Initial Environmental Examination

June 2012

Viet Nam: Northern Power Transmission Expansion Sector Project

Subproject 9: 220 kV Hai Duong 2 Substation


This initial environmental examination is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature.

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.
Project: D288

220KV HAI DUONG 2SUBSTATION

INITIAL ENVIRONMENTAL EXAMINATION

Established : Nguyen Xuan Hung
Project manager : Phung Van Cuong

Date of Revision: June 13, 2012
CONTENTS

CHAPTER 1: GENERAL INTRODUCTION
  1.1 Objective of IEE report
  1.2 IEE implementation organization

CHAPTER 2: DESCRIPTION OF THE PROJECT
  2.1 Objective of Project
  2.2 Project Location
  2.3 The size of Project
  2.4 Total cost of Project

CHAPTER 3: DESCRIPTION OF THE ENVIRONMENT
  3.1 Physical Environment
    3.1.1 Geographical position
    3.1.2 Topography
    3.1.3 Geology
    3.1.4 Climate, and hydrometeorology
    3.1.5 Ecology
    3.1.6 National parks or historic, cultural sites
    3.1.7 Planning
  3.2 Socio-economic characteristics
    3.2.1 Population
    3.2.2 Health service
    3.2.3 Infrastructure and services

CHAPTER 4: SCREENING POTENTIAL ENVIRONMENTAL IMPACTS AND
MITIGATION MEASURES
  4.1 Screening potential environment impact.
  A-Preconstruction phase
    4.1.1 Land Loss
    4.1.2 Impact on drainage and flooding
  B-Construction and Operation phase
    4.1.3 Site clearance
    4.1.4 Noise and Vibration
    4.1.5 Air Quality
    4.1.6 Ecology
    4.1.7 Water Resources/Quality
    4.1.8 Waste Management
    4.1.9 Community Health and Safety
    4.1.10 Occupational Health and Safety
4.1.11 Electromagnetic Fields
4.1.12 Heritage and Archaeology

4.2 Mitigation measure of environment impact

CHAPTER 5: ANALYSIS OF ALTERNATIVES
5.1 No project alternatives
5.2 Alternatives for the substation location

CHAPTER 6: INSTITUTIONAL REQUIREMENTS AND MONITORING PROGRAMS
6.1 Institutional Requirements
   6.1.1 Capability Strengthening
6.2 Environmental Monitoring Plan
   6.2.1 Description of Monitoring Programs
   6.2.2 Responsibilities for Monitoring
6.3 Environmental Management Plan Budget

CHAPTER 7: PUBLIC CONSULTATION AND DISCLOSURE
7.1 Introduction
7.2 Rationale
7.3 Objectives
7.4 Format Used
7.5 Approach and Techniques Used
7.6 Program and Topics Discussed
7.7 Sequence of Public Consultation and Disclosure

CHAPTER 8: CONCLUSIONS

ANNEX
CURRENCY EQUIVALENTS
(as of 31 March 2012)
Currency Unit Vietnamese Dong
US$1.00 = 20,837 VND
1 VND = 0.000048 US$

GLOSSARY OF TERMS

ADB  Asian Development Bank
DBC  Design and Build Contractor
DoNRE Department of Natural Resources and Environment
EMD  Environment Management Division
EMF  Electromagnetic Fields
EMP  Environment Monitoring Plan
EVN  Electricity of Vietnam
NPT  National Power Transmission Corporation
H/H  Households
IEE  Initial Environment Examination
LEP  Law on Protection of the Environment
MoNRE Ministry of Natural Resources and Environment
MPI  Ministry of Planning and Industry
NGO  Non-Governmental Organization
NPPMB Northern Viet Nam Power Project Management Board
OHL  Overhead Line
PAH  Project Affected Households
PAP  Project Affected Person
PC  Power Company
PCBs Polychlorinated Biphenyls
PECC 1 Power Electric Consulting Company No. 1
PPTA Project Preparatory Technical Assistance
RAP Resettlement Action Plan
RF  Resettlement Framework
RoW Right-of-Way
RVS  Replacement Value Survey
SIEE  Summary IEE
WEIGHTS AND MEASURES

ha   hectare
km   kilometer
KV   One thousand volts
MVA  One million volt amps
KW   Kilowatt
KWh  Kilowatt hour
CHAPTER 1 : GENERAL INTRODUCTION

1.1 Objective of IEE reports:
- This Initial Environmental Examination (IEE) report is prepared for the 220kV Hai Duong 2 substation which is proposed for financing by the Asian Development Bank (ADB). This IEE is prepared consistent with ADB’s Environmental Assessment Guidelines (2003) which classified the proposed project as Category B.
- The environmental assessment was conducted at the location of the 220kV Hai Duong 2 substation. The people contributing to the IEE are well-versed and experienced in the assessment of environmental impacts for the type of developments proposed. An Initial Environmental Examination (IEE) report is prepared for this project. The report was presented to the Department of Natural Resources and Environment of Kinh Mon town, Hai Duong province. The environmental clearance was submitted to the People’s Committee of Kinh Mon town, Hai Duong province. The approval and confirmation was issued by the Kinh Mon PCon January 13 2010. (Annex 1)
- The purpose of the IEE report is to identify potential environmental impacts of the project and propose appropriate mitigation measures to minimize negative environmental impacts. An environmental monitoring program is also proposed.

1.2 IEE implementation organization
- Power Engineering Consulting Joint Stock Company1 is the consulting unit commissioned by the Project Management Unit to prepare the IEE of the project. The IEE was developed through the following methodologies:
  + Collection of documents related to the project area, preliminary studies on the survey plan for implementing the environmental field survey.
  + Conduct of investigations and surveys in the field of natural environment (water and air environment), economic and social conditions in the project area.
  + Refer to ADB’s Environmental Assessment Guidelines (2003) and other related reports and documents.
CHAPTER 2 : DESCRIPTION OF THE PROJECT

2.1 Objective of project:
The proposed 220kV Hai Duong 2 substation will be developed with the following objectives:

- Contribute to meet the electricity supply demand for Kinh Mon district, Hoa Phat and Tan Phu Xuan steel factories Phuc Son and Phu Tan cement factories and other industries in the east-west area of Hai Duong province.
- Strengthen and enhance local network that provide the long-term stability and reliability of supplying electricity supply for Hai Duong province.
- Develop the investment and operational power network in accordance with the plans for economic efficiency.
- Increase stability and operational safety of power network.
- Reduce the loss of electrical energy, the loss of power in the grid and contribute to raising the efficiency of electricity production and trading of EVN.

2.2 Project Location:
- The Power Engineering Consulting Company No. 1 (PECC1) conducted survey of the site to choose a location that meets the requirements of the substation. The criteria that were considered include the size requirements for project construction, local programming requirement, operation and traffic conditions, natural conditions, and economic considerations.
- The 220kV Hai Duong 2 substation is located on agricultural land in Cang Cua, which belongs to Hue Tri village, An Phu commune, Kinh Mon district, Hai Duong province. Hai Duong 2 substation shall take up an area of 35,232m². (Figure 2-1)

Figure 2.1- Location of Hai Duong 2 substation
2.3 The size of project:

- **Access Road:** The proposed access road to the 220 kV substations will be connected from the Provincial Road No. 389B at Km 13+485. The access road will have a length of 260m and a width of 5m. The shoulder width shall be 1m. The road shall be paved with asphalt overlay. The access road will be located along the north of the project area and included in the project component. See Figure 2.2 for the position of the access road. The access road construction will not affect any community structures and household since all the acquired land for the substation and access road is now agriculture field.

- **Voltage level:** The substation has 3 levels of voltage: 220kV, 110kV, 22kV (35kV)
  - 220kV level is powered from the national electricity grid.
  - 110kV level supplies power for the 110kV local network.
  - 35kV & 22kV level is only used for auxiliary transformers.

- **Capacity:** Two transformers -220kV/250MVA and two transformers -110/63MVA
  - The first Auto-transformers: 220/110kV - Capacity 1x250MVA, will be installed in the period of 2012-2015 (this project).
  - The second one: 220/110kV - Capacity 1x250MVA, will be installed in next stage (future).

- The main component of the project includes (Figure 2 - Layout of the Hai Duong 2 substation):
  - 220kV Side: The 220kV system designed with double bus-bars system includes 11 sections:
    + Two 220kV sections of 220/110kV Auto-transformers and one of them will be spared for the future.
    + Two feeders for Hai Duong 2- Pha Lai 220kV transmission line (double circuit).
    + Two feeders for Hai Duong 2- Dong Hoa 220kV transmission line (double circuit).
    + Two feeders for Hai Duong 2- Mao Khe TPP 220kV transmission line (double circuit).
    + One Section for 220kV Coupling.
    + Spare sections for two 220kV line feeders in the future.
  - 110kV Side: The 110kV side designed as double busbars with by-pass busbar system includes 17 sections:
    + Two 110kV sections for 220/110kV Auto-transformers and one of them will be spared for the future.
    + Two feeders for Hai Duong 2- Hoa Phat 110kV transmission lines (double circuit).
    + Two feeders for Hai Duong 2- Tien Trung 110kV transmission lines (double circuit).
    + Two feeders for Hai Duong 2- Thanh Ha 110kV transmission lines (double circuit).
    + One feeder for 110kV coupling.
+ One feeder for 110kV by-pass.
+ Two feeders for 110kV Capacitor will be installed in the future.
Figure 2.2- Layout of Hai Duong 2 substation
+ Spare sections for six 110kV line feeders and two 110kV/63MVA transformers installed in the future.

- 22kV & 35kV Side:
  + 22kV: Electricity for auxiliary 22/0.4kV transformer is supplied by 22kV source of AT1 through outdoor distribution equipment.
  + 35kV: Electricity for auxiliary equipment supplied by 35(22)/0.4kV transformer powered from the existing 35kV transmission line.

- The Control – Protection system:
  + Substation will be equipped with computer control system. Main relays of protection diagram will be used with digital relay with microprocessor, computer control system and SCADA system.
  + Equipment for management-operation, as follows: fault record, measurement cubicle, interface equipment for SCADA system.

- Auxiliary Power Supply: The AC auxiliary power shall be supplied from two auxiliary transformers of TN1-35(22)±2x2.5%/0,4kV-250kVA and TN2-22±2x2.5%/0,4kV-250kVA which receive power from 35kV and 22kV respectively.

- Grounding System. The rod-wire combination grounding system using galvanized steel grounding rod with diameter of Φ22 and 5m length will be used within the substation range. The main grounding wire and radial grounding wires shall be of galvanized steel wires with diameter of Φ14. Electric welding shall be applied for connection between grounding rods and bars. The grounding for equipment supports shall be of M120 copper wires, grounding wires, and grounding grid connected by cadwelding.

- Lighting System. The substation will have 2 lighting system supplied from 380/220V-AC for the control house lighting and 220V-DC system for emergency lighting. Outdoor lighting in independent lightning protection poles shall use 250 W beacon lights

- Foundation System. The substation will be located on kudzu and rice paddy fields which has a flood historic record inundation level of +1.9m during the rainy season. To protect the substation from inundation, embankment and filling shall be undertaken above current ground level to 3.0m. The following are the substation grading and embankment requirements:
  
  (ii) Quantity of excavated soil (0.2m thick of the vegetation layer) : 6.245m³

  (iii) Quantity of soil embankment : 73.560m³ of sand
- Fire Prevention and Fighting System: 2 tanks with 100m$^3$ each of supplying water from the pumping station to the substation will be provided. Hydrants, hoses, and hand-held nozzles will be provided at the site. The pumping station will be equipped with one electric pump and a booster pump. Other fire fighting devices such as CO$_2$ gas tanks shall be installed at the substation.

### 2.4 Total Project Cost and Implementation Schedule

- **Project owner:** NORTHERN VIET NAM POWER PROJECT MANAGEMENT BOARD
- **Total project cost:** 340,280,151,304 VND, broken down as follows in VND:

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction and Erection</td>
<td>95,398,968,167</td>
</tr>
<tr>
<td>Equipment</td>
<td>132,223,024,123</td>
</tr>
<tr>
<td>Compensation and resettlement</td>
<td>3,859,272,540</td>
</tr>
<tr>
<td>Project management</td>
<td>3,119,591,243</td>
</tr>
<tr>
<td>Consultancy of investment and construction</td>
<td>9,491,843,092</td>
</tr>
<tr>
<td>Other Expenditure</td>
<td>47,082,552,385</td>
</tr>
<tr>
<td>Spare cost</td>
<td>49,104,899,755</td>
</tr>
<tr>
<td><strong>Total cost</strong></td>
<td><strong>340,280,151,304</strong></td>
</tr>
</tbody>
</table>

- **Schedule of project:** 2012-2015
- **Number of workers:** is around 30 people for construction phase and 10 people for operational phase. It is estimated that 73,560m$^3$ of sand will be required for soil embankment to raise the foundation of the substation above 3.0m ground level. This amount of sand will be transported from the quarries in the area.
CHAPTER 3 : DESCRIPTION OF THE ENVIRONMENT

3.1 Physical Environment

3.1.1 Geographical position

220kV Hai Duong 2 substation is located on agriculture land in An Phu ward, Kinh Mon district, Hai Duong province. Location map is presented in the Figure2.1 and 3.1

3.1.2 Topography

The proposed substation site is located on rice agricultural land. The area has weathered terrain eroded from the sand and shale formations of siltstone with undulating valley terrain. The difference of high surface terrain averages 0.9m to 0.95m. According to the survey in the local area, the historical record of flooding is +1.9m which occurred in 1971. As such, the flood frequency of P (2%) as surveyed is 1.9m. The area is not located in a flood-prone area.

3.1.3 Geology

- Data collection on geological conditions in Viet Nam is difficult due to the absence of published data. Two approaches are possible; firstly, conducting surveys and investigations at the particular points where geological data need to be collected and the second is gathering EIA reports on other development projects surrounding or in the vicinity of the Project area that have included relevant geological information. Based on secondary information, the geological condition in the vicinity is described as follows:
  + Average 40m, mainly. Soil layer (1): brownish yellow, soft foam, both root vegetation and the grass roots. Distribution area covers almost the entire surface topography, with thickness of about 0.3m.
  + Soil in covered slopes is characterized as (2): Clay colored yellow, yellow red patchy, half-hard state, and about 5% of weathered weak beam. Distribution area covers almost the entire
surface topography with variable thickness from 0.5m up to 2.3 m. This strata has the following mechanical and physical properties:

Table 3.1 The mechanical and physical properties of the second soil layer.

<table>
<thead>
<tr>
<th>Properties</th>
<th>Symbol</th>
<th>Unit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nature humidity</td>
<td>W</td>
<td>%</td>
<td>31.8</td>
</tr>
<tr>
<td>Nature weight</td>
<td>γ_w</td>
<td>g/cm³</td>
<td>1.82</td>
</tr>
<tr>
<td>Dry weight</td>
<td>γ_k</td>
<td>g/cm³</td>
<td>1.38</td>
</tr>
<tr>
<td>Density</td>
<td>Δ</td>
<td>g/cm³</td>
<td>2.75</td>
</tr>
<tr>
<td>Soft index</td>
<td>Ip</td>
<td>%</td>
<td>20.4</td>
</tr>
<tr>
<td>Thick degree</td>
<td>B</td>
<td></td>
<td>0.23</td>
</tr>
<tr>
<td>Empty degree</td>
<td>n</td>
<td>%</td>
<td>50.0</td>
</tr>
<tr>
<td>Coefficient of empty</td>
<td>ε_o</td>
<td></td>
<td>0.95</td>
</tr>
<tr>
<td>Coefficient of compressibility</td>
<td>a_1-2</td>
<td>cm²/KG</td>
<td>0.028</td>
</tr>
<tr>
<td>Agglutinate force</td>
<td>C</td>
<td>KG/cm²</td>
<td>0.38</td>
</tr>
<tr>
<td>Internal friction angle</td>
<td>φ</td>
<td>0°</td>
<td>17.5</td>
</tr>
</tbody>
</table>

Source:

+ Intense weathering zone (3): Slate weathering intensity of gray clay, patchy gray-yellow color, semi-hard state and weak beam. Common distribution area, the thickness is not clearly defined zones (drilling to 12m not all classes). This strata has the following mechanical and physical properties.

Table 3.2. The mechanical and physical properties of the third soil layer.

<table>
<thead>
<tr>
<th>Properties</th>
<th>Symbol</th>
<th>Unit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nature humidity</td>
<td>W</td>
<td>%</td>
<td>27.5</td>
</tr>
<tr>
<td>Nature weight</td>
<td>γ_w</td>
<td>g/cm³</td>
<td>1.88</td>
</tr>
<tr>
<td>Dry weight</td>
<td>γ_k</td>
<td>g/cm³</td>
<td>1.48/1.92</td>
</tr>
<tr>
<td>Density</td>
<td>Δ</td>
<td>g/cm³</td>
<td>2.74</td>
</tr>
<tr>
<td>Soft index</td>
<td>Ip</td>
<td>%</td>
<td>15.1</td>
</tr>
<tr>
<td>Thick degree</td>
<td>B</td>
<td></td>
<td>0.20</td>
</tr>
<tr>
<td>Empty degree</td>
<td>n</td>
<td>%</td>
<td>46.0</td>
</tr>
<tr>
<td>Coefficient of empty</td>
<td>ε_o</td>
<td></td>
<td>87.8</td>
</tr>
<tr>
<td>Coefficient of compressibility</td>
<td>a_1-2</td>
<td>cm²/KG</td>
<td>0.90</td>
</tr>
<tr>
<td>Agglutinate force</td>
<td>C</td>
<td>KG/cm²</td>
<td>0.30/0.14</td>
</tr>
<tr>
<td>Internal friction angle</td>
<td>φ</td>
<td>0°</td>
<td>17.5</td>
</tr>
<tr>
<td>Load force</td>
<td>R_h</td>
<td>KG/cm²</td>
<td>20/17</td>
</tr>
</tbody>
</table>

Source:

- The resistivity of soil is:
  \[ h_1 = (1.0\div3.0) \text{ m} \quad \rho_1 = 120\div158\Omega \text{m.} \]
  \[ h_2 = (1.0\div5.0) \text{ m} \quad \rho_2 = 644\div1230 \Omega \text{m.} \]

3.1.4 Climate and hydrometeorology

The following are the climatological conditions prevailing in the area:

- The maximum temperature is 41.6°C in June.
  The average temperature is 23.4°C
  The minimum temperature is 3.1°C in January
- The maximum humidity is 88%.
The average humidity is 83%.
The minimum humidity is 16%.

- The average rainfall: 1,661 mm

3.1.5 Ecology

- Hai Duong Province is located in the delta region which has no forest or nature reserve. There are no reported or known areas of sensitive or protected ecology or natural habitats in the area. The project is not located or cross any area of primary forest. It is also not close to any areas with significant or sensitive ecological habitats or is located in areas identified as being of very specific scenic value. The nearest protected area or nature reserve are in Cat Ba which is located more than 150km away and XuanThuy-Nam Dinh which is more than 100km from the substation site. There are no rare plant species found in the affected areas of the project. Vegetation is mainly rice and kudzu (*Pueraria lobata*), Kudzu is a kind of shrub with roots containing starch, which has traditionally been used as a drink in the summer in Vietnam. Plants such as longan (*Dimocarpus longan*), lychee (*Litchi chinensis*), and legumes are abundant in the surrounding areas. However, only those affected by the project are rice and kudzu in the paddy fields. There are no rare animal species found living in the project area. Therefore, the effect of construction of the project on ecology is negligible.

![Figure 3.2. Kudzu field in the substation area](image)

3.1.6 National parks or historic, cultural sites

There are no sites with high social, historical or cultural value within the substation area and the route of transmission lines.

3.1.7 Planning

- The 220kV Hai Duong 2 substation is located on agriculture land in the expansion part of An Phu ward. There are no other proposed project at the substation site, hence, it will not affect the socio-economic, political and cultural development plan of the government.
- The irrigation canals will be affected by the development of the project. This will be discussed in detail in the following sections.

![Figure 3.3. Landuse map](image)

**3.2 Socio-economic characteristics**

**3.2.1 Population**
- Kinh Mon district’s mountain area of Hai Duong is bordered by Hai Phong city Anh Quang Ninh province. Its population is 163,752 people with density of 1,003 people/km². Kinh Mon district includes 22 ward and 3 town unit administrations as follows:
  + Kinh Mon, Minh Tan and Phu Thu towns

- Kinh group is the only dominant group but are not considered as ethnic minority. The nearest settlement is more than 300m away at the western side of the project site.

**3.2.2 Health service**
- The nearest medical center to the substation is at a distance of 2 km. This is within An Phu commune, Kinh Mon district. Communities in the project area have medical stations and all maintain national standards in health services. Medical staff in the medical stations performs first aid, vaccination, immunization, and coordination with other groups and sectors for inspection on environmental sanitation and food safety. This clinic is open 24 hours to attend
to the medical needs of the people. Serious diseases will be transferred to the provincial hospital. There is no report on the prevalence of malaria, dengue fever, or HIV/AIDS.

### 3.2.3 Infrastructure and services

**Water Supply.** Surface water is the direct water source for production and daily life in the area. Some households use drilled wells to tap groundwater sources. For the substation, domestic water will be obtained from groundwater via the planned drilled wells (2 wells at 70 m depth) in the area.

**Traffic system.** Until now, Kinh Mon traffic network is 75km length that includes 5 highways, Ha Noi – Hai Phong railway, 7 roads, inter-district way and inside traffic system. Traffic density is 5km/km². The condition of the road going to the site is rather good. The site is located close to the provincial road, 398B, and is convenient for transport of construction materials.

**Electricity.** Power supply of Kinh Mon town is supplied from two 110kV S/S. Until now, Kinh Mon town has three 35/04kV S/S and forty-five 6/0,4kV S/S; 101,92km low voltage T/L. The power supply system ensures the safety and stability in the area. It also satisfies the power demand for domestic use and production. It is estimated that around 100% of the population is served by the power supply system.
CHAPTER 4: SCREENING POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.1 Screening Potential Environmental Impacts

The potential environmental impacts associated with the Hai Duong 2 substation has been initially screened by completing the Rapid Environmental Assessment (REA) Checklist (Annex 2).

The environmental impacts are discussed in detail and structured into the (i) pre-construction phase of the project; (ii) construction phase, and (iii) operation phase of the substation. Mitigating measures are recommended to avoid or minimize adverse environmental impacts.

A- Preconstruction phase

The potential impacts during the design and pre-construction phase of the project are related to the sitting and survey of the substation site. There is potential for the substation, access road to affect irrigation canals and agricultural land. The construction of the towers may also have visual impacts on aesthetics.

4.1.1 Land Loss

There are no permanent or temporary buildings on the site of the substation and access road. Thus, the land acquisition of the substation and access road will not result in any loss of structures, property or have any impact on human habitation. However, at the Hai Duong 2 substation site, there will be a loss of land to enable construction of the site and the access road leading to it. The area affected is estimated to be 35,232 m² and which is currently occupied by rice and kudzu agriculture land. The roots of Kudzu contain starch, which has traditionally been used as a food ingredient or a drink in the summer. The loss of this land area represents an inevitable and unavoidable impact. The owners of these areas will require to be compensated as a consequence.

The NPPMB has drafted an appropriate land acquisition and compensation plan for the affected area of the substation in accordance with the national and ADB requirements. The detail information on the rice, kudzu and other affected tree will be provided when the final resettlement plan is disclosed.

The workers will mainly stay in the residential area in the local village. There is only a small and simple camp which will be built within the substation area for material management. As such, there are no temporary lands which will be required for the worker camp.

4.1.2 Impact on drainage and flooding

The substation area is located in a low-lying area that is vulnerable to inundation. According to the survey in the local area, the substation will be located on kudzu and rice paddy fields which have a flood historical record inundation level of +1.9m (1971) during the rainy season. The
construction of the substation will require the establishment of a raised platform to ensure adequate protection from flooding. As such, the flood frequency of P (2%) as surveyed is 1.9m. To protect the substation from inundation, embankment and filling shall be undertaken above current ground level to 3.0m.

The existing drainage system associated with the surrounding agricultural land is composed of network of irrigation and drainage canals within and around the substation site. The design of the substation will ensure that the existing drainage system will be protected and where necessary additional drainage diversion structures will be included in the works. This is to ensure that the construction and operation of the substation will not have adverse impact on the existing drainage system. The construction engineers and designers will also consider the inundation levels in the vicinity in the design the embankments, soil filling, and foundation of the substation.

The irrigation canals of Hue Tri, An Phu commune might be affected by the project. The current canal which runs from the north will be realigned to run along the substation to meet the existing irrigation canal. This re-aligned section is 2.5m in width and 1.5m deeper compared to the elevation of current field and could maintain the drainage of the current situation. In addition to ensure the irrigation of the agricultural land in the vicinity, another canal (1m width and 0.6m depth) in the northwest of the substation will be built. The drainage system inside the substation will be connected to the existing system.

**B- Construction and Operation phase**

**4.1.3 Site clearance**

The construction will start with the site clearance. Beside the generation of bio waste which is from the rice and kudzu field, the site clearance may disrupt to cropping activities, result to crop damage or loss, and damage to bound walls, canals and drains. This impact could be minimized through proper construction techniques and machinery selection that will minimize ground disturbance. Construction activities on cropping land should be timed to avoid disturbance of field crops within one month of harvest wherever possible. In addition, immediate repair of damaged community facilities (e.g., irrigation canals, pond dikes, etc.) will be undertaken.

**4.1.4 Noise and vibration**

- Impacts from noise and vibration have the potential to occur during the construction phase and the operational phase. The character of any disturbance will vary between each phase of works while the scale and significance of impact will be largely determined by the nature of
the ambient noise environment, the proximity of residential properties (or ‘sensitive receivers’) to the source of noise and the level of noise/vibration impact occurring. Other potential ways in which impacts could occur are a function of the tonality and intensity of impact, the timing of the impact (night or day for example) and the period of time over which the impacts will occur.

- The presence of the perimeter wall will reduce noise impacts during the construction phase to a negligible level and given that this activity is likely to be undertaken in a predominantly manual manner over a relatively short period with the existing plant continuing to operate, it is unlikely that there will be any noise disturbance during the construction phase. The implementation of the EMP will however address this element further in ensuring that this is the case and that for example mechanical plant are well maintained and only operated when necessary and only during normal working hours and not at night. If the construction is required in the evening, pre-notification and approval by local affected groups will be needed. Construction equipment must be well maintained.

- In the operation stage, noise from operating equipment is permanent (controlled to be less than 75 dB with distance of 5m), but the substation location is far from the residential area and there are no public works such as hospital, school, and museum, so this effect is negligible. The machines have to satisfy the permitted noise levels.

- Many trees are planted in/around substation to isolate noise sources (corona discharge, cooling fans, etc.).

- Vibration impacts have been predicted to be minimal during both the construction and operation phases due to the lack of significant vibration sources. Some minor impact on properties very close to roads used for access during the construction stage may occur but the impact will be short term and of temporary duration.

**4.1.5 Air Quality**

- Air quality impacts will be restricted to the construction phase as there will be no emissions to air during ordinary operation of the substation. Impacts on air quality in the vicinity of the substation have the potential to occur as a result of excavation and construction activities. During excavation and material handling activities (for example, the works necessary to create a level the site) dust and particulates may be generated. The scale of the impact will be determined by the proximity of any residential properties that could be affected by dusts to the work sites, the nature of the material being excavated, its soil water/moisture content and the prevailing weather conditions at the time of excavation.
In the construction phase, it will be necessary to control emission to air to ensure that dust nuisance is not significant; this will be achieved through the use of an EMP to control site activities. Mitigation of impacts can take two forms; planning and scheduling activities including communication with those that have the potential to be affected as to when works will be taking place while physical methods such as controlling vehicle speeds on site, attention to methods of material handling and general site control will reduce the volume of dust liberated that could have the potential to cause nuisance.

Air pollution may result from transportation, earthworks and exhaust fumes from vehicles. To mitigate the effect, all trucks transporting dusty materials to/from the site will be covered by canvas. Water must be sprayed in dusty area (construction site, roads, etc.) during hot, dry, and windy conditions. All machinery will use fuel with valid operating licenses during the whole project schedule.

4.1.6 Ecology

The proposed substation site has not been identified as being sensitive or to contain valuable ecology that will be affected by the proposed developments.

At the proposed Hai Duong 2 substation site, the area is occupied by rice and kudzu fields. The surrounding area is similar in nature and as a consequence the loss of a relatively small area is not of significant ecological concern.

4.1.7 Water Resources/Quality

The nearest river to the site is Kinh Thay river which is about 3km southwest from the substation site.

Impacts on water resources in terms of potential reductions in surface water quality may occur in the vicinity of locations where construction activities are taking place. Potential sources of water pollution are from the domestic sewage from construction workers, spillage of oil and other lubricants, disposal of construction wastes, and wastewater from washing of construction equipment and vehicles. During the construction of the project, the contractor will be required to implement measures to prevent the discharge of wastewater from entering directly into the drainage. Measures to mitigate impacts on water quality include: (i) Provision of adequate on-site sanitation facilities with septic tanks to prevent untreated sewage from being channelled into the drainage canals and irrigation canals (ii) Implementation of appropriate solid waste and construction waste collection and disposal system, with provision for waste segregation. (iii) Designation of areas for equipment services, refuelling, and wash down. The maintenance area should be
provided with oil and grease traps to prevent oil from being washed into the offsite drainage canals

- On the operation stage, there will be operating workers. However, the number workers of each shift is small. Moreover, waste water system in substation obeys standards thus it has minimal impact on the environment. At the substation, there is a well to supply water for workers and for operation of the substation. Diameter of the well is 110 mm and the depth is 80-100m. To ensure quality of water, water will flow through a water treatment system before being pumped for water supply.

- Harmful chemicals can be caused by equipment of the substation. But equipment of the substation will not use PCB (Poly Chlorinated Biphenyl). Transformer is placed on waterproof slab (made of cement) with wall fence to prevent from water and leaks of toxic materials. Oil hole has size corresponding to the existing norm slopes to the side where water and oil drainage pipes are located on. In case of equipment breakdown, oil running from the transformer down to this hole can be discharged immediately through the back Φ400 steel piping to the oil tank. After treatment, oil is reused and water is discharged through the drainage system. The drainage systems beneath the transformers will be fitted with oil interception equipment with capacity of 100% of the largest element of the transformer oil tank.

4.1.8 Waste Management

- A number of different wastes will be generated during the construction phase at the substation site.

- In Hai Duong 2 substation site, it is estimated that clearance of 0.2m think of vegetation layer will generate 6.245m³ of grass and bushes from excavation activities. It will be important that such wastes that are generated in this manner are disposed of in an appropriate manner. Wastes will not be dumped into watercourses or onto adjacent land where it could either become a threat to water quality or nuisance to the land owners at those points. Where other trees are cut, they will be made available to local villagers rather than be disposed of.

- Solid wastes will also be produced when the substation equipment and electrical parts are delivered at the site for installation. This will primarily include packaging materials which could consist of wooden pallets, plastic, foam, and cardboard boxes. These materials can be also recycled or disposed of in local approved landfills.

- The excavation of ground for the foundations at the proposed substation site will generate quantities of earth and stone. The majority of this material will be backfilled into the
trenches but it is likely that because of bulking some excavated soils will require disposal. The proper disposal will be observed to ensure that excess spoils will be properly disposed off and will not cause damage to productive land, obstruction of surface water flow, and sedimentation. Those other construction materials can cause pollution of river and stream, mud on road or houses of local people. However, all sand, soil and stone are used to improve surfaces of the substation. The remaining waste will be collected and transported to the local approved landfill. As such this effect is negligible.

- Normal operation of the substation site will result in the generation of relatively small amounts of commercial type waste including paper, cardboard, plastics, and food waste. These wastes will be stored in an appropriate manner on site and collected and disposed of at the nearest waste disposal facility to the site

4.1.9. Community Health and Safety

- The project construction will result to moderate impacts associated with community health and safety such as construction traffic, transport of materials, fires, emergency spills of materials, and unauthorized entry by the villagers into dangerous working areas. To mitigate these potential impacts, the civil works contractor will be required to develop a Community Health and Safety Plan (CHSP) that incorporates recognized standards. The CHSP should include emergency response and preparedness procedures to be developed in close consultation with potentially affected communities and local authorities. The plan should include specific emergency response procedures, communication systems and protocols, interaction with local and regional emergency and health authorities, provision of emergency equipment and facilities such as emergency service vehicles.

4.1.10. Occupation Health and Safety

Construction activities may cause harm and danger to the lives and welfare of workers. The wearing of Personal Protective Equipment (PPE) such as helmet, safety gloves, ear mufflers, and other materials should be strictly imposed. A construction health and safety plan needs to be prepared and implemented by the contractor. The existing health services near the substation site are located in the community area. The community health service may not be able to accommodate any additional patients from the construction workers. Therefore in the construction phase, the contractor will be required to provide first-aid facilities for the workers and at least one trained first-aider should be available at the construction camp.
4.1.11 Electromagnetic Fields

- Electromagnetic fields (EMF) are produced whenever there is a voltage or a flow of electricity. The substation will produce such fields. The strength of field varies according to the voltage (or strength of flow of electricity) and field strengths diminish rapidly with distance from source.

- It has been suggested that EMF may be harmful to human health and there has been considerable research undertaken throughout the world in an attempt to assess and quantify the level of risk. Since 2000, several studies have linked exposure to magnetic fields with increased risk of health problems such as childhood leukaemia, motor neurone disease, miscarriage, brain cancer and depression. Although the risk to the individual remains small, when applied across a whole population, it could become a public health issue (Henshaw, D.L. (2002) ‘Adverse Health Effects From Power Frequency EMFs – they are starting to look real’. Engineering Science and Education Journal, June 2002, Editorial).

- In a paper published by the British Medical Journal in 1998 (Rutter, T. Electromagnetic fields may be carcinogenic BMJ 1998; 317:12) Rutter summarised that electromagnetic fields, should be regarded as "a possible human carcinogen", a working group drawn together by the US National Institute of Environmental Health Sciences reported.

- The group commented that "this report does not suggest that the risk is high. It is probably quite small, compared to many other public health risks. However, additional hypothesis-driven, focused research should be pursued to reduce uncertainties in this arena."

- The working group found no connection between electromagnetic fields and Alzheimer's disease, depression, or birth defects.

- Rutter also made reference to other research: In 1979, researchers in Denver, Colorado published the results of a study that found an association between children who had died of leukaemia and their residential proximity to high current electrical transmission or distribution lines. Since then, numerous epidemiological studies have looked for similar associations, but with inconsistent findings. Biological studies on animals have found little or no evidence linking disease to exposure to electromagnetic fields.

- In 1997 a committee of the National Academy of Scientists also reviewed the scientific evidence surrounding electromagnetic fields and their association with cancer. They found "no convincing evidence" to support an association.

- The American Physical Society issued a National Policy Statement in 1995 concerning power lines and human health (Summary of American Physical Society, National Policy
Statement number 95.2 – Statement on Power Line Fields and Public Health). The summary is included below:

- ‘Scientific studies (epidemiological studies, research on biological systems, and analyses of theoretical interaction mechanisms) show no consistent, significant link between cancer and power line fields and have failed to substantiate those studies which have reported links. No plausible mechanisms for the initiation or promotion of cancer by these power line fields have been identified. While it is impossible to prove that no deleterious health effects occur from exposure to any environmental factor, it is necessary to demonstrate a consistent, significant, and causal relationship before one can conclude that such effects do occur. From this standpoint, the conjectures relating cancer to power line fields have not been scientifically substantiated.’

- It is considered prudent that the site of substation should avoid (where an alternative is available) being located in close proximity to properties in the event that a link between EMF and cancer is proven in the future and that in accepting the need for such sources of EMF, distance separation is considered the best method of mitigation and avoidance of impact.

- When the substation operates, magnetic and electric field will not impact on the residential area and nearby works because the residential area around the substation location is sparse and far from the perimeter walls of the substation.

- Vietnamese standards on exposure to EMF are contained in the document ‘Permitted Level of Power Frequency and the Regulation of Supervision at Working Sites’ issued with Decision No. 183 NL/KHKT dated 12 April 1994 by the Ministry of Energy. This identifies that where levels are below 5kV/m there is no limit on the amount of exposure time.

4.1.12 Heritage and Archaeology

- As there are no known elements of heritage or archaeology within the area or near-by to be affected either by the proposed works, no impact is expected.

4.2 Mitigation Measures of Environmental Impacts

The Environmental Management Plan to address adverse environmental impacts of the project is presented in Table 4.1.
Table 4.1: Summary of Mitigation Measures

<table>
<thead>
<tr>
<th>Potential Environmental Impact</th>
<th>Proposed Mitigation Measure</th>
<th>Responsibility</th>
<th>Cost</th>
<th>Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-construction Hai Duong 2 Substation Design</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Location of substation</td>
<td>• Siting of substation is considered in selection. Hai Duong 2 is located on the current rice and kudzu field so as not to cause any adverse impacts on houses or any other structures.</td>
<td>Institute of Energy (IE)</td>
<td>Included in Engineering Consulting Contract</td>
<td>Northern Viet Nam Power Management Board (NPPMB) with consolation with the local authority</td>
</tr>
<tr>
<td>Loss of land</td>
<td>• The area affected is estimated to be 35232 m² will be compensated as shown in the RP</td>
<td>NPPMB with local authority</td>
<td>RP</td>
<td>PAHs and ADB</td>
</tr>
<tr>
<td>Safety hazards</td>
<td>• PCBs will not be used in substation transformers or other project facilities or equipment.</td>
<td>(IE)</td>
<td>Included in Engineering Consulting Contract</td>
<td>NPPMB</td>
</tr>
<tr>
<td></td>
<td>• Preparation of an Occupational Health and Safety Plan and provision of related training and instructions to all staff before each person commences duties.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noise</td>
<td>• Design of plant enclosures at Hai Duong 2 to comply with Vietnamese regulations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potential Environmental Impact</td>
<td>Proposed Mitigation Measure</td>
<td>Responsibility</td>
<td>Cost</td>
<td>Monitoring</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-----------------------------</td>
<td>----------------</td>
<td>------</td>
<td>------------</td>
</tr>
</tbody>
</table>
| Drainage and flooding          | • To protect the substation from inundation, embankment and filling shall be undertaken above current ground level to 3.0m  
• The design of the substation will ensure that the existing drainage system will be protected.  
• The current canal which runs from the north will be adjusted running along eastern side of the substation and diverted to the other side of the existing irrigation. This adjusted section is 2.5m in width and 1.5m deeper compared to the elevation of current field and could maintain the drainage of the current situation | Contractor | Included in contractor bidding price | - Technical supervisors of NPPMB and/or SIMC employed by NPPMB |
| Disruption of cropping activities, crop damage or loss, damage to canals and drains | • Construction techniques and machinery selection seeking to minimize ground disturbance.  
• Construction activities on cropping land should be timed to avoid disturbance of field crops within one month of harvest wherever possible.  
• Immediate repair of damaged community facilities (e.g. irrigation canals, pond dikes, etc.) will be undertaken  
• Excess spoils will not be dumped in productive agricultural land | Contractor | Included in contractor bidding price | - Technical supervisors of NPPMB and/or SIMC employed by NPPMB |
| Noise and vibration            | • All construction activities are conducted during daytime hours. If the construction is required in the evening, pre-notification and approval by local affected groups will be needed.  
• Presence of the perimeter wall will reduce noise impacts  
• The machines have to satisfy noise standard.  
• Construction equipment to be well maintained | Contractor | Included in contractor bidding price | - Technical supervisors of NPPMB and/or SIMC employed by NPPMB |
<table>
<thead>
<tr>
<th>Potential Environmental Impact</th>
<th>Proposed Mitigation Measure</th>
<th>Responsibility</th>
<th>Cost</th>
<th>Monitoring</th>
</tr>
</thead>
</table>
| **Air Quality**                | • All trucks transporting dusty materials to/from the site will be covered by canvas.  
• Water must be sprayed in dusty area (construction site, roads, etc) during hot, dry, and windy conditions. All machinery are to use fuel with valid operating licenses during the whole project schedule.  
• Communication with residents close to substation site to advise of construction program  
• Use existing roads and tracks for construction and maintenance as access to the line wherever possible. | Contractor | Included in contractor bidding price | - Technical supervisors of NPPMB and/or SIMC employed by NPPMB |
| **Water Quality**              | • Provision of adequate on-site sanitation facilities with septic tanks to prevent untreated sewage from being channeled into the drainage canals and irrigation canals  
• Implementation of appropriate solid waste and construction waste collection and disposal system, with provision for waste segregation  
• Designation of areas for equipment services, refueling, and wash down  
• Fuel and other hazardous materials securely stored above flood level. Storage area will be provided with concrete pavement and embankment. | Contractor | Included in contractor bidding price | - Technical supervisors of NPPMB and/or SIMC employed by NPPMB |
## Potential Environmental Impact

<table>
<thead>
<tr>
<th>Proposed Mitigation Measure</th>
<th>Responsibility</th>
<th>Cost</th>
<th>Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid waste will include vegetation debris (6.245 m³) at substation site, excavated soil, other residual construction materials and packaging wastes from equipment</td>
<td>Contractor</td>
<td>Included in contractor bidding price</td>
<td>- Technical supervisors of NPPMB and/or SIMC employed by NPPMB</td>
</tr>
<tr>
<td>Excavated materials will be used as fill material</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residual cut soil and other construction debris will be disposed in an approved site by the village authorities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Packaging wastes from electrical equipment will be recycled or will be disposed of in local approved landfills</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal operation of the substation site will result in the generation of relatively small amounts of commercial type waste including paper, cardboard, plastics, and food waste.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>These wastes will be stored in an appropriate manner on site and collected and disposed of at the nearest waste disposal facility to the site.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Potential Environmental Impact

<table>
<thead>
<tr>
<th>Occupational Health and Safety</th>
<th>Proposed Mitigation Measure</th>
<th>Responsibility</th>
<th>Cost</th>
<th>Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Conduct training and orientation of workers on construction health and safety management</td>
<td>Contractor</td>
<td>Included in contractor bidding price</td>
<td>- Technical supervisors of NPPMB and/or SIMC employed by NPPMB</td>
</tr>
<tr>
<td></td>
<td>Require the wearing of PPEs by workers within the project site.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Strictly require the contractor and its workers to follow construction health and safety program.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Provide first-aid facilities for workers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>All site workers will be accommodated in the provided construction camps unless they are recruited from nearby communes.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The construction camp site and surrounding areas will be kept clean. Inspections of the camp sites will be carried out weekly. Adequate number of rubbish bins will be provided</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Potable water supply and/or water tank will be provided for workers. All potable water supply sources and storage facilities will be secured.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Regular collection of waste/rubbish at the camp to be taken to a managed waste disposal facility.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Construction workforce facilities to include proper sanitation, water supply and waste disposal facilities.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Public health information provided to the construction workforce prior to the commencement of on-site work, primarily covering the prevention of HIV/AIDS and other communicable diseases.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potential Environmental Impact</td>
<td>Proposed Mitigation Measure</td>
<td>Responsibility</td>
<td>Cost</td>
<td>Monitoring</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------------------------------------------------------------------------------------------</td>
<td>------------------------</td>
<td>-------------------------------------------</td>
<td>-------------</td>
</tr>
</tbody>
</table>
| Community Health and Safety   | • Develop a Community Health and Safety Plan that integrates good international practice and recognized standards on community safety  
  • Provide procedures for emergency response, communication systems and protocols, interaction with local and regional emergency and health authorities, provision of emergency equipment  
  • Fencing of entire construction area  
  • Posting of warning signs in Vietnamese language for better understanding of locals. | Contractor             | Included in contractor bidding price      | NPPMNB      |

### Substation operation

| Waste Management               | Disposal of wastes in appropriate manner.  
  Maintenance and regular checking of oil interception facilities  
  Transformer is placed on waterproof slab (made of cement) with wall fence to prevent from water and leaks of toxic materials.  
  Oil hole has size corresponding to the existing norm slopes to the side where water and oil drainage pipes are located. In case of equipment breakdown, oil running from the transformer down to this hole can be discharged immediately through the drain to the oil interception facility. | Power Transmission Company No 1 (PTC1) | Included in operating cost | National Power Transmission Corporation (NPT) |
| Noise                         | Regular maintenance of transformers to assure compliance with design criteria. | PTC1                   | Included in operating cost | NPT         |
| Electromagnetic Fields        | Operating staff have to observe and comply with operating regulation for 220kV substation of EVN in general and Power Transmission in particular. | PTC1                   |                            | NPT         |
CHAPTER 5
ANALYSIS OF ALTERNATIVES

5.1 No project alternatives
A No Project alternative is not acceptable because the proposed project is an important component of the Master Plan of Power Sector Development of Viet Nam No. VI. Without the project, the load demand in the northern region and in general, the national load will not be met. This would lead to ongoing operating losses for power generation. The present situation will not improve and the reliability and safety of power supply in the northern region will not be attained.

5.2 Alternatives for the substation location
Three alternative sites were considered for the 220kV Hai Duong 2 substation, as follows:

(i) Alternative 1: An agricultural land in the Hue Tri Village, An Phu commune, Kinh Mon district, Hai Duong province

(ii) Alternative 2: An agricultural land in the An Sinh commune Kinh Mon district, Hai Duong province

The Institute of Energy surveyed the existing conditions at the sites. Alternative 2 was found to have several limiting factors. The 220kV Hai Duong 2 substation cannot be expanded since the area is not sufficient for the requirement of the 500kV substation. The surrounding areas of the existing substation are industrial zones and residential areas which would not be convenient for connecting the 500kV transmission line to the substation. The length of the transmission line will also be longer and the occupied ROW is very large.

The location of Alternative 1 was agreed in writing by the People’s Committee of Hai Duong province as per the document of số 1578/UBND-VP dated on 03/11/2009.
CHAPTER 6
INSTITUTIONAL REQUIREMENTS AND MONITORING PROGRAMS

6.1 Institutional Requirements

6.1.1 Capability Strengthening
- NPPMB will be the central agency responsible for project implementation and as such requires trained and experienced environmental professionals to ensure that the environmental responsibilities are discharged correctly. It is proposed that a trained technical specialist be employed by NPPMB to manage the EMP rather than utilising engineers who would have to acquire new skills. The aim will be for NPPMB to retain this position post-project construction to provide experience-based expertise for future projects.
- Given the difficulties of recruiting experienced staff, unit staff will require initial training in environmental management. It will be necessary for external support that are employed by NPPMB to prepare a Training Plan early in the pre-construction phase of project development. Theoretical and hands-on training will be conducted for staff whose management activities and decisions can affect the environmental impact of the project.
- Initial training will be provided. The external consultant will prepare and carry out a 3-4 day workshop for NPPMB staff covering:
  + standard environmental management requirements including: vegetation clearance, pruning and management requirements and techniques; temporary access;
  + earthworks management; erosion control; and
  + monitoring/auditing requirements.
- In addition to the preparation and running of the training course, an Environmental Operation Handbook covering the above subjects for field use by staff will be prepared by NPPMB.

6.2 Environmental Monitoring Plan

6.2.1 Description of Monitoring Programs
- Monitoring the implementation of environmental mitigation measures is required to ensure they are undertaken in accordance with the EMP, and to enable mitigation to be adapted and refined as required. Auditing the success or otherwise of implemented mitigation is also required to identify ineffective measures or implementation procedures, and thus enabling the design and incorporation of improved measures and the implementation of corrective actions.
### Table 6.1 Summary of Monitoring Requirements-Substation

<table>
<thead>
<tr>
<th>Project stage</th>
<th>Proposed Mitigation Measures</th>
<th>Parameter to be monitored</th>
<th>Location</th>
<th>Measurement</th>
<th>Frequency</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-construction</strong></td>
<td>• PCBs not used in substation transformers or other project facilities or equipment.</td>
<td>Transformer design</td>
<td>Office</td>
<td>Exclusion of PCBs in transformers stated in tender specification</td>
<td>Once</td>
<td>PECC1</td>
</tr>
<tr>
<td></td>
<td>• Design of substation meets noise regulations.</td>
<td>Substation design</td>
<td>Office and substation site</td>
<td>Compliance with regulations</td>
<td>Once</td>
<td>PECC1</td>
</tr>
<tr>
<td></td>
<td>• Consultation with residents regarding possible location</td>
<td>Substation design</td>
<td>Substation</td>
<td>Consultation with residents</td>
<td>All official landowners once</td>
<td>PECC1</td>
</tr>
<tr>
<td></td>
<td>• Construction techniques and machinery are selected to minimize ground disturbance, where possible.</td>
<td>Construction techniques and machinery</td>
<td>Substation</td>
<td>Construction techniques and machinery creating minimal ground disturbance</td>
<td>Once at the start of each construction season</td>
<td>Contractor</td>
</tr>
<tr>
<td><strong>Construction</strong></td>
<td>• Construction activities on cropping land timed to avoid disturbance of field crops within one month of harvest wherever possible.</td>
<td>Timing of start of construction</td>
<td>Substation</td>
<td>Crop disturbance within one month of harvest</td>
<td>Once per site</td>
<td>- Technical supervisors of NPPMB and/or SIMC employed by NPPMB</td>
</tr>
<tr>
<td>Project stage</td>
<td>Proposed Mitigation Measures</td>
<td>Parameter to be monitored</td>
<td>Location</td>
<td>Measurement</td>
<td>Frequency</td>
<td>Responsibility</td>
</tr>
<tr>
<td>---------------</td>
<td>------------------------------</td>
<td>---------------------------</td>
<td>----------</td>
<td>-------------</td>
<td>-----------</td>
<td>----------------</td>
</tr>
<tr>
<td>• Inspection of construction works particularly near irrigation canals, roads, and drainage canals to check whether appropriate mitigating measures are instituted by the contractor.</td>
<td>Mitigation measure has been applied</td>
<td>Substation</td>
<td>Complaints received by provincial/ Government District</td>
<td>Every 4 weeks</td>
<td>- Technical supervisors of NPPMB and/or SIMC employed by NPPMB</td>
<td></td>
</tr>
<tr>
<td>• Inspection of road condition to ensure public safety during construction</td>
<td>Accident case</td>
<td>Substation</td>
<td>Observation</td>
<td>Every 4 weeks</td>
<td>- Technical supervisors of NPPMB and/or SIMC employed by NPPMB</td>
<td></td>
</tr>
<tr>
<td>• Construction equipment to be well-maintained</td>
<td>Construction equipment</td>
<td>Substation</td>
<td>Complaints received by provincial/ Government District</td>
<td>Every 2 weeks</td>
<td>- Technical supervisors of NPPMB and/or SIMC employed by NPPMB</td>
<td></td>
</tr>
<tr>
<td>• Minimize land loss</td>
<td>Land perimeter marking</td>
<td>Substation</td>
<td>Compliance with boundary limits</td>
<td>Every 4 weeks</td>
<td>- Technical supervisors of NPPMB and/or SIMC employed by NPPMB</td>
<td></td>
</tr>
<tr>
<td>• Marking of vegetation prior to clearance, and strict control on clearing activities to ensure minimal clearance.</td>
<td>Vegetation marking and clearance control</td>
<td>Substation</td>
<td>Clearance strictly limited to target vegetation</td>
<td>Every 2 weeks</td>
<td>- Technical supervisors of NPPMB and/or SIMC employed by NPPMB</td>
<td></td>
</tr>
<tr>
<td>Project stage</td>
<td>Proposed Mitigation Measures</td>
<td>Parameter to be monitored</td>
<td>Location</td>
<td>Measurement</td>
<td>Frequency</td>
<td>Responsibility</td>
</tr>
<tr>
<td>---------------</td>
<td>------------------------------</td>
<td>--------------------------</td>
<td>----------</td>
<td>-------------</td>
<td>-----------</td>
<td>---------------</td>
</tr>
<tr>
<td>• Felled trees and other cleared or pruned vegetation offered to the owner for their use, or removed if requested.</td>
<td>Availability of cleared vegetation to owners</td>
<td>Substation</td>
<td>Use or intended use of vegetation by owners</td>
<td>Every 2 weeks</td>
<td>- Technical supervisors of NPPMB and/or SIMC employed by NPPMB</td>
<td></td>
</tr>
<tr>
<td>• Construction activities involving significant ground disturbance (i.e. substation land forming) not undertaken during the monsoon season.</td>
<td>Seasonal start and finish of major earthworks</td>
<td>Substation</td>
<td>Timing of major disturbance activities</td>
<td>Prior to commencement of major construction activities</td>
<td>- Technical supervisors of NPPMB and/or SIMC employed by NPPMB</td>
<td></td>
</tr>
<tr>
<td>• Establishment to only involve cutting trees off at ground level or pruning as appropriate, with tree stumps and roots left in place and ground cover left undisturbed.</td>
<td>Ground disturbance during vegetation clearance</td>
<td>Substation</td>
<td>Amount of ground disturbance</td>
<td>Every 2 weeks</td>
<td>- Technical supervisors of NPPMB and/or SIMC employed by NPPMB</td>
<td></td>
</tr>
<tr>
<td>• Fuel and other hazardous materials must not leak.</td>
<td>Location of fuel and hazardous material Storage</td>
<td>Substation</td>
<td>Fuel storage in appropriate locations and receptacles</td>
<td>Every 2 weeks</td>
<td>- Technical supervisors of NPPMB and/or SIMC employed by NPPMB</td>
<td></td>
</tr>
</tbody>
</table>
## Initial Environmental Examination

### Project stage

<table>
<thead>
<tr>
<th>Project stage</th>
<th>Proposed Mitigation Measures</th>
<th>Parameter to be monitored</th>
<th>Location</th>
<th>Measurement</th>
<th>Frequency</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Construction</strong></td>
<td>Construction activities only undertaken during the day and local communities informed of the construction schedule.</td>
<td>Timing of construction</td>
<td>Substation</td>
<td>Daytime construction only</td>
<td>Every 2 weeks</td>
<td>- Technical supervisors of NPPMB and/or SIMC employed by NPPMB</td>
</tr>
<tr>
<td></td>
<td>• Construction workforce facilities include proper sanitation, water supply and waste disposal facilities.</td>
<td>Workforce facilities</td>
<td>Substation</td>
<td>Presence of proper sanitation, water supply and waste disposal facilities</td>
<td>Once each new facility</td>
<td>- Technical supervisors of NPPMB and/or SIMC employed by NPPMB</td>
</tr>
<tr>
<td><strong>Operation and maintenance</strong></td>
<td>• Substation constructed above at least the 1:10 year flood level by raising the foundation pad.</td>
<td>Substation design and base heights</td>
<td>Substation</td>
<td>Base height as per flood design</td>
<td>Once</td>
<td>PECC1 and PTC1</td>
</tr>
<tr>
<td></td>
<td>• Substation transformers located within secure and impervious bounded areas with a storage capacity of at least 110% of the capacity of oil in transformers and associated</td>
<td>Substation bounding</td>
<td>Substation</td>
<td>Bounding capacity and permeability</td>
<td>Once</td>
<td>PECC1 and PTC1</td>
</tr>
</tbody>
</table>
6.2.2 Responsibilities for Implementing Mitigation and Monitoring Measures

The following organisations will have a key role in implementing and monitoring the EMP.

- National Power Transmission Corporation (NPT) as the main proponent of the project: ensure that bidding documents for contractors include provisions on implementation of the EMP (environmental mitigation measures and environmental monitoring requirements).

- Northern Viet Nam Power Project Management Board (NPPMB) responsible for the project as part of NPT but with specific responsibility for
  - overall planning, coordination and management of the EMP
  - ensuring compliance with environmental regulations
  - coordination with provincial and district peoples committees
  - management of environmental training courses
  - auditing of contractors activities (potentially through sub-contract to
    - another element of NPT or an external body)
  - reporting on environmental issues to NPT.

- Design and Build Contractor (DBC) – full responsibility for ensuring environmental protection as per the IEE is incorporated, specifically;
  - Preparation of detailed EMP prior to commencement of site works
  - undertaking all monitoring elements as defined in the EMP
  - reporting on environmental issues regularly to NPPMB
  - ensuring compliance with all Vietnamese environmental legislation during design and build activities.

- Safeguard Independent monitoring Consultant (SIMC) will be hired by NPPMB to monitor and verify that the EMP has been fully implemented.

- Peoples Committee (PC) both the District and the Communes Peoples Committee will play an important role in the EMP through:
  - contributing during the preparation of detailed EMP
  - identify impacts where they occur and reporting to DBC and NPPMB.

- Ministry of Natural Resources and Environment (MoNRE) responsible for establishing policies and guidelines on environmental management. The EIA division should be consulted on the drafting of the detailed EMP.

- Departments of Natural Resources and Environment (DoNRE), Provincial Peoples Committee representative with considerable local knowledge of their provinces should be involved at all stages of the EMP preparation as well as receiving reports form the DBC as to environmental compliance.

The proposed relationship between the above will need to be confirmed prior to commencement of the project but a schematic figure illustrating the suggested linkages is illustrated below in Figure 6.1.
The DBC should prepare a detailed EMP based on the finding enclosed in the IEE and the outline EMP enclosed in this document. The EMP should identify precisely the following issues:

- time line for monitoring/visits to site (only possible when the route and substation construction plan has been subject to detailed design)
- what elements will be monitored at what locations based on the recommendations in Table 6.1 (including activities to be undertaken prior to construction commencing)
- reporting structure following such visits including proposed response in the event of an environmental incident (such as an oil spillage)
- staffing proposals for a) undertaking the monitoring, b) reporting and c) liaison with People’s Committee representatives and the client (NPPMB).

The EMP should be issued for comment and agreement to NPPMB, the Peoples Committee at Provincial and District level and also to MoNRE not less than 2 months prior to proposed commencement of work.

- Monitoring and reporting:
  - Maintaining the regular reporting on the implementation of the mitigating measures during construction and operation phases of the project as required by ADB and GOV. Quarterly monitoring reports are to be submitted to ADB during the construction phase. The semi-annual monitoring reports prepared by the VICA consultant. The report then will be submitted to LIC environment and

---

**Figure 6.1 Proposed Relationships between Parties**

- The DBC should prepare a detailed EMP based on the finding enclosed in the IEE and the outline EMP enclosed in this document. The EMP should identify precisely the following issues:

  - time line for monitoring/visits to site (only possible when the route and substation construction plan has been subject to detailed design)
  - what elements will be monitored at what locations based on the recommendations in Table 6.1 (including activities to be undertaken prior to construction commencing)
  - reporting structure following such visits including proposed response in the event of an environmental incident (such as an oil spillage)
  - staffing proposals for a) undertaking the monitoring, b) reporting and c) liaison with People’s Committee representatives and the client (NPPMB).

- The EMP should be issued for comment and agreement to NPPMB, the Peoples Committee at Provincial and District level and also to MoNRE not less than 2 months prior to proposed commencement of work.

- Monitoring and reporting:
  - Maintaining the regular reporting on the implementation of the mitigating measures during construction and operation phases of the project as required by ADB and GOV. Quarterly monitoring reports are to be submitted to ADB during the construction phase. The semi-annual monitoring reports prepared by the VICA consultant. The report then will be submitted to LIC environment and
NPPMB for review and comment. The final report which consolidated all comments will be submitted to ADB for further review.

- Monitoring and reporting system will undertake as follows (Table 6.2):
<table>
<thead>
<tr>
<th>REPORT TYPE</th>
<th>PRIMARY REPORTING LEVEL</th>
<th>BY</th>
<th>TO</th>
<th>FREQUENCY</th>
<th>SECONDARY REPORTING LEVEL</th>
<th>BY</th>
<th>TO</th>
<th>FREQUENCY</th>
<th>TERTIARY REPORTING LEVEL</th>
<th>BY</th>
<th>TO</th>
<th>FREQUENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Environmental Management</td>
<td>Contractor</td>
<td>NPPMB</td>
<td></td>
<td>Once before construction commences &amp; monthly thereafter</td>
<td>NPPMB</td>
<td>NPT</td>
<td></td>
<td>Once per 3 months</td>
<td>NPT</td>
<td>ADB</td>
<td></td>
<td>Once per 3 months</td>
</tr>
<tr>
<td>Environmental performance monitoring:</td>
<td>Technical supervisors of NPPMB</td>
<td>NPPMB</td>
<td></td>
<td>Monthly</td>
<td>NPPMB</td>
<td>NPT</td>
<td></td>
<td>Quarterly</td>
<td>NPT</td>
<td>ADB</td>
<td></td>
<td>Quarterly</td>
</tr>
<tr>
<td>construction</td>
<td>SIMC</td>
<td>ADB</td>
<td></td>
<td>Quarterly</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental performance monitoring:</td>
<td>Operating workers</td>
<td>PTC1</td>
<td>NPT</td>
<td>Annually</td>
<td></td>
<td>NPT</td>
<td>ADB</td>
<td>Annually</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>operation</td>
<td>Power transmission company 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(PTC1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Safeguard Independent monitoring Consultant (SIMC)
6.3 Environmental Management Plan Budget
- The costs for many of the EMP and EMoP measures are part of engineering, construction, and procurement costs and are not included in the EMP budget. EMP costs are mainly included in the EPC package and PIC costs, based on two years of construction (Table 6.3).
- The costs for implementing the mitigation measures during the construction phase of the project include the management of soil runoff, dust, and construction wastes, and the training and orientation of workers and community on the health and safety management plan.
- The NPPMB shall contract a Project Implementation Consultant for 22 person-month to oversee the environmental compliance of all subprojects during construction phase and to conduct training on environmental management, occupational health and safety and community health and safety/awareness.
- During the operational phase, the cost of the EMP are also integrated in the operations cost of the substation. Capacity building, field monitoring, and procurement of monitoring devices for the operational phase are also outlined.

Table 6.3 Summary of Monitoring Requirements-Substation

<table>
<thead>
<tr>
<th>Activities</th>
<th>Responsibility</th>
<th>Unit</th>
<th>No</th>
<th>Unit Cost (USD)</th>
<th>Total (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment Monitoring Inspection</td>
<td>NPPMB</td>
<td>Month</td>
<td>24</td>
<td>300</td>
<td>7,200</td>
</tr>
<tr>
<td>Training and Capacity Building for Environmental</td>
<td>NPPMB/LIC</td>
<td>Lump sum</td>
<td>22</td>
<td></td>
<td>52,000</td>
</tr>
<tr>
<td>Management and Monitoring: Occupation Health and</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sub-Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>59,200</td>
</tr>
<tr>
<td>Contingency (15%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8,880</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>68,080</td>
</tr>
</tbody>
</table>
CHAPTER 7
PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

7.1 Introduction
As part of the IEE preparation, it was required that workshops concerning potential environmental impacts were held prior to commencing the field work which is necessary to prepare the Environmental Assessment as well as the Environmental Monitoring Plan. These involved key stakeholders from the project area. There are 17 stakeholders who were consulted in the consultation meeting workshops which was organized in 21 April 2012 in An Phu commune, Kinh Mon district, Hai Duong province. The minutes of the Public consultation meeting has been attached in the Annex 3.

Figure 7.1. Public consultation meeting was held in 21/4/2012 in An Phu commune, Kinh Mon district, Hai Duong province

7.2 Rationale
- The following rationales have been applied to the Project in general and to the consultation exercises in particular:
  - ADB’s safeguard policies: OM/OP 20, OM/OP 47, OM/OP 50, OM/OP 53
  - Viet Nam Environmental Protection Law, Government Decree No. 175-CP

7.3 Objectives
- The objectives of the workshops were as follows:
  + Disseminating information on the project to the stakeholders and thereby helping them better understand the trade-offs between project benefits and disadvantages.
  + Helping identify key causes of environmental problems
  + Gaining a better understanding of existing environmental conditions
  + Helping the stakeholders contribute meaningfully to the project design
  + Gaining greater trust with the project proponent and support for the project
  + Reducing potential conflicts and substantial delays
  + Helping recognize possible alternatives
+ Helping to establish a comprehensive Environmental Management Plan by incorporating local input and know-how
+ Helping to determine project programs that fit the needs and priorities of the affected people
+ Ensuring the sustainability of the project

7.4 Format Used
- The public consultation meetings were undertaken in a traditional format as follows:
  + Presentation of the project and predicted impacts
  + Asking questions about the public’s views and concerns
  + Listening to and answering questions
  + Giving explanations to clarify issues
  + Displaying printed materials
  + Using question box to collect people’s questions, concerns, input, and recommendations

7.5 Approach and Techniques Used
- The approach used in public consultation meetings was a combination of the following approaches: 1) disseminating information; 2) soliciting input; and 3) getting consensus on issues. Using such an integrated approach helped increase the overall outcome of the meetings and reduce disadvantages inherently associated with each approach. Below is a summary of the techniques used:
  - Disseminating information:
    + Displaying printed materials: available technical reports in Vietnamese such as FS, RAP, IEE; project detailed drawings; maps of line route; pictures.
    + Giving presentation about the project in terms of size, main components, capacity, specifications, benefits, negative impacts with emphasis on the Project components that traverse the local in which the workshop is being undertaken.
  - Soliciting input:
    + Project team: direct discussions with the participants and relevant agencies and organizations on the project issues; exchange of information on local environmental conditions as well as land use issues;
    + Question box and papers: used to solicit input from the public and relevant agencies about any issue related to the project for those individuals not wishing to raise the question in an open forum.
  - Getting consensus
    + Project team: two way and direct communication with the public and relevant agencies helped the public better understand the project’s positive and negative impacts.

7.6 Program and Topics Discussed
The topics discussed during the workshops include the following:
+ The scope of the project as well as its role in the electricity and economic development strategies in Viet Nam.
+ The locations of the Hai Duong 2 substation with emphasis on the Project’s components that traverse the local area in which the workshop is being undertaken.
Environmental impacts that might occur during the Project implementation process, including three stages: pre-construction, construction and operation as well as the mitigation measures of impacts on environment.

+ ADB environmental policies as well as ADB requirements of public consultation and information disclosure.

7.7 Sequence Of Public Consultation And Information Disclosure

- Step 1: Project Information Notice: During the survey, investigating the scope of the project's impact, coordinating with government and inform local people about the content of the project (size, location, purpose and the significance of the project).

- Step 2: Public consultation meeting: The report summarizes the initial environmental assessment of projects presented in An Phu commune, Kinh Mon district. During the meeting, the consulting unit discussed the project scope, resettlement policy, the impact of a project on natural environment and social mitigation measures that.

- Step 3: Disclosure of information: after the IEE report completed according to the feedback of APs and affected people's committees of communes and in the opinion of ADB will be NPPMB with local authorities publicize and inform affected households.

7.8 Comment received from the local authority and representatives of affected households

Local authority:

- Agree with the development of the 220kV Hai Duong 2 substation.
- Agree with the EMP proposed by the LIC consultant.
- The project owner NPPMB has to ensure that the contractor will be complying with the committed EMP.
- The project owner has to properly compensate the affected households
- The contractor has to rebuild the irrigation canal affected by the construction of the substation

Representatives of Affected household:

- Agree with the development of the 220kV Hai Duong 2 substation and the EMP proposed by the LIC consultant
- The project owner has to properly compensate the affected households
- The project owner and contractor have to ensure that the irrigation system will not be affected during the construction and operation of the project.
- The contractor will have to comply with the EMP particularly avoiding the pollution of the environment in the area.
- The contractor will commit to traffic safety and social safety in the area.

Respond from LIC environment and NPPMB

- LIC environment, on behalf of NPPMB has agreed with the comments/issues raised by local authority (An Phu commune, Kinh Mon district, Hai Duong province) and affected households who participated in the consultation meeting.

- LIC environment will report to NPPMB to ensure that all comments/issues will be properly addressed before, during and after the construction of the 220kV Hai Duong 2 substation.
CHAPTER 8
CONCLUSIONS

- During the project operation, the level of negative impacts to the surrounding environment is negligible. However, the main focus will be for the impacts that may occur during the project construction stage.

- The 220kV Hai Duong 2 substation is constructed to meet increasing load demand of Kinh Mon district, Hai Duong province. When Hai Duong 2 substation is operated, it will enhance area connection of Vietnam power system; improve system stability and safe operation for national system; reduce power loss, energy loss in power system, and improve electrical production and business of EVN.

- Construction of the substation and transmission lines can cause some impacts on environment and local people, but with mitigation measures, its impacts are minor.

- An outline of the EMP has been prepared in order to ensure that mitigation measures identified are successfully implemented and environmental impacts are managed in an appropriate manner during the construction phase. A detailed EMP will be prepared prior to the construction works. This IEE confirms that the project is environmental category B and no further environmental impact assessment is necessary.
ANNEX

ANNEX1:
Certification on Environmental Protection Commitment of Hai Duong 2 Substation 220kV on January 13th 2010 by Kinh Mon District People’s Committee.
CERTIFICATE OF REGISTRATION OF ENVIRONMENT PROTECTION COMMITMENT

Chairman of Kinh Mon District People’s Committee attests that
Fact 2: Project owner is responsible for implementing sufficiently and properly the contents of environment protection included in its guarantee.
Fact 3: Based on this guarantee, managing authorities on environment protection will monitor and inspect project activities on environment protection.
Fact 4: This certification is valid from its signing date.

Receiving place: On behalf of Kinh Mon DPC
-as above
- archived
- PMU of Northern electricity construction
- Institute of Energy
ANNEX 2: Rapid Environmental Assessment (REA) Checklist

**Instructions:**

(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to Environment and Safeguards Division (RSES) for endorsement by Director, RSES and for approval by the Chief Compliance Officer.

(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.

(iii) Answer the questions assuming the “without mitigation” case. The purpose is to identify potential impacts. Use the “remarks” section to discuss any anticipated mitigation measures.

| Country/Project Title: Loan 2225-VIE: Northern Power Transmission Expansion Project Hai Duong 2 Substation |
| Sector Division: SEEN |

<table>
<thead>
<tr>
<th>Screening Questions</th>
<th>Yes</th>
<th>No</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. PROJECT SITING</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IS THE PROJECT AREA ADJACENT TO OR WITHIN ANY OF THE FOLLOWING ENVIRONMENTALLY SENSITIVE AREAS?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• CULTURAL HERITAGE SITE</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• PROTECTED AREA</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• WETLAND</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• MANGROVE</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• ESTUARINE</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• BUFFER ZONE OF PROTECTED AREA</td>
<td>√</td>
<td></td>
<td>The project is not located in a buffer zone of a protected area. The nearest protected area are the Cat Ba National Park in HaiPhong and XuanThuy Nature Reserve in Nam Dinh which are about 150 and 100km away respectively.</td>
</tr>
<tr>
<td>• SPECIAL AREA FOR PROTECTING BIODIVERSITY</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>B. POTENTIAL ENVIRONMENTAL IMPACTS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WILL THE PROJECT CAUSE…</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• encroachment on historical/cultural areas, disfiguration of landscape and increased waste generation?</td>
<td>√</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Screening Questions

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes/No</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>encroachment on precious ecosystem (e.g. sensitive or protected areas)?</td>
<td>Yes</td>
<td>The project will affect an irrigation canal. Realignment of the irrigation canal will be undertaken to avoid causing negative impacts to the nearby agricultural land. People’s Committee of An Phu approve the plans.</td>
</tr>
<tr>
<td>alteration of surface water hydrology of waterways crossed by roads and resulting in increased sediment in streams affected by increased soil erosion at the construction site?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>damage to sensitive coastal/marine habitats by construction of submarine cables?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>deterioration of surface water quality due to silt runoff, sanitary wastes from worker-based camps and chemicals used in construction?</td>
<td>No</td>
<td>Minimal impact will occur because the project will implement measures to avoid unsanitary conditions at the workers camp as part of the EMP.</td>
</tr>
<tr>
<td>increased local air pollution due to rock crushing, cutting and filling?</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?</td>
<td>No</td>
<td>Minimal impact is anticipated but mitigating measures will be included in the EMP.</td>
</tr>
<tr>
<td>chemical pollution resulting from chemical clearing of vegetation for construction site?</td>
<td>No</td>
<td>Not applicable</td>
</tr>
<tr>
<td>noise and vibration due to blasting and other civil works?</td>
<td>Yes</td>
<td>Very minimal noise will be generated. The nearest residential area is located about 500 meters away.</td>
</tr>
<tr>
<td>dislocation or involuntary resettlement of people?</td>
<td>Yes</td>
<td>Only agricultural land will be affected</td>
</tr>
<tr>
<td>disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>social conflicts relating to inconveniences in living conditions where construction interferes with pre-existing roads?</td>
<td>Yes</td>
<td>Insignificant social impacts are anticipated because the project will hire local workers.</td>
</tr>
<tr>
<td>hazardous driving conditions where construction interferes with pre-existing roads?</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>creation of temporary breeding habitats for vectors of disease such as mosquitoes and rodents?</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>dislocation and compulsory resettlement of people living in right-of-way of the power transmission lines?</td>
<td>Yes</td>
<td>The project will involve a substation only.</td>
</tr>
<tr>
<td>environmental disturbances associated with the maintenance of lines (e.g. routine control of vegetative height under the lines)?</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>facilitation of access to protected areas in case corridors traverse protected areas?</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>disturbances (e.g. noise and chemical pollutants) if herbicides are used to control vegetative height?</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>large population influx during project construction and operation that cause increased burden on social infrastructure and services (such as water supply and sanitation systems)?</td>
<td>Yes</td>
<td>About 30-35 people will be hired during construction of the project, mostly coming from the community.</td>
</tr>
</tbody>
</table>
### Screening Questions

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>• social conflicts if workers from other regions or countries are hired?</td>
<td></td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>• poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases from workers to local populations?</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• risks to community safety associated with maintenance of lines and related facilities?</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• community health hazards due to electromagnetic fields, land subsidence, lowered groundwater table, and salinization?</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project (e.g., high voltage wires, and transmission towers and lines) are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?</td>
<td>√</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Climate Change and Disaster Risk Questions

The following questions are not for environmental categorization. They are included in this checklist to help identify potential climate and disaster risks.

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Is the Project area subject to hazards such as earthquakes, floods, landslides, tropical cyclone winds, storm surges, tsunami or volcanic eruptions and climate changes (see Appendix I)?</td>
<td>√</td>
<td></td>
<td>The project is located within a reported flood-prone area. Embankment will be provided to avoid impacts of flooding to the site.</td>
</tr>
<tr>
<td>• Could changes in precipitation, temperature, salinity, or extreme events over the Project lifespan affect its sustainability or cost?</td>
<td>√</td>
<td></td>
<td>The design of the project has considered the 100-year flood.</td>
</tr>
<tr>
<td>• Are there any demographic or socio-economic aspects of the Project area that are already vulnerable (e.g. high incidence of marginalized populations, rural-urban migrants, illegal settlements, ethnic minorities, women or children)?</td>
<td>√</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Could the Project potentially increase the climate or disaster vulnerability of the surrounding area (e.g., increasing traffic or housing in areas that will be more prone to flooding, by encouraging settlement in earthquake zones)?</td>
<td>√</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Appendix I: Environments, Hazards and Climate Changes

<table>
<thead>
<tr>
<th>Environment</th>
<th>Natural Hazards and Climate Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arid/Semi-arid and desert environments</td>
<td>Low erratic rainfall of up to 500 mm rainfall per annum with periodic droughts and high rainfall variability. Low vegetative cover. Resilient ecosystems &amp; complex pastoral and systems, but medium certainty that 10–20% of drylands degraded; 10-30% projected decrease in water availability in next 40 years; projected increase in drought duration and severity under climate change. Increased mobilization of sand dunes and other soils as vegetation cover declines; likely overall decrease in agricultural productivity, with rain-fed agriculture yield reduced by 30% or more by 2020. Earthquakes and other geophysical hazards may also occur in these environments.</td>
</tr>
<tr>
<td>Humid and sub-humid plains, foothills and hill country</td>
<td>More than 500 mm precipitation/yr. Resilient ecosystems &amp; complex human pastoral and cropping systems. 10-30% projected decrease in water availability in next 40 years; projected increase in droughts, heatwaves and floods; increased erosion of loess-mantled landscapes by wind and water; increased gully erosion; landslides likely on steeper slopes. Likely overall decrease in agricultural productivity &amp; compromised food production from variability, with rain-fed agriculture yield reduced by 30% or more by 2020. Increased incidence of forest and agriculture-based insect infestations. Earthquakes and other geophysical hazards may also occur in these environments.</td>
</tr>
<tr>
<td>River valleys/ deltas and estuaries and other low-lying coastal areas</td>
<td>River basins, deltas and estuaries in low-lying areas are vulnerable to riverine floods, storm surges associated with tropical cyclones/typhoons and sea level rise; natural (and human-induced) subsidence resulting from sediment compaction and ground water extraction; liquefaction of soft sediments as result of earthquake ground shaking. Tsunami possible/likely on some coasts. Lowland agri-business and subsistence farming in these regions at significant risk.</td>
</tr>
<tr>
<td>Small islands</td>
<td>Small islands generally have land areas of less than 10,000km² in area, though Papua New Guinea and Timor with much larger land areas are commonly included in lists of small island developing states. Low-lying islands are especially vulnerable to storm surge, tsunami and sea-level rise and, frequently, coastal erosion, with coral reefs threatened by ocean warming in some areas. Sea level rise is likely to threaten the limited ground water resources. High islands often experience high rainfall intensities, frequent landslides and tectonic environments in which landslides and earthquakes are not uncommon with (occasional) volcanic eruptions. Small islands may have low adaptive capacity and high adaptation costs relative to GDP.</td>
</tr>
<tr>
<td>Mountain ecosystems</td>
<td>Accelerated glacial melting, rockfalls/landslides and glacial lake outburst floods, leading to increased debris flows, river bank erosion and floods and more extensive outwash plains and, possibly, more frequent wind erosion in intermontane valleys. Enhanced snow melt and fluctuating stream flows may produce seasonal floods and droughts. Melting of permafrost in some environments. Faunal and floral species migration. Earthquakes, landslides and other geophysical hazards may also occur in these environments.</td>
</tr>
<tr>
<td>Volcanic environments</td>
<td>Recently active volcanoes (erupted in last 10,000 years – see <a href="http://www.volcano.si.edu">www.volcano.si.edu</a>). Often fertile soils with intensive agriculture and landslides on steep slopes. Subject to earthquakes and volcanic eruptions including pyroclastic flows and mudflows/lahars and/or gas emissions and occasionally widespread ashfall.</td>
</tr>
</tbody>
</table>
ANNEX 3: Minutes of Public Participation

Công hòa xã hội chủ nghĩa Việt Nam
Độc lập - Tự do - Hạnh phúc

BIÊN BẢN THAM VĂN CỘNG ĐỒNG
BÁNH GIÁ TÁC ĐỒNG MÔI TRƯỜNG BAN ĐẦU
Đề án Truyền tải điện miền Bắc mở rộng (VIE 2225)
Trạm biến áp 220KV Hải Dương 2

1. Thời gian họp:..........................giờ, ngày, tháng, năm 2012
2. Địa điểm họp:..........................địa điểm
3. Thành phần tham dự:
   - Ông (bà):..........................Chức vụ
   - Ông (bà):..........................Chức vụ
   - Ông (bà):..........................Chức vụ
   - Ông (bà):..........................Chức vụ

Điểm chính quyền địa phương (Xã An Phú, huyện Kinh Môn, tỉnh Hải Dương)
   - Ông (bà):..........................Chức vụ
   - Ông (bà):..........................Chức vụ
   - Ông (bà):..........................Chức vụ
   - Ông (bà):..........................Chức vụ

Điểm các hộ bị ảnh hưởng xã An Phú (đánh sách định kèm theo biên bản)
   - Ông (bà):..........................Chức vụ
   - Ông (bà):..........................Chức vụ
   - Ông (bà):..........................Chức vụ
   - Ông (bà):..........................Chức vụ

4. Nội dung cuộc họp:
   - Đại diện chính quyền địa phương khai mạc cuộc họp tham vấn cộng đồng, giới thiệu thành phần tham gia.
   - Từ vấn giới thiệu về mục tiêu, ý nghĩa của việc tham vấn cộng đồng đối với các vấn đề môi trường trong việc xây dựng dự án xây dựng trạm biến áp 220kv Hải Dương 2 tại xã An Phú huyện Kinh Môn tỉnh Hải Dương thuộc dự án truyền tải điện miền Bắc mở rộng (NPPMB)
   - Từ vấn giới thiệu về nội dung của dự án
   - Từ vấn giới thiệu về tác động môi trường của dự án và Kế hoạch quản lý môi trường (EMP) được tóm tắt theo bảng sau:
<table>
<thead>
<tr>
<th>Tác động môi trường</th>
<th>Biện pháp giảm thiểu</th>
<th>Trách nhiệm</th>
<th>Чи phái</th>
<th>Giảm sát</th>
</tr>
</thead>
<tbody>
<tr>
<td>GFMB làm ảnh hưởng đến môi trường, đặc biệt là ảnh hưởng đến hệ thống dây cáp...</td>
<td>Tranh thủ công trình mia và xử lý vấn đề...</td>
<td>Nhà thu</td>
<td>Bảo gồm trong hợp đồng xây dựng</td>
<td>-NPPMB và tu vấn giám sát</td>
</tr>
<tr>
<td>Tiếng ồn và rung</td>
<td>Thi công diễn ra vào ban ngày, nên làm ảnh hưởng tới quy hoạch đô thị</td>
<td>Nhà thu</td>
<td>Bảo gồm trong hợp đồng xây dựng</td>
<td>-NPPMB và tu vấn giám sát</td>
</tr>
<tr>
<td>Không khí</td>
<td>Chế biến khí thải với quy trình khí thải...</td>
<td>Nhà thu</td>
<td>Bảo gồm trong hợp đồng xây dựng</td>
<td>-NPPMB và tu vấn giám sát</td>
</tr>
<tr>
<td>Môi trường nước</td>
<td>Đảm bảo cỗi nguồn nước tại khu vực...</td>
<td>Nhà thu</td>
<td>Bảo gồm trong hợp đồng xây dựng</td>
<td>-NPPMB và tu vấn giám sát</td>
</tr>
<tr>
<td>Quản lý chất thải</td>
<td>Chế biến và xử lý chất thải...</td>
<td>Nhà thu</td>
<td>Bảo gồm trong hợp đồng xây dựng</td>
<td>-NPPMB và tu vấn giám sát</td>
</tr>
<tr>
<td>An toàn và sức khỏe công động</td>
<td>Xây dựng kế hoạch sức khỏe công động và an toàn...</td>
<td>Nhà thu</td>
<td>Bảo gồm trong hợp đồng xây dựng</td>
<td>-NPPMB và tu vấn giám sát</td>
</tr>
<tr>
<td>Sức khỏe nghề nghiệp</td>
<td>Đào tạo tập huấn về quản lý an toàn cho công nhân...</td>
<td>Nhà thu</td>
<td>Bảo gồm trong hợp đồng xây dựng</td>
<td>-NPPMB và tu vấn giám sát</td>
</tr>
</tbody>
</table>
5. Y kiến của chính quyền địa phương và đại diện công dụng bị ảnh hưởng

Đại diện chính quyền địa phương:
- [Text]

Đại diện công dụng bị ảnh hưởng:
- [Text]

6. Kê luan

Chính quyền địa phương (ký và ghi rõ họ tên)

Đại diện tư vấn (ký và ghi rõ họ tên)

Đại diện công dụng (ký và ghi rõ họ tên)
<table>
<thead>
<tr>
<th>TT</th>
<th>Họ và tên</th>
<th>Đơn vị</th>
<th>Ký tên</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Nguyễn Như bố</td>
<td>Chị tich UBND xã An Lão</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Nguyễn Văn Thơ</td>
<td>Phò Chị tich UBND xã</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Nguyễn Văn Hiển</td>
<td>Bí thư thôn Tần Thủy</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Lê Thị Khoa</td>
<td>Chị tich Hội PN xã</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Phùng Văn Nghi</td>
<td>Chị tich UBND xã</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Nguyễn Văn Bôi</td>
<td>Chị tich Hội Cơ Xã</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Dương A. Hớp</td>
<td>HĐ BA H thiện Hồ Thị</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Nguyễn Nhưugen</td>
<td>HĐ BA H thiện Hồ Thị</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Nguyễn Büyük première</td>
<td>HĐ BA H thiện Hồ Thị</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Nguyễn Thị Thúy</td>
<td>HĐ BA H thiện Hồ Thị</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Nguyễn Út Vàng</td>
<td>Cán bộ Phó chánh xã</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Nguyễn Thị Bích</td>
<td>HĐ BA H thiện Hồ Thị</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>Mã Lương Bình</td>
<td>HĐ BA H thiện Hồ Thị</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Dương A. Tý</td>
<td>HĐ BA H thiện Hồ Thị</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Nguyễn Văn Vi</td>
<td>HĐ BA H thiện Hồ Thị</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>Nguyễn Thị Hạnh</td>
<td>HĐ BA H thiện Hồ Thị</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>Nguyễn Thị Hạnh</td>
<td>HĐ BA H thiện Hồ Thị</td>
<td></td>
</tr>
</tbody>
</table>
MINUTES OF PUBLIC PARTICIPATION
INITIAL ENVIRONMENT EXAMINATION (IEE)
Northern Power Transmission Expansion Sector (VIE 2225)
Hải Dương 2 220KV Transformer Substation

1. Time: 21/4/2012
2. Venue: Office of An Phu commune, Kinh Mon district, Hải Dương province
3. Participation:
   
   **Consultant:**
   - Mr. Ngo Huy Toan  Position: LIC-Environment
   - Mr. Ta Van Tuan  Position: Consultant (support)

   **Local authority (An Phu commune, Kinh Duong district, Hải Dương province):**
   - Mr. Nguyen Nho Bo  Position: Head of An Phu commune
   - Mr. Nguyen Van The  Position: Vice Head of An Phu commune
   - Mr. Nguyen Do Vong  Position: Cadre Officer
   - Mr. Nguyen Duc Toan  Position: Head of Hue Tri village,

   **Representatives of Affected Person (detail list is attached):**
   - Mr. Nguyen Nho Tuyen  Position: Affected household in Hue Tri village, An Phu commune
   - Mr. Duong Dang Hop  Position: Affected household in Hue Tri village, An Phu commune
   - Mrs. Nguyen Thi Diem  Position: Affected household in Hue Tri village, An Phu commune
   - Mrs. Nguyen Thi Hien  Position: Affected household in Hue Tri village, An Phu commune

4. Content of public participation:

   - Representative kick off the public participation meeting, and introduced the participants.
   
   - LIC consultant introduced the objectives and content of the public participation meeting on the environmental safeguard issues during the construction and operation of the Hải Dương 2 substation in Hue Tri village, An Phu commune, Kinh Mon district, Hải Dương province. The project is part of the Northern Power Transmission Expansion Sector (VIE 2225) which is funded by ADB.
   
   - LIC introduced the content of the project.
   
   - LIC introduced the environmental issues that could be generated and the EMP.

<table>
<thead>
<tr>
<th>Potential Environmental Impact</th>
<th>Proposed Mitigation Measure</th>
<th>Responsibility</th>
<th>Cost</th>
<th>Monitoring</th>
</tr>
</thead>
</table>

ININITIAL ENVIRONMENTAL EXAMINATION
<table>
<thead>
<tr>
<th>Potential Environmental Impact</th>
<th>Proposed Mitigation Measure</th>
<th>Responsibility</th>
<th>Cost</th>
<th>Monitoring</th>
</tr>
</thead>
</table>
| Site clearance could disrupt cropping activities, crop damage or loss, damage to bound walls, canals and drains | • Construction activities on cropping land timed to avoid disturbance of field crops within one month of harvest wherever possible.  
• Immediate repair of damaged community facilities (e.g., irrigation canals, pond dikes, etc.) will be undertaken | Contractor | Included in contractor bidding price | - Technical supervisors of NPPMB and/or SIMC employed by NPPMB             |
| Noise and vibration            | • All construction activities are conducted during daytime hours. If the construction is required in the evening, pre-notification and approval by local affected groups will be needed.  
• Presence of the perimeter wall will reduce noise impacts |                  |                           |                                                                          |
| Air Quality                    | • All trucks transport dusty materials to/from the site is covered by canvas.  
• Water must be spray dusty area (construction site, roads, etc) during hot, dry, windy conditions. All machinery are be ensured using fuel with valid operating licenses during the whole project schedule.  
• Use existing roads and tracks used for construction and maintenance access to the line wherever possible. | Contractor | Included in contractor bidding price | - Technical supervisors of NPPMB and/or SIMC employed by NPPMB             |
| Water Quality                  | • Provision of adequate on-site sanitation facilities with septic tanks to prevent untreated sewage from being channeled into the drainage canals, irrigation canals  
• Implementation of appropriate solid waste and construction waste collection and disposal system, with provision for waste segregation  
• Designation of areas for equipment services, refueling, and wash down | Contractor | Included in contractor bidding price | - Technical supervisors of NPPMB and/or SIMC employed by NPPMB             |
| Waste Management               | • Solid waste will include vegetation debris (6.245m³) at substation site, excavated soil, other residual construction materials and packaging wastes from equipment  
• Excavated materials will be used as fill material  
• Residual cut soil and other construction debris will be disposed in an approved site by the village authorities  
• Packaging wastes from electrical equipment will be recycled or will be disposed of in local approved landfills | Contractor | Included in contractor bidding price | - Technical supervisors of NPPMB and/or SIMC employed by NPPMB             |
## Potential Environmental Impact

<table>
<thead>
<tr>
<th>Community Health and Safety</th>
<th>Proposed Mitigation Measure</th>
<th>Responsibility</th>
<th>Cost</th>
<th>Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Develop a Community Health and Safety Plan that integrates good international practice and recognized standards on community safety</td>
<td>Contractor</td>
<td>Included in contractor bidding price</td>
<td>- Technical supervisors of NPPMB and/or SIMC employed by NPPMB</td>
</tr>
<tr>
<td></td>
<td>• Provide procedures for emergency response, communication systems and protocols, interaction with local and regional emergency and health authorities, provision of emergency equipment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Fencing of entire construction area</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Posting of warning signs in Vietnamese language for better understanding of locals.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupation Health and Safety</td>
<td>• Conduct training and orientation of workers on construction health and safety management</td>
<td>Contractor</td>
<td>Included in contractor bidding price</td>
<td>- Technical supervisors of NPPMB and/or SIMC employed by NPPMB</td>
</tr>
<tr>
<td></td>
<td>• Require the wearing of PPEs by workers within the project site.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Strictly require the contractor and its workers to follow construction health and safety program.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Provide first-aid facilities for workers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• The construction camp site and surrounding areas will be kept clean</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Public health information provided to the construction workforce prior to the commencement of on-site work, primarily covering the prevention of HIV/AIDS.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 5. Comment of local authority and representatives of affected household

**Local authority:**
- Agree with the development of the Hai Duong 2 220kV substation.
- Agree with the EMP proposed by the LIC consultant.
- The project owner NPPMB has to ensure that the contractor will be in compliance with the committed EMP.
- The project owner has to properly compensate the affected households
- *The contractor has to rebuild the irrigation canal that will be affected by the construction of the substation*

**Representatives of Affected household:**
- Agree with the development of the Hai Duong 2 220kV substation and the EMP proposed by the LIC consultant
- The project owner has to properly compensate the affected households
- The project owner and contractor have to ensure that the irrigation system will not be affected during the construction and operation of the project.
- The contractor will have to comply with the EMP and do not pollute the environment in the area.
- The contractor will commit the traffic safety and social safety in the area.

6. Conclusion:
- The local authority and affected households in An Phu commune, Kinh Mon district, Hai Duong province agree with the development of the HaiDuong 2 220kV substation and the EMP proposed by the LIC consultant

<table>
<thead>
<tr>
<th>Local authority</th>
<th>Consultant</th>
<th>Representative of PAH</th>
</tr>
</thead>
<tbody>
<tr>
<td>(signed)</td>
<td>(signed)</td>
<td>(signed)</td>
</tr>
</tbody>
</table>