td>
<td>World Bank Group</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
</tbody>
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1 Introduction

The Multan Electric Power Company (MEPCO) is planning to undertake the 6th Secondary Transmission and Grid (STG) and Energy Loss Reduction (ELR) project in various parts of its territory. MEPCO is seeking finances from the World Bank (WB) for a portion of this 5-year project. In line with the prevailing legislation in the country, and the WB safeguard policies, an environmental and social assessment (ESA) of the project's components to be undertaken during the year 2006-07 has been carried out.

In addition to the ESA, the environmental and social guidelines (ESG) have also been developed for the project components to be undertaken during the subsequent years of the project, for which enough details are not known at this stage. This document presents the ESG for the proposed project.

1.1 Project Proponent

MEPCO is a public utility company, providing electricity to the southern districts of the Punjab Province (Multan, Sahiwal, Khanewal, Pakpattan, Vehari, Rahim Yar Khan, Muzaffargarh, Dera Ghazi Khan, Layyah, Rajanpur, Bahawalpur, Bahawalnagar and Lodhran). MEPCO was incorporated in 1998 under the Companies Ordinance 1984. Before this, it was one of the eight Area Electricity Boards (AEBs) of the Water and Power Development Authority (WAPDA).

Established in 1958, WAPDA had two wings: Water and Power. The Water Wing was (and still is) responsible for developing and managing large water reservoirs and barrages, while its Power Wing was a vertically integrated utility, responsible for generation, transmission and distribution of electricity throughout Pakistan (except for the City of Karachi, where the Karachi Electric Supply Company – KESC - performed a similar function).

Under its un-bundling and restructuring program, WAPDA’s Power Wing has been broken down into eight distribution companies collectively called DISCOs, three generating companies collectively called GENCOs and a transmission company called National Transmission and Dispatch Company (NTDC). MEPCO is one of the eight DISCOs; the other seven DISCOs are:

- Islamabad Electric Supply Company (IESCO), for Islamabad, Rawalpindi, Jhelum, Chakwal and Attock districts.¹
- Peshawar Electric Supply Company (PESCO), for the entire North Western Frontier Province (NWFP), northern parts of AJK and the Northern Areas.
- Gujranwala Electric Power Company (GEPCO), for Gujranwala, Sialkot, Mandi Bahauddin, Hafizabad, Narowal and Gujrat districts.

¹ In addition, IESCO also supplies bulk electricity to Azad Jammu and Kashmir (AJK).
1.2 Project Background and Justification

Pakistan as a whole is an energy-deficient country and per capita electricity generation has traditionally been low (581 KWh as against the World average of 2,657 KWh²). The electricity demand in the country has grown at a rapid pace since 1985. Consumption of electricity increased from 17,608 GWh in 1985 to 55,507 GWh in 2004, representing an annual average growth rate of 6.2%. The growth in the electricity demand has however been uneven over the years. The consumption grew at a rate of 11% during 1985-99, the growth rate slowed down to 6.5% during 1990-95 and 2.5% during 1996-2000. Since the year 2000 however, the trend has reversed and electricity demand has picked up, mirroring the overall economic growth in the country. During the period 2001-04, the electricity demand grew at a rate of 3.3% (NEPRA 2005).

MEPCO is also experiencing growth in the electricity demand. In order to meet the increasing electricity demand, the existing secondary transmission and grid system (132 and 66 kV) has to be expanded, in addition to the increased generation and primary transmission (500 kV and 220 kV) capacity. Towards this end, MEPCO, being responsible for the expansion, operation and maintenance of the secondary transmission and grid (STG) system within its territory, has developed the 6th STG project. The ELR project on the other hand ensures increased system reliability and reduced losses at the HT and LT levels (11 kV and 0.4 kV, respectively).

The project includes establishment of new grid stations, extension / conversion / augmentation of existing grid stations, laying of new transmission line and replacing weaker/undersized transmission lines. The project will ensure supply of electricity in new areas, load reduction on presently overloaded grid stations and transmission lines, and improvement in the voltage profile as well as the system reliability.

1.3 Project Overview

The overall objective of the 6th STG and ELR project is to help increase the efficiency, reliability and quality of the electricity supply. The project seeks to decrease the technical as well as commercial losses, increase the electricity availability, and improve the voltage profile, within the MEPCO’s electricity network.

1.3.1 STG Project

The 6
th
 STG is a 5-year project, from 2005-6 to 2009-10
3, and has been broken down in five distinct year-wise phases. Each phase of the project consists of establishing new grid stations, extending/upgrading/augmenting existing grid stations, and laying transmission lines. The key components of these phases are tabulated below.

<table>
<thead>
<tr>
<th>Description</th>
<th>2005-06</th>
<th>2006-07</th>
<th>2007-08</th>
<th>2008-09</th>
<th>2009-10</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Grid Stations (GS)</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>GS Conversion</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>GS Augmentation</td>
<td>13</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>24</td>
</tr>
<tr>
<td>GS Extension</td>
<td>16</td>
<td>12</td>
<td>5</td>
<td>3</td>
<td>0</td>
<td>36</td>
</tr>
<tr>
<td>Transmission Lines (km)</td>
<td>190</td>
<td>272</td>
<td>129</td>
<td>49</td>
<td>26</td>
<td>666</td>
</tr>
</tbody>
</table>

MEPCO is seeking the WB financing for a 3-year slice starting with the 2
nd year of the project.

1.3.2 ELR Project

The ELR is also a 5-year project, from 2005-6 to 2009-10. The project consists of rehabilitation of high-tension (HT) feeders and low-tension (LT) lines, replacement of undersized and/or old transformers, replacement of sluggish energy meters, and associated activities. The yearly breakup of the key components of this project is provided below.

<table>
<thead>
<tr>
<th>Description</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>11 kV New Lines (km)</td>
<td>131</td>
<td>65</td>
<td>59</td>
<td>68</td>
<td>93</td>
</tr>
<tr>
<td>11 kV Re-conductoring (km)</td>
<td>108</td>
<td>77</td>
<td>72</td>
<td>68</td>
<td>91</td>
</tr>
<tr>
<td>Transformers for LT Proposals</td>
<td>526</td>
<td>250</td>
<td>227</td>
<td>260</td>
<td>300</td>
</tr>
<tr>
<td>New LT Lines (km)</td>
<td>473</td>
<td>43</td>
<td>43</td>
<td>63</td>
<td>78</td>
</tr>
<tr>
<td>LT Lines Re-conductoring (km)</td>
<td>75</td>
<td>72</td>
<td>65</td>
<td>85</td>
<td>110</td>
</tr>
</tbody>
</table>

MEPCO is seeking finances from the WB for the 2
nd year of the ELR project, ie, 2006-07.

1.4 Environmental and Socioeconomic Overview

The project area lies in the Upper Indus Plain, which essentially forms the western extension of Indo-Gangetic Plain. The Indus Plain has been made up of the silt brought by the Indus and its numerous tributaries, such as Jhelum, Chenab, Ravi and Sutlej on the east bank, and Kabul, Kurram, Tochi, and others on the west bank. The Indus Plain

3 The original PCI was prepared for the project duration from 2003-04 to 2007-08.
4 The original year-wise distribution of work within the total project duration as given in the PCI has subsequently been revised, based upon changing load demand and priorities.
is known for its agricultural fertility and cultural development throughout history. The Upper Indus Plain consists of four river interfluves, the Bahawalpur plain and the Sulaiman piedmont.

The main rivers that flow through the project area include Indus, Chenab, Ravi and Sutlej. However, under the Indus Basin Treaty, India has rights over the waters of Ravi and Sutlej.

The agriculture is by far the main economic activity in the project area, which lies within the Indus Basin Irrigation system — one of the most extensive canal irrigation systems in the world. The groundwater extraction augments the canal water for irrigation in the area.

Ecologically, the project area can be divided in three broad ecozones: tropical thorn forest ecozone, riverine forest ecozone and desert habitat. However, urban centers, villages and agriculture activities have greatly modified these ecozones in most parts of the project area. Whatever wild species now found in the area are essentially those which have adapted to the modified conditions and presence of human beings.

Administratively, the project area falls under thirteen districts of the Punjab Province — Multan, Sahiwal, Khanewal, Vehari, Pakpattan, Bahawalnagar, Layyah, Muzaffargarh, Dera Ghazi Khan, Rajanpur, Lodhran, Bahawalpur and Rahim Yar Khan.

1.5 Key Environmental and Socioeconomic Issues

The key environmental and socioeconomic issues that could arise as a result of the proposed project include:

- **Design Phase:**
  - Soil erosion and contamination
  - Water contamination
  - Loss of natural vegetation
  - Threat to wildlife
  - Land acquisition issues
  - Blocked access
  - Safety hazards and public health concerns
  - Aesthetic value.

- **Construction Phase:**
  - Soil erosion, degradation
  - Air quality deterioration
  - Water contamination and consumption
  - Loss of/damage to the floral resources (natural vegetation) of the area
  - Loss of/damage to faunal resources (wildlife) of the area
  - Land acquisition, compensation and resettlement
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- Loss of agriculture
- Blocked access
- Noise and vibration
- Safety hazard and public health
- Damage to infrastructure
- Gender issues
- Impacts on archeological, cultural, historical or religious significance.

Operation and Maintenance Phase

- Contamination of soil and water as a result of inappropriate waste disposal
- Contamination of soil and water as a result of leakage of transformer oil.
- Damage to natural vegetation and wildlife during the transmission line patrolling and maintenance activities
- Safety hazards and public health
- Loss of agriculture.

The above issues were identified by the ESA of the 6th STG, year 2006-07. In order to identify the impacts more precisely for project components to be carried out during the subsequent years (ie, 2007-08 and 2008-09), a separate ESA for this period will have to be performed.

1.6 ESA and RP

In accordance with the WB's safeguard policies and the relevant national legislation, an environmental and social assessment (ESA) of the 6th STG and ELR project's components to be undertaken during the year 2006-07 has been carried out. The ESA has predicted the potential environmental as well as socioeconomic impacts of the proposed project, and recommended the mitigation measures to reduce if not eliminate these impacts. The ultimate aim for conducting the ESA has been to ensure that the project design and implementation are socially responsive and environmentally sound.

The ESA includes an environmental management plan (EMP), which provides the implementation mechanism for the mitigation measures identified during the assessment. An RP has also been prepared to address the involuntary resettlement issues identified during the ESA.

The ESA and RP are stand-alone documents and provided under separate covers.

1.7 ESG

The ESA has been conducted for the first year (2006-07) of the WB financing, as described above. For the project components to be undertaken during the subsequent years of WB financing (ie, 2007-08 and 2008-09), the details, such as grid station locations and transmission line routes, are not known at this stage. Consequently, the exact nature and extent of the impacts cannot be predicted. For these project components, the present ESG has been prepared.
The ESG provides a broad framework to address the environmental and socioeconomic concerns of the project activities of years 2007-08 and 2008-09. For site specific and exact impact assessment/mitigation, a separate ESA will have to be conducted for the project components under discussion, in accordance with the WB safeguard policies and national legislation.

The ESA’s terms of reference (ToR), appended with the ESA report, addresses the ESG as well.

1.8 Study Team

The study team consisted of environmental and socioeconomic experts having considerable experience in their respective field of expertise. The list of the experts is provided in the ESA report.

1.9 Document Structure

Chapter 2 discusses the World Bank’s safeguard policies, as well as the regulatory, legislative and institutional setup in the country, relevant to the environmental and social aspects of the project. Chapter 3 provides the environmental and social guidelines. The guidelines address stakeholder consultation, impact assessment, analysis of alternatives, preparing environmental management plan and developing resettlement plan/resettlement policy framework. Finally, Chapter 4 provides the environmental and social management framework.
2 Policy, Legal and Administrative Framework

This Chapter discusses the policy, legal and administrative framework and institutional set-up relevant to the proposed project. Also included in the Chapter are the guidelines from the national agencies as well as international donors and other organizations.

2.1 The World Bank Operational Policies

Relevance of the WB Operational Policies (OPs) with respect to the environmental and social issues associated with the proposed project is tabulated below.

<table>
<thead>
<tr>
<th>Environmental Assessment (OP 4.01)</th>
<th>Relevant.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Involuntary Resettlement (OP 4.12)</td>
<td>Likely to be relevant, though ESA will determine the type and magnitude of involuntary resettlement.</td>
</tr>
<tr>
<td>Forestry (OP 4.36)</td>
<td>Do not know at this stage.</td>
</tr>
<tr>
<td>Natural Habitat (OP 4.04)</td>
<td>Do not know at this stage.</td>
</tr>
<tr>
<td>Pest Management (OP 4.09)</td>
<td>Unlikely to be relevant.</td>
</tr>
<tr>
<td>Safety of Dams (OP 4.37)</td>
<td>Unlikely to be relevant.</td>
</tr>
<tr>
<td>Projects in International Waters (OP 7.50)</td>
<td>Unlikely to be relevant.</td>
</tr>
<tr>
<td>Cultural Property (OP 4.11)</td>
<td>Do not know at this stage.</td>
</tr>
<tr>
<td>Indigenous People (OP 4.10)</td>
<td>Do not know at this stage.</td>
</tr>
<tr>
<td>Projects in Disputed Area (7.60)</td>
<td>Unlikely to be relevant.</td>
</tr>
</tbody>
</table>

These policies are discussed in the following sections.

2.1.1 Environmental Assessment (OP 4.01)

The World Bank requires environmental assessment (EA) of projects proposed for Bank financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision making. The OP defines the EA process and various types of the EA instruments.

The proposed project consists of activities which are likely to have environmental and social consequences, such as:

- Damage to assets (such as crops),
- Deterioration of air quality
- Water contamination and consumption

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- Damage to top soil, land erosion
- Safety hazard.

To identify the extent and consequences of these impacts, and to develop an EMP for their mitigation, an ESA will have to be carried out, in accordance with this OP.

2.1.2 Involuntary Resettlement (OP 4.12)

The WB's experience indicates that involuntary resettlement under development projects, if unmitigated, often gives rise to severe economic, social, and environmental risks: production systems are dismantled; people face impoverishment when their productive assets or income sources are lost; people are relocated to environments where their productive skills may be less applicable and the competition for resources greater; community institutions and social networks are weakened; kin groups are dispersed; and cultural identity, traditional authority, and the potential for mutual help are diminished or lost. This policy includes safeguards to address and mitigate these impoverishment risks.6

The overall objectives of the Policy are given below.

- Involuntary resettlement should be avoided where feasible, or minimized, exploring all viable alternative project designs.
- Where it is not feasible to avoid resettlement, resettlement activities should be conceived and executed as sustainable development programs, providing sufficient investment resources to enable the persons displaced by the project to share in project benefits. Displaced persons should be meaningfully consulted and should have opportunities to participate in planning and implementing resettlement programs.
- Displaced persons should be assisted in their efforts to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.

The Policy defines the requirement of preparing a resettlement plan or a resettlement policy framework, in order to address the involuntary resettlement.

For the proposed project, land will need to be acquired for the establishment of the new grid stations. During the site/route selection, settlements are generally avoided, however at some places acquisition of cultivable land — though temporary — cannot be ruled out.

Similarly, crops along the proposed transmission lines may be damaged during the construction and operation phases of the proposed project.

In view of the above, the OP 4.12 is likely to be triggered. Based upon the findings of the ESA — which needs to be carried out for this phase of the 6th STG project, as mentioned earlier — a resettlement policy framework (RPF) or a resettlement plan (RP) will be developed, in accordance with this OP.

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2.1.3 Forestry (OP 4.36)

The objective of this Policy is to assist the WB’s borrowers to harness the potential of forests to reduce poverty in a sustainable manner, integrate forests effectively into sustainable economic development, and protect the vital local and global environmental services and values of forests.

Since the project details, such as the proposed grid station locations and transmission line routes, are not known at this stage, it cannot be ascertained whether this OP is triggered or not. Once the ESA of the years 3 and 4 of the 6th STG project is performed, and its findings known, only then the status of the project with respect to this OP would be determined.

2.1.4 Natural Habitat (OP 4.04)

The conservation of natural habitats, like other measures that protect and enhance the environment, is essential for long-term sustainable development. The Bank therefore supports the protection, maintenance, and rehabilitation of natural habitats and their functions.\footnote{Excerpts from WB OP 4.04. WB Operational Manual. June 2001.}

As mentioned earlier as well, the details for the years 3 and 4 of the 6th STG project are not known at this stage. Therefore it cannot be ascertained whether this OP is triggered or not. Once the ESA of the specified period of the 6th STG project is performed, and its findings known, only then the status of the project with respect to this OP would be determined.

2.1.5 Pest Management (OP 4.09)

Through this OP, the WB supports a strategy that promotes the use of biological or environmental control methods and reduces reliance on synthetic chemical pesticides.

This OP is not triggered since the proposed project does not involve usage of pesticides. (Usage of the chemical herbicides to clear vegetation under the transmission lines will not be allowed during the proposed project.)

2.1.6 Safety of Dams (OP 4.37)

The Policy seeks to ensure that appropriate measures are taken and sufficient resources provided for the safety of dams the WB finances. However this OP is not relevant since the proposed project does not involve construction of dams.

2.1.7 Projects on International Waterways (OP 7.50)

This OP defines the procedure to be followed for projects the WB finances that are located on any water body that forms a boundary between, or flows through two or more states. However, the proposed project does not involve any works on such waterways, hence this OP is not triggered.
2.1.8 Cultural Property (OP 4.11)

The World Bank's general policy regarding cultural properties is to assist in their preservation, and to seek to avoid their elimination. The specific aspects of the Policy are given below.  

- The Bank normally declines to finance projects that will significantly damage non-replicable cultural property, and will assist only those projects that are sited or designed so as to prevent such damage.

- The Bank will assist in the protection and enhancement of cultural properties encountered in Bank-financed projects, rather than leaving that protection to chance. In some cases, the project is best relocated in order that sites and structures can be preserved, studied, and restored intact in situ. In other cases, structures can be relocated, preserved, studied, and restored on alternate sites. Often, scientific study, selective salvage, and museum preservation before destruction is all that is necessary. Most such projects should include the training and strengthening of institutions entrusted with safeguarding a nation's cultural patrimony. Such activities should be directly included in the scope of the project, rather than being postponed for some possible future action, and the costs are to be internalized in computing overall project costs.

- Deviations from this policy may be justified only where expected project benefits are great, and the loss of or damage to cultural property is judged by competent authorities to be unavoidable, minor, or otherwise acceptable. Specific details of the justification should be discussed in project documents.

- This policy pertains to any project in which the Bank is involved, irrespective of whether the Bank is itself financing the part of the project that may affect cultural property.

Much like in the case of OPs 4.36 and OP 4.04 discussed above, the proposed ESA of the years 3 and 4 of the project will determine whether any of the project components would be located at or near any sites of archeological, cultural, historical or religious significance.

2.1.9 Indigenous People (OP 4.10)

For purposes of this policy, the term “indigenous Peoples” is used in a generic sense to refer to a distinct, vulnerable, social and cultural group possessing the following characteristics in varying degrees.  

- self-identification as members of a distinct indigenous cultural group and recognition of this identity by others;

- collective attachment to geographically distinct habitats or ancestral territories in the project area and to the natural resources in these habitats and territories;

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customary cultural, economic, social, or political institutions that are separate from 
those of the dominant society and culture; and
an indigenous language, often different from the official language of the country or 
region.

The OP defines the process to be followed if the project affects the indigenous people.

The ESA of the years 3 and 4 of the project will identify the presence of indigenous 
people, if any, at or near the proposed project sites.

2.1.10 Projects in Disputed Areas (OP 7.60)

Projects in disputed areas may raise a number of delicate problems affecting relations 
not only between the Bank and its member countries, but also between the borrower and 
one or more neighboring countries. In order not to prejudice the position of either the 
Bank or the countries concerned, any dispute over an area in which a proposed project is 
located is dealt with at the earliest possible stage.

The Bank may proceed with a project in a disputed area if the governments concerned 
agree that, pending the settlement of the dispute, the project proposed for country A 
should go forward without prejudice to the claims of country B. 10

The MEPCO territory does not include any disputed areas, hence this OP will not be 
triggered.

2.2 Laws and Regulations

Pakistan's statute books contain a number of laws concerned with the regulation and 
control of the environmental and social aspects. However, the enactment of 
comprehensive legislation on the environment, in the form of an act of parliament, is a 
relatively new phenomenon. Most of the existing laws on environmental and social 
issues have been enforced over an extended period of time, and are context-specific.
The laws relevant to the developmental projects are briefly reviewed below.

2.2.1 Pakistan Environmental Protection Act, 1997

The Pakistan Environmental Protection Act, 1997 (the Act) is the basic legislative tool 
empowering the government to frame regulations for the protection of the environment 
(the 'environment' has been defined in the Act as: (a) air, water and land; (b) all layers of 
the atmosphere; (c) all organic and inorganic matter and living organisms; (d) the 
ecosystem and ecological relationships; (e) buildings, structures, roads, facilities and 
works; (f) all social and economic conditions affecting community life; and (g) the inter-
relationships between any of the factors specified in sub-clauses 'a' to 'f'). The Act is 
applicable to a broad range of issues and extends to socioeconomic aspects, land 
acquisition, air, water, soil, marine and noise pollution, as well as the handling of 
hazardous waste. The discharge or emission of any effluent, waste, air pollutant or noise 
in an amount, concentration or level in excess of the National Environmental Quality 
Standards (NEQS) specified by the Pakistan Environmental Protection Agency (Pak-

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EPA) has been prohibited under the Act, and penalties have been prescribed for those contravening the provisions of the Act. The powers of the federal and provincial Environmental Protection Agencies (EPAs), established under the Pakistan Environmental Protection Ordinance 1983, have also been considerably enhanced under this legislation and they have been given the power to conduct inquiries into possible breaches of environmental law either of their own accord, or upon the registration of a complaint.

The requirement for environmental assessment is laid out in Section 12 (1) of the Act. Under this section, no project involving construction activities or any change in the physical environment can be undertaken unless an initial environmental examination (IEE) or an environmental impact assessment (EIA) is conducted, and approval is received from the federal or relevant provincial EPA. Section 12 (6) of the Act states that this provision is applicable only to such categories of projects as may be prescribed. The categories are defined in the Pakistan Environmental Protection Agency Review of IEE and EIA Regulations, 2000 and are discussed in Section 2.2.2 below.

The requirement of conducting an environmental assessment of the proposed project emanates from this Act.

2.2.2 Pakistan Environmental Protection Agency Review of IEE and EIA Regulations, 2000

The Pakistan Environmental Protection Agency Review of IEE and EIA Regulations, 2000 (the 'Regulations'), developed by the Pak-EPA under the powers conferred upon it by the Act, provide the necessary details on preparation, submission and review of the initial environmental examination (IEE) and the EIA. Categorization of projects for IEE and EIA is one of the main components of the Regulations. Projects have been classified on the basis of expected degree of adverse environmental impacts. Project types listed in Schedule I are designated as potentially less damaging to the environment, and those listed in Schedule II as having potentially serious adverse effects. Schedule I projects require an IEE to be conducted, provided they are not located in environmentally sensitive areas. For the Schedule II projects, conducting an EIA is necessary.

The proposed project falls under the Schedule II of the Regulations, hence an EIA has to be conducted for it.

2.2.3 National and International Environmental Standards

National Standards

The National Environmental Quality Standards (NEQS), promulgated under the PEPA 1997, specify the following standards:

- Maximum allowable concentration of pollutants (16 parameters) in gaseous emissions from industrial sources,
- For power plants operating on oil and coal:

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Superseded by the Pakistan environmental Protection Act, 1997.
Maximum allowable emission of sulfur dioxide,
- Maximum allowable increment in concentration of sulfur dioxide in ambient air,
- Maximum allowable concentration of nitrogen oxides in ambient air, and
- Maximum allowable emission of nitrogen oxide for steam generators as function of heat input.

- Maximum allowable concentration of pollutants (32 parameters) in municipal and liquid industrial effluents discharged to inland waters, sewage treatment and sea (three separate set of numbers).

Selected NEQS for liquid effluents discharged to inland waters, gaseous emission from industrial sources and emissions from motor vehicles are provided in Exhibits 2.1, 2.2 and 2.3, respectively. These standards will be applicable to the gaseous emissions and liquid effluents discharged to the environment from the proposed project.

International Standards

The NEQS do not cover the ambient air quality or water quality standards. The international standards for ambient air quality and drinking water quality are presented in Exhibits 2.4 and 2.5.

For noise, the NEQS are limited to the vehicular noise. For noise generated by other sources, the WB standards are usually applied. The allowable noise limits per these standards are 55 dB(A) for daytime and 45 dB(A) for nighttime, measured at the receptor.

2.2.4 Land Acquisition Act, 1894

The Land Acquisition Act (LAA) of 1894 amended from time to time has been the de-facto policy governing land acquisition and compensation in the country. The LAA is the most commonly used law for acquisition of land and other properties for development projects. It comprises of 55 sections pertaining to area notifications and surveys, acquisition, compensation and apportionment awards and disputes resolution, penalties and exemptions.

WAPDA has been acquiring land for the grid stations under the provisions of this Act. However, for the proposed project, the grid station sites will be procured directly from the owners, after paying the mutually agreed price. And in case some parts of the land required for the proposed project is acquired under this Act, the Urgency/Emergency Clause (Section 17) will not be used, in the absence of an urgency or emergency.

2.2.5 National Resettlement Policy / Ordinance

The Ministry of Environment, Local Government and Rural Development formulated a draft policy in 2004 on involuntary resettlement with technical assistance from ADB. The policy aims to compensate for the loss of income to those who suffer loss of communal property including common assets, productive assets, structures, other fixed assets, income and employment, loss of community networks and services, pasture, water rights, public infrastructure like mosques, shrines, schools and graveyards.
The government has also developed a document entitled "Project Implementation and Resettlement of the Affected Persons Ordinance, 200Z", later referred to as the "Resettlement Ordinance", for enactment by provincial and local governments, after incorporating local requirements. The Ordinance, being a new law, shall be supplementary to the LAA as well as other laws of Pakistan, and wherever applicable under this policy. However, if necessary, appropriate amendments to the LAA 1894 will also be proposed to facilitate the application of the Resettlement Ordinance.

There has not been much progress on the enactment of the Resettlement Ordinance; hence this is not relevant for the proposed project.

2.2.6 Telegraph Act, 1885

This law was enacted to define the authority and responsibility of the Telegraph authority. The law covers, among other activities, installation and maintenance of telegraph lines and posts (poles). The Act defines the mechanism to determine and make payment of compensation associated with the installation of these lines and posts.

Under this Act, the land required for the poles is not acquired (or purchased) from the owner, nor the title of the land transferred. Compensation is paid to the owner for any structure, crop or tree that exists on the land; cost of the land is not paid to the owner.

WAPDA has been installing the transmission lines and their towers, and determining the associated compensation, on the basis of this Act. For the proposed project as well, MEPCO will use this Act. However, the land under the towers will be acquired if there is loss of access, and productive use of the land by the landowners/affectees is impacted.

2.2.7 Punjab Wildlife Protection Act, 1974

This law was enacted to protect the province’s wildlife resources directly and other natural resources indirectly. It classifies wildlife by degree of protection, i.e., animals that may be hunted on a permit or special license, and species that are protected and cannot be hunted under any circumstances. The Act specifies restrictions on hunting and trade in animals, trophies, or meat. The Act also defines various categories of wildlife protected areas, i.e., National Parks, Wildlife Sanctuaries and Game Reserve.

2.2.8 Forest Act, 1927

The Act authorizes Provincial Forest Departments to establish forest reserves and protected forests. The Act prohibits any person to set fire in the forest, quarries stone, removes any forest-produce or cause any damage to the forest by cutting trees or clearing up area for cultivation or any other purpose.

2.2.9 Provincial Local Government Ordinances, 2001

These ordinances were issued under the devolution process and define the roles of the district governments. These ordinances also address the land use, conservation of natural vegetation, air, water and land pollution, disposal of solid waste and wastewater effluents, as well as matters relating to public health.
2.2.10 Antiquity Act, 1975

The Antiquities Act of 1975 ensures the protection of cultural resources in Pakistan. The Act is designed to protect 'antiquities' from destruction, theft, negligence, unlawful excavation, trade and export. Antiquities have been defined in the Act as ancient products of human activity, historical sites, or sites of anthropological or cultural interest, national monuments, etc. The law prohibits new construction in the proximity of a protected antiquity and empowers the Government of Pakistan to prohibit excavation in any area that may contain articles of archeological significance.

Under this Act, the project proponents are obligated to:

- Ensure that no activity is undertaken in the proximity of a protected antiquity, and
- If during the course of the project an archeological discovery is made, it should be reported to the Department of Archeology, Government of Pakistan.

2.2.11 Mines, Oil Fields and Mineral Development Act, 1948

This legislation provides procedures for quarrying and mining of construction material from state-owned as well as private land. These procedures will have to be followed during the proposed project.

2.2.12 Factories Act, 1934

The clauses relevant to the MEPCO's proposed project are those that address the health, safety and welfare of the workers, disposal of solid waste and effluents, and damage to private and public property. The Act also provides regulations for handling and disposing toxic and hazardous substances. The Pakistan Environmental Protection Act of 1997 (discussed above), supersedes parts of this Act pertaining to environment and environmental degradation.

2.2.13 Pakistan Explosive Act, 1884

This Act provides regulations for the handling, transportation and use of explosives during quarrying, blasting and other purposes. The transmission line tower installation may need blasting at rocky/mountainous areas, thus these regulations will be applicable for the proposed project.

2.2.14 Pakistan Penal Code, 1860

The Code deals with the offences where public or private property or human lives are affected due to intentional or accidental misconduct of an individual or organization. The Code also addresses control of noise, noxious emissions and disposal of effluents. Most of the environmental aspects of the Code have been superseded by the Pakistan Environmental Protection Act, 1997.

2.3 Obligations under International Treaties

Pakistan is signatory of several MEAs, including:

- Basel Convention,
Policy, Legal and Administrative Framework

- Convention on Biological Diversity, Convention on Wetlands (Ramsar),
- Convention on International Trade in Endangered Species (CITES),
- UN Framework Convention on Climate Change (UNFCCC),
- Kyoto Protocol,
- Montreal Protocol,
- UN Convention to Combat Desertification,
- Convention for the Prevention of Pollution from Ships (MARPOL),
- UN Convention on the Law of Seas (LOS),
- Stockholm Convention on Persistent Organic Pollutants (POPs),
- Cartina Protocol.

These MEAs impose requirements and restrictions of varying degrees upon the member countries, in order to meet the objectives of these agreements. However, the implementation mechanism for most of these MEAs is weak in Pakistan and institutional setup non-existent.

In order to address this state of affairs, the GoP has recently approved a PCI for the establishment of the National MEA Secretariat under the Ministry of Environment in Islamabad. The Secretariat will handle and coordinate activities, and develop action plans for each MEA vis-à-vis the country's obligation under these agreements. The Secretariat will then be responsible to ensure implementation of these action plans. The Secretariat will also evaluate future MEAs and advise the Government for acceding (or otherwise) these agreements.

For the proposed project, the Stockholm Convention has the direct relevance. The Convention addresses the eradication of the persistent organic pollutants (POPs). The transformer oil used to contain poly-chlorinated biphenyl (PCB), which is one of the POPs. Though now its usage has been abandoned, old transformers in Pakistan still contain oil containing PCB.

2.4 Institutional Setup for Environmental Management

The apex environmental body in the country is the Pakistan Environmental Protection Council (PEPC), which is presided by the Chief Executive of the Country. Other bodies include the Pakistan Environmental Protection Agency (Pak-EPA), provincial EPAs (for four provinces, AJK and Northern Areas), and environmental tribunals.

The EPAs were first established under the 1983 Environmental Protection Ordinance; the PEPA 1997 further strengthened their powers. The EPAs have been empowered to receive and review the environmental assessment reports (IEEs and EIAs) of the proposed projects, and provide their approval (or otherwise).

All of the components of the proposed projects would be located in Punjab Province. Hence this ESA report will be sent to the Punjab EPA for review.
2.5 Environmental and Social Guidelines

Two sets of guidelines, the Pak-EPA's guidelines and the World Bank Environmental Guidelines are reviewed here. These guidelines address the environmental as well as social aspects.

2.5.1 Environmental Protection Agency's Environmental and Social Guidelines

The Federal EPA has prepared a set of guidelines for conducting environmental assessments. The guidelines derive from much of the existing work done by international donor agencies and NGOs. The package of regulations, of which the guidelines form a part, includes the PEPA 1997 and the NEQS. These guidelines are listed below.

- Guidelines for the Preparation and Review of Environmental Reports,
- Guidelines for Public Consultation,
- Guidelines for Sensitive and Critical Areas,
- Sectoral Guidelines.

It is stated in the Pakistan Environmental Protection Agency Review of IEE and EIA Regulations, 2000 that the EIA or IEE must be prepared, to the extent practicable, in accordance with the Pakistan Environmental Protection Agency Environmental Guidelines.

2.5.2 World Bank Environmental and Social Guidelines

The principal World Bank publications that contain environmental and social guidelines are listed below.

- Pollution Prevention and Abatement Handbook 1998: Towards Cleaner Production
- Social Analysis Sourcebook.
- WB environmental and social safeguard policies.
Exhibit 2.1: Selected NEQS for Waste Effluents

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unit</th>
<th>Standards (maximum allowable limit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature increase</td>
<td>°C</td>
<td>&lt; 3</td>
</tr>
<tr>
<td>pH value (acidity/basicity)</td>
<td>pH</td>
<td>6-9</td>
</tr>
<tr>
<td>5-day biochemical oxygen demand (BOD) at 20 °C</td>
<td>mg/l</td>
<td>80</td>
</tr>
<tr>
<td>Chemical oxygen demand (COD)</td>
<td>mg/l</td>
<td>150</td>
</tr>
<tr>
<td>Total suspended solids</td>
<td>mg/l</td>
<td>200</td>
</tr>
<tr>
<td>Total dissolved solids</td>
<td>mg/l</td>
<td>3,500</td>
</tr>
<tr>
<td>Grease and oil</td>
<td>mg/l</td>
<td>10</td>
</tr>
<tr>
<td>Phenolic compounds (as phenol)</td>
<td>mg/l</td>
<td>0.1</td>
</tr>
<tr>
<td>Chloride (as Cl)</td>
<td>mg/l</td>
<td>1,000</td>
</tr>
<tr>
<td>Fluoride (as F)</td>
<td>mg/l</td>
<td>10</td>
</tr>
<tr>
<td>Sulfate (SO₄)</td>
<td>mg/l</td>
<td>600</td>
</tr>
<tr>
<td>Sulfide (S)</td>
<td>mg/l</td>
<td>1.0</td>
</tr>
<tr>
<td>Ammonia (NH₃)</td>
<td>mg/l</td>
<td>40</td>
</tr>
<tr>
<td>Cadmium</td>
<td>mg/l</td>
<td>0.1</td>
</tr>
<tr>
<td>Chromium (trivalent and hexavalent)</td>
<td>mg/l</td>
<td>1.0</td>
</tr>
<tr>
<td>Copper</td>
<td>mg/l</td>
<td>1.0</td>
</tr>
<tr>
<td>Lead</td>
<td>mg/l</td>
<td>0.5</td>
</tr>
<tr>
<td>Mercury</td>
<td>mg/l</td>
<td>0.01</td>
</tr>
<tr>
<td>Selenium</td>
<td>mg/l</td>
<td>0.5</td>
</tr>
<tr>
<td>Nickel</td>
<td>mg/l</td>
<td>1.0</td>
</tr>
<tr>
<td>Silver</td>
<td>mg/l</td>
<td>1.0</td>
</tr>
<tr>
<td>Total toxic metals</td>
<td>mg/l</td>
<td>2.0</td>
</tr>
<tr>
<td>Zinc</td>
<td>mg/l</td>
<td>5</td>
</tr>
<tr>
<td>Arsenic</td>
<td>mg/l</td>
<td>1.0</td>
</tr>
<tr>
<td>Barium</td>
<td>mg/l</td>
<td>1.5</td>
</tr>
<tr>
<td>Iron</td>
<td>mg/l</td>
<td>8.0</td>
</tr>
<tr>
<td>Manganese</td>
<td>mg/l</td>
<td>1.5</td>
</tr>
<tr>
<td>Boron</td>
<td>mg/l</td>
<td>6.0</td>
</tr>
<tr>
<td>Chlorine</td>
<td>mg/l</td>
<td>1.0</td>
</tr>
</tbody>
</table>


Notes:
1. The standard assumes that dilution of 1:10 on discharge is available. That is, for each cubic meter of treated effluent, the recipient water body should have 10 m$^3$ of water for dilution of this effluent.
2. Toxic metals include cadmium, chromium, copper, lead, mercury, selenium, nickel and silver. The effluent should meet the individual standards for these metals as well as the standard for total toxic metal concentration.
### Exhibit 2.2: NEQS for Industrial Gaseous Emissions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Source of Emission</th>
<th>Standards (maximum allowable limit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoke</td>
<td>Smoke opacity not to exceed</td>
<td>40% or 2 Ringlemann Scale or equivalent smoke number</td>
</tr>
<tr>
<td>Particulate matter</td>
<td>(a) Boilers and furnaces:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>i. Oil fired</td>
<td>300</td>
</tr>
<tr>
<td></td>
<td>ii. Coal fired</td>
<td>500</td>
</tr>
<tr>
<td></td>
<td>iii. Cement Kilns</td>
<td>300</td>
</tr>
<tr>
<td></td>
<td>(b) Grinding, crushing, dinker coolers and related processes, metallurgical processes, converters, blast furnaces and cupolas</td>
<td>500</td>
</tr>
<tr>
<td>Hydrogen Chloride</td>
<td>Any</td>
<td>400</td>
</tr>
<tr>
<td>Chlorine</td>
<td>Any</td>
<td>150</td>
</tr>
<tr>
<td>Hydrogen fluoride</td>
<td>Any</td>
<td>150</td>
</tr>
<tr>
<td>Hydrogen sulphide</td>
<td>Any</td>
<td>10</td>
</tr>
<tr>
<td>Sulphur Oxides 2,3</td>
<td>Sulfuric acid/Sulphonic acid plants</td>
<td>5,000</td>
</tr>
<tr>
<td></td>
<td>Other Plants except power Plants operating on oil and coal</td>
<td>1,700</td>
</tr>
<tr>
<td>Carbon Monoxide</td>
<td>Any</td>
<td>800</td>
</tr>
<tr>
<td>Lead</td>
<td>Any</td>
<td>50</td>
</tr>
<tr>
<td>Mercury</td>
<td>Any</td>
<td>10</td>
</tr>
<tr>
<td>Cadmium</td>
<td>Any</td>
<td>20</td>
</tr>
<tr>
<td>Arsenic</td>
<td>Any</td>
<td>20</td>
</tr>
<tr>
<td>Copper</td>
<td>Any</td>
<td>50</td>
</tr>
<tr>
<td>Antimony</td>
<td>Any</td>
<td>20</td>
</tr>
<tr>
<td>Zinc</td>
<td>Any</td>
<td>200</td>
</tr>
<tr>
<td>Oxides of Nitrogen 3</td>
<td>Nitric acid manufacturing unit</td>
<td>3,000</td>
</tr>
<tr>
<td></td>
<td>Other plants except power plants operating on oil or coal:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>i. Gas fired</td>
<td>400</td>
</tr>
<tr>
<td></td>
<td>ii. Oil fired</td>
<td>600</td>
</tr>
<tr>
<td></td>
<td>iii. Coal fired</td>
<td>1,200</td>
</tr>
</tbody>
</table>


Explanations:
1. Based on the assumption that the size of the particulate is 10 micron or more.
2. Based on 1% sulphur content in fuel oil. Higher content of sulphur will cause standards to be prorated.
3. In respect of emissions of sulphur dioxide and nitrogen oxides, the power plants operating on oil and coal as fuel shall in addition to NEQS specified above, comply with the standards provided separately.
Exhibit 2.3: NEQS for Motor Vehicles Exhaust and Noise

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Standards (maximum permissible limit)</th>
<th>Measuring Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoke</td>
<td>40% or 2 on the Ringlemann Scale during engine acceleration mode.</td>
<td>To be compared with Ringlemann Chart at a distance of 6 meters or more.</td>
</tr>
<tr>
<td>Carbon Monoxide</td>
<td>New Vehicle = 4.5%</td>
<td>Under idling conditions: non-dispersive infrared detection through gas analyzer.</td>
</tr>
<tr>
<td></td>
<td>Used Vehicle = 6%</td>
<td></td>
</tr>
<tr>
<td>Noise</td>
<td>85 dB(A)</td>
<td>Sound meter at 7.5 meter from the source.</td>
</tr>
</tbody>
</table>


Exhibit 2.4: WHO Ambient Air Quality Standards

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Maximum Allowable Limit</th>
<th>Units</th>
<th>Averaging Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO</td>
<td>35</td>
<td>ppm</td>
<td>1 hour</td>
</tr>
<tr>
<td>NOx</td>
<td>106</td>
<td>ppb</td>
<td>1 hour</td>
</tr>
<tr>
<td>SO₂</td>
<td>134</td>
<td>ppb</td>
<td>1 hour</td>
</tr>
<tr>
<td>PM₁₀</td>
<td>70</td>
<td>μg/m³</td>
<td>24 hours</td>
</tr>
</tbody>
</table>
### Exhibit 2.5: WHO Drinking Water Quality Standards

<table>
<thead>
<tr>
<th>Element/Substance</th>
<th>Symbol/Formula</th>
<th>Normally Found In Freshwater/Surface Water/ Groundwater</th>
<th>Health Based WHO Guideline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminium</td>
<td>Al</td>
<td>&lt; 0.2 mg/l (up to 0.3 mg/l in anaerobic waters)</td>
<td>0.2 mg/l</td>
</tr>
<tr>
<td>Ammonia</td>
<td>NH₄</td>
<td>&lt; 4 μg/l</td>
<td>0.005 mg/l</td>
</tr>
<tr>
<td>Antimony</td>
<td>Sb</td>
<td>&lt; 4 μg/l</td>
<td>0.01 mg/l</td>
</tr>
<tr>
<td>Arsenic</td>
<td>As</td>
<td>&lt; 4 μg/l</td>
<td>0.01 mg/l</td>
</tr>
<tr>
<td>Asbestos</td>
<td></td>
<td></td>
<td>No guideline</td>
</tr>
<tr>
<td>Barium</td>
<td>Ba</td>
<td>&lt; 4 μg/l</td>
<td>0.3 mg/l</td>
</tr>
<tr>
<td>Beryllium</td>
<td>Be</td>
<td>&lt; 1 μg/l</td>
<td>No guideline</td>
</tr>
<tr>
<td>Boron</td>
<td>B</td>
<td>&lt; 1 μg/l</td>
<td>0.3 mg/l</td>
</tr>
<tr>
<td>Cadmium</td>
<td>Cd</td>
<td>&lt; 1 μg/l</td>
<td>0.003 mg/l</td>
</tr>
<tr>
<td>Chloride</td>
<td>Cl</td>
<td></td>
<td>250 mg/l</td>
</tr>
<tr>
<td>Chromium</td>
<td>Cr³⁺, Cr⁶⁺</td>
<td>&lt; 2 μg/l</td>
<td>0.05 mg/l</td>
</tr>
<tr>
<td>Color</td>
<td></td>
<td></td>
<td>Not mentioned</td>
</tr>
<tr>
<td>Copper</td>
<td>Cu</td>
<td></td>
<td>2 mg/l</td>
</tr>
<tr>
<td>Cyanide</td>
<td>CN⁻</td>
<td></td>
<td>0.07 mg/l</td>
</tr>
<tr>
<td>Dissolved oxygen</td>
<td>O₂</td>
<td>&lt; 1 mg/l</td>
<td>No guideline</td>
</tr>
<tr>
<td>Fluoride</td>
<td>F</td>
<td>&lt; 1.5 mg/l (up to 10)</td>
<td>1.5 mg/l</td>
</tr>
<tr>
<td>Hardness</td>
<td>mg/l CaCO₃</td>
<td></td>
<td>No guideline</td>
</tr>
<tr>
<td>Hydrogen sulfide</td>
<td>H₂S</td>
<td></td>
<td>No guideline</td>
</tr>
<tr>
<td>Iron</td>
<td>Fe</td>
<td>0.5 - 50 mg/l</td>
<td>No guideline</td>
</tr>
<tr>
<td>Lead</td>
<td>Pb</td>
<td></td>
<td>0.01 mg/l</td>
</tr>
<tr>
<td>Manganese</td>
<td>Mn</td>
<td></td>
<td>0.5 mg/l</td>
</tr>
<tr>
<td>Mercury</td>
<td>Hg</td>
<td>&lt; 0.5 μg/l</td>
<td>0.001 mg/l</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>Mo</td>
<td>&lt; 0.01 mg/l</td>
<td>0.07 mg/l</td>
</tr>
<tr>
<td>Nickel</td>
<td>Ni</td>
<td>&lt; 0.02 mg/l</td>
<td>0.02 mg/l</td>
</tr>
<tr>
<td>Nitrate and nitrite</td>
<td>NO₃, NO₂</td>
<td></td>
<td>50 mg/l total nitrogen</td>
</tr>
<tr>
<td>Turbidity</td>
<td></td>
<td></td>
<td>Not mentioned</td>
</tr>
<tr>
<td>pH</td>
<td></td>
<td></td>
<td>No guideline</td>
</tr>
<tr>
<td>Selenium</td>
<td>Se</td>
<td>&lt; &lt; 0.01 mg/l</td>
<td>0.01 mg/l</td>
</tr>
<tr>
<td>Silver</td>
<td>Ag</td>
<td>5 - 50 μg/l</td>
<td>No guideline</td>
</tr>
<tr>
<td>Sodium</td>
<td>Na</td>
<td>&lt; 20 mg/l</td>
<td>200 mg/l</td>
</tr>
<tr>
<td>Sulfate</td>
<td>SO₄</td>
<td></td>
<td>500 mg/l</td>
</tr>
<tr>
<td>Inorganic tin</td>
<td>Sn</td>
<td></td>
<td>No guideline</td>
</tr>
<tr>
<td>TDS</td>
<td></td>
<td></td>
<td>No guideline</td>
</tr>
<tr>
<td>Uranium</td>
<td>U</td>
<td></td>
<td>1.4 mg/l</td>
</tr>
<tr>
<td>Zinc</td>
<td>Zn</td>
<td></td>
<td>3 mg/l</td>
</tr>
</tbody>
</table>
3 Environmental and Social Guidelines

This Chapter provides guidelines and checklists for the environmental and social assessment for the 6th STG and ELR project components to be executed during the years 2007-08 and 2008-09.

3.1 Regulatory and Policy Review

3.1.1 World Bank Operational Policies

The WB operational policies that could be relevant to the proposed activities have been discussed in Section 2.1 of this document. Once the project details are finalized in sufficient details, ESA of the proposed activities will determine which of the operational policies would be triggered. The ESA will identify the specific actions the Project will have to take for each triggered operational policy.

3.1.2 National Legislation and Regulations

The ESA will also assess the project with respect to the applicability of various national laws and regulations discussed in Section 2.2 of this document. The ESA will identify the specific actions the Project will be liable to take for each relevant/applicable law or regulation.

3.2 Environmental Baseline Conditions

The environmental baseline condition will record the conditions of the various aspects of the environment before the commencement of the project. The following aspects of the environment will be covered.

3.2.1 Physiography of the Project Area

The ESA will describe the topography, geography, relief and geology of the project area. Where relevant, site-specific information will also be provided. This information will mostly be obtained through secondary literature sources. Photographic record will also be included in the ESA report where necessary.

3.2.2 Climate, Meteorological Conditions and Ambient Air Quality

The ESA will provide the climate and meteorological data of the project area. The source of this information will also be published data.

The ambient air quality information will be site specific as far as possible. Where required, primary data will be collected to record the ambient air quality at the key project sites.

3.2.3 Surface Water, Groundwater and Water Quality

The ESA will report the surface water bodies of the project area. The description will be augmented by appropriate maps showing the key surface water resources of the area.
Data will also be presented on the surface water quality of the area, and if required, water analysis will be carried out at the project sites. Any significant water bodies at or around the project sites will be described in greater detail.

Much like the surface water, the groundwater resources of the project area will be described. The key data will be obtained including availability, depth to water table, and quality of the groundwater. Most of this information will be obtained from the available secondary literature. Site specific information will include the water usage, depth to water table, and water quality analysis carried out at the project sites.

### 3.2.4 Biological Environment

The ESA will provide description of the ecological conditions of the region, ecozones of the project area, the key floral and faunal resources of the area, and the prevailing threats to these resources, if any. Site-specific information will be provided in greater detail. The description will focus on the biological resources which can be potentially impacted by the proposed activities. A suitable expert (i.e., a biologist) will be part of the ESA team to develop this baseline description of the biological resources of the project area.

The ESA will also identify any wildlife protected areas at or in the vicinity of the project sites (i.e., grid station locations and transmission line routes). A list of these protected areas is provided in Exhibit 3.1.

### 3.2.5 Environmental Hotspots

The ESA will also identify environmental hotspots at or around the project sites. These will be in addition to the protected areas mentioned above (and listed in Exhibit 3.1). The description will focus on the aspects of these hotspots which are vulnerable to be affected as a result of the project activities.

### 3.3 Socioeconomic Baseline Conditions

The socioeconomic baseline condition will record the conditions of the various aspects of the human and social environment before the commencement of the project. A suitable socioeconomic expert will be included in the ESA team to undertake this aspect of the ESA.

The following aspects of the human and social environment will be covered.

#### 3.3.1 Social Setup

The ESA will include an overview of the social setup, ethnic mix up, family structure and castes/tribes of the project area. This information will mostly be based upon the secondary literature.

#### 3.3.2 Economic Conditions

This aspect of the socioeconomic baseline will address the economic activities, main occupations and poverty situation of the area. The agricultural activities, main crops and
cultivation patterns will also be reported. An overview of the industrial setups in the area will also be provided. Most of this information will be obtained from the available secondary resources.

3.3.3 Demographic Data
The ESA will report the key demographic data of the project area. The key aspects of the demographic data will include the population, housing, literacy and basic amenities. This information will also be obtained from the published literature and reports.

3.3.4 Social Infrastructure
The baseline description of the project area will also include information on educational institutes and health facilities available in the area.

3.3.5 Administrative Setup
An overview of the administrative setup(s) prevailing in different parts of the project area will be provided in the ESA. The description will focus on the aspects which are relevant to the proposed project.

3.3.6 Site Specific Information
The aspects of human and social environment discussed in Sections 3.3.1 to 3.3.5 above would primarily cover the entire project area, and would mostly draw from the secondary resources. Detailed primary data will be collected at the project sites (grid station locations and transmission line routes), and reported in the ESA. This data will focus on the project affected persons (PAPs). The income/asset survey of the PAPs will also be carried out where necessary.

3.3.7 Sites of Archeological, Cultural, Historical or Religious Significance
The ESA will also identify any sites of archeological, cultural, historical or religious significance at or in the vicinity of the project sites (ie, grid station locations and transmission line routes). A list of these sites that have been notified/documentd is provided in Exhibit 3.2.

3.4 Analysis of Alternatives
3.4.1 No-Project Alternative
The ESA will evaluate the 'no-project' situation and report the justification for rejecting this alternative.

3.4.2 Siting Alternatives
The siting alternatives for the grid stations and transmission line routes will be analyzed. The environmental and social aspects of these alternatives will be particularly described. The description will also include the siting process, selection criteria and justification for the selected options. While considering various alternatives sites for grid stations and routes for transmission lines, efforts will be made to minimize the environmental as well
Environmental and Social Guidelines

as socioeconomic impacts of the selected options. For this task, close coordination with
the MEPCO staff, particularly the route survey teams, will be essentially required.

3.4.3 Technical Alternatives
The ESA will analyze the environmental and socioeconomic aspects of various technical
options available for the Project. For this task as well, close liaison with the MEPCO
technical staff will be required.

3.5 Stakeholder Consultation

3.5.1 Participation Framework
The ESA will define the participation and consultation requirements during different
phases of the project. The framework will include information pertaining to the
stakeholder consultation, particularly 'what', 'who', 'how', 'by whom' and 'when'.

3.5.2 Stakeholder Analysis
The ESA will define the process to be used for the identification and classification of
various stakeholders of the proposed project. The outcome of the process in terms of the
identified stakeholders will also be documented during the ESA.

3.5.3 Institutional Consultations
During the ESA, consultations and meetings will be held with the institutional
stakeholders. These will include the MEPCO staff, regulatory agency staff, local
administration and prominent/relevant NGOs. The salient project information and the key
social as well as environmental aspects of the project will be explained to the participants
during these meetings. The ESA team will record the participants' comments,
observations, apprehensions and recommendations.

The ESA report will include the process and outcome of the institutional stakeholder
consultations.

3.5.4 Grass Root Consultation
The ESA team will conduct more comprehensive consultations with the grass route
stakeholders, focusing on the PAPs. These consultations will be carried out at the grid
station sites and along the transmission line routes. Much like the institutional
consultations, the ESA team will provide the salient project information to the participants,
focusing on the project's impacts on the communities, such as land acquisition and crop
damage. The ESA team will record the feedback, comments, concerns, apprehensions
and recommendations of the participants.

The ESA report will include the process and outcome of the grass root stakeholder
consultations.
3.6 Environmental Impacts and their Mitigation

The environment impact assessment will be the key element of the ESA study. The suggested methodology for the impact assessment, followed by the application of this methodology for different project phases, is described below.

3.6.1 Environmental Impact Assessment Methodology

The ESA will use a screening matrix tailored specifically to the proposed project, focusing the potential environmental impacts during the design, construction and operation phases. The matrix will examine the interaction of project activities with various components of the environment. The potential impacts thus predicted will be characterized as follows:

- High negative (adverse) impact,
- Low negative impact,
- Insignificant impact,
- High positive (beneficial) impact,
- Low positive impact, and
- No impact.

The suggested matrix is provided in Exhibit 3.3. However this matrix can be modified, if required, while performing the ESA.

Once the potentially adverse impacts are identified as discussed above, these impacts will be characterized. Various aspects of the impact characterization will include:

- Nature (direct/indirect)
- Duration of impact (short term, medium term, long term)
- Geographical extent (local, regional)
- Timing (project phase: before, during and after construction)
- Reversibility of impact (reversible/irreversible)
- Likelihood of the impact (certain, likely, unlikely, rare)
- Impact consequence severity (severe, moderate, mild)
- Significance of impact (High, medium, low).

3.6.2 Design Phase Environmental Impacts and Mitigation

The ESA will identify the potential environmental impacts associated with the design phase of the project. The key design aspects with environmental significance that will be considered during the ESA will include:

- Soil Erosion
- Soil and Water Contamination
3.6.3 Construction Phase Environmental Impacts and Mitigation

The ESA will also identify the potential environmental impacts associated with the construction phase of the project. The key environmental issues that are likely to arise during the construction activities include:

- **Physical Environment**
  - Soil erosion, degradation
  - Air quality deterioration
  - Water contamination and consumption

- **Biological Environment**
  - Loss of/damage to the floral resources (natural vegetation) of the area
  - Loss of/damage to faunal resources (wildlife) of the area.

However the ESA may identify additional environmental impacts during the assessment. The ESA will recommend mitigation measures to address the above concerns. The residual impacts will also be identified, which will be experienced after the implementation of the mitigation measures.

3.6.4 Operation Phase Environmental Impacts and Mitigation

The ESA will also identify the potential environmental impacts associated with the operation and maintenance (O&M) phase of the project. The key environmental issues that are likely to arise during this phase include:

- Contamination of soil and water as a result of inappropriate waste disposal at the grid stations
- Contamination of soil and water as a result of leakage of transformer oil.
- Damage to natural vegetation and wildlife during the transmission line patrolling and maintenance activities.

However the ESA may identify additional environmental impacts during the assessment. The ESA will recommend mitigation measures to address the above concerns. The residual impacts will also be identified, which will be experienced after the implementation of the mitigation measures.
3.7 Social Impacts and their Mitigation

The social impact assessment will focus on identification of the PAPs and the compensation arrangements, though there will also be some secondary concerns. The methodology and various elements of the social impact assessment is discussed below.

3.7.1 Social Impact Assessment Methodology

The screening matrix discussed in Section 3.6.1 above and presented in Exhibit 3.3 addresses the socioeconomic aspects as well. In addition, a checklist will also be used to identify the key social aspects of the proposed project. The checklist is provided in Exhibit 3.4.

3.7.2 Design Phase Social Impacts and Mitigation

The ESA will identify the potential social impacts associated with the design phase of the project. The key design aspects with social significance that will be considered during the ESA will include:

- Resettlement issues
- Safety hazards
- Public health concerns
- Aesthetic value.

However the ESA may identify additional social impacts during the assessment.

The ESA will recommend mitigation measures to address the above concerns.

3.7.3 Construction Phase Social Impacts and Mitigation

The ESA will also identify the potential social impacts associated with the construction phase of the project. Involuntary resettlement will be the key social issue that will arise as a result of the proposed project. During the resettlement impact assessment, PAPs will be identified, along with the determination of extent and magnitude of resettlement impact. The compensation amount for each PAP will also be estimated during this task.

Other social issues that are likely to arise during the construction activities include:

- Damage to infrastructure
- Blocked access
- Noise and vibration
- Safety hazard
- Public health
- Gender issues.

However the ESA may identify additional social impacts during the assessment.
The ESA will recommend mitigation measures to address the above concerns. The residual impacts will also be identified, which will be experienced after the implementation of the mitigation measures.

**3.7.4 Operation Phase Social Impacts and Mitigation**

The ESA will also identify the potential social impacts associated with the operation and maintenance (O&M) phase of the project. The key social issues that are likely to arise during this phase include:

- Safety hazards
- Public health
- Loss of agriculture.

However, the ESA may identify additional social impacts during the assessment.

The ESA will recommend mitigation measures to address the above concerns. The residual impacts will also be identified, which will be experienced after the implementation of the mitigation measures.

**3.8 Environmental Management Plan**

An environmental management plan (EMP) will be developed while performing the ESA. The EMP will provide the delivery mechanism to address the adverse environmental as well as social impacts of the proposed project during its execution, to enhance project benefits, and to introduce standards of good practice to be adopted for all project works. The outline EMP, in the shape of the environmental and social management framework, is provided in the next chapter.

The key aspects of the EMP are discussed below.

**3.8.1 Organizational Structure**

The EMP will recommend the organizational structure required for managing the environmental as well as social aspects of the proposed project. The description will be augmented with an organizational chart for the proposed project, focusing on the environmental and social management of the project.

**3.8.2 Roles and Responsibilities**

The EMP will define the roles and responsibilities of the various role players during the project. The roles and responsibilities will be defined for the MEPCO staff, contractors' staff and environmental and social personnel.

**3.8.3 Mitigation Plan**

The ESA will develop a mitigation plan as a part of the EMP. The Plan will list all the potential effects of each activity of the project and their associated mitigation measures identified in the ESA. For each project activity, the following information will be presented in the plan:
3.8.4 Monitoring Plan
The ESA will develop a monitoring plan as a part of the EMP. The objective of environmental and social monitoring during the various phases of the proposed project will be as follows:

- Ensuring that the mitigation measures included in the ESA are being implemented completely.
- Ensuring the effectiveness of the mitigation measures in minimizing the project's impacts on social and environmental resources.

To achieve these objectives the following monitoring program will be implemented.

- Compliance monitoring
- Effects monitoring
- External monitoring

The monitoring plan will provide details of the above types of monitoring, including the procedures, responsibility, timeframe and reporting requirements.

3.8.5 Communication and Documentation
The ESA will propose an effective mechanism for storing and communicating environmental and social information during the project. The key features of such a mechanism will be:

- Recording and maintenance of all information generated during the monitoring in a predetermined format.
- Communicating the information to a central location.
- Storing raw information in a central database.
- Processing the information to produce periodic reports.

The EMP will provide details of each of the above aspects of the communication and documentation system.

3.8.6 Grievance Redressal Mechanism
The ESA will develop a comprehensive grievance redressal mechanism (GRM), in order to address the grievances of the stakeholders, particularly the PAPs. The key reasons of these grievances may include
3.8.7 Change Management

The EMP will propose a change management system that will define course of actions in case of changes in the project components and their siting. Such changes may have environmental and/or social implications. The change management system will address such eventualities and will define course of action, ensuring that the project remains environmentally and socially compliant to the WB's OPs and national legislation/regulations.

3.8.8 Environmental and Social Trainings

The EMP will propose an environmental and social training program. The program will identify various types of trainings, the staff to be trained, responsibility of conducting the trainings and timeframe.

3.8.9 Environmental and Social Management Budget

The EMP will also provide an estimate of the environmental and social management of the proposed project. The budget will include personnel cost, environmental and social monitoring cost, environmental and social training cost, compensation amounts to be paid to PAPs, and any other expenses related to the ESA and EMP implementation.

3.9 Resettlement Plan/Resettlement Policy Framework

During the ESA, an RP or RPF will be developed, depending upon the total number of PAPs, in accordance with the OP 4.12. The key elements of the RP/RPF are discussed below.

3.9.1 Regulatory and Policy Framework

The RP/RPF will provide a review of the national legislation/regulations and WB's safeguard policies relevant to the resettlement and other social issues.
3.9.2 Entitlement Framework

This will be the key element of the RP/RPF, and will provide the entitlement criteria for various types of resettlement impacts, define various PAPs categories, and determine the compensation basis for each category. The framework will be developed in accordance with the provisions of the WB OP 4.12 and the national laws.

3.9.3 Assessment of Involuntary Resettlement

The RP/RPF will provide details of the resettlement impacts, with type, extent and magnitude of the impact. The PAPs will be identified, with estimates of compensation to be paid for each PAP.

3.9.4 Institutional and Implementation Arrangements

The RP/RPF will define the institutional as well as implementation arrangements for the resettlement mitigation actions to be carried out during the proposed project. Roles and responsibilities of various project personnel will be defined for the RP implementation. Discussions with the relevant MEPCO staff will also be taken place in order to incorporate their inputs in the proposed system.

3.9.5 Monitoring Requirements

The RP/RPF will also include a monitoring system to ensure effective implementation of the resettlement mitigation. The system will monitor the process as well as effects/outcome of the mitigation measures. A set of monitoring indicators will also be identified.

3.9.6 Grievance Redressal Mechanism

Much like the GRM defined under the EMP, the RP/RPF will also have a GRM in place, that will ensure that the grievance of the stakeholders - particularly the project affectees - are recorded and addressed in a timely and effective manner during the RP/RPF implementation. The GRM will provide a step-wise procedure to be implemented to address the grievances communicated by the project affectees. Roles and responsibility of various project personnel will be defined for the grievance redressal.

3.9.7 Communication and Documentation Requirements

A communication and documentation system will be developed under the RP/RPF. The system will define meeting schedules, provide communication protocol and describe documentation procedures.

3.9.8 Resettlement Budget

The RP/RPF will also provide the resettlement budget. The budget will include all types of compensations to be paid to the PAPs during the project execution.
## Exhibit 3.1: Wildlife Protected Areas in MEPCO Area

<table>
<thead>
<tr>
<th>Description</th>
<th>Location</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>National Parks</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lal Sohanra National Park</td>
<td>Bahawalpur</td>
<td>50,992</td>
</tr>
<tr>
<td><strong>Wildlife Sanctuaries</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bahawalnagar Plantation</td>
<td>Bahawalnagar</td>
<td>547</td>
</tr>
<tr>
<td>Chak Katra Plantation</td>
<td>Bahawalnagar</td>
<td>536</td>
</tr>
<tr>
<td>Chichawati Plantation</td>
<td>Sahiwal</td>
<td>4,668</td>
</tr>
<tr>
<td>Cholistan</td>
<td>Bahawalpur and Bahawalnagar</td>
<td>651,216</td>
</tr>
<tr>
<td>Daman Forest Plantation</td>
<td>Rajanpur</td>
<td>2,271</td>
</tr>
<tr>
<td>Inayat Forest Plantation</td>
<td>Layyah</td>
<td>4,213</td>
</tr>
<tr>
<td>Khanewal Plantation</td>
<td>Khanewal</td>
<td>7,216</td>
</tr>
<tr>
<td>Lal Sohanra</td>
<td>Bahawalpur</td>
<td>5,101</td>
</tr>
<tr>
<td>Machu Plantation</td>
<td>Layyah</td>
<td>4,111</td>
</tr>
<tr>
<td>Miranpur Plantation</td>
<td>Lodhran</td>
<td>789</td>
</tr>
<tr>
<td>Rajan Shah Plantation</td>
<td>Layyah</td>
<td>2,111</td>
</tr>
<tr>
<td>Rakh Kharewala</td>
<td>Layyah</td>
<td>5,880</td>
</tr>
<tr>
<td>Taunsa Barrage</td>
<td>Muzaffargarh</td>
<td>6,569</td>
</tr>
<tr>
<td>Walhar Plantation</td>
<td>Rahim Yar Khan</td>
<td>1,875</td>
</tr>
<tr>
<td><strong>Game Reserves</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abasia Forest Plantation</td>
<td>Rahim Yar Khan</td>
<td>2,732</td>
</tr>
<tr>
<td>Cholistan</td>
<td>Bahawalpur, Rahim Yar Khan and Bahawalnagar</td>
<td></td>
</tr>
<tr>
<td>Chopalia</td>
<td>Bahawalnagar</td>
<td>9,861</td>
</tr>
<tr>
<td>Head Islam</td>
<td>Vehari</td>
<td>3,132</td>
</tr>
<tr>
<td>Kot Sabzai</td>
<td>Rajanpur</td>
<td>10,121</td>
</tr>
</tbody>
</table>

Source: Punjab Wildlife Department
### Exhibit 3.2: Places of Archeological, Historical or Religious Significance

<table>
<thead>
<tr>
<th>Description</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tomb of Abu Hanifa</td>
<td>Uch Sharif, Bahawalpur</td>
</tr>
<tr>
<td>Tomb of Bibi Jawidi</td>
<td>Uch Sharif, Bahawalpur</td>
</tr>
<tr>
<td>Tomb of Nuria</td>
<td>Uch Sharif, Bahawalpur</td>
</tr>
<tr>
<td>Tomb of Bhawal Halee</td>
<td>Uch Sharif, Bahawalpur</td>
</tr>
<tr>
<td>Tomb of Musa Pak Shaheed</td>
<td>Uch Sharif, Bahawalpur</td>
</tr>
<tr>
<td>Fort Derawar</td>
<td>About 50 km from Bahawalpur</td>
</tr>
<tr>
<td>Noor Palace</td>
<td>Bahawalpur</td>
</tr>
<tr>
<td>Sadiq Garh Palace</td>
<td>Bahawalpur</td>
</tr>
<tr>
<td>Tomb of Ghazi Khan</td>
<td>Village Chirota, Dera Ghazi Khan</td>
</tr>
<tr>
<td>Shrine of Sakhi Sarwar</td>
<td>Dera Ghazi Khan</td>
</tr>
<tr>
<td>Ther Dallu Roy</td>
<td>Dajal, Dera Ghazi Khan</td>
</tr>
<tr>
<td>Shrine of Mohammad Suleman at Taunsa (Taunsa Sharif)</td>
<td>Taunsa, Dera Ghazi Khan</td>
</tr>
<tr>
<td>Tomb of Khalid Walid</td>
<td>Kabirwala, Khanewal</td>
</tr>
<tr>
<td>Ruins of Indus Civilization</td>
<td>Hrappa, Sahiwal</td>
</tr>
<tr>
<td>Tomb of Mir Chakar</td>
<td>Satghara, Sahiwal</td>
</tr>
<tr>
<td>Tomb of Syed Daud Kirmani</td>
<td>Shergarh, Sahiwal</td>
</tr>
<tr>
<td>Tomb of Sheikh Baha-ud-din Zakaria</td>
<td>Multan</td>
</tr>
<tr>
<td>Sawi Masjid and graves</td>
<td>Kotla Tole Khan, Multan</td>
</tr>
<tr>
<td>Tombs of Patrick Alexander Vana, Andrew and William Anderson</td>
<td>Old Fort, Multan</td>
</tr>
<tr>
<td>Shrine of Shah Rukne Alam</td>
<td>Old Fort, Multan</td>
</tr>
<tr>
<td>Tomb of Shah Ali Akbar's mother</td>
<td>Sura Miana, Multan</td>
</tr>
<tr>
<td>Tomb of Shams Tabrez</td>
<td>Sura Miana, Multan</td>
</tr>
<tr>
<td>Tomb of Shah Ali Akbar</td>
<td>Multan</td>
</tr>
<tr>
<td>Tomb of Shah Yusuf Gardezi</td>
<td>Multan</td>
</tr>
<tr>
<td>Mound Ratti Khari</td>
<td>Kabirwala</td>
</tr>
<tr>
<td>Tomb of Shah Hussain Soozai</td>
<td>Multan</td>
</tr>
<tr>
<td>Tomb of Mai Mehraban</td>
<td>Multan</td>
</tr>
<tr>
<td>Ruins of a Mosque</td>
<td>Sargana, Multan</td>
</tr>
<tr>
<td>Maryala Mound</td>
<td>Multan</td>
</tr>
<tr>
<td>Phulra Fort</td>
<td>Fort Abbas, Bahawalnagar</td>
</tr>
<tr>
<td>Mir Garh Fort</td>
<td>Fort Abbas, Bahawalnagar</td>
</tr>
<tr>
<td>Jam Garh Fort</td>
<td>Fort Abbas, Bahawalnagar</td>
</tr>
<tr>
<td>Marrot Fort</td>
<td>Bahawalnagar</td>
</tr>
</tbody>
</table>
...Continued, Exhibit 3.2.

<table>
<thead>
<tr>
<th>Description</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tomb of Thar Khan Nahar</td>
<td>Muzaffargarh</td>
</tr>
<tr>
<td>Mosque of Thar Khan Nahar</td>
<td>Muzaffargarh</td>
</tr>
<tr>
<td>Tomb of Sheikh Sadan Shaheed</td>
<td>Muzaffargarh</td>
</tr>
<tr>
<td>Shrine of Hazrat Din Panah</td>
<td>Daira Din Panah, Muzaffargarh</td>
</tr>
<tr>
<td>Shrine of Hazrat Noor Shah</td>
<td>Kot Addu, Muzaffargarh</td>
</tr>
<tr>
<td>Shrine of Hazrat Baba Baga Sher</td>
<td>Muzaffargarh</td>
</tr>
<tr>
<td>Shrine of Hazrat Alam Shah Bukhari</td>
<td>Shehr Sultan Jatoi, Muzaffargarh</td>
</tr>
<tr>
<td>Shrine of Hazrat Pir Jahanian</td>
<td>Muzaffargarh</td>
</tr>
<tr>
<td>Shah Garh Fort</td>
<td>Muzaffargarh</td>
</tr>
<tr>
<td>Mosque at Bhong</td>
<td>Bhong, about 28 km from Sadiqabad, District Rahim Yar Khan</td>
</tr>
<tr>
<td>Pttan Minar</td>
<td>Rahim Yar Khan</td>
</tr>
<tr>
<td>Mau Mubarakik Fort</td>
<td>Rahim Yar Khan</td>
</tr>
<tr>
<td>Khair Garh Fort</td>
<td>About 40 km south of Khanpur, District Rahim Yar Khan</td>
</tr>
<tr>
<td>Islam Garh Fort</td>
<td>About 34 km south of Rahim Yar Khan</td>
</tr>
<tr>
<td>Bhutta Wahan</td>
<td>About 16 km north of Rahim Yar Khan</td>
</tr>
<tr>
<td>Shrine of Hazrat Baba Farid-ud-din Ganj-e-Shakar</td>
<td>Pakpattan</td>
</tr>
</tbody>
</table>

### Exhibit 3.3: Environmental and Social Screening Matrix

<table>
<thead>
<tr>
<th>Physical</th>
<th>Biological</th>
<th>Social and Socioeconomic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soil Erosion / Contamination</td>
<td>Air Quality</td>
<td>Wildlife</td>
</tr>
<tr>
<td></td>
<td>Surface Water Quality</td>
<td>Blocked Access Routes</td>
</tr>
<tr>
<td></td>
<td>Groundwater Quality and Consumption</td>
<td>Noise and Vibration</td>
</tr>
<tr>
<td></td>
<td>Water Availability and Consumption</td>
<td>Agriculture</td>
</tr>
<tr>
<td></td>
<td>Natural Vegetation</td>
<td>Livestock Grazing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Compensation Issues</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Safety Hazard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Employment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Infrastructure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Public Health and Nuisance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Aesthetic Value</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cultural Issues</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gender Issues</td>
</tr>
</tbody>
</table>

#### Design Phase
- Site Selection for Grid Stations
- Route Selection for Transmission Lines/Feeders
- Equipment Selection

#### Construction Phase-Grid Stations
- Land Acquisition
- Mobilization of Contractors
- Construction Camp Establishment
- Construction Camp Operation
- Transportation of Construction Materials and Supplies
- Excavation for Foundations
- Construction Works
- Equipment Installation
- Testing and Commissioning
- Construction Phase-Transmission Lines/Feeders
# Environmental and Social Guidelines

**MEPCO 6th STG Project**

**Environmental and Social Guidelines**

## Table of Environmental and Social Impacts

<table>
<thead>
<tr>
<th>Physical</th>
<th>Biological</th>
<th>Social and Socioeconomic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation and Maintenance Phase</td>
<td>Grid Station O&amp;M</td>
<td>Transmission Line/Feeders O&amp;M</td>
</tr>
</tbody>
</table>

**Key:**

-2: High negative impact; -1: Low negative impact; 0: insignificant/negligible impact; +1: low positive impact; +2: High positive impact; N: no impact.

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3-16

September 2006

FRT06V03MES-ESG
Exhibit 3.4: Social Screening Checklist

- Who are people affected by the project (with categories of persons and intensity of impacts)?
- What is the poverty level of affected persons?
- Are directly affected stakeholders agreeable to allow the project?
- What are the social issues, impacts of the project (loss of land, loss of livelihood, impact of high voltage transmissions on electrical and other machines, etc)?
- Does the project require land? If yes how much? How will it be acquired?
- Is there any involuntary land acquisition? How will it be acquired?
- Are there any affected structures if yes, how many?
- Will there be any loss of livelihood of title and non-title holders?
- Is there a social conflict resolution mechanism in the communities?
- Are the social safeguard triggered? If yes, which ones and how?
- Any commercial activities affected in urban/rural areas?
4 Environmental and Social Management Framework

This Chapter outlines the environmental and social management framework (ESMF). The ESMF provides generic guidelines to be followed while implementing various project activities, in order to keep the project environmentally and socially sound. However for more precise, site specific environmental and social management, an ESA has to be carried out for the years 3 and 4 of the 6th STG project, as mentioned earlier.

4.1 Organizational Structure, Roles and Responsibilities

This section describes the organizational structure required for managing the environmental as well as social aspects of the proposed project. Also defined in this section are the roles and responsibilities of the various role players during the project.

4.1.1 Design and Construction Phases

The organizational structure during the 3rd and 4th years of the 6th STG project will essentially be similar to the one proposed in the ESA for the 2nd year of the project (see Chapter 10 of the ESA report). The salient features of the structure are provided below.

- MEPCO's Environmental and Social Cell (ESC), proposed in the ESA, will continue providing supervisory and advisory services to other MEPCO departments concerning environmental and social issues during the 3rd and 4th years of the 6th STG project.
- MEPCO will appoint an Environmental and Social Inspector (ESI) at the project sites to ensure compliance with the ESMF (and EMP when available), and MEPCO's other environmental commitments.
- Each contractor will appoint a dedicated Environmental and Social Monitor (ESM) at the project sites. The ESM will be responsible for the implementation of the ESMF (and EMP when available) during construction works. He will also be responsible for communication with and the training of their respective construction and camp crews in all aspects of the ESMF.

The responsibilities of various role players are summarized in Exhibit 4.1.

4.1.2 Operation Phase

During the operation phase of the proposed project, environmental and social management will become a routine function, as an integral part of the O&M activities. Various environmental and social management roles and responsibilities would be distributed among the MEPCO staff assigned to operate and maintain grid stations as well as transmission lines. The ESC will continue providing supervisory and advisory services during this phase as well.
4.2 Environmental and Social Guidelines

The guidelines are the key component of the ESMF. These guidelines list all the potential effects of each activity of the project and their associated generic mitigation measures. These guidelines should be followed during the design, construction and operation of project components. The guidelines are presented in Exhibits 4.2 to 4.9.

Once the ESA of the years 3 and 4 of the 6th STG project is completed, the mitigation plan included in the ESA would replace the environmental and social guidelines provided in this document.

4.3 Monitoring Plan

The objective of environmental and social monitoring during the various phases of the proposed project would be as follows:

- Ensuring that the guidelines included in the ESMF are being implemented completely.
- Ensuring the effectiveness of the guidelines in minimizing the project's impacts on social and environmental resources.

To achieve these objectives the following monitoring program will be implemented (the ESA will provide more details of the monitoring plan to be implemented during the proposed project).

4.3.1 Compliance Monitoring

The compliance monitoring of the project activities is principally a tool to ensure that the environmental and social control measures required in the ESMF are strictly adhered to during the project activities.

The environmental and social guidelines discussed in Section 4.2 will be used as a management and monitoring tool for compliance monitoring. Inspection will be done using checklists prepared by the respective contractors, on the basis of the Exhibits 4.2 to 4.9, during the construction phase.

Once the ESA findings are available, the mitigation plan will become the basis for the compliance monitoring.

Compliance monitoring will be the responsibility of all organizations involved in the field activities, ie, GSC and the contractors. It will be carried out by the following:

- Environmental and Social Inspector
- Contractors' Environmental and Social Monitors.

4.3.2 External Monitoring

In addition to the compliance monitoring discussed above, MEPCO will engage consultants to carry out external monitoring on periodical basis. The objectives of this external monitoring will be to ensure that:
- the ESMF (and EMP when it is developed as part of the ESA) is being adequately implemented,
- mitigation measures are being implemented,
- the RP/RPF is being implemented
- the compliance and effects monitoring are being conducted,
- environmental and social trainings are being conducted, and
- complete documentation is being maintained.
### Exhibit 4.1: Roles and Responsibilities

<table>
<thead>
<tr>
<th>Organization</th>
<th>Designation</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental and Social Cell</td>
<td>Environmental and Socioeconomic Experts</td>
<td>Advise GSC and other MEPCO departments on matters relating to environment and social aspects of the project.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Advise and support ESI for the implementation of ESG, ESMF (and ESA when available).</td>
</tr>
<tr>
<td>GSC Department</td>
<td>PD</td>
<td>Fulfill MEPCO’s and GSC’s obligations as laid out various project documents.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ensure that the construction is carried out within the agreed timeframe according to satisfactory HSE and technical standards.</td>
</tr>
<tr>
<td>GSC Department (or Site Incharge (or Supervision Consultant))</td>
<td>Site Incharge (or RE if Supervision Consultant is employed)</td>
<td>Facilitate field management of contractors;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Report regularly to the Project Manager and PD.</td>
</tr>
<tr>
<td>GSC Department (or Site Incharge (or Supervision Consultant))</td>
<td>Environmental and Social Inspector (ESI)</td>
<td>Ensure that the entire project is conducted in an environmentally friendly manner.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ensure compliance with all relevant environmental laws.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Facilitate full implementation of ESG, ESMF (and ESA when available) requirements during the project.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Assist the PD and Project Manager in fulfilling MEPCO’s and GSC’s environmental responsibilities and keep them updated on environmental matters relating to the construction.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Review environmental reports (ER), and ensure implementation of corrective measures, if any.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coordinate with other stakeholders, including relevant EPAs.</td>
</tr>
<tr>
<td>Contractors</td>
<td>Site Manager</td>
<td>Manage construction activities, manage construction crew, camp crew and other site personnel, in an environmentally responsible manner;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Liaise with GSC’s Project Manager;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Liaise with GSC’s Site Incharge.</td>
</tr>
<tr>
<td>Environment and Social Monitors (ESM)</td>
<td>Site Manager</td>
<td>Manage the implementation of mitigation measures given in the ESMF (and ESA and EMP when available);</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Manage implementation of entire ESMF (and EMP when available);</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Report regularly to Site Manager;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Liaise with ESI;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provide environmental training to construction crew.</td>
</tr>
</tbody>
</table>
Exhibit 4.2: Guidelines for Design Phase

Site/Route Selection

- Areas prone to land sliding (such as river banks or mountain slopes having more than 30% gradient) should be avoided for the grid station sites.
- Slope stabilization measures should be incorporated in the design of transmission line tower foundations.
- Areas having precious/sensitive natural vegetation and wildlife resources should be avoided for the grid station sites and transmission line routes.
- Protected areas (national parks, wildlife sanctuaries and game reserves) should be avoided while selecting the grid station sites and transmission line routes. A list of such areas within the MEPCO region is provided in Exhibit 3.1.
- Sites of archeological, cultural, historical or religious significance should be avoided when selecting the grid station sites and transmission line routes. A list of such sites reported from the project area is provided in Exhibit 3.2.
- The grid station should preferably be planned on the State land.
- In case the State land is not available, it should be ensured that the land is not disputed, and proper documents are available with the owners.
- Efforts should be made to select the transmission line routes on existing right of way (RoW) or State land. Cultivated areas should be avoided as far as possible.

Equipment Selection

- PCB-free transformers should be selected for the proposed project. Appropriate clauses will be included in the equipment specifications and tender documents.

Grid Station Design

- The grid stations and associated buildings should have appropriate sewage disposal systems.
- Leaked oil collection arrangement (such as a channel and a drain pit below the transformers) should be incorporated in the design of the transformer foundations at the grid stations.
- Tree plantation will be carried inside and at the periphery of the grid stations, without compromising the safety aspects (i.e., required clearances will be maintained). For this purpose, provisions will be made in the site layout of the grid stations.
Exhibit 4.3: Guidelines for Addressing Involuntary Resettlement

Requirement of RP or RPF

- If the ESA finds the project affected person (PAPs) to be up to 200, an RPF will be developed, in accordance with the OP 4.12.
- If the ESA finds the PAPs to be more than 200, an RP will be developed, in accordance with the OP 4.12.

Guiding Principles of the RPF/RP

- The PAPs are defined as those who stand to lose land, houses, structures, trees, crops, businesses, income, livelihood or access to assets/livelihood as a consequence of the proposed project activities.
- All PAPs are equally eligible for compensation and rehabilitation assistance, irrespective of land ownership status, to ensure that those affected by the project will be at least as well off, if not better off than they would have been without the Project.
- Absence of title will not be a bar for PAPs to receive compensation and rehab assistance except for compensation for land. Compensation for land will require a title.
- The compensation packages will reflect replacement costs for all losses (such as lands, crops, trees, structures, businesses, income, etc.).
- PAPs will be systematically informed and consulted about the project, and RP will be made available to the affected persons and communities.
- For land acquired under the LAA (1894), section 17(4) the emergency/urgency clause, will not be used in the absence of an emergency/urgency situation.
- For land purchased, the concept of willing buyer/willing seller at market price and with consensus of both parties will be used. The seller will have the right of refusal.
- For land located under the towers, compensation will be paid for crops and only if the land becomes inaccessible and out of productive use, it will be purchased.
- All assets/infrastructure and livelihood negatively impacted will be compensated at replacement cost (salvage value will not be deducted).
- All community and religious sites affected by the project activities will be compensated or rebuilt.
- All public utilities affected/damaged by the project will be compensated.
- All trees affected by the project will be compensated and affectees allowed salvaging the trees.

Structure of the RP/RPF

- Regulatory review.
- Project description.
- Socioeconomic profile, key impacts and their mitigation, focusing on the involuntary resettlement issues.
Contd. Exhibit 4.3.

- Stakeholder consultation, including participation framework and stakeholder analysis.
- Entitlement framework
- Institutional and implementation arrangements
- Monitoring and evaluation
- Grievance redressal mechanism
- Resettlement budget.
Exhibit 4.4: Guidelines for Contractor Mobilization / Demobilization

Soil Erosion and Contamination

- Vehicular traffic on unpaved roads should be avoided as far as possible. Operation of vehicles and machinery close to the water channels, water reservoir will be minimized.
- Vehicles and equipment should not be repaired in the field. If unavoidable, impervious sheathing should be used to avoid soil and water contamination.

Air Quality Deterioration

- Construction machinery and vehicles will be kept in good working condition and properly tuned, in order to minimize the exhaust emissions.
- Fugitive dust emissions will be minimized by appropriate methods, such as spraying water on soil, where required and appropriate.
- Project vehicles will avoid passing through the communities, farms and orchards as far as possible. If unavoidable, speed will be reduced to 15 km/h to avoid excessive dust emissions.

Noise

- Vehicles will have exhaust mufflers (silencers) to minimize noise generation.
- Nighttime traffic will be avoided near the communities. Local population will be taken in confidence if such work is unavoidable.
- Vehicular traffic through the communities will be avoided as far as possible. Vehicle speeds will be kept low, and horns will not be used while passing through or near the communities.

Safety Hazards

- Road signage will be fixed at appropriate locations to reduce safety hazard associated with project-related vehicular traffic.
- Project drivers will be trained on defensive driving.
- Vehicle speeds near / within the communities will be kept low, to avoid safety hazard and dust emissions.

Damage to Infrastructure

- All damaged infrastructure will be restored to original or better condition.
Exhibit 4.5: Guidelines for Construction Camp Establishment and Operation

**Soil Erosion / Contamination**

- The construction camps will preferably be established in the nearby grid stations.
- Photographs will be taken to record the site conditions prior to the establishment of the camp.
- Construction camp will be located in a stable and flat area, requiring minimal devegetation and leveling. ESI's approval will be obtained for camp location.
- Land clearing, leveling and grading will be minimized, and carried out in a manner to minimize soil erosion.
- Vehicular traffic on unpaved roads will be avoided as far as possible. Operation of vehicles close to the water channels, water reservoirs will be minimized.
- Contractors will prepare a waste disposal plan and submit to ESI for his approval.
- For the domestic sewage, appropriate treatment and disposal system will be constructed having adequate capacity.
- Waste oils will be collected in drums and sold to the recycling contractors.
- The inert recyclable waste from the site (such as cardboard, drums, broken/used parts, etc.) will be sold to recycling contractors. The hazardous waste will be kept separate and handled according to the nature of the waste.
- Domestic solid waste from the construction camp will be disposed in a manner that does not cause soil contamination.
- The camp sites will be completely restored after the completion of the construction works. All temporary structures will be demolished, land leveled and re-contoured to the original condition or better. All debris and any other material will be removed from the site. The photographs taken prior to the camp establishment will be used to restore the area.

**Air Quality Deterioration**

- Construction camp will be established about 500 m from communities.
- Generators and vehicles will be kept in good working condition and properly tunned, in order to minimize the exhaust emissions.
- Fugitive dust emissions will be minimized by appropriate methods, such as spraying water on soil, where required and appropriate. Waste water from kitchen and washing area of the construction camp may be used for water spraying.
- Project vehicles will avoid passing through communities, farms and orchards. If unavoidable, max speed of 15 km/h will be observed to avoid excessive dust emissions.

**Surface Water Contamination**

- For the domestic sewage, appropriate treatment and disposal system will be constructed having adequate capacity. Waste oils will be collected in drums and sold to the recycling contractors.
Contd. Exhibit 4.5.

- The inert recyclable waste from the site (such as card board, drums, broken/used parts, etc.) will be sold to recycling contractors. The hazardous waste will be kept separate and handled according to the nature of the waste.
- Domestic solid waste from the construction camp will be disposed in a manner that does not cause soil contamination.

Water Consumption

- Water will be obtained from the source approved by the ESI.
- Astute planning will be employed to conserve water at the construction sites and camp. Water will be procured in a manner that least affects the local communities. Waste water recycling will be carried out for sprinkling and gardening purposes.

Loss of Vegetation

- Clearing natural vegetation will be avoided as far as possible.
- The camp will be established in a natural clearing, outside forested areas.
- Complete record will be maintained for any tree cutting.
- The construction crew will be provided with LPG as cooking (and heating, if required) fuel. Use of fuel wood will not be allowed.

Noise

- Generators and vehicles will have exhaust mufflers (silencers) to minimize noise generation.

Safety Hazards

- Protective fencing to be installed around the Camp to avoid any accidents.
- Firefighting equipment will be made available at the camps.
- The camp staff will be provided fire fighting training.
- All safety precautions will be taken to transport, handle and store hazardous substances, such as fuel.

Public Health

- Camps will be at least 500 m from any groundwater wells used by the community.
- The construction camps and site offices will have first-aid kits.
- The construction crew will be provided awareness for the transmissible diseases (such as HIV/AIDS, hepatitis B and C).

Social and Gender Issues

- Construction crew will avoid entering the villages and settlements.
- No child labor will be employed at the camp sites.
Exhibit 4.6: Guidelines for Transportation of Equipment and Construction Materials

Soil Erosion and Contamination

- Vehicular traffic on unpaved roads will be avoided as far as possible. Operation of vehicles and machinery close to the water channels, water reservoir will be minimized.
- Vehicles and equipment will not be repaired in the field. If unavoidable, impervious sheathing will be used to avoid soil and water contamination.

Air Quality Deterioration

- Fugitive dust emissions will be minimized by appropriate methods, such as spraying water on soil, where required and appropriate.
- Project vehicles will avoid passing through the communities and cultivation fields as far as possible. If unavoidable, speed will be reduced to 15 km/h to avoid excessive dust emissions.

Noise

- Vehicles will have exhaust mufflers (silencers) to minimize noise generation.
- Nighttime traffic will be avoided near the communities. Local population will be taken in confidence if such work is unavoidable.
- Vehicular traffic through the communities will be avoided as far as possible. Vehicle speeds will be kept low, and horns will not be used while passing through or near the communities.

Safety Hazards

- Road signage will be fixed at appropriate locations to reduce safety hazard associated with project-related vehicular traffic.
- Project drivers will be trained on defensive driving.
- Vehicle speeds near / within the communities will be kept low, to avoid safety hazard and dust emissions.

Damage to Infrastructure

- All damaged infrastructure will be restored to original or better condition.
Exhibit 4.7: Guidelines for Grid Station Construction

Land Acquisition

- Land for the grid stations will be purchased directly from the owners, on the basis of willing seller – willing buyer, at mutually acceptable price (based on market price). The seller will have the right of refusal.
- The agreement between MEPCO and the sellers will be properly documented.
- Grievance redressal mechanism will be put in place to address the community complaints.

Loss of Agriculture

- The land price will include any existing crops at the time of the agreement.
- Compensation will also be paid for damaged crops, if any, outside the acquired land.
- Complete record will be maintained for the compensation determination and payment.

Blocked Access

- In case of the blockage of the existing routes, alternate routes will be identified in consultation with affected communities.

Noise and Vibration

- Working hours for construction activities within the communities will be limited to between 8 am and 6 pm.

Safety Hazards

- The construction sites will have protective fencing to avoid any unauthorized entry.
- Before commencing the testing commissioning of the system, the nearby communities will be informed. Protective fencing will be used where appropriate/possible.

Damage to Infrastructure

- All damaged infrastructure will be restored to original or better condition.

Gender and Social Issues

- Bypass routes to be provided to communities, if required, especially along routes frequented by women, such as route to the local well or water source.
- Construction crew will avoid in entering villages and settlements.
- Local social norms and practices will be respected.
- No child labor will be employed at the project sites.
Contd. Exhibit 4.7.

Sites of Historical, Cultural, Archeological or Religious Significance

- Grid station sites will avoid the known sites of historical, archeological, cultural or religious significance (see Exhibit 3.2 for a list of such sites in the project area).
- In case of discovery of any sites or artifacts of historical, cultural, archeological or religious significance, the work will be stopped at that site.
- The provincial and federal archeological departments will be notified immediately, and their advice will be sought before resumption of the construction activities at such sites.

Soil Erosion

- Cut and fill at the proposed grid station site will be carefully designed, and ideally should balance each other. The surplus soil, if any, will be disposed at places approved by ESI. Such sites will be selected after surveying the area and ensuring that soil deposition will not have any significant impacts, such as loss of productive land, blocked access, natural vegetation and disturbance to drainage.
- If necessary, fill material for grid station sites will be obtained from appropriate locations approved by ESI. Such locations will be selected after surveying the area and ensuring that soil extraction will not have any significant impacts, such as soil erosion, loss of natural vegetation and disturbance to drainage.
- The fill material will not be obtained from any cultivation fields, unless allowed by the landowner/cultivator.
- Where the use of cultivated land is unavoidable for obtaining the fill material, the top 30 cm soil layer will be removed and stockpiled for redressing the land after removal of the borrow material. The excavation in such areas will be limited to 50 cm depth.
- Areas from where the fill material is obtained or surplus soil deposited, will be landscaped to minimize erosion and hazard for people and livestock.
- Embankments and excavated slopes will not be left untreated/unattended for long durations. Appropriate slope stabilization measures will be taken per the design (e.g., stone pitching).
- After the completion of the construction works, campsites and other construction sites will be completely restored. No debris, surplus construction material or any garbage will be left behind.
- Photographic record will be maintained for pre-project, during-construction and post-construction condition of the sites.

Soil Contamination

- Vehicles and equipment will not be repaired in the field. If unavoidable, impervious sheathing will be used to avoid soil and water contamination.
- For the domestic sewage, appropriate treatment and disposal system, such as septic tanks and soaking pits, will be constructed having adequate capacity. The contractor(s) will submit to ESI the plans for the camp layout and waste disposal system, and obtain approval.
Contd. Exhibit 4.7.

- Waste oils will be collected in drums and sold to the recycling contractors.
- The inert recyclable waste from the site (such as card board, drums, broken/used parts, etc.) will be sold to recycling contractors. The hazardous waste will be kept separate and handled according to the nature of the waste.
- Domestic solid waste from the construction camp will be disposed in a manner that does not cause soil contamination. The waste disposal plan submitted by the contractor(s) will also address the solid waste.
- PCB-free transformers will be selected for the proposed project. Appropriate clauses will be included in the equipment specifications and tender documents.
- Leaked oil collection arrangement (such as a channel and a drain pit below the transformers) will be incorporated in the design of the transformer foundations at the grid stations.

Air Quality Deterioration

- Construction machinery, generators and vehicles will be kept in good working condition and properly tuned, in order to minimize the exhaust emissions.
- Fugitive dust emissions will be minimized by appropriate methods, such as spraying water on soil, where required and appropriate. Since water availability is an issue in some of the areas, it is recommended that the waste water from kitchen and washing area of the construction camp may be used for water spraying.
- While working within the communities for works such as transmission line laying, coordination with the communities will be maintained to minimize any detrimental impacts on the crops and settlements.
Exhibit 4.8: Guidelines for Transmission Line Construction

**Loss of Agriculture**

- Temporary RoW will be acquired along the proposed transmission lines, and for access routes to the transmission line corridor.
- Compensation will be paid for the crops damaged during the construction activities. The compensation will be paid to the cultivator, and absence of the land title will not be a bar to receiving the compensation. Based upon the findings of the ESA, an RP or RPF will be prepared to address the involuntary resettlement issues (see Exhibit 4.3).
- Complete record will be maintained for the determination and payment of the compensation.
- It will be ensured that the land under the 132-KV transmission line tower remains available for cultivation.
- In case the above is not possible, the land under the tower will be acquired in accordance with the LAA procedures (Section 17.4 of the LAA will not be used).
- Operation of project vehicles and construction machinery outside the RoW will be avoided. Attempts will be made to use existing tracks/roads to access the transmission line corridor/tower locations. In case new access routes are necessary, the cultivated land will be avoided as far as possible. Damage to crops will be compensated.
- Grievance redressal mechanism will be put in place to address the community complaints.

**Blocked Access**

- In case of the blockage of the existing routes, alternate routes will be identified in consultation with affected communities.

**Noise and Vibration**

- Vehicular traffic through the communities will be avoided as far as possible. Project routes will be authorized by ESI
- Vehicle speeds will be kept low, and horns will not be used while passing through or near the communities.
- Vehicles will have exhaust silencers to minimize noise generation.
- Nighttime traffic will be avoided near the communities.
- Movement of all project vehicles and personnel will be restricted to within work areas, to avoid noise disturbance.
- Working hours for construction activities within the communities will be limited to between 8 am and 6 pm.
Safety Hazards

- The construction sites will have protective fencing to avoid any unauthorized entry.
- Before commencing the testing commissioning of the system, the nearby communities will be informed. Protective fencing will be used where appropriate/possible.

Damage to Infrastructure

- All damaged infrastructure will be restored to original or better condition.

Gender and Social Issues

- Bypass routes to be provided to communities, if required, especially along routes frequented by women, such as route to the local well or water source.
- Construction crew will avoid entering villages and settlements.
- Local social norms and practices will be respected.
- No child labor will be employed at the project sites.

Sites of Historical, Cultural, Archaeological or Religious Significance

- The known sites of historical, archeological, cultural or religious significance will be avoided for routing the transmission lines (see Exhibit 3.2).
- In case of discovery of any sites or artifacts of historical, cultural, archeological or religious significance, the work will be stopped at that site.
- The provincial and federal archeological departments will be notified immediately, and their advice will be sought before resumption of the construction activities at such sites.

Soil Erosion

- Embankments and excavated slopes will not be left untreated/unattended for long durations. Appropriate slope stabilization measures will be taken per the design (eg, stone pitching).
- Vehicular traffic on unpaved roads will be avoided as far as possible. Operation of vehicles and machinery close to the water channels, water reservoir will be minimized.
- Construction works at mountain slopes will be carefully planned. Off-track vehicular traffic will not be allowed.
- Appropriate measures will be taken to avoid soil erosion during the excavation of transmission line tower foundations. These include temporary embankments to protect excavated soil and placing gabions. The surplus soil will be disposed as stated above.
- After the completion of tower foundations particularly on slopes, additional stone pitching around the foundation will be carried out, where required, to avoid any subsequent soil erosion/land sliding.
The construction works, particularly in the mountainous areas, will not be undertaken during the rainy season.

After the completion of the construction works, the transmission line routes, campsites and other construction sites will be completely restored. No debris, surplus construction material or any garbage will be left behind.

Photographic record will be maintained for pre-project, during-construction and post-construction condition of the sites.

Soil Contamination

- Vehicles and equipment will not be repaired in the field. If unavoidable, impervious sheathing will be used to avoid soil and water contamination.

Air Quality Deterioration

- Construction machinery, generators and vehicles will be kept in good working condition and properly tuned, in order to minimize the exhaust emissions.

- Fugitive dust emissions will be minimized by appropriate methods, such as spraying water on soil, where required and appropriate. Since water availability is an issue in some of the areas, it is recommended that the waste water from kitchen and washing area of the construction camp may be used for water spraying.

- Project vehicles will avoid passing through the communities and cultivation fields as far as possible. If unavoidable, speed will be reduced to 15 km/h to avoid excessive dust emissions.

- While working within the communities for works such as transmission line laying, coordination with the communities will be maintained to minimize any detrimental impacts on the crops and settlements.

Loss of Natural Vegetation

- Clearing of natural vegetation will be minimized as far as possible during the transmission line works.

- No new tracks will be developed to reach the transmission line route inside the forested areas; the existing routes will be used to transport equipment, material and personnel. Vehicles will not be operated off-track in such areas.

- For each transmission line route, a tree cutting plan will be prepared and submitted to MEPCO for approval. A complete record will be maintained for any tree cutting or trimming. The record will include: the number, species, type, size, age, condition and photograph of the trees to be cut/trimmed. The compensation will be determined on the basis of these factors.

- Herbicides will not be used to clear vegetation along the transmission line route (or at other project locations).
A program will be developed for the tree plantation particularly along the transmission line routes in the forested areas, in order to compensate removal of the trees during the transmission line laying. The trees thus planted will be at least 5 times the ones which would be removed for the transmission line works. MEPCO will coordinate with the relevant Forest Department for the development and implementation of this program.

- Indigenous tree species will be selected for plantation; in particular, Eucalyptus trees will not be used in any case.

- Consultations will be held with the forest department on the possibility of using the transmission line route in the forested areas as the fire line. The forest fires are a frequent problem in our mountainous areas, and if the de-vegetated strip under the transmission lines can effectively be used as the fire line, the transmission lines can provide a useful value to the forest.

- The construction crew will be provided with LPG as cooking (and heating, if required) fuel. Use of fuel wood will not be allowed.

- No fires will be allowed inside the forest.

- Construction camps will not be established inside the forested area.

**Damage to Wildlife**

- Blasting will not be carried out while working in the forested areas for new transmission line routes. No nighttime activities will be carried out in such areas. The works in such forested areas will be carried out in coordination with the Forest and Wildlife departments.

- Vehicle movement will be limited to the existing tracks in the above area.

- The measures to prevent soil and water contamination will forestall any adverse impact on the faunal resources of the area.

- Garbage will not be left in the open.

- The project staff will not be allowed to indulge in any hunting or trapping activities.
### Exhibit 4.9: Guidelines for O&M Activities

#### Soil and Water Contamination
- The grid stations will have appropriate solid waste collection and disposal arrangements.
- The grid stations will have appropriate sewage handling system. The grid stations' sewage collection system will be connected to the Municipality operated sewerage system, if available. Otherwise, grid stations will have their own septic tanks and soakage pits.
- Waste oils and chemicals will be disposed in accordance with their respective Material Safety Data Sheet (MSDS).
- Non-toxic recyclable waste (such as cardboard) will be given away for recycling.
- Toxic waste will be stored separately, and incinerated at an appropriate double chamber incinerator.
- Grid stations will have channels and drainage pits to collect any leaked oil from the transformers in the grid stations.
- MEPCO will develop a comprehensive plan for PCB testing and its complete elimination from all the transformers and circuit breakers from the entire network.

#### Impacts on Biological Resource
- MEPCO will maintain coordination with the Forest and Wildlife departments for trimming the tall trees under the forested segments of the transmission lines.
- MEPCO will implement and monitor the forestation initiative, with collaboration of the Forest Department.
- Maintenance works on the forested segment of transmission lines will be carried out in consultation with the Wildlife Department.
- No new tracks will be developed inside the forested areas. The vehicular movement will be restricted to the existing tracks.
- No nighttime maintenance works will be carried out in the forested areas.

#### Safety Hazards
- Trees under the transmission lines will be regularly trimmed to maintain the minimum clearance required (8 m).
- MEPCO's O&M staff will be provided essential protective gears and equipment.
- MEPCO's O&M staff will be provided safety training. Refresher courses will be arranged on regular basis.
- The communities near the grid stations and transmission lines will be educated on the risk of electrocution, and how to avoid accidents.

#### Loss of Agriculture
- Damage to the crops will be avoided during the transmission line patrolling.
- Any damage during the repair and maintenance activities will be compensated.
- Liaison with the nearby communities will be maintained in this regard.
- The grievance redressal mechanism will be maintained on continuous basis.