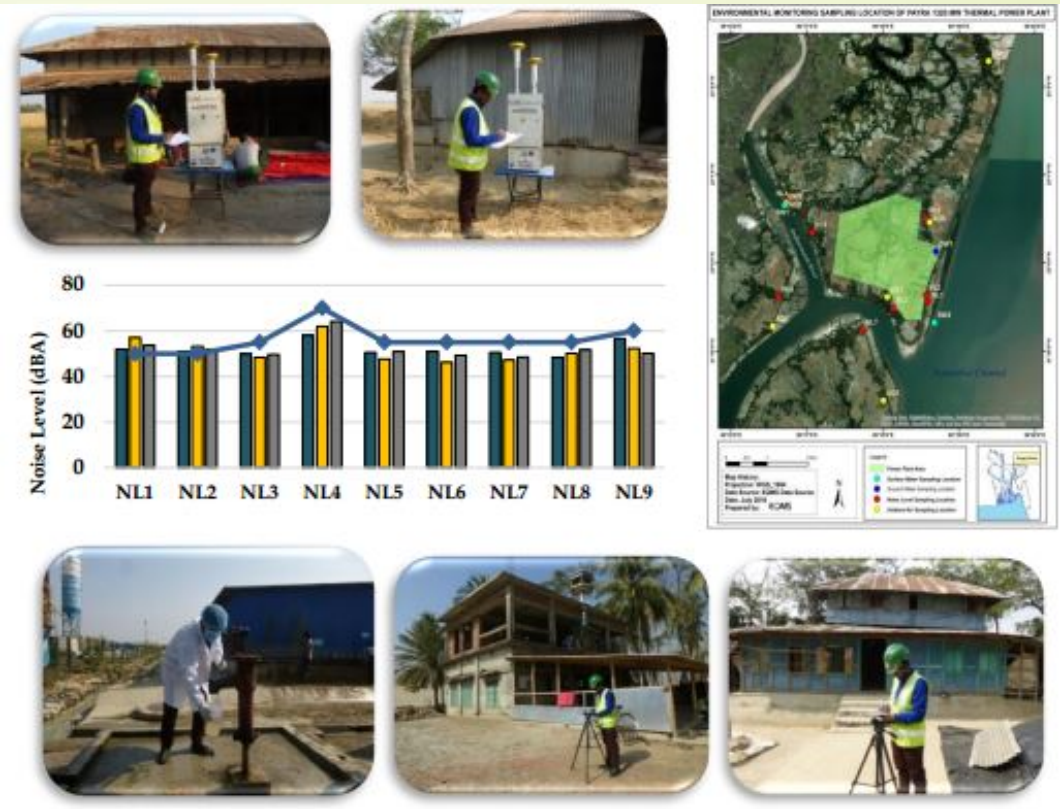
# Environmental Monitoring of Payra 1320 MW Thermal Power Plant Project

## QUARTERLY MONITORING REPORT

JANUARY 2019




**Submitted by**

**Bangladesh-China Power Company (Pvt.) Limited (BCPCL)**

**Prepared by**

**China Energy Engineering Group**

**Northeast No.1 Electric Power Construction Co. Ltd. (NEPC)**

**Technical Support by**

**EQMS Consulting Limited**

website: www.eqms.com.bd

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# ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| ADB | Asian Development Bank |
| AQ | Air Quality |
| BBS | Bangladesh Bureau of Statistics |
| BCPCL | Bangladesh-China Power Company (Pvt.) Limited |
| BIWTA | Bangladesh Inland Water Transport Authority |
| BMD | Bangladesh Meteorological Department |
| BOD | Biological Oxygen Demand |
| BPDB | Bangladesh Power Development Board |
| BWDB | Bangladesh Water Development Board |
| CEGIS | Center for Environmental and Geographic Information Services |
| COD | Chemical Oxygen Demand |
| DGPS | Differential Global Positioning System |
| DO | Dissolve Oxygen |
| DoE | Department of Environment |
| DPHE | Department of Public Health Engineering |
| DSS | Dust Suppression System |
| DTW | Deep Tube Well |
| EC | Electric Conductivity |
| ECA | Environment Conservation Act /Ecological Critical Area |
| ECC | Environmental Clearance Certificate |
| ECR | Environment Conservation Rules |
| EMP | Environmental Management Plan |
| KV | Kilo Volt |
| KWh | Kilo Watt hour |
| MoA | Ministry of Agriculture |
| MoC | Ministry of Communication |
| MoCAT | Ministry of Civil Aviation and Tourism |
| MoEF | Ministry of Environment and Forestry |
| MoFL | Ministry of Fisheries and Livestock |
| MoPEMR | Ministry of Power, Energy and Mineral Resources |
| MoWR | Ministry of Water Resources |

| | |
|---|---|
| MoU | Memorandum of Understanding |
| MPA | Mongla Port Authority |
| MW | Mega Watt |
| NEMAP | National Environmental Management Action Plan |
| NEP | National Environmental Policy |
| NOx | Oxides of Nitrogen |
| NWPGCL | North-West Power Generation Company Limited |
| PPA | Payra Port Authority |
| PPM | Parts Per Million |
| Sox | Oxides of Sulfur |
| SPM | Suspended Particulate Matter |
| STW | Shallow Tube-Well |
| TDS | Total Dissolved Solid |

# CHAPTER 1

## 1. Introduction

### 1.1 Study Background

Planned and appropriate use of power is one of the pre-conditions for economic development of Bangladesh. There is a huge demand for electricity in our day-to-day life as well as in various sectors of the economy. The total power produced in the country is not enough to ensure adequate access to electricity. As of now, only 62 percent of the total population has access to electricity. Per capita electricity generation is only 321 kWh (BPDB, 2014), which is very low compared to that of other developing countries. In order to improve this situation, the Government has given the highest priority to power sector development and is committed to make electricity available to all by 2021. Several programmers have already been taken up to implement short, medium- and long-term plans for the balanced development of power sector to scale up electricity generation. FY 2013-14 (Till April2014), a total of 23,204 million-kilowatt hour (MkWh) net energy (10,804 MkWh in public sector and 12,399 MkWh in private sector including (IPP, SIPP, Rental and REB) was generated. Of the total generation, the public sector power plants generated 46.56 percent while private sector generated 53.44 percent. The share of gas, hydro, coal and oil-based energy generation was 74.71 percent, 1.77 percent, 2.48 percent and 17.61percent respectively. On the other hand, in FY 2012-13, 38,213 million-kilowatt hour (MkWh) and in FY 2011-12, 35,199 million-kilowatt hour (MkWh) net energy were generated i.e. net energy generation growth in FY 2012-13 was 8.13 percent more than the FY 2011-12.

To meet up this, the Government of Bangladesh has formulated a Power System Master Plan (2010). Taking consideration of high dependency on natural gas (77% of power generation comes from natural gas-based units), Power System Master Plan (PSMP 2010) recommends diversification of fuel used for electricity generation because present primary energy i.e. natural gas supply will decrease after 2017 and opt coal as a prime energy for electricity generation. The Master plan, targets composition of power supply as of 2030 is set at 50% for domestic and imported coal, 25% for domestic and imported (in the form of LNG) natural gas and 25% for other sources such oil, nuclear power and renewable energy. The coal-based generation is the least cost option in consideration to present economy.

In Bangladesh, natural gas reserve is depleting and recent gas demands are increasing in other sectors. Hence Government of Bangladesh has decided to install new coal-based power plants for future power generation expansion. With the objective of fuel diversification for sustainable power generation and reliable electricity supply, North-West Power Generation Company Limited (an Enterprise of Bangladesh Power Development Board) is installing new Payra 1320 MW Thermal Power Plant (hereinafter referred as Payra1320 MW power plant) in Patuakhali district covering areas of Dhankhali Union under Kalapara Upazila. The project location has been shown in the Figure 1-1 and Figure 1-2.

The Payra1320 MW power plant is a joint venture of North-West Power Generation Company Limited (NWPGCL) and CMC, China. The Payra1320 MW power plant will to some extent meet up electricity demand for the country which will improve the system reliably and reduce load shedding.

Proper location /sitting, its process and waste abatement and control are very important for an industry to be environmentally sound. In tackling environmental problems of the country, various environmental legislations have been made time to time in Bangladesh. Here, like in some other countries environmental issues are handled by various sectoral legislations. Policies, strategies adopted on environment conservation and on scrotal issues – all have given conservation, protection and preservation of the environment a paramount importance. Sustainable development is therefore the corner stone of the policies and procedures regarding Industrial or any other development activities in Bangladesh. As such this current project need to comply with all the relevant national legislation in general and in particular to the Environment Conservation Act, 1995 (ECA, '95) and Environment Conservation Rules, 1997 (ECR, '97). The environmental legislation encompasses laws relating to the protection of environmental health, the control of pollution, and conservation of wildlife and natural resources.

According to approved EIA Report by Department of Environment (DoE), current report presents the monthly environmental monitoring results of the Payra 1320 MW Thermal Power Plant.

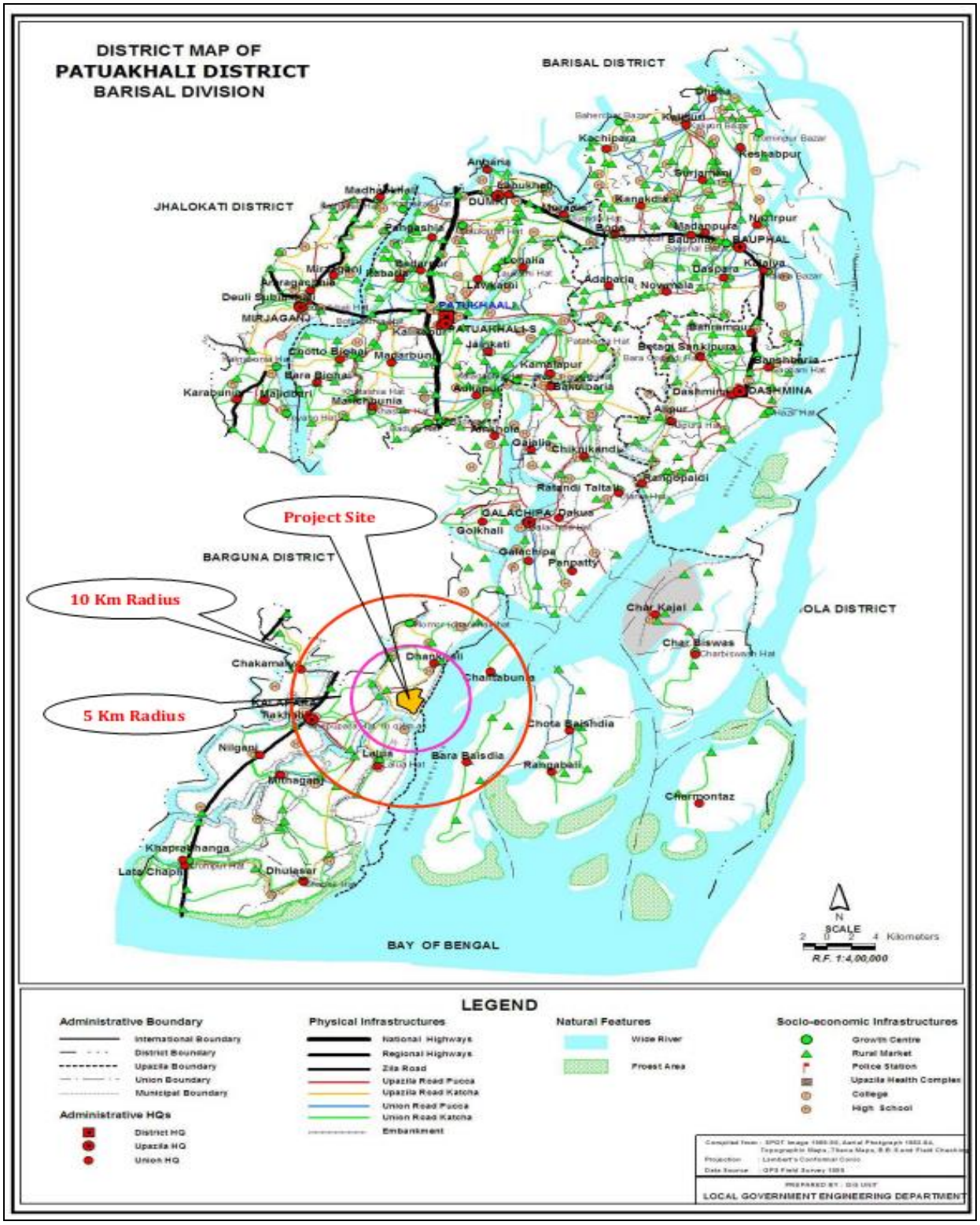


**Figure 1-1: Project Site at Kalapara Upazila in Patuakhali District**

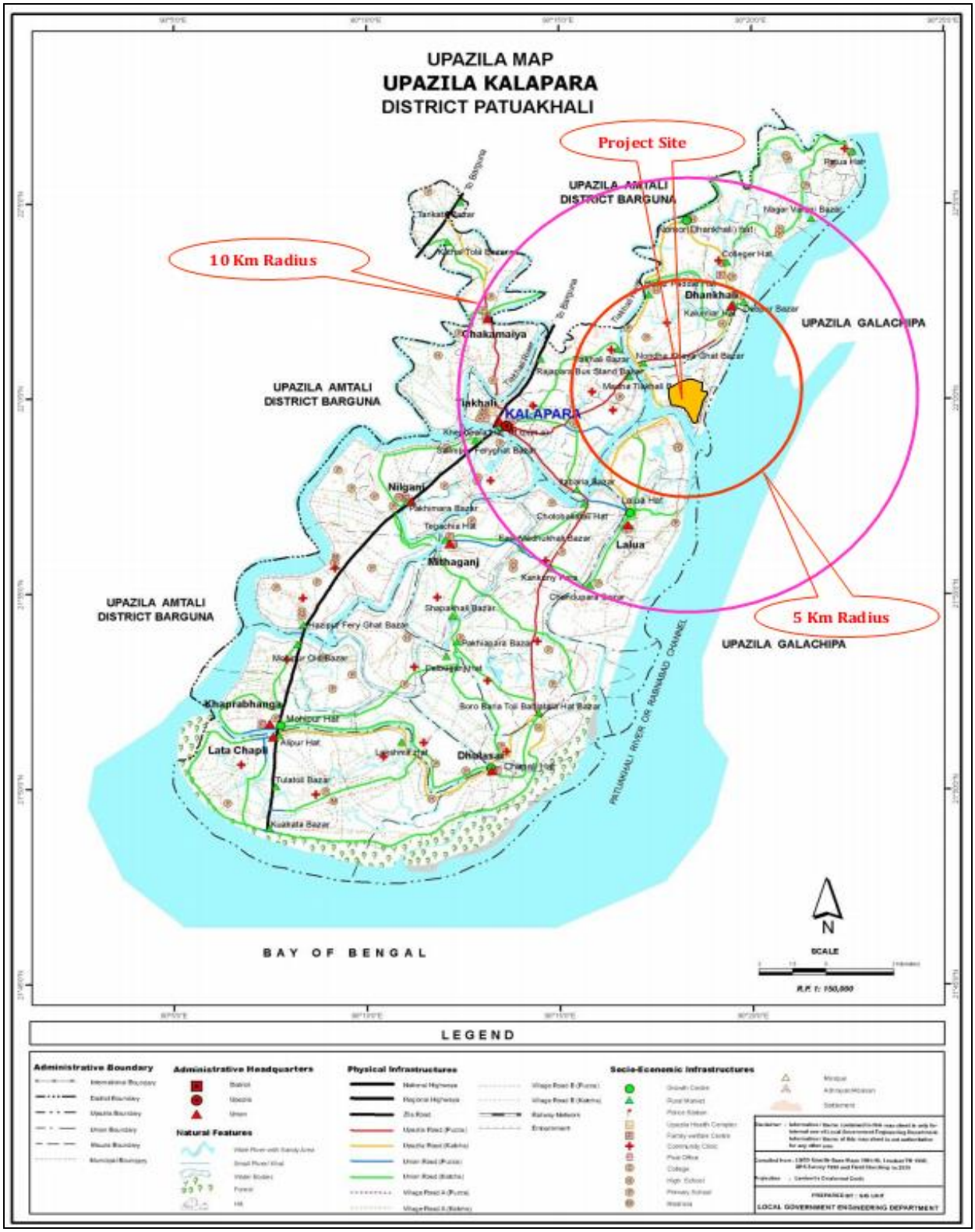


**Figure 1-2: Power plant Site beside the Rabnabadh Channel, Kalapara Upazila**

## 1.2 Importance of the project

The Payra 1320 MW power plant will add 1300MW electricity to our national grid that will improve our present electricity generation significantly and as well as trigger our national economic development. Besides, industrial development will be initiated after implementation. Additionally, it will create employment opportunity to the local people and improve transportation system in the project area, which will ultimately play an important role in poverty reduction and develop social safety net condition. Moreover, this coal-based power plant will thereby play an important role in fuel diversification in electricity generation and reduce pressure on natural gas reserve.

## 1.3 Objective of Monitoring

- To characterize and monitor the environmental quality at project site;
- To obtain an environmental database which can be used to identify any short- and long-term environmental impacts of the Project;
- To verify the environmental impacts predicted in the EIA study;
- To monitor the performance and effectiveness of proposed environmental management plan and practiced mitigation measures;
- To identify environmental compliance of the project with regulatory requirements, Government standards and policies; and
- To provide suggestion and additional measures to achieve proposed Environmental Management Plan.

# CHAPTER 2

# 2. Legal and Legislative Framework, Regulations and Policy Considerations

## 2.1 Applicable Policies and Legal Provision

All legal provisions relevant to environmental protection applicable to the planning, construction, operation and coal transportation were identified according to the approved EIA report. **Table 2-1**below summarizes all relevant legal provisions:

**Table 2-1: National Legal provisions applicable to the Payra power plant for ensuring environmental protection**

| Issue | Bangladeshi Legislation or Regulation |
|---|---|
| Governance of Power Generation and Management System | a. Bangladesh Energy Regulatory Commission Act, 2003<br>b. Power System Master Plan, 2010<br>**c.** National Energy Policy |
| Coal Sourcing | a. Bangladesh Coal Policy (Draft)<br>b. Master Plan on Coal Power Development, 2010<br>**c.** Import and Export Control Act, 1950 |
| Coal Transportation | a. Terrestrial Water and Maritime Zones Act 1974 & Rules 1977<br>b. The Ferries Act, 1885<br>c. Ports Act, 1908<br>d. Bangladesh Merchant Shipping Ordinance 1983<br>e. The Prevention of the Interference with Aid to Navigable<br>f. Waterways Ordinance, 1962<br>g. Payra Port Authority Act, 2013 |
| Prevention of pollution, and Protection of Environment | a. Payra Port Authority Act, 2013<br>b. Ports Act, 1908<br>c. The Forests Act, 1927<br>d. Environment Conservation Act, 1995 and the Amendments thereafter<br>e. Environment Conservation Rules, 1997<br>**f.** The Environment Court Act, 2000 |
| Health and Safety | a. Fatal Accidents Act, 1855<br>b. Dock Laborers Act, 1934<br>c. Dangerous Cargoes Act, 1953<br>d. Imports and Exports (Control) Act, 1950<br>e. Public Safety Ordinance, 1953<br>f. The Explosives Act, 1884<br>**g.** Fire prevention and Extinguish Act, 2003 |
| Procurement in | a. The Public Procurement Regulations, 2003 and Revisions |

| Issue | Bangladeshi Legislation or Regulation |
|---|---|
| Bangladesh | thereafter |
| Transport, Handling and Storage of Dangerous Goods | a. Environment Conservation Act, 1995 (Amendments thereafter)<br>b. Ports Act, 1908<br>c. Petroleum Act, 1934<br>d. Dangerous Cargoes Act, 1953 |

## 2.2 National Environmental Legal Provisions in Connection with Setup, Operation and Maintenance

The Environment Conservation Act of 1995 is the key legislation in relation to environment protection in Bangladesh. This Act has been promulgated for environment conservation, standards, development, pollution control and abatement. It has repealed the Environment Pollution Control Ordinance of 1977. The Act has been subsequently amended in 2000, 2002, 2007 and latest amendments done up to year 2010. The main objectives of the Act are:

- Conservation and improvement of the environment and
- Control and mitigation of pollution of the environment

The main strategies of the Act can be summarized as:

- Declaration of ecologically critical areas and restriction on the operations and processes, which can or cannot be carried/initiated in the ecologically critical areas
- Regulations in respect of vehicles emitting smoke harmful for the environment
- Environmental clearance
- Regulation of the industries and other development activities' discharge permits
- Promulgation of standards for quality of air, water, noise and soil for different areas for different purposes
- Promulgation of a standard limit for discharging and emitting waste and
- Formulation and declaration of environmental guidelines

According to the law before setting up any new project/interventions by the Government/ non-government agencies/public, the proponents are required to obtain respective clearance from the Department of Environment. Under the Environment Conservation Rules 1997, the project promoter must obtain site clearance from the Director General of Department of Environment. An appeal procedure does exist for those promoters who fail to obtain clearance. The Department of Environment executes the Act under the leadership of the Director General.

Under the Environment Conservation Act, 1995 the first set of rules promulgated is the Environment Conservation Rules, 1997. The Rules have provided categorization of industries/ projects, hence identified types of environmental assessments needed against respective categories of industries/projects. The Environment Conservation Act (Amendment), 2000 provides responsibility for compensation in cases of damage to ecosystems: (1) The polluter pay

principle is included herein, (2) increased provision of punitive measures both for fines and imprisonment and (3) fixing authority on cognizance of offences.

The Bangladesh Environment Conservation Act (Amendment), 2002 elaborates on: (1) restriction on polluting automobiles, (2) restriction on the sale and production of environmentally harmful items like those that polythene bags, (3) assistance from law enforcement agencies for environmental actions, (4) break up of punitive measures and (5) authority to try environmental cases.

The Environmental Rules are not explicit for various oil and gas exploration interventions. Rather, this is covered under the broader heading of "exploration, extraction and distribution of mineral resources" under the 'Red' category projects.

So far, the Rule has been updated three times - February and August 2002 and April 2003.

## 2.3 Policy Guidance

Under the study a number of sectoral national policies have been reviewed to identify the guiding principles which are relevant to the coal based thermal power plant installation, operation and maintenance activities. The sectoral policies will include energy, environment, water, forest, transport, import; fisheries etc.

Analysis of the relevant policies is summarized in **Table 2-2**.

**Table 2-2: Summary of the Relevant Polices**

| Title and Scope | Relevant Provisions to the Project Activities | Obligations of Bangladesh-China Power Company (Pvt.) Limited (BCPCL) | Requirement of BCPCL |
|---|---|---|---|
| **Agricultural Policy, 1999** | | | |
| Agricultural Policy, 1999 | Preserve and develop land productivity | Bangladesh-China Power Company (Pvt.) Limited Should: take appropriate measures to prevent loss of land fertility in and around Project site during the project implementation period. If not, then compensate the loss. | Extension Department, Soil Resource Development Institute |
| Agricultural Policy, 1999 | Section 2.1 Objective; Preserve existing biodiversity of different crops | Bangladesh-China Power Company (Pvt.) Limited Should take appropriate measures to prevent loss of any indigenous crop variety of the project site Viz. preserve the indigenous crop verity. If not, then compensate the loss. | MoA, Bangladesh Rice Research Institute (BRRI), BARC |
| Agricultural Policy, 1999 | Section 12.1 Land Use; Appropriate measures will be taken in the light of the Land Use Policy, to stop the trend of shifting agricultural land into to other due to its use for non-agricultural purposes. | Bangladesh-China Power Company (Pvt.) Limited must follow the appropriate land acquisition procedure as per the GOB | MoA, MoFL |
| **Environment Policy 1992** | | | |
| Environment Policy,1992 | Section 3.2.1 Industry; Adoption of corrective measures by polluting industries in phases | Bangladesh-China Power Company (Pvt.) Limited must comply with the Government regulation. | MoEF, MoFL, MoPEMR, DoE and other relevant government agencies |
| Environment Policy 1992 | Section 3.2.4 Industry; Encourage development of environmentally sound and | Bangladesh-China Power Company (Pvt.) Limited should use economically viable and | MoEF, MoFL, DoE |

| Title and Scope | Relevant Provisions to the Project Activities | Obligations of Bangladesh-China Power Company (Pvt.) Limited (BCPCL) | Requirement of BCPCL |
|---|---|---|---|
| | appropriate technology and initiatives on research and extension in the fields of Industry. Balance such initiatives with the best use of labor and provision of proper Wages. | environmentally friendly technology Provide analysis of alternatives in the EIA report | |
| Environment Policy 1992 | Section 3.3.1 Health; Prevent activities, which are harmful to public health in all spheres, including development | Bangladesh-China Power Company (Pvt.) Limited should take all appropriate measures to prevent risky activities that may affect the Public. | MoEF, LGED, DPHE, Local Administration |
| Environment Policy 1992 | Section 3.3.5 Health; Ensure healthy workplace for workers | Bangladesh-China Power Company (Pvt.) Limited should take all appropriate measures to ensure healthy workplace for the workers | DoE, DPHE |
| Environment Policy 1992 | Section 3.4.1 Energy and Fuel Reduce and discourage the use of those fuels which pollute the environment and increase the use of environmentally sound and less harmful fuels | Bangladesh-China Power Company (Pvt.) Limited must use the fuels in their machinery and vehicles that reduce pollution in the environment | MoEF, DoE, MoPEMR, Local Government Institutes |
| Environment Policy 1992 | Section 3.4.2 Energy and Fuel reduce the use of fuel wood, agricultural residues etc. to meet energy need and increase the use of alternative energy sources | Bangladesh-China Power Company (Pvt.) Limited should use materials other than fuel wood and agricultural residue | MoPEMR |
| Environment Policy 1992 | Section 3.4.5 Energy and Fuel Conserve country's fossil fuel reserves and renewable sources of energy | Bangladesh-China Power Company (Pvt.) Limited should: Consider the provision for long term aspects | MoPEMR |
| Environment | Section 3.4.6 Energy and Fuel; Conduct EIA | Bangladesh-China Power Company (Pvt.) | MoEF |

| Title and Scope | Relevant Provisions to the Project Activities | Obligations of Bangladesh-China Power Company (Pvt.) Limited (BCPCL) | Requirement of BCPCL |
|---|---|---|---|
| Policy 1992 | before implementing the projects for extraction of fuel and mineral resources | Limited should conduct EIA | |
| Environment Policy 1992 | Section 3.5.1 Water development; Ensure environmentally sound utilization of all water resources | Bangladesh-China Power Company (Pvt.) Limited should: Ensure conservation of freshwater resources | MoEF |
| Environment Policy 1992 | Section 3.5.5 Water development keep the rivers, canals, ponds, lakes, haors, baors and all other water bodies and water resources free from pollution | Bangladesh-China Power Company (Pvt.) Limited should: Make sure that the nearby water bodies and resources are not polluted due to project activities. | MoEF |
| Environment Policy 1992 | Section 3.6.2 Prevent land erosion, preserve and increase soil fertility, and expand activities for conservation and environmentally sound management of newly accreted land | Bangladesh-China Power Company (Pvt.) Limited should take appropriate measures to prevent land erosion in the project site. | MoEF, MoFL |
| Environment Policy 1992 | Section 3.7.2 Forest; Include tree plantation programme in all relevant development activities | Bangladesh-China Power Company (Pvt.) Limited should: Carry out afforestation in and around the project site | MoEF, FD |
| Environment Policy 1992 | Section 3.7.3 Forest; Stop shrinkage and depletion of forest land and forest resources | Bangladesh-China Power Company (Pvt.) Limited should: Take appropriate measures minimize the deforestation around the site | MOEF, FD |
| Environment Policy 1992 | Section 3.7.5 Forest Conserve wildlife and biodiversity | Bangladesh-China Power Company (Pvt.) Limited should: Take appropriate measures to prevent loss of the biodiversity and undertake compensatory measures in case of inevitable damage if any | MoEF, FD |

| Title and Scope | Relevant Provisions to the Project Activities | Obligations of Bangladesh-China Power Company (Pvt.) Limited (BCPCL) | Requirement of BCPCL |
|---|---|---|---|
| Environment Policy 1992 | Section 3.7.6 Forest; Conserve and develop wetlands and protect migratory birds | Bangladesh-China Power Company (Pvt.) Limited must:<br>avoid activities which cause huge damage to wetlands and<br>destroy the any fish sanctuary or species habitat of<br>conservation significance | MoEF, MoWR, FD |
| Environment Policy 1992 | Section 3.8.2 Fisheries; Prevent activities that diminish the wetlands natural habits of fish | Bangladesh-China Power Company (Pvt.) Limited should: Take appropriate measure, so that the nearby fish habitats are not threatened due to project activities, viz. do not discharge untreated waste water into the river | WET, EIA Report |
| Environment Policy 1992 | Section 3.11.2 Transport and Communication; Ensure that vehicles and people using roads, rails, air and inland waterways do not pollute the environment and take steps to protect health of the workers running these transports | Bangladesh-China Power Company (Pvt.) Limited should: Use the vehicles (which are going to be used during the operation of the project) which cause less pollution to the environment. Take necessary measures to protect health of the workers running transports | MoEF, MoC, Roads and Highway Department, Railway Authority, Inland Water Transport Authority |
| Environment Policy 1992 | Section 3.11.3 Transport and Communication; Control activities in inland ports and dockyards which cause pollution of water and the local environment | Bangladesh-China Power Company (Pvt.) Limited should: Need to consider this provision while importing and transporting the coals | MoEF, MoC, Roads and Highway Department, Port Authority, Inland Water transport Authority |
| Environment Policy 1992 | Section 3.12.1 Integrate environmental consideration into all housing and urban | Bangladesh-China Power Company (Pvt.) Limited should: While setting up the | MoEF |

| Title and Scope | Relevant Provisions to the Project Activities | Obligations of Bangladesh-China Power Company (Pvt.) Limited (BCPCL) | Requirement of BCPCL |
|---|---|---|---|
| | planning activities and research | proposed location town, consider the integrated environmental aspects | |
| **Energy Policy 1996** | | | |
| Energy Policy 1996 | Section 1.2 Objective (iv); Ensure sustainable operation of the energy utilities | Bangladesh-China Power Company (Pvt.) Limited should: Ensure that the project activities do not hamper the sustainable of operations of energy utilities in the Proposed location | MoPEMR, Power Development Board, Rural Electrification Board |
| Energy Policy 1996 | Section 1.2 Objective (v); Rational use of total energy sources | Bangladesh-China Power Company (Pvt.) Limited should: Ensure the coal are used rationally | MoPEMR Hydrocarbon Unit |
| Energy Policy 1996 | Section 1.2 Objective (vi); Ensure environmentally sound sustainable energy development program causing minimum damage to the environment | Bangladesh-China Power Company (Pvt.) Limited must: Consider this provision while implementing the project viz. ensure minimum damages caused to the environment | MoPEMR |
| Energy Policy 1996 | Sectio1. 9 Environmental Conservation issues will be considered for all type of fuels and in each and every step of fuel cycle; namely, exploration, appraisal, extraction, conversion, transportation and consumption. | Bangladesh-China Power Company (Pvt.) Limited Should: Need to consider this Provision during their project cycle. | MoPEMR |
| Energy Policy 1996 | Section 7.3 Technology Assessment, Necessary arrangements are to be made to select appropriate technologies i.e. conversion, efficiency, transferability, adaptability, environmental effects, cost | Bangladesh-China Power Company (Pvt.) Limited should: Consider these (Mentioned) factors while selecting the technologies. | MoPEMR |

| Title and Scope | Relevant Provisions to the Project Activities | Obligations of Bangladesh-China Power Company (Pvt.) Limited (BCPCL) | Requirement of BCPCL |
|---|---|---|---|
| | should be considered while selecting technologies | | |
| Energy Policy 1996 | Promote use of economically viable environment friendly technology is to be promoted | Bangladesh-China Power Company (Pvt.) Limited should: Use economically viable and environmentally friendly technology | MoPEMR |
| Energy Policy 1996 | Discourage use of fuel wood | Bangladesh-China Power Company (Pvt.) Limited should: Use materials other than fuel wood | MoPEMR |
| Energy Policy 1996 | Section 1.9 (g) Encourage the use of lead-free petrol | Bangladesh-China Power Company (Pvt.) Limited should: Use lead free petrol | MoPEMRF |
| **Land Use Policy 1994** | | | |
| Land Use Policy 2010 | Section 2 (e) Objective Ensure the land use in Harmony with the natural environment. | Bangladesh-China Power Company (Pvt.) Limited should: Follow the Government's land use plan | MoFL and DoE |
| Land Use Policy 2010 | Section 2 (i) Objective; Conserve the natural forest | Bangladesh-China Power Company (Pvt.) Limited must: Compensate for destroying the natural forest, viz. plantation on the other nearby areas, Reforestation and plantation on the annulled forest area. | MoFL, Forest Department |
| Land Use Policy 2010 | Section 2 (i) Objective; Prevent river bank erosion | Bangladesh-China Power Company (Pvt.) Limited should: Prevent activities that may cause river bank erosion | MoFL and MoWR |
| Land Use Policy 2010 | Section 2 (h) Objective; Prevent the land pollution | Bangladesh-China Power Company (Pvt.) Limited should: Take appropriate measures to prevent/ reduce the land pollution | MoFL and DoE |
| Land Use Policy | Section 3.4 Land Use; Maintaining a balanced | Bangladesh-China Power Company (Pvt.) | MoFL, MoWR, Forest |

| Title and Scope | Relevant Provisions to the Project Activities | Obligations of Bangladesh-China Power Company (Pvt.) Limited (BCPCL) | Requirement of BCPCL |
|---|---|---|---|
| 2010 | ecosystem | Limited should: Proper authorization to utilizing the area (project site) from the concerned authority, via, seek authorization from the Forest Department for utilizing the forest land | Department and others |
| **The Forest Policy 1994** | | | |
| Forest Policy 1994 | Conserve the natural forest (protected, reserved and unclassified state forest) | Bangladesh-China Power Company (Pvt.) Limited should: Take appropriate measures to mitigate adverse impact (due to project activities) on the forest of the power plant location area | MoEF, FD |
| Forest Policy 1994 | Restoration of natural forest to preserve biodiversity and wildlife | Bangladesh-China Power Company (Pvt.) Limited should: Carry out afforestation and reforestation of forests cleared during the project activity | MoEF, FD |
| Forest Policy 1994 | Without proper authorization, forest land Cannot be used for non-forest purpose. | Bangladesh-China Power Company (Pvt.) Limited should: Seek for permission from the Forest Department for using the forest area for non-forest purpose | MoEF, FD |
| **The Tourism Policy 1992** | | | |
| Tourism Policy 1992 | Section 5 (3): Development, preservation and maintenance of tourism resources of the country | Bangladesh-China Power Company (Pvt.) Limited need: To look into the matter so that any tourism resource nearby the powerplant are not affected due to the project activities | MoCAT |
| Tourism Policy 1992 | Section 7: Restoration and maintenance of archaeological and historical sites | Bangladesh-China Power Company (Pvt.) Limited must: Not destroy any archaeological and historical sites of the | MoCAT |

| Title and Scope | Relevant Provisions to the Project Activities | Obligations of Bangladesh-China Power Company (Pvt.) Limited (BCPCL) | Requirement of BCPCL |
|---|---|---|---|
| | | with the power plant location of the Power Plant | |
| Tourism Policy 1992 | Section 8: Conservation of wildlife | Bangladesh-China Power Company (Pvt.) Limited need to consider this provision | MoEF |
| **The Fisheries Policy 1998** | | | |
| Fisheries Policy 1998 | Section 9.10; Protect natural water bodies and marine biodiversity. | Bangladesh-China Power Company (Pvt.) Limited must: Consider this provision and take appropriate measure to reduce adverse impact on the water bodies | MoFL, Fisheries Department |
| Fisheries Policy 1998 | 9.10.2 Control activities which may have adverse effect on the fish resources | Bangladesh-China Power Company (Pvt.) Limited must: Control the activities which may have adverse impact on the fish resources | MoFL, Fisheries Department |
| Fisheries Policy 1998 | 9.10.6 Implement laws to prevent discharge of untreated waste into water bodies. | Bangladesh-China Power Company (Pvt.) Limited must comply with these laws | MoFL, Fisheries Department |
| **The Water Policy 1999** | | | |
| Water Policy 1999 | Section 4.8 Water and Industry; a) Zoning regulation will be established for location of new industries in consideration of fresh and safe water availability and effluent discharge possibilities. | Bangladesh-China Power Company (Pvt.) Limited must: Follow the zoning regulation of the Government | MoFL, MoWR |
| Water Policy 1999 | b) Effluent disposal will be monitored by relevant Government agencies to prevent water pollution | Bangladesh-China Power Company (Pvt.) Limited must: Allow the monitoring authority to monitor their effluent discharge | MoWR |
| Water Policy 1999 | c) Standards of effluent disposal into common water courses will set by WARPO in | Bangladesh-China Power Company (Pvt.) Limited need to comply with the polluter | DoE/MoWR |

| Title and Scope | Relevant Provisions to the Project Activities | Obligations of Bangladesh-China Power Company (Pvt.) Limited (BCPCL) | Requirement of BCPCL |
|---|---|---|---|
| | consultation with DoE | pay principle under the national legislation | |
| Water Policy 1999 | d) Industrial polluters will be required under law to pay for the cleanup of water body Polluted by then. | Bangladesh-China Power Company (Pvt.) Limited need to comply with the polluter pay principle under the national legislation | DoE/MoWR |
| Water Policy 1999 | Section 4.12 Water and Environment; d) Protect against degradation and resuscitate natural water bodies such as lakes, ponds, Heels, tanks, etc. affected by man-made Intervention or other causes. | Bangladesh-China Power Company (Pvt.) Limited should: Consider this provision while implementing the project | MoWR |
| Water Policy 1999 | i) Enforce the 'polluter pay' principle in the development of regulatory guidelines for all regulatory actions designed to protect public health and the environment | Bangladesh-China Power Company (Pvt.) Limited need to follow the regulatory Guidelines. | DoE |
| **The Industrial Policy 1999** | | | |
| Industrial Policy 1999 | Objective (p); To take appropriate measures for preventing | Bangladesh-China Power Company (Pvt.) Limited need to consider the provision during implementation of the project activities | DoE, MoPEMR |
| **The Housing Policy 1999** | | | |
| Housing Policy 1999 | Section 4.7; Initiate planning to produce more forest products used to build infrastructures and attention be given to environmental management | Bangladesh-China Power Company (Pvt.) Limited should: Carry out afforestation and Reforestation activities to restore degraded lands | MoHPW/MoHFW |
| Housing Policy 1999 | Section 4.9; While implementing any new housing project, need to consider the local | Bangladesh-China Power Company (Pvt.) Limited should: Consider the provision while implementing the | MoHFW/MoC |

| Title and Scope | Relevant Provisions to the Project Activities | Obligations of Bangladesh-China Power Company (Pvt.) Limited (BCPCL) | Requirement of BCPCL |
|---|---|---|---|
| | building modes, upholding and conservation of the cultural heritage | township under the project activities | |
| Housing Policy 1999 | Section 5.1.3 Land; Ensure that the minimum land acquired for any development project/programmer | Bangladesh-China Power Company (Pvt.) Limited should: Adopt the principle during land acquisition | MoHPW Bangladesh-China Power Company (Pvt.) Limited |
| **Biodiversity Strategy and Action Plan (BSAP)** | | | |
| BSAP | Strategy 2: Conserve ecosystems, species and genetic pool of the country to ensure that the present and future well-being of the country and its people are secure | Bangladesh-China Power Company (Pvt.) Limited should:<br>• Create an inventory of all the species of flora and fauna in the area.<br>• Conduct EIA and SIA reports. | MoEF/ DoE |
| BSAP | Strategy 3: Restore ecosystems and rehabilitate endangered species | Bangladesh-China Power Company (Pvt.) Limited should:<br>• Construct ETP to restrict amount of pollution<br>• Create buffer zones in and around the project site<br>• Carry on afforestation and reforestation activities on abandoned site | MoEF/ DoE |
| BSAP | Strategy 10: Ensure wise use of wetland resources environment pollution and maintaining the ecological balance | Bangladesh-China Power Company (Pvt.) Limited should:<br>Consider the provision while implementing the project. | MoWR/ MoEF |

**Law and Policy relevant to Occupational health and safety**

**A. National Policy Framework**

The constitution of Bangladesh adapted on the November 4th 1972 recognizes productivity as a basic need for economic development and covers the right to work and reasonable wages, Medicare and, disease and disablement. And thus, it is assumed the health and safety of industrial workers has been taken care of.

The Occupational Health and Safety Services in Bangladesh, is still in the developmental stage. In Bangladesh Occupational Health and Safety generally refers mainly to needs of workers of industries or some manufacturing process but does not completely cover all recognized occupations of the country.

**In the Fifth Five Year Plan** (1997-2002) for the labor and manpower sector the objectives relatable to OSH are:

a. "To ensure fair wages, welfare and social protection of workers under the structural adjustment programs adopted by the government."
b. "To initiate steps to protect children from economic exploitation."

To achieve the objectives of the Fifth Five Year Plan (1997-2002) for the labor and manpower sector the strategies relatable to OSH that were to be pursued are: "Review of existing labor related laws, rules, regulations and directives and adoption of necessary modifications."

a. "Stress on gradual elimination of child labor and protection of children from economic exploitation and hazardous work."

In the labor sector the OSH relatable programs that were to be undertaken under the Fifth Five Year Plan included- Strengthening of Inspectorate of Factories and Establishments in terms of manpower and resources so as to enable them to "enforce various labor laws/rules concerning working hours, working condition, safety, and maternity benefits in different mills, shops and factories, etc."

In the Fifth Five Year Plan (1997-2002) for the health population and family welfare sector some scope for further development in the sector against the background that 'with increased urbanization and industrialization, the number of burn and trauma cases due to traffic and industrial accidents, unsafe use of chemicals, fire, etc., has been increasing every year'. The following needs have been identified:

a. Need to establish hospitals near major highways, traffic black spots and industrial areas with trauma and burn units to treat burn and trauma cases in time.
b. Promote industrial and occupational health through IEC activities so as to raise awareness of industrial workers and protect them from industrial hazards.

**Labor Policy:**

- Undertake effective new labor policy on the basis of tripartite negotiation
- Link wages with productivity
- Quick disposal of Industrial dispute
- Stop child labor and provide workers with education, healthcare, and better working facilities

## B. LEGISLATIONS RELATING TO OCCUPATIONAL HEALTH AND SAFETY

The Department of Inspection for Factories and Establishments under the Ministry of Labor and Employment administers and enforces 42 labor laws. The following legislations have provisions relating to occupational health, hygiene of workers, occupational diseases, industrial accidents, protection of women and young persons in dangerous occupations, and also cover conditions of work, working hours, welfare facilities, holidays, leave, etc.

| Sl# | Legislation | Enforcing agency |
|---|---|---|
| 1. | The Factories Act, 1965 and the Factories Rules 1979 | Department of Inspection for Factories and Establishment |
| 2. | Dock laborers' Act 1934 | Department of Inspection for Factories and Establishment |
| 3. | Dock laborers' Regulations 1948 | Department of Inspection for Factories and Establishment |
| 4. | Tea Plantation Laborers' Ordinance 1962 and the rules there under | Department of Inspection for Factories and Establishment |
| 5. | The Workmen's Compensation Act 1923 as amended in 1980 and 1983 | Department of Inspection for Factories and Establishment |
| 6. | The Shops and Establishments Act 1965 | Department of Inspection for Factories and Establishment |
| 7. | Employment of Children Act 1938 | Department of Inspection for Factories and Establishment |
| 8. | The Maternity Benefit Tea Estates Act 1950 | Department of Inspection for Factories and Establishment |
| 9. | The Maternity Benefit Act 1939 | Department of Inspection for Factories and Establishment |
| 10. | The Maternity Benefit Rules 1953 | Department of Inspection for Factories and Establishment |
| 11. | The Boilers Act 1923 | Chief Inspector of Boilers under Ministry of Industry |
| 12. | Nuclear Safety and Radiation Control Act 1993 | Atomic Energy Commission Bangladesh |

### C. ILO Convention regarding OSH:

Until now 31 ILO conventions have been ratified by Bangladesh. The ILO convention C 155 and C161 are concerned with the Occupational Safety and Health and the Occupational Health Services respectively. The aim of the policy of the convention C155 is to prevent occupational accidents and injury to health and illnesses by identification and minimizing the causes of hazards in the working environment. The aim of the convention C161 is to

establish and maintain a safe and healthy working environment which will facilitate optimal physical and mental health in relation to work. Although these conventions are not yet ratified in Bangladesh but many of the recommendations of these conventions have been practiced to some extent through the implementations of existing various laws and regulations. In the Factory Act 1965 and Factory Rules 1979 and in some other laws and regulations there are various chapters that are relatable to OSH. But by the existing laws and regulations qualitative inspections regarding safety and health in the working is possible but could not be monitored in terms of quantitative standard values and permissible limits.

For ratification of ILO convention No. C 155 and C161 the motivation of all the parties, policy makers, employers and employees is required.

**D. IFC's Performance Standard on Labor and Working Condition**

IFC's Performance Standard 2 recognizes that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of fundamental rights of workers.

The requirements set out in this performance standard have been in part guided by a number of international conventions and instruments, including those of the International Labor Organization (ILO) and the United Nations (UN). Its objectives are following

- To promote the fair treatment, non-discrimination and equal opportunity of workers.
- To establish, maintain and improve the worker-management relationship.
- To promote compliance with national employment and labor laws.
- To protect workers, including vulnerable categories of workers such as children, migrant workers, workers engaged by third parties and workers in the client's supply chain.
- To promote safe and healthy working conditions and the health of the workers.
- To avoid the use of forced labor.

# CHAPTER 3

# 3. Methodology

## 3.1 Project Area

Payra 1320MW power plant is located at Latitude: 22° 59' 58" (N) and Longitude: 90° 17' 58" (E) adjacent to the Kazol River as well as upstream of Rabnabadh Channel at Dhankhali Union, Kalapara Upazila, Patuakhali District of Bangladesh. The site is spread across the Mouza: Modhupara, Char Nisanbaria and Nisanbaria. Plant site is about 8km away from KalaparaUpazila and 39km away from Patuakhali district.

The Payra 1320 MW power plant site stretches about 2.5 km from north to south and 2.3 km. from east to west. This open site is capable of meeting the land-use demand of the Payra 1320 MW (2× 660MW) ultra-supercritical coal-fired power plants, as well as the need for further expansion. The project location with respect to Bangladesh is presented in **Figure3-1** and the geographic location of the Payra 1320 MW site has been shown in **Figure 3-2**.

The priority economic activities are agriculture, fisheries and plantation. According to different environmental policy and regulations of Bangladesh, plant site is away from any notified eco sensitive area like Natural Park, wild life sanctuary, buildings of archaeological importance etc.

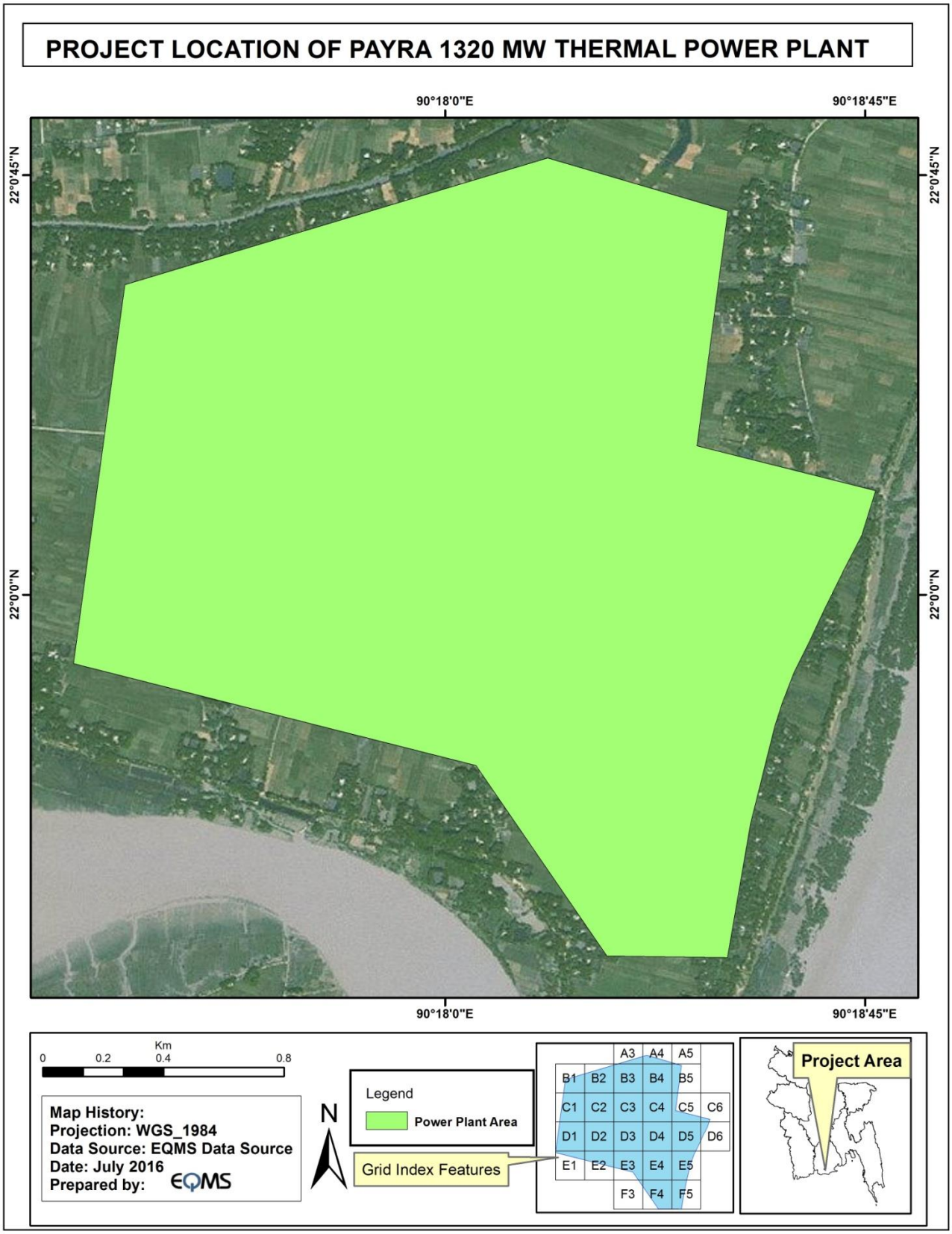


**Figure3-1: Project Location Map**

## 3.2 Environmental quality monitoring

According to the approval of Environmental Impact Assessment (EIA) report Memo No: DoE/Clearance/5310/2014/485on 08 October 2016, a number of physical environmental parameters required to monitor during the construction period of the Payra 1320 MW power plant. Among them, air quality has been measured quarterly and noise level and water quality have been measured on monthly basis.

## 3.3 Methods of Environmental Monitoring

### 3.3.1 Air Quality Monitoring

The ambient air quality monitoring sampling locations have been adopted from the approved EIA report of Payra 1320 MW power plant. The existing ambient air quality of the study area was monitored during the construction period of the power plant. The ambient status of major air pollutants viz. Particulate Matter (SPM, $PM_{10}$ and $PM_{2.5}$), Sculpture Dioxide ($SO_2$), Oxides of Nitrogen ($NO_x$), and Carbon Monoxide (CO) have been assessed by monitoring air quality at six locations. All the parameters were monitored on 24-hourly basis during the study period.

Respirable Dust Sampler (Model-Lata Envirotech APM 250 combined PM10 and PM2.5 sampler) has been used to collect the air sample. The particulate and gaseous samples collected during the monitoring have been analyses as per the procedures specified in **Table 3 1.**

**Table 3-1: Methodology for Analysis of Ambient Air Quality**

| Sl. | Parameter | Analysis procedure |
|---|---|---|
| **1.** | SPM | Gravimetric method |
| **2.** | $PM_{10}$ | Gravimetric method |
| **3.** | $PM_{2.5}$ | Gravimetric method |
| **4.** | $SO_2$ | Colorimetric method at 560nm using spectrophotometer (West-Geake method) |
| **5.** | $NO_x$ | Colorimetric method at 540 nm using spectrophotometer (Jacob and Hochheiser method) |
| **6.** | CO | Digital CO meter |

The geographical locations and setting of the ambient air quality monitoring locations has been listed in **Table 3-2** presented in **Figure 3-2**.

**Table 3-2: Ambient Air Quality Sampling Locations**

| Sl. | Sampling Station | Station Code | Geographic Location | Location Setting |
|---|---|---|---|---|
| **1.** | Project site (Nishanbari) | AQ1 | 21°59'36.71"N 90°18'3.29"E | Village and Rural Setting |
| **2.** | Londa Kheya Ghat | AQ2 | 22° 0'40.67"N 90°16'43.35"E | Village and Rural Setting |
| **3.** | Dhankhali Union Complex | AQ3 | 22° 2'17.32"N 90°19'23.42"E | Village and Rural Setting |
| **4.** | Tiakhali village | AQ4 | 21°59'16.74"N 90°16'32.70"E | Village and Rural Setting |
| **5.** | Lalua village | AQ5 | 21°58'26.19"N 90°18'0.26"E | Village and Rural Setting |
| **6.** | Nishanbari village | AQ6 | 22° 0'27.59"N 90°18'36.73"E | Village and Rural Setting |

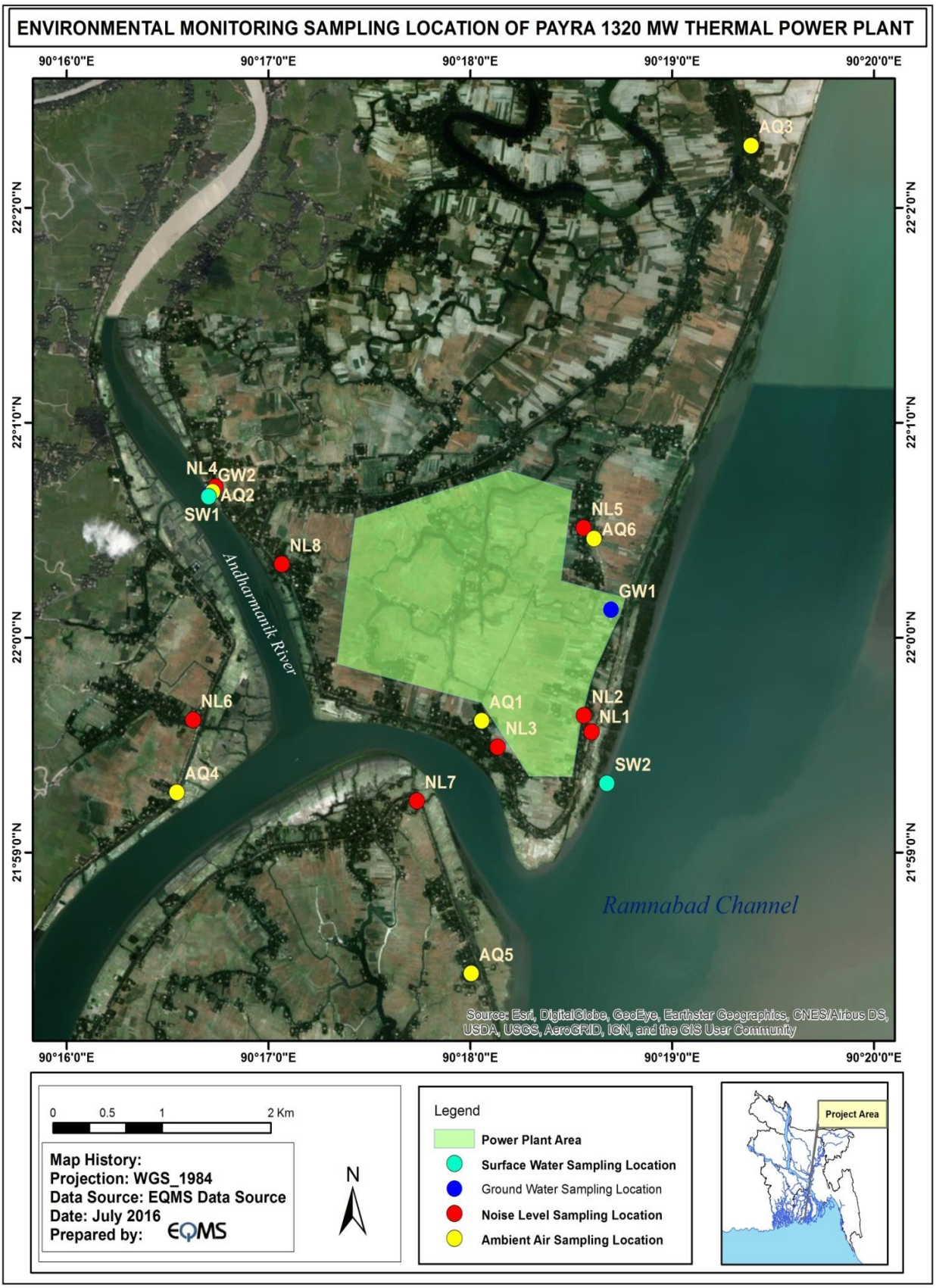


**Figure3-2: Location Map of Samplaning Points**

### 3.3.2 Noise Level Monitoring

Ambient noise levels have been monitored on monthly basis during the construction phase. Noise data logger (REED Sound Level Meter SE-322, Korea) has been used to monitor of ambient noise levels. Eight (8) noise level sampling locations have been selected from the approved EIA report of Payra 1320 MW power plant. Detail list of sampling location have been shown in **Table 3-3** and **Figure 3-2**. Noise level was measured for 1 hour at every location on different time.

**Table 3-3: Sensitive Noise Location**

| Sl. | Code | Location | Geographic location | Location setting |
|---|---|---|---|---|
| **1.** | **NL1** | Char Nishanbari Primary School | 21°59'33.66"N 90°18'35.96"E | Silent |
| **2.** | **NL2** | Char Nishanbari Mosque | 21°59'38.18"N 90°18'33.69"E | Silent |
| **3.** | **NL3** | Rofiqure Mia's House, Nishanbari Village | 21°59'29.40"N 90°18'8.05"E | Residential |
| **4.** | **NL4** | LondaKheyaGhat | 22° 0'42.08"N 90°16'44.23"E | Commercial |
| **5.** | **NL5** | MonirHossain's House, Nishanbari village | 22° 0'30.58"N 90°18'33.61"E | Residential |
| **6.** | **NL6** | Salam Uddin's House, Tiakhali village | 21°59'36.98"N 90°16'37.53"E | Residential |
| **7.** | **NL7** | Akber Mia's House, Lalua | 21°59'14.37"N 90°17'44.09"E | Residential |
| **8.** | **NL8** | Sabder Ali's House, Madhupara | 22° 0'20.47"N 90°17'3.90"E | Residential |

### 3.3.3 Water Quality Monitoring

Water sampling and analysis was undertaken to understand the overall baseline water quality characteristics of the surface and groundwater of the study area. Samples were taken from sampled water bodies and different groundwater sources from the study area. Surface water sampling was based on the identification of major surface water bodies such as the Rabnabadh Channel and Andharmanik River adjacent to the project site. Groundwater sampling locations were selected to obtain a representative water sample from various zones within the study area. The samples were collected from existing tube wells (hand-pumps being used by the villagers). A total of 4 samples comprising of Two (2) surface water and two (2) ground water samples were collected. Detail of the sampling location is provided in

**Table** 3-4 and depicted in

Figure3-2**.**

**Table 3-4: Details of Surface and Ground Water Sampling Locations**

| Sl. | Sampling location | Sampling water | Sampling Code | Geographic location | Type of Source |
|---|---|---|---|---|---|
| **1.** | Londa Kheya Ghat (Andharmanik river adjacent to the project area) | Surface water | SW1 | 22°0'39.33"N 90°16'42.21"E | Andharmanik River |
| **2.** | Rabnabadh Channel (adjacent to the project area) | Surface water | SW2 | 21°59'30.18"N 90°18'45.26"E | Rabnabadh Channel |
| **3.** | Project site | Ground water | GW1 | 22° 0'7.74"N 90°18'41.78"E | Tubewell |
| **4.** | Londa Kheya Ghat | Ground water | GW2 | 22° 0'40.22"N 90°16'42.73"E | Tubewell |

The samples were analyzed for parameters covering bacteriological and physio-chemical characteristics which include certain heavy metals and trace elements.

Water samples were collected as grab water sample in a standard sampling bottle and 250 ml sterilized clean PET bottle for complete physio-chemical and bacteriological tests respectively.

The samples were analyzed as per standard procedure/method given in Standard Method for Examination of Water and Wastewater Edition 20, published by APHA as well as using on site field test kit. Details of the analysis method and protocol are presented in Table.

**Table 3-5: Method for Water Analysis**

| Sl. | Parameter | Unit | Test method (APHA) |
|---|---|---|---|
| 1. | Temperature | ˚C | Digital thermometer |
| 2. | Total Dissolved Solids | mg/l | Digital TDS meter |
| 3. | EC | µmhos/*cm* | Digital EC meter |
| 4. | DO | mg/l | Digital DO meter |
| 5. | pH | | Digital pH meter |
| 6. | Salinity | ppt | Digital Salinity meter |
| 7. | Arsenic (As) | mg/l | 3114.C |
| 8. | Chloride ($Cl^-$) | mg/l | 4110.B |
| 9. | Fecal Coliform | mg/l | Lab Analysis |
| 10. | Iron (Fe) | mg/l | 3113.B |

| | | | |
|---|---|---|---|
| 11. | Lead (Pb) | mg/l | 3113.B |
| 12. | Oil and Grease | mg/l | Lab Analysis |
| 13. | Total Coliform | 0 CFU (N/100mL) | 9222.B |
| 14. | Turbidity | 10 NTU | Turbidity Meter |

The quality of surface water was compared with the standards for Inland Surface Water, Environment Conservation Rules (ECR), and 1997-Schedule 3 whereas the groundwater was compared with the Drinking Water Standard ECR Schedule-3, 1997. The standards have been presented along with the monitoring results of surface and groundwater for comparison.

### 3.3.4 Occupational health and safety

To study the labor and working conditions of Payra Coal Power Plant Project observational method was used. Monitoring team physically stayed in the construction camp for few days; from ***15th January to 20th January,*** and observed labor and working conditions of the proposed project. During observation several informal discussions were also conducted with workers of three workers' shed.

For both observation and informal discussion, a checklist with the compliance of "Performance Standards-2 on Labor and Working Conditions" formulated by International Finance Corporation (IFC) was followed.

# CHAPTER 4

## 4. Result and Discussion

### 4.1 Air Quality Monitoring Result and Discussion

#### 4.1.1 Ambient Air Quality in the Study Area

The monitored ambient air quality is summarized in **Table 4-1**. (Overleaf)

**Table 4-1: Ambient Air Quality in the Study Area**

| Sl. | Sampling location | Ambient air pollution concentration in µg/m³ | | | | | | | | | | CO* ppm | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $PM_{2.5}$ | | $PM_{10}$ | | SPM | | $SO_2$ | | NOx | | | |
| | | Jan-19 | Baseline-14 | Jan-19 | Baseline-14 | Jan-19 | Baseline-14 | Jan-19 | Baseline-14 | Jan-19 | Baseline-14 | Jan-19 | Baseline-14 |
| 1. | AQ1 | 11.59 | 9.13 | 50.29 | 53.63 | 69.23 | 86.32 | 6.19 | 2.52 | 16.26 | 7.50 | <2 | <2 |
| 2. | AQ2 | 13.10 | 15.63 | 78.18 | 89.53 | 98.28 | 112.11 | 5.88 | 3.76 | 13.31 | 13.16 | <2 | <2 |
| 3. | AQ3 | 10.37 | 12.46 | 56.17 | 65.72 | 79.89 | 98.74 | 4.20 | 3.01 | 10.24 | 11.32 | <2 | <2 |
| 4. | AQ4 | 12.27 | 11.31 | 67.21 | 75.45 | 81.11 | 78.54 | 3.49 | 2.65 | 11.39 | 8.43 | <2 | <2 |
| 5. | AQ5 | 10.67 | 10.56 | 58.54 | 68.56 | 74.16 | 82.67 | 5.18 | 3.06 | 09.11 | 9.65 | <1 | <2 |
| 6. | AQ6 | 15.86 | 9.21 | 51.59 | 57.32 | 55.42 | 75.72 | 3.57 | 2.87 | 10.27 | 7.85 | <1 | <2 |
| **Duration (hours)** | | **24** | | **24** | | **8** | | **24** | | **24** | | **8** | |
| **Weather Condition** | | **Sunny** | | | | | | | | | | | |
| **Bangladesh Standard* (*according to Environmental Conservation Rules' 1997 and subsequent amendment in 2005*)** | | **65** | | **150** | | **200** | | **365** | | **100** | | **10** | |
| WHO ambient air quality Guideline Values (2005 and 2000), which are also being referred in the World Bank and IFCs General EHS Guidelines | | **25** | | **50** | | **-** | | **20** | | **-** | | **9** | |
| **Method of analysis** | | *Gravimetric* | | *Gravimetric* | | *Gravimetric* | | *West- Geake* | | *Jacob and Hochheiser* | | *Indicator tube* | |

*Source: Air quality analysis done by EQMS Consulting Limited, 2018*
*Date of analysis: 7th February 2019*
*Note:*
** CO concentrations and standards are 8-hourly only.*
*** The Bangladesh National Ambient Air Quality Standards have been taken from the Environmental Conservation Rules, 1997 which was amended on 19th July 2005 vide S.R.O. No. 220-Law/2005.*

### 4.1.2 Analysis and Discussion of Result

**SPM**

The 8-hourly SPM concentration in ambient air in the study area was recorded in the range of 55.42– 98.28 µg/m$^3$. During the monitoring period, the maximum SPM concentration was reported from Londa Kheya Ghat (AQ2) as 98.28 µg/m$^3$. SPM concentrations at this location are primarily due to traffic movement. SPM level of all locations were reported below the National Ambient Air Quality Standards of Bangladesh but AQ4 (81.11 µg/m$^3$) higher than the baseline value.

**$PM_{10}$**

The 24-hourly $PM_{10}$ concentration in ambient air in the study area was recorded in the range of 50.29 – 78.18 µg/m$^3$. During the monitoring period, the maximum $PM_{10}$ concentration was reported from Londa Kheya Ghat as 78.18 µg/m$^3$. $PM_{10}$ level at all monitoring locations were reported below the NAAQS and also below the baseline value.

**$PM_{2.5}$**

The 24-hourly $PM_{2.5}$ concentration in ambient air in the study area was recorded in the range of 10.37 – 15.86 µg/m$^3$. During the monitoring period, the maximum $PM_{2.5}$ concentration was reported from Nishanbari Village as 15.86 µg/m$^3$. All the monitoring locations result was within the 24-hourly National Ambient Air Quality Standard (NAAQS) for $PM_{2.5}$ in Bangladesh.

**$SO_2$**

The 24-hourly $SO_2$ concentration was recorded in the range of 3.49 – 6.19 µg/m$^3$. Concentration of $SO_2$ is reported low at residential area due to their rural setting. During the monitoring period, the maximum $SO_2$ concentration is reported at Project Sites 6.19 µg/m$^3$. $SO_2$ concentrations at all the monitoring locations were reported well below 365 µg/m$^3$, which is National Ambient Air Quality Standard (NAAQS) for $SO_2$ in Bangladesh but all monitoring locations higher than the baseline value.

**NOx**

The 24-hourly NOx concentration was recorded in the range of 9.11 – 16.26 µg/m$^3$. Concentrations of NOx were reported due to their rural setting, whereas at AQ2, the levels are slightly higher due to the traffic movement. During the monitoring period, the maximum NOx concentration is reported at Project Sites 16.26 µg/m$^3$. There are no stipulated standards for 24-hourly NOx concentration in Bangladesh. The annual Bangladesh standard values for NOx are 100µg/m$^3$ and present concentrations at all the locations are well below these values but all monitoring locations higher than the baseline value except AQ3 and AQ5.

**CO** CO concentrations are reportedly low at all the monitoring locations while comparing with the Bangladesh Standards (10 ppm).

## 4.2 Noise Level Monitoring Result and Discussion

Summary results Noise level monitoring results shown in **Table 4-2**.

**Table 4-2: Noise Level Monitoring Results**

| Location | November 2018 | | | | December 2018 | | | | January 2019 | | | | Applicable Standard * (dB(A)) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Average Noise level (dB(A)) | | | | | | | | | | | | | |
| | $Leq_{day}$ | $Leq_{night}$ | $L_{max}$ | $L_{min}$ | $Leq_{day}$ | $Leq_{night}$ | $L_{max}$ | $L_{min}$ | $Leq_{day}$ | $Leq_{night}$ | $L_{max}$ | $L_{min}$ | Day | Night |
| **NL1** | 51.9 | 42.2 | 75.6 | 38.1 | 57.0 | 41.6 | 69.2 | 39.3 | 53.7 | 40.9 | 73.7 | 38.6 | 50 | 40 |
| **NL2** | 51.1 | 45.4 | 61.9 | 39.8 | 53.2 | 43.0 | 58.6 | 35.2 | 51.5 | 41.4 | 60.8 | 36.4 | 50 | 40 |
| **NL3** | 49.9 | 41.6 | 54.3 | 35.4 | 48.4 | 42.4 | 60.2 | 37.6 | 49.6 | 41.2 | 62.6 | 36.3 | 55 | 45 |
| **NL4** | 58.1 | 47.9 | 66.7 | 43.7 | 62.0 | 48.7 | 69.8 | 44.2 | 64.1 | 49.8 | 68.5 | 43.7 | 70 | 60 |
| **NL5** | 50.6 | 40.3 | 56.6 | 37.4 | 47.6 | 42.1 | 57.8 | 38.8 | 50.9 | 43.7 | 58.9 | 37.9 | 55 | 45 |
| **NL6** | 51.1 | 42.2 | 54.3 | 35.9 | 46.2 | 40.6 | 59.8 | 36.7 | 49.3 | 41.5 | 62.0 | 38.2 | 55 | 45 |
| **NL7** | 50.5 | 40.8 | 54.9 | 37.8 | 47.2 | 41.9 | 60.2 | 35.5 | 48.5 | 40.6 | 59.6 | 38.5 | 55 | 45 |
| **NL8** | 48.4 | 42.4 | 54.6 | 36.3 | 50.1 | 43.3 | 57.8 | 37.5 | 51.7 | 42.0 | 56.6 | 36.9 | 55 | 45 |
| **NL9** | 56.7 | 43.5 | 80.9 | 38.4 | 52.3 | 42.8 | 59.6 | 39.1 | 50.1 | 40.3 | 59.3 | 35.2 | 60 | 50 |

*Source: Field Survey by EQMS (19th-22th November, 2018; 18th-20th December, 2018; 15th to 20th January, 2018). And Analysis date: 28th November 2018; 27th December 2019; 7thFebruary 2019.*

**Environmental Conservation Rules, 1997 (Schedule 4) (subsequent amendment in 2006)*

Due to an absence of heavy industries, large urban development or other significant noise sources, the background noise level at the project area is low till date of data collection.

According to Bangladesh Environmental Quality Standard ECR'97 categorizations current project area falls into residential area zone. **Table 4-2** shows that the average day time noise level at NL1, NL2, and are location are slightly higher than the national standard. The main reason is due to and sample collection area resides in front of the school whereas the other locations average day time noise is well within the standard limit of ECR'97. Besides, average night time noise level of all locations is well within the standard limit of ECR'97 (*subsequent amendment in 2006*).

Comparison of the ambient noise level monitoring in 5th Quarter (November - January 2018, 2019) presented in **Figure 4-1** and **Figure 4-2.**

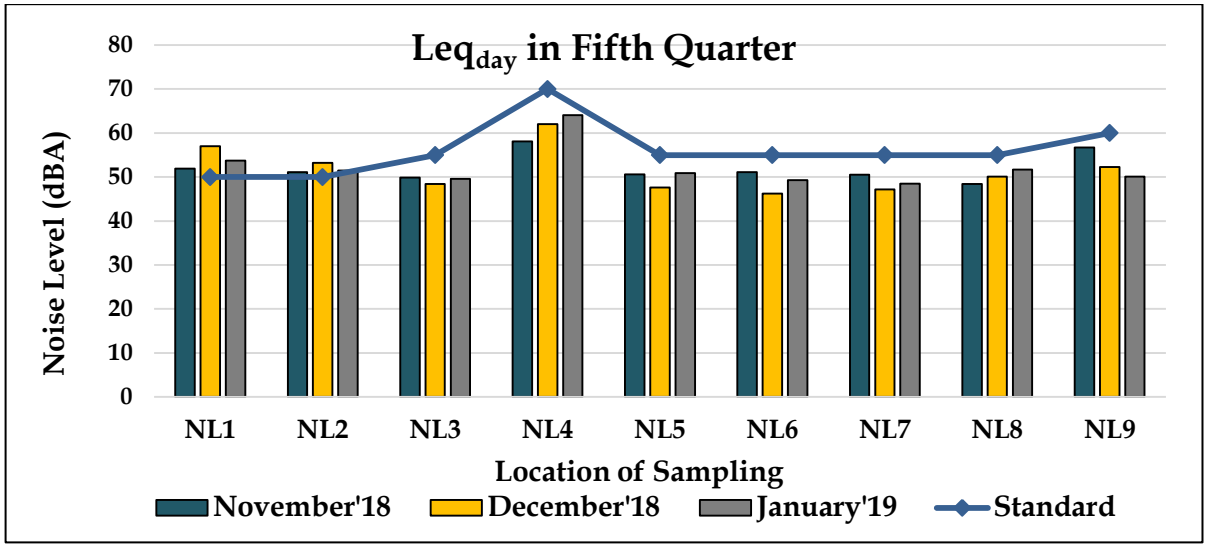


**Figure 4-1: Summary of the ambient noise recorded at day time in November 2018 to January 2019.**

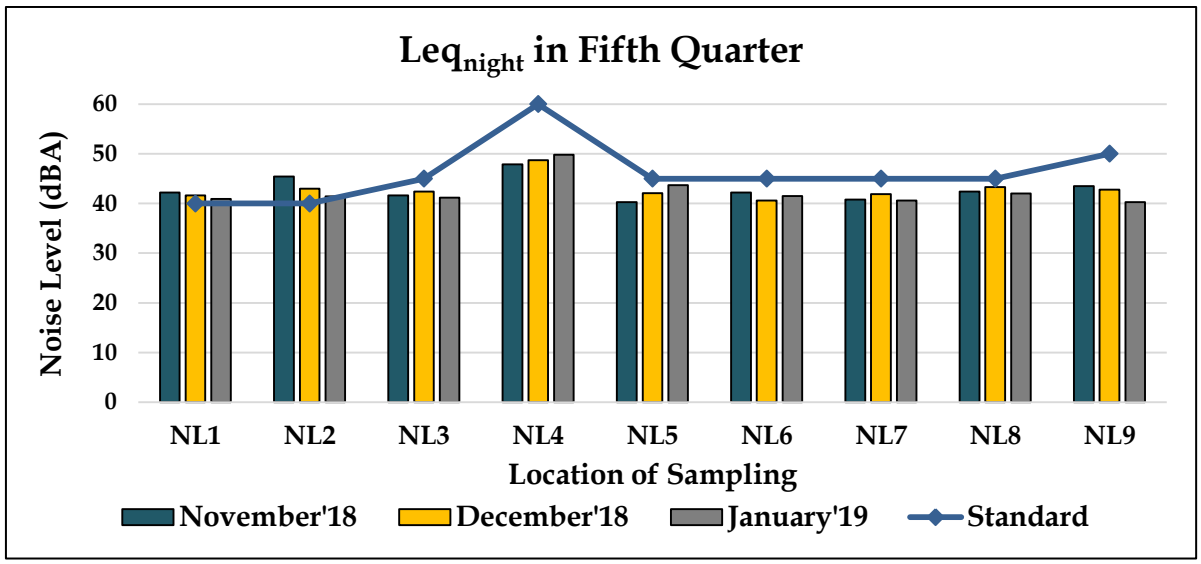


**Figure 4-2: Summary of the ambient noise recorded at night time in November 2018 – January 2019.**

## 4.3 Surface Water Monitoring Result and Discussion

The surface water Quality was compared with the Bangladesh ECR standard for best practice-based classification criteria. **Table 4-3** shows the analysis results. All the analyzed water quality parameters are within the acceptable limit of Bangladesh water quality standard (ECR, 1997).

**Table 4-3: Surface Water Quality Analysis**

| *SL.* | *Characteristics* | *Unit* | *November - 2018* | | | | *December - 2018* | | | | *January - 2019* | | | | *Bangladesh Standard* | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *SW1* | | *SW2* | | *SW1* | | *SW2* | | *SW1* | | *SW2* | | *Source of drinking water for supply only after disinfecting* | *Water usable for recreational activity* | *Source of drinking water for supply after conventional treatment* | *Water usable by fisheries* | *Water usable by various process and cooling industries* | *Water usable for irrigation* |
| | | | *Nov-18* | *Baseline -14* | *Nov-18* | *Baseline -14* | *Dec-18* | *Baseline -14* | *Dec-18* | *Baseline -14* | *Jan-19* | *Baseline -14* | *Jan-19* | *Baseline-14* | | | | | | |
| **1.** | **EC** | µmhos / *cm* | 300 | 86 | 240 | 92 | 840 | 86 | 500 | 92 | 1190 | 86 | 2380 | 13.87 | - | - | - | - | - | - |
| **2.** | **DO** | mg/l | 4.5 | 6.9 | 7.3 | 7.1 | 5.5 | 6.9 | 4.8 | 7.1 | 8.5 | 6.9 | 7.8 | 3.4 | 6 or above | 5 of more | 6 or above | 5 of more | 5 of more | 5 of more |
| **3.** | **Iron** | mg/l | 0.31 | 0.53 | 0.38 | 0.46 | 0.35 | 0.53 | 0.41 | 0.46 | 0.42 | 0.53 | 0.45 | 0.05 | - | - | - | - | - | - |
| **4.** | **Lead (Pb)** | mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | - | - | - | - | - | - |
| **5.** | **Oil and Grease** | mg/l | Less than 5 | <2 | Less than 5 | <2 | Less than 5 | <2 | Less than 5 | <2 | Less than 5 | <2 | Less than 5 | <2 | - | - | - | - | - | - |
| **6.** | **pH** | - | 7.40 | 6.9 | 7.31 | 7.1 | 7.60 | 6.9 | 7.85 | 7.1 | 8.07 | 6.9 | 8.06 | 8.70 | 6.5-8.5 | 6.5-8.5 | 6.5-8.5 | 6.5-8.5 | 6.5-8.5 | 6.5-8.5 |
| **7.** | **Temperature** | $^{o}$C | 26.4 | 28.5 | 25.2 | 28.3 | 22.7 | 28.5 | 22.9 | 28.3 | 23.8 | 28.5 | 23.9 | 20.2 | - | - | - | - | - | - |
| **8.** | **TDS** | mg/l | 150 | 75 | 120 | 70 | 420 | 75 | 250 | 70 | 600 | 75 | 1190 | 6.95 | - | - | - | - | - | - |
| **9.** | **BOD** | mg/l | 1.9 | 2.0 | 2.2 | <0.05 | 1.6 | 2.0 | 2.1 | <0.05 | 3.1 | 2.0 | 2.9 | 1.9 | 2 or less | 3 or less | 6 or less | 6 or less | 10 or less | 10 or less |
| **10.** | **Turbidity** | NTU | 11 | 17 | 15 | 15 | 09 | 17 | 13 | 15 | 10 | 17 | 15 | 15 | - | - | - | - | - | - |
| **11.** | **Salinity** | ppt | 0.13 | 2.3 | 0.11 | 1.5 | 0.42 | 2.3 | 0.25 | 1.5 | 0.61 | 2.3 | 1.27 | 8.80 | - | - | - | - | - | - |

*Source: Laboratory Analysis, Department of Soil, water and Environment, University of Dhaka and EQMS wet laboratory,*
*Sampling Date: (19th-22th November 2018, 18th-20th December, 2018, 15th to 20th January, 2019).*
*Analysis date: (28th November 2018, 7th January 2019, 7th February 2019),*
** Bangladesh Environment Conservation Rules, 1997- Schedule 3 (Standards for inland surface water*

Comparison of the data with the surface water quality standards of government of Bangladesh reveal the fact that water of the water bodies is suitable for Source of drinking water for supply after conventional treatment, Water usable by fisheries, Industrial process and cooling industries.

## 4.4 Ground Water Monitoring Result and Discussion

The results of two groundwater samples collected from the tube-wells in project site and Londa Gheya Ghat (Table 4-4).

Shallow tube-wells (200-400 feet) of the project area contain arsenic contamination. Peoples in this area use surface water for their domestic purposes and use deep tube-wells (900-1000 feet) water for drinking.

In ***November 2018 to January 2019***, Groundwater samples were collected by EQMS Consulting Limited (Monitoring team) from shallow tube wells in the project area. The result of the groundwater field samples and the GoB standards for potable water (ECR, 1997) are shown in Table 4-4. The concentration levels of pH, As, Fe, Chloride, Fecal Coliform, Conductivity, Lead, DO, TDS and Total Coliform for tube well were found within the acceptable limit set by the DOE, GoB for drinking water. According to the overall water quality data, practically moderate quality and quantity of ground water is available in and around the project site.

**Table 4-4: Ground Water Quality Analysis Result**

| Sl. | Parameters | November - 2018 | | | | December - 2018 | | | | January - 2019 | | | | Bangladesh Standard |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | GW1 | | GW2 | | GW1 | | GW2 | | GW1 | | GW2 | | |
| | | Nov-18 | Baseline-14 | Nov-18 | Baseline-14 | Dec-18 | Baseline-14 | Dec-18 | Baseline-14 | Jan-19 | Baseline-14 | Jan-19 | Baseline-14 | |
| **1.** | Arsenic | <0.010 | <0.05 | <0.010 | <0.05 | <0.010 | <0.05 | <0.010 | <0.05 | <0.010 | <0.05 | <0.010 | <0.010 | 0.05 mg/l |
| **2.** | Chloride | 163.2 | 163.68 | 154.7 | 145.37 | 155.6 | 163.68 | 150.9 | 145.37 | 134.19 | 176.71 | 142.31 | 178.29 | 150-600 mg/l |
| **3.** | Conductivity | 1040 | 280 | 1050 | 260 | 1040 | 280 | 1060 | 260 | 1080 | 280 | 1050 | 1.09 | -µmhos/cm |
| **4.** | Fecal Coliform | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 mg/l |
| **5.** | Iron (Fe) | 0.12 | 0.65 | 0.10 | 0.58 | 0.16 | 0.65 | 0.12 | 0.58 | 0.21 | 0.65 | 0.16 | 0.15 | 0.3-1.0 mg/l |
| **6.** | Lead (Pb) | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.05 mg/l |
| **7.** | pH | 7.58 | 6.8 | 7.5 | 7.0 | 7.74 | 6.8 | 7.72 | 7.0 | 8.07 | 8.15 | 7.92 | 8.62 | 6.5-8.5 |
| **8.** | Temperature | 25.1 | 26.9 | 25.2 | 27.6 | 22.8 | 26.9 | 22.8 | 27.6 | 23.9 | 30.3 | 23.8 | 20.2 | 20-30 ˚C |
| **9.** | Total Coliform | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 mg/l |
| **10.** | Total Dissolved Solids | 520 | 380 | 520 | 340 | 520 | 380 | 530 | 340 | 540 | 550 | 530 | 540 | 1000 mg/l |

*Source: Laboratory Analysis, Department of Soil, water and Environment, University of Dhaka and EQMS Wet laboratory,*
*Sampling Date: (19th-22th November 2018, 18th-20th December, 2018, 15th to 20th January, 2019).*
*Analysis date: (28th November 2018, 7th January 2019, 7thFebruary 201*

## 4.5 Occupational health and safety

Occupational health and safety (OHS) programs are a legal requirement and every workplace must have an OHS program to help prevent accidents and injuries. An effective program will also help dzeal with any incidents that do occur.

The occupational health and safety service in Bangladesh is still in the developmental stage. Here the occupational health & safety refers mainly to needs of workers of industries or some manufacturing processes but does not completely cover all occupations of the country. The main laws related to occupational health & safety in this country is the Factory Act 1965 and the Factory Rule of 1979. There are a number of other laws and regulations that are also have some provisions related to occupational health and safety. These laws have provisions on occupational hygiene, occupational diseases, industrial accidents, protection of women and young persons in dangerous occupations and also cover conditions of work, working hours, welfare facilities, holidays, leave etc. But most of the laws are lacking in standard values and not specific rather general in nature.

### 4.5.1 Scope

Occupational Health and Safety covers safe and healthy accommodation along with work environment. Safe and healthy accommodation is the most important and broad issue. Other health and safety issues are also included.

**Safe and Healthy Accommodation**

- Types of accommodation
- Standards for workers' accommodation
- General living facilities
- Drainage
- Heating, air conditioning, ventilation and light
- Water
- Waste water and solid waste
- Room/dormitories facilities
- Sanitary and toilet facilities
- Shower/bathroom and other sanitary facilities
- Canteen- cooking and laundry facilities
- Standards for nutrition and food safety

**Other Health and Safety Issues**

- Health and Safety on Site
- Medical Facilities
- Leisure, Social and Telecommunication facilities
- Security on Workers' Accommodation
- Consulting and Grievance Mechanism
- Workers' rights, rules and regulations on workers' accommodation

### 4.5.2 Relevant Law and Policy

**C. National Policy Framework**

**The constitution of Bangladesh** adapted on the November 4th 1972 recognizes productivity as a basic need for economic development and covers the right to work and reasonable wages, Medicare and, disease and disablement. And thus it is assumed the health and safety of industrial workers has been taken care of.

The Occupational Health and Safety Services in Bangladesh, is still in the developmental stage. In Bangladesh Occupational Health and Safety generally refers mainly to needs of workers of industries or some manufacturing process but does not completely cover all recognized occupations of the country.

**In the Fifth Five Year Plan** (1997-2002) for the labour and manpower sector the objectives relatable to OSH are:

a. "To ensure fair wages, welfare and social protection of workers under the structural adjustment programs adopted by the government."
b. "To initiate steps to protect children from economic exploitation."

To achieve the objectives of the Fifth Five Year Plan (1997-2002) for the labour and manpower sector the strategies relatable to OSH that were to be pursued are:

a. "Review of existing labour related laws, rules, regulations and directives and adoption of necessary modifications."
b. "Stress on gradual elimination of child labour and protection of children from economic exploitation and hazardous work."

In the labor sector the OSH relatable programs that were to be undertaken under the Fifth Five Year Plan included- Strengthening of Inspectorate of Factories and

Establishments in terms of manpower and resources so as to enable them to "enforce various labour laws/rules concerning working hours, working condition, safety, and maternity benefits in different mills, shops and factories, etc."

In the Fifth Five Year Plan (1997-2002) for the health population and family welfare sector some scope for further development in the sector against the background that 'with increased urbanization and industrialization, the number of burn and trauma cases due to traffic and industrial accidents, unsafe use of chemicals, fire, etc., has been increasing every year'. The following needs have been identified:

c. Need to establish hospitals near major highways, traffic blackspots and industrial
areas with trauma and burn units to treat burn and trauma cases in time.
d. Promote industrial and occupational health through IEC activities so as to raise
awareness of industrial workers and protect them from industrial hazards.

**Labour Policy:**

- Undertake effective new labour policy on the basis of tripartite negotiation
- Link wages with productivity
- Quick disposal of Industrial dispute
- Stop child labour and provide workers with education, healthcare, and better working facilities

D. **LEGISLATIONS RELATING TO OCCUPATIONAL HEALTH AND SAFETY**

The Department of Inspection for Factories and Establishments under the Ministry of Labour and Employment administers and enforces 42 labour laws. The following legislations have provisions relating to occupational health, hygiene of workers, occupational diseases, industrial accidents, protection of women and young persons in dangerous occupations, and also cover conditions of work, working hours, welfare facilities, holidays, leave, etc.

| | **Legislation** | **Enforcing agency** |
|---|---|---|
| 1 | The Factories Act, 1965 and the Factories Rules 1979 | Department of Inspection for Factories and Establishment |
| 2 | Dock laborers' Act 1934 | Department of Inspection for Factories and Establishment |
| 3 | Dock laborers' Regulations 1948 | Department of Inspection for Factories and Establishment |
| 4 | Tea Plantation Laborers' Ordinance 1962 and the rules thereunder | Department of Inspection for Factories and Establishment |

| | | |
|---|---|---|
| 5 | The Workmen's Compensation Act 1923 as amended in 1980 and 1983 | Department of Inspection for Factories and Establishment |
| 6 | The Shops and Establishments Act 1965 | Department of Inspection for Factories and Establishment |
| 7 | Employment of Children Act 1938 | Department of Inspection for Factories and Establishment |
| 8 | The Maternity Benefit Tea Estates Act 1950 | Department of Inspection for Factories and Establishment |
| 9 | The Maternity Benefit Act 1939 | Department of Inspection for Factories and Establishment |
| 10 | The Maternity Benefit Rules 1953 | Department of Inspection for Factories and Establishment |
| 11 | The Boilers Act 1923 | Chief Inspector of Boilers under Ministry of Industry |
| 12 | Nuclear Safety and Radiation control Act 1993 | Atomic Energy Commission Bangladesh |
| | **Legislation** | **Enforcing agency** |
| 1 | The Factories Act, 1965 and the Factories Rules 1979 | Department of Inspection for Factories and Establishment |
| 2 | Dock laborers' Act 1934 | Department of Inspection for Factories and Establishment |
| 3 | Dock laborers' Regulations 1948 | Department of Inspection for Factories and Establishment |
| 4 | Tea Plantation Laborers' Ordinance 1962 and the rules thereunder | Department of Inspection for Factories and Establishment |
| 5 | The Workmen's Compensation Act 1923 as amended in 1980 and 1983 | Department of Inspection for Factories and Establishment |
| 6 | The Shops and Establishments Act 1965 | Department of Inspection for Factories and Establishment |
| 7 | Employment of Children Act 1938 | Department of Inspection for Factories and Establishment |
| 8 | The Maternity Benefit Tea Estates Act 1950 | Department of Inspection for Factories and Establishment |
| 9 | The Maternity Benefit Act 1939 | Department of Inspection for Factories and Establishment |
| 10 | The Maternity Benefit Rules 1953 | Department of Inspection for Factories and Establishment |
| 11 | The Boilers Act 1923 | Chief Inspector of Boilers under Ministry of Industry |
| 12 | Nuclear Safety and Radiation control Act 1993 | Atomic Energy Commission Bangladesh |

**E. ILO Convention regarding OSH:**

Until now 31 ILO conventions have been ratified by Bangladesh. The ILO convention C 155 and C161 are concerned with the Occupational Safety and Health and the Occupational Health Services respectively. The aim of the policy of the convention C155 is to prevent occupational accidents and injury to health and illnesses by identification and minimizing the causes of hazards in the working environment. The aim of the convention C161 is to establish and maintain a safe and healthy working environment which will facilitate optimal physical and mental health in relation to work. Although these conventions are not yet ratified in Bangladesh but many of the recommendations of these conventions have been practiced to some extent through the implementations of existing various laws and regulations. In the Factory Act 1965 and Factory Rules 1979 and in some other laws and regulations there are various chapters that are relatable to OSH. But by the existing laws and regulations qualitative inspections regarding safety and health in the working is possible but could not be monitored in terms of quantitative standard values and permissible limits.

For ratification of ILO convention No. C 155 and C161 the motivation of all the parties, policy makers, employers and employees is required.

**F. IFC's Performance Standard on Labour and Working Condition**

IFC's Performance Standard 2 recognizes that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of fundamental rights of workers.

The requirements set out in this performance standard have been in part guided by a number of international conventions and instruments, including those of the International Labour Organization (ILO) and the United Nations (UN). It's objectives are following:

- To promote the fair treatment, non-discrimination and equal opportunity of workers.
- To establish, maintain and improve the worker-management relationship.
- To promote compliance with national employment and labour laws.
- To protect workers, including vulnerable categories of workers such as children, migrant workers, workers engaged by third parties and workers in the client's supply chain.
- To promote safe and healthy working conditions and the health of the workers.
- To avoid the use of forced labor.

## 4.6 GAP ASSESSMENT TO THE APPLICABLE REFERENCE FRAMEWORK APPLICABLE STANDARD

This section reviews the performance of the Project with respect to the Applicable Standards. In terms of IFC PS standard EQMS review the following 4 PS standards as per the MIGA's "Environmental and Social Review Summary (ESRS), February 23, 2015:

- PS2: Labor and Working Conditions;

The findings are categorized as per

**Table 4-5: IFC PS Alignment Definitions**

| Rating | Definition |
|---|---|
| Aligned | Information available indicates that the Project fulfills the requirement and/or is aligned with intended outcome of the requirement. |
| Partially Aligned | Information available indicates that the Project partially fulfills the requirement and/or is partially aligned with intended outcome of the requirement. |
| Not Aligned | Information available indicates that the Project does not fulfill the requirement. |
| Insufficient Information for the assessment | There is insufficient information to make an assessment of the level of alignment. |
| Not Applicable | The requirements do not apply to the Project at the current time. |

The gap assessment with respect to applicable standards primarily focuses on the construction phase environmental and social management and monitoring plan (ESMMP) developed as part of the ESIA study, Project level environmental, health, safety and social policies, procedures and plans as being developed by BCPCL and the EPC contractors as well as their implementation on ground. Furthermore, the aspects related to the operation phase of the Project and linked management plans have been referred in order the operation phase.

## Methodology

To study the labor and working conditions of Payra Coal Power Plant Project observational method was used. Monitoring team physically stayed in the construction camp for few days; from 15th January to 20th January, and observed labor and working conditions of the proposed project. During observation several informal discussions were also conducted with workers of three workers' shed.

For both observation and informal discussion a checklist with the compliance of "Performance Standards-2 on Labor and Working Conditions" formulated by International Finance Corporation (IFC) was followed.

**Table 4-6: Gap Assessment to the IFC Performance Standards (2012) of the Project**

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
|---|---|---|---|---|---|
| **1** | <u>Types of Workers Accommodation</u><br><br>There is a large variety of workers' living facilities. These can be classified in a number of ways. According to IFC's typology of workers' accommodation, in construction camp workers' camp lies in temporary and extractives in nature.<br><br>Where accommodation services are provided to workers covered by the scope of this Performance Standard, the client will put in place and implement policies on the quality and management of the accommodation and provision of basic services. This also includes the | Temporary sheds for all labors and employees have been developed. Available sheds are<br>1. Sheds for NEPC staffs within the project site<br>2. Sheds for mechanic and engineer of NDE<br>3. Sub-contractor labor shed under NDE within the project site<br>4. Subcontractor labor shed Under NEPC within the project site<br><br>**NEPC Chinese Employees' Accommodation**<br><br>The NEPC employees (Chinese) and workers (Chinese) are housed in inside the project site;<br><br>1. Inside the project boundary. At present several sheds were observed.<br><br>**NDE Employees' Accommodation**<br><br>Employees of NDE are housed in three separate accommodation camps adjacent to the construction site. Sheds are known | **Aligned** | Clear labor construction camp guidelines to be formulated and shared with BCPCL to meet the IFC guideline on worker's accommodation.<br><br>EPC contractors; NEPC, NDE and others sub-contractors also should take into consideration the observations highlighted in the report. | No additional accommodation facilities have been developed since last quarterly |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
|---|---|---|---|---|---|
| | applicable requirements of the IFC Guidelines on Worker Accommodation. | by followings;<br>1. 1 no shed<br>2. 2 no shed<br>3. 3 no shed (Bat-tola)<br>**Subcontractor Labors' Shed Under NDE**<br>All subcontractor labors' sheds have been shifted to project site. There are 2 numbers of labors sheds have been observed during field visit.<br>**Subcontractor Labors' Shed Under NEPC**<br>All subcontractor labors' shed under NEPC have been established within project site. There are 24 numbers of sheds have been observed during field visit.<br>Moreover, Bangladesh police and answer VDP, who are giving security to the workers, are housed in a separate shed outside of the project site. | | | |
| **2** | General Construction Standards<br>Building Construction | General construction standards followed by the EPC contractors and subcontractors are describing as follows; | **Aligned** | Subcontractor labors of NEPC are housed densely in every shed. NEPC | Deteriorated since last quarterly report. |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
|---|---|---|---|---|---|
| | Quality of material, construction methods, resistance to earthquakes.<br><br>General health, safety and security<br>Requirements on health and safety are often an important part of building standards and might include provisions on occupation density, minimal air volumes, ventilation, the quality of the flooring (slip-resistant) or security against intrusion.<br><br>Fire safety<br>Requirements on fire safety are common and are likely to apply to housing facilities of any type. This can include provision on fire extinguishers, fire alarms, number and size of staircases and emergency exits, restrictions on the | **NEPC Chinese Employees' Accommodation**<br>1. Shed inside the project area was built with good materials as well as shed is resistant to earthquakes.<br>2. As all rooms are air conditions air volumes and ventilation are not mandatory.<br>3. Concrete floors are slip resistant.<br>4. Available security against intrusion was observed during visit.<br>5. Sufficient fire extinguishers have been found in the shed.<br>6. Electricity, plumbing, water and sanitation all are designed compliance with national and IFC standard.<br><br>**NDE Employees' Accommodation**<br>1. All sheds were built with good materials as well as sheds are resistant to earthquakes.<br>2. Air volumes and ventilation are seen sufficient.<br>3. Concrete floors are slip resistant. | | should take necessary step to make the subcontractors comply the standard density for labors' accommodation. | |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
|---|---|---|---|---|---|
| | use of certain building materials.<br><br>Electricity, plumbing, water and sanitation National design and construction standards often include very detailed provisions on electricity or plumbing fixtures/fittings, water and sanitation connection/equipment | 4. Available security against intrusion was observed during visit.<br>5. No fire extinguisher was seen.<br>6. Electricity, plumbing, water and sanitation all are designed compliance with national and IFC standard.<br>**Subcontractor Labors' Shed Under NDE**<br>1. All sheds were built with good materials as well as sheds are resistant to earthquakes.<br>2. Minimal density observed. Highest 4 persons are sharing each room.<br>3. Air volumes and ventilation are seen sufficient.<br>4. Concrete floors are slip resistant.<br>5. Available security against intrusion was observed during visit.<br>6. No fire extinguisher was seen.<br>7. Electricity, plumbing, water and sanitation all are designed compliance with national and IFC standard.<br>**Subcontractor Labors' Shed Under NEPC** | | | |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
|---|---|---|---|---|---|
| | | 1. All 24 Sheds inside the project area was built with good materials as well as shed is resistant to earthquakes.<br>2. Air volumes and ventilation are available.<br>3. Concrete floors are slip resistant.<br>4. Available security against intrusion was observed during visit.<br>5. Fire extinguishers have found but very poor in number in the shed.<br>6. Electricity, plumbing, water and sanitation all are designed compliance with national and IFC standard. | | | |
| **3** | <u>General Living Facilities</u><br><br>Ensuring good standards in living facilities is important in order to avoid safety hazards and to protect workers from diseases and/or illness resulting from humidity, bad/stagnant water (or lack of water), cold, spread of fungus, proliferation of | There is a Basin Plant creates noise continuously even all the night also. Labors reported that during the field visit that this noise is unbearable.<br><br>All living facilities are developed avoiding flood and other natural hazards.<br><br>Regular basis cleaning activities were not observed in all labors' sheds. Sub-contractor labors shed under both NEPC and NDE were observed messy. Sufficient | **Not Aligned** | NEPC must check whether the noise generated from the Basin Plant is bearable or not. To assess that, noise monitoring during the Basin Plant running time is required. If noise level exceeds the standard, NEPC | Deteriorated since last quarterly. |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
|---|---|---|---|---|---|
| | insects or rodents, as well as to maintain a good level of morale. The location of the facilities is important to prevent exposure to wind, fire, flood and other natural hazards.<br><br>Some requirements need to be followed;<br><br>1. Living facilities are located to avoid flooding and other natural hazards.<br>2. Where possible, living facilities are located within a reasonable distance from the worksite.<br>3. Transport from the living facilities to worksite is safe and free.<br>4. The living facilities are built with adequate materials kept in good repair and kept clean and free from rubbish and other refuse. | numbers of cleaners and routine basis cleaning activities are required. | | should take necessary step to minimize this noise problem. | |
| **3.1** | ***Drainage*** | It was found that all sheds are built with | **Aligned** | NDE and NEPC | Same as last |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
|---|---|---|---|---|---|
| | The presence of stagnant water is a factor of proliferation of potential disease vectors such as mosquitoes, flies and others, and must be avoided. Client need to consider<br><br>1. The building site is adequately drained to avoid the accumulation of stagnant water. | proper drainage system.<br><br>Stagnant water or water logging wasn't seen at labor shed during field visit. | | labour shed side should be cleaned up in a regular basis. | Quarterly report |
| **3.2** | ***Heating, air conditioning, ventilation and light***<br><br>Heating, air conditioning and ventilation should be appropriate for the climatic conditions and provide workers with a comfortable and healthy environment to rest and spend their spare time. Followings are required<br><br>1. For facilities located in | Well air conditioning system was found in NEPC workers shed. All the requirements are met by the NEPC.<br><br>NDE provides sufficient numbers of electric fans in every shed. Moreover, artificial lighting is available in all sheds. 24 hours electricity service is not provided in subcontractors' labor sheds. Electric supply from generator is supplied for specific time period.<br><br>In the case of ventilation all sheds were followed the window area against room area. | **Aligned** | BCPCL as well as NDE and NEPC should take proper action for ensuring 24 hours electricity supply for all workers sheds. | Same as last Quarterly report |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
|---|---|---|---|---|---|
| | cold weather zones, the temperature is kept at a level of around 20 degrees Celsius notwithstanding the need for adequate ventilation.<br>2. For facilities located in hot weather zones, adequate ventilation and/or air conditioning systems are provided.<br>3. Both natural and artificial lighting are provided and maintained in living facilities. It is best practice that the window area represents not less than 5% to 10% of the floor area. Emergency lighting is provided. | | | | |
| **3.3** | ***Water***<br>Special attention to water quality and quantity is absolutely essential. To prevent dehydration, water poisoning and diseases resulting from lack of hygiene, workers | Adequate Tap water and tube-well water are available in every labors shed for drinking, cleaning and other purposes. Tap water is not drinkable. Workers only do their cleaning activities with the tap water.<br><br>Observing the hardship in getting | **Aligned** | Water quality must be tested periodically as all labors are depending on this water treatment plant. Any malfunction of | Improved |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
|---|---|---|---|---|---|
| | should always have easy access to a source of clean water. An adequate supply of potable water must be available in the same buildings where bedrooms or dormitories are provided. Drinking water must meet local or WHO drinking water standards and water quality must be monitored regularly.<br><br>1. Access to an adequate and convenient supply of free potable water is always available to workers. Depending on climate, weather conditions and accommodation standards, 80 to 180 liters per person per day are available.<br>2. Drinking water meets national/local or WHO drinking water standards.<br>3. All tanks used for the storage of drinking water | drinking water, NEPC has set up a water treatment plant adjacent to subcontractors' labor sheds. This water is drinkable. | | water treatment plant may cause epidemic. | |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
|---|---|---|---|---|---|
| | are constructed and covered as to prevent water stored therein from becoming polluted or contaminated. | | | | |
| **3.4** | ***Wastewater and solid waste***<br>Wastewater treatment and effluent discharge as well as solid waste treatment and disposal must comply with local or World Bank effluent discharge standards and be adequately designed to prevent contamination of any water body, to ensure hygiene and to avoid the spread of infections and diseases, the proliferation of mosquitoes, flies, rodents, and other pest vectors. Depending on the local context, treatment and disposal services can be either provided by dedicated or existing municipal facilities. As | It is observed that a dedicated waste disposal site has been developed for accumulating waste produced from labor sheds and canteens.<br><br>Plastic rubbish containers 30 meters from each shed were observed. Moreover, waste bucket or dust bin was also found in labor sheds' kitchen and canteen.<br>In sub-contractor shed, it was observed that waste is not managed or disposed properly. Instead of having proper waste management infrastructure but labors were not seen using rubbish containers. Waste was seen disposed adjacent place to kitchen. Chance of pollution is very high.<br><br>It is also observed that Pest extermination, vector control and disinfection activities are not periodically carried out. | **Partially Aligned** | NEPC must develop Standard Effluent Discharge Plan considering all sorts of effluents.<br><br>BEPCL should monitor the effluent discharge activities periodically.<br><br>Moreover, A training program can be arranged for NDE and NEPC subcontractors' labor for increasing conciseness regarding the importance of waste management. | Deteriorated since last quarterly report. |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
|---|---|---|---|---|---|
| | follows<br><br>1. Wastewater, sewage, food and any other waste materials are adequately discharged, in compliance with local or World Bank standards – whichever is more stringent – and without causing any significant impacts on camp residents, the biophysical environment or surrounding communities.<br>2. Specific containers for rubbish collection are provided and emptied on a regular basis. Standards range from providing an adequate number of rubbish containers to providing leak proof, non-absorbent, rust and corrosion-resistant containers protected | Most concerning issue is disposed wastes are not treated complying local or World Bank effluent discharge standards. During the field visit, it was observed that wastes were burnt out in open area which may ultimately contribute to environmental degradation. | | | |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
|---|---|---|---|---|---|
| | from insects and rodents. In addition it is best practice to locate rubbish containers 30 meters from each shelter on a wooden, metal, or concrete stand. Such containers must be emptied at regular intervals (to be determined based on temperatures and volumes generated) to avoid unpleasant odours associated with decaying organic materials.<br>3. Pest extermination, vector control and disinfection are carried out throughout the living facilities in compliance with local requirements and/or good practice. Where warranted, pest and vector monitoring should be performed on a regular basis. | | | | |
| **4** | Room and Dormitory | **NEPC Chinese Employees Room and** | **Partially** | NEPC must | No Improvement |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
|---|---|---|---|---|---|
| | Facilities<br><br>The standards of the rooms or dormitory facilities are important to allow workers to rest properly and to maintain good standards of hygiene. Overcrowding should be avoided particularly. This also has an impact on workers' productivity and reduces work related accidents. It is generally acknowledged that rooms/dormitories should be kept clean and in a good condition. Exposure to noise and odor should be minimized. In addition, room/dormitory design and equipment should strive to offer workers a maximum of privacy. Resorting to dormitories should be minimised and single or double rooms are preferred. Dormitories and | **Dormitory Facilities**<br><br>During field visit, facilities observed;<br><br>1. Rooms are kept in good conditions.<br>2. Rooms are built with easily cleanable flooring.<br>3. Sanitary facilities are located within the same buildings; Total 20 numbers of toilets.<br>4. Followed standard flooring range (4 to 5.5 sq. metres) and minimum ceiling height (2.10 metres)<br>5. Standard range of room sharing is not considered. 6 to 8 persons are sharing each room. Double deck bunks are applied for all workers.<br>6. Lockable door and adequate furniture are provided.<br><br>**NDE Mechanics and Engineers' Room Facilities**<br><br>1. Rooms are kept in good conditions.<br>2. Rooms are built with easily cleanable flooring.<br>3. Sanitary facilities are located within the | **Aligned** | monitor the room facilities of subcontractor labors' shed and take necessary steps to reduce the room sharing number.<br><br>BCPCL may monitor the rooming facilities periodically. | observed |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
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| | rooms must be single-sex. Following benchmarks need to be followed.<br><br>1. Rooms/dormitories are kept in good condition.<br>2. Rooms/dormitories are aired and cleaned at regular intervals.<br>3. Rooms/dormitories are built with easily cleanable flooring material.<br>4. Sanitary facilities are located within the same buildings and provided separately for men and women.<br>5. Density standards are expressed either in terms of minimal volume per resident or of minimal floor space. Usual standards range from 10 to 12.5 cubic metres (volume) or 4 to 5.5 square metres (surface).<br>6. A minimum ceiling height of 2.10 metres is | same buildings.<br>4. Followed standard flooring range (4 to 5.5 sq. metres) and minimum ceiling height (2.10 metres)<br>5. Standard range of room sharing is considered. 4 to 5 workers share single room.<br>6. Lockable door and adequate furniture are provided.<br><br>**NDE Subcontractor Labour Shed's Room Facilities**<br><br>1. Rooms are kept in good conditions.<br>2. Rooms are built with easily cleanable flooring.<br>3. Sanitary facilities are located outside the sheds;<br>4. Followed standard flooring range (4 to 5.5 sq. metres) and minimum ceiling height (2.10 metres)<br>5. Standard range of room sharing is considered. 3 to 4 workers share single room.<br>6. Lockable door and adequate furniture are provided.<br><br>**NEPC Subcontractor Labour Shed's** | | | |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
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| | provided.<br>7. In collective rooms, which are minimized, in order to provide workers with some privacy, only a reasonable number of workers are allowed to share the same room. Standards range from 2 to 8 workers.<br>8. All doors and windows should be lockable, and provided with mosquito screens where conditions warrant.<br>9. There should be mobile partitions or curtains to ensure privacy.<br>10. Every resident is provided with adequate furniture such as a table, a chair, a mirror and a bedside light.<br>11. Separate sleeping areas are provided for men and women, except in family accommodation. | **Room Facilities**<br><br>1. Rooms are kept in good conditions.<br>2. Rooms are built with easily cleanable flooring.<br>3. Sanitary facilities are located within the same buildings; Total 20 numbers of toilets in each sheds.<br>4. Followed standard flooring range (4 to 5.5 sq. metres) and minimum ceiling height (2.10 metres)<br>5. Standard range of room sharing is not considered. 14-20 persons are sharing each room.<br>6. Lockable door and adequate furniture are provided. | | | |
| **4.1** | ***Bed Arrangements and*** | **NEPC Chinese Employees Bed** | **Partially** | NEPC, NDE and | No Improvement |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
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| | ***Storage Facilities***<br><br>The provision of an adequate numbers of beds of an appropriate size is essential to provide workers with decent, safe and hygienic conditions to rest and sleep. Here again, particular attention should be paid to privacy. Consideration should be given to local customs so beds could be replaced by hammocks or sleeping mats for instance. Benchmarks are...<br><br>1. A separate bed for each worker is provided. The practice of "hot-bedding" should be avoided.<br>2. There is a minimum space between beds of 1 metre.<br>3. Double deck bunks are not advisable for fire safety and hygiene reasons, and | **Arrangements and Storage Facilities**<br><br>During field visit, facilities observed<br><br>1. A separate bed for each worker is provided.<br>2. Minimum space between beds (1 metre) is not maintained all the time.<br>3. All the beds are double deck bunks.<br>4. Each worker is provided with a comfortable mattress, pillow, cover and clean bedding.<br>5. Standard requirement for storage facility was absent. (475-litre big lockers and 1 metre of shelf unit)<br>6. Separate storage for work boots and other personal protection equipment wasn't visible during field visit.<br><br>**NDE Mechanics and Engineers' Bed Arrangements and Storage Facilities**<br><br>1. A separate bed for each worker is provided.<br>2. Minimum space between beds (1 metre) is not maintained all the time.<br>3. Double deck bunk and triple deck bunk were not seen during | **Aligned** | Subcontractor are suggested to provide separate bed, mattress and storage facilities to all workers.<br><br>Subcontract labor sheds need to be monitored periodically whether all requirements are met. | observed |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
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| | their use is minimized. Where they are used, there must be enough clear space between the lower and upper bunk of the bed. Standards range from to 0.7 to 1.10 metres.<br>4. Triple deck bunks are prohibited.<br>5. Each worker is provided with a comfortable mattress, pillow, cover and clean bedding.<br>6. Bed linen is washed frequently and applied with repellents and disinfectants where conditions warrant (malaria).<br>7. Facilities for the storage of personal belongings for workers are provided. Standards vary from providing an individual cupboard for each worker to providing 475-litre big lockers and 1 metre of shelf unit. | observation.<br>4. Each worker is provided with a comfortable mattress, pillow, cover and clean bedding.<br>5. Standard requirement for storage facility was absent. (475-litre big lockers and 1 metre of shelf unit)<br>6. Separate storage for work boots and other personal protection equipment wasn't visible during field visit.<br><br>**Subcontractor Labour Shed's Bed Arrangements and Storage Facilities**<br><br>1. A separate bed for each worker is not provided. Most of them sleep together in floor.<br>2. Minimum space between beds (1 metre) is not maintained all the time.<br>3. Each worker is not provided with a comfortable mattress, pillow, cover and clean bedding.<br>4. Standard requirement for storage facility was absent. (475-litre big lockers and 1 metre of shelf unit)<br>5. Separate storage for work boots and other personal protection equipment wasn't visible during field visit. | | | |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
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| | 8. Separate storage for work boots and other personal protection equipment, as well as drying/airing areas may need to be provided depending on conditions. | | | | |
| **5** | <u>Sanitary and Toilet Facilities</u><br>It is essential to allow workers to maintain a good standard of personal hygiene but also to prevent contamination and the spread of diseases which result from inadequate sanitary facilities. Sanitary and toilet facilities will always include all of the following: toilets, urinals, washbasins and showers. Sanitary and toilet facilities should be kept in a clean and fully working condition. Facilities should also be constructed of materials that are easily cleanable and ensure | **NEPC Chinese Employees' Sanitary and Toilet Facilities**<br><br>1. Sanitary and toilet facilities are constructed with easily cleanable materials.<br>2. Sanitary and toilet facilities are cleaned frequently and kept in working condition.<br>3. Adequate privacy<br>4. Sanitary and toilet facilities are not shared between men and women. One female employee was seen and her sanitary and toilet facility are attached to her living room.<br><br>**NDE Mechanics and Engineers' Sanitary and Toilet Facilities**<br><br>1. Sanitary and toilet facilities are constructed with easily cleanable | **Partially Aligned** | Proper monitoring is required for making subcontractor follow the standard requirements. | Improved compared to previous Quarterly |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
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| | privacy. Sanitary and toilet facilities are never shared between male and female residents, except in family accommodation. Where necessary, specific additional sanitary facilities are provided for women. Required benchmarks are…<br><br>1. Sanitary and toilet facilities are constructed of materials that are easily cleanable.<br>2. Sanitary and toilet facilities are cleaned frequently and kept in working condition.<br>3. Sanitary and toilet facilities are designed to provide workers with adequate privacy, including ceiling to floor partitions and lockable doors.<br>4. Sanitary and toilet facilities are not shared | materials.<br>2. Cleaned frequently and kept in working condition.<br>3. Moderate privacy was observed. Ceiling was absent.<br>**Subcontractor Labor Shed's**<br>**Sanitary and Toilet Facilities**<br>1. Sanitary and toilet facilities are constructed with easily cleanable materials.<br>2. Cleaned frequently and kept in working condition.<br>3. Moderate privacy was observed. Ceiling was absent.<br>4. Toilet doors were being repaired during field visit. | | | |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
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| | between men and women, except in family accommodation. | | | | |
| **5.1** | ***Toilet Facilities***<br>Toilet arrangements are essential to avoid any contamination and prevent the spread of infectious disease. Benchmarks should be followed.<br><br>1. An adequate number of toilets are provided to workers. Standards range from 1 unit to 15 persons to 1 unit per 6 persons. For urinals, usual standards are 1 unit to 15 persons.<br>2. Toilet facilities are conveniently located and easily accessible. Standards range from 30 to 60 meters from rooms/dormitories. Toilet rooms shall be located so as to be accessible without any individual passing through | **NEPC Chinese Employees' Toilet Facilities**<br><br>1. Standards range. In the shed, 20 toilets for 100 workers.<br>2. Toilet facilities are conveniently located and easily accessible.<br>3. Good ventilation and sufficient hand wash basins are provided.<br><br>**NDE Mechanics and Engineers' Toilet Facilities**<br><br>1. Standards range (1 unit to 15 persons to 1 unit per 6 persons and for urinals, usual standards are 1 unit to 15 persons) was considered providing toilet and urinal facilities. (6 toilets are provided for more than 40 persons)<br>2. Toilet facilities are conveniently located and easily accessible.<br>3. Good ventilation and one hand wash basins are provided. | **Aligned** | | No major change observed compared to previous quarterly. |

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| | any sleeping room. In addition, all toilet rooms should be well-lit, have good ventilation or external windows, have sufficient hand wash basins and be conveniently located. Toilets and other sanitary facilities should be ("must be" in cold climates) in the same building as rooms and dormitories. | **Subcontractor Labour Sheds' Toilet Facilities**<br><br>1. Standards range (1 unit to 15 persons to 1 unit per 6 persons and for urinals, usual standards are 1 unit to 15 persons) was considered providing toilet and urinal facilities. (40 toilets are provided for more than 324 persons)<br>2. Toilet facilities are conveniently located and easily accessible.<br>3. Good ventilation and one hand wash basins are not provided. | | | |
| **5.2** | ***Shower/Bathrooms and Other Sanitary Facilities***<br>Showers/bathrooms and other sanitary facilities Hand wash basins and showers should be provided in conjunction with rooms/dormitories. These facilities must be kept in good working condition and cleaned frequently. The flooring for | **NEPC Chinese Employees' shed**<br><br>1. Shower/bathroom flooring is made of concrete.<br>2. Hand wash facilities including basin and soap were found adequate.<br>3. Adequate numbers of shower/bathroom facilities are provided. (within the standard limit)<br>4. Conveniently located.<br><br>**NDE Employees' Shed** | **Partially Aligned** | All required facilities are available but proper maintenance is required.<br><br>Soap supply for hand wash in all labor sheds would be appreciable. | Improved compared to previous quarterly |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
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| | shower facilities should be of hard washable materials, damp-proof and properly drained. Adequate space must be provided for hanging, drying and airing clothes. Suitable light, ventilation and soap should be provided. Lastly, hand washing, shower and other sanitary facilities should be located within a reasonable distance from other facilities and from sleeping facilities in particular. Benchmarks<br>1. Shower/bathroom flooring is made of anti-slip hard washable materials.<br>2. An adequate number of hand wash facilities is provided to workers. Standards range from 1 unit to each 15 persons to 1 unit per 6 workers. Hand wash facilities should | 1. Concrete floor<br>2. Hand wash facilities including basin and soap were found inadequate comparing to standards. (One unit was visible during field visit)<br>3. One common shower place was found. One tube-well is set up there. Moreover 6 shower rooms are also available. Comparing to the standard range it's enough.<br>4. Conveniently located.<br><br>**Subcontractor Labors' Shed**<br><br>1. Hand wash facilities are available.<br>2. They do their shower in open place.<br>3. Conveniently located. | | | |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
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| | consist of a tap and a basin, soap and hygienic means of drying hands.<br>3. An adequate number of shower/bathroom facilities are provided to workers. Standards range from 1 unit to 15 persons to 1 unit per 6 persons.<br>4. Showers/bathrooms are conveniently located.<br>5. Shower/bathroom facilities are provided with an adequate supply of cold and hot running water. | | | | |
| **6** | <u>Canteen, Cooking and Laundry Facilities</u><br><br>Good standards of hygiene in canteen/dining halls and cooking facilities are crucial. Adequate canteen, cooking and laundry facilities and equipment should also be provided. When caterers are contracted to manage kitchens and canteens, | **NEPC Chinese Employees' Canteen, Cooking and Laundry Facilities**<br><br>1. Canteen and cooking facilities are built in adequate and easy to clean materials.<br>2. Found clean and sanitary condition.<br>3. Laundry facilities were visible.<br><br>**NDE Mechanics and Engineers' Canteen, Cooking and Laundry Facilities** | **Partially Aligned** | Despite all requirements have been found being met, still clean and sanitary condition is questionable.<br><br>Labors and canteen workers are required to train up on cleanliness. | Improved |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
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| | special attention should be paid to ensure that contractors take into account and implement the benchmarks below and that adequate reporting and monitoring mechanisms are in place. When workers can individually cook their meals, they should be provided with a space separate from the sleeping areas. Facilities must be kept in a clean and sanitary condition. In addition, canteen, kitchen, cooking and laundry floors, ceilings and walls should be made of easily cleanable materials.<br><br>1. Canteen, cooking and laundry facilities are built in adequate and easy to clean materials.<br>2. Canteen, cooking and laundry facilities are kept | 1. Canteen and cooking facilities are built in adequate and easy to clean materials.<br>2. Moderately clean and sanitary condition found.<br>3. Laundry facilities compliance to national standards were visible.<br><br>**Subcontractor Labors Shed's Canteen, Cooking and Laundry Facilities**<br><br>1. Canteen and cooking facilities are built in adequate and easy to clean materials.<br>2. Moderately clean and sanitary condition found.<br>3. Laundry facilities compliance to national standards were visible | | | |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
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| | in a clean and sanitary condition.<br>3. If workers can cook their own meals, kitchen space is provided separate from sleeping areas. | | | | |
| **6.1** | ***Laundry Facilities***<br><br>Providing facilities for workers to wash both work and non-work related clothes is essential for personal hygiene. The alternative is for the employer to provide a free laundry service.<br>Benchmarks are…<br><br>1. Adequate facilities for washing and drying clothes are provided. Standards range from providing sinks or tubs with hot and cold water, cleaning soap and drying lines to providing washing machines and dryers. 2. | National standard applicable in all sheds. Moreover, NEPC manage international standards for its workers. | **Aligned** | | Same compared to previous report. |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
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| | When work clothes are used in contact with dangerous substance (for example, application of pesticide), special laundry facilities (washing machines) should be provided. | | | | |
| **6.2** | ***Canteen and Cooking Facilities***<br><br>Canteen and cooking facilities should provide sufficient space for preparing food and eating, as well as conform to hygiene and safety requirements.<br>1. Canteens have a reasonable amount of space per worker. Standards range from 1 square meter to 1.5 square meters. 2. Canteens are adequately furnished. Standards range from providing tables, benches, | **NEPC Chinese Employees' Canteen Cooking Facilities.**<br><br>1. Adequate space.<br>2. Tables, benches, individual drinking cups and plates are available.<br>3. Places for food preparation are designed to permit good food hygiene practices.<br>4. Sufficient number of washbasins designated for cleaning hands.<br>5. Wall surfaces adjacent to cooking areas are made of fire resistant materials.<br>6. Adequate facilities for cleaning, disinfecting and storage of cooking utensils and equipment are provided.<br>7. Food waste and other refuse are seen to be deposited in waste bin and | **Partially Aligned** | BCPCL should monitor as all the requirements are maintained properly. | Same as previous Quarterly |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
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| | individual drinking cups and plates to providing special drinking fountains.<br>3. Places for food preparation are designed to permit good food hygiene practices, including protection against contamination between and during food preparation.<br>4. Kitchens are provided with facilities to maintain adequate personal hygiene including a sufficient number of washbasins designated for cleaning hands with clean, running water and materials for hygienic drying.<br>5. Wall surfaces adjacent to cooking areas are made of fire resistant materials. Food preparation tables are also equipped with a smooth durable washable surface. Lastly, in order to enable easy cleaning, it is | removed from the kitchen frequently to avoid accumulation.<br><br>**NDE Mechanics and Engineers' Canteen Cooking Facilities.**<br><br>1. Adequate space.<br>2. Tables, benches, individual drinking cups and plates are available.<br>3. Places for food preparation are designed to permit good food hygiene practices.<br>4. Washbasins for cleaning hands were provided.<br>5. Wall surfaces adjacent to cooking areas are made of fire resistant materials.<br>6. Adequate facilities for cleaning, disinfecting and storage of cooking utensils and equipment are provided.<br>7. Food waste and other refuses are not seen to be deposited separately.<br><br>**Subcontractor Labours Shed's Canteen Cooking Facilities.**<br><br>1. Adequate space.<br>2. Tables, benches, individual drinking | | | |

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| | good practice that stoves are not sealed against a wall, benches and fixtures are not built into the floor, and all cupboards and other fixtures and all walls and ceilings have a smooth durable washable surface.<br>6. All kitchen floors, ceiling and wall surfaces adjacent to or above food preparation and cooking areas are built using durable, non-absorbent, easily cleanable, non-toxic materials.<br>7. Wall surfaces adjacent to cooking areas are made of fire resistant materials. Food preparation tables are equipped with a smooth, durable, easily cleanable, non-corrosive surface made of non-toxic materials. Lastly, in order to enable easy cleaning, it is good practice that stoves are not sealed against a | cups and plates are available.<br>3. Places for food preparation are designed to permit good food hygiene practices.<br>4. Washbasins for cleaning hands were provided.<br>5. Wall surfaces adjacent to cooking areas are made of fire resistant materials.<br>6. Adequate facilities for cleaning, disinfecting and storage of cooking utensils and equipment are provided.<br>7. Food waste and other refuses were seen to be deposited separately. | | | |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
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| | wall, benches and fixtures are not built into the floor, and all cupboards and other fixtures have a smooth, durable and washable surface.<br>8. Adequate facilities for cleaning, disinfecting and storage of cooking utensils and equipment are provided.<br>9. Food waste and other refuse are to be adequately deposited in sealable containers and removed from the kitchen frequently to avoid accumulation. | | | | |
| **7** | <u>Standards for Nutrition and Food Safety</u><br><br>When cooking for a number of workers, hygiene and food safety are absolutely critical. In addition to providing safe food, providing nutritious food is important as it has | Meals are not planned by trained nutritionist. In the case of all sheds separate cooks make meals. Food and meal are selected on the basis of worker's choice.<br><br>All requirements of the WHO 5 keys to safer food are not maintained in all the sheds. | **Partially Aligned** | The WHO 5 keys to safer food can be followed emphasizing workers' health. Concerned authority should make management plan and implement as well | Same as previous report. |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
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| | a very direct impact on workers' productivity and wellbeing. An ILO study demonstrates that good nutrition at work leads to gains in productivity and worker morale, prevention of accidents and premature deaths and reductions in health care costs.<br><br>1. The WHO 5 keys to safer food or an equivalent process is implemented.<br>2. Food provided to workers contains an appropriate level of nutritional value and takes into account religious/cultural backgrounds; different choices of food are served if workers have different cultural/ religious backgrounds.<br>3. Food is prepared by cooks. It is also best practice that meals are | Most vulnerable situation found in subcontract labor shed. All requirements of WHO are absent there.<br><br>Foods are served according to workers' different cultural and religious backgrounds. | | as monitor it regular basis. | |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
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| | planned by a trained nutritionist. | | | | |
| **8** | Medical facilities<br><br>Access to adequate medical facilities is important to maintain workers' health and to provide adequate responses in case of health emergency situations. The availability or level of medical facilities provided in workers' accommodation is likely to depend on the number of workers living on site, the medical facilities already existing in the neighboring communities and the availability of transport. However, first aid must always be available on site.<br><br>*First aid facilities* Providing adequate first aid training and facilities can save lives and prevent minor injuries | Client provided medical facilities were found during the field visit. Moreover, numbers of pharmacies are available adjacent to labor sheds.<br><br>Both NEPC and NDE have health and safety officer but no monthly incident report is kept. Moreover, no medical staffs/workers were found who deal with first aid kits. | **Partially Aligned** | Accident/incident report must be prepared by designated personnel.<br><br>Fast aid facilities along with designated personnel must be available in all work stations.<br><br>BCPCL should take it into account and make all EPC contractors to follow the requirements. | No improvement observed |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
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| | becoming major ones.<br><br>*Other medical facilities* Depending on the number of workers living on site and the medical services offered in the surrounding communities, it is important to provide workers with additional medical facilities. Special facilities for sick workers and medical services such as dental care, surgery, a dedicated emergency room can, for instance, be provided.<br><br>1. A number of first aid kits adequate to the number of residents are available.<br>2. First aid kits are adequately stocked. Where possible a 24/7 fist aid service/facility is available.<br>3. An adequate number of | | | | |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
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| | staff/workers are trained to provide first aid.<br>4. Where possible and depending on the medical infrastructures existing in the community, other medical facilities are provided (nurse rooms, dental care, minor surgery). | | | | |
| **9** | <u>Leisure, Social and Telecommunication Facilities</u><br><br>Basic leisure and social facilities are important for workers to rest and also to socialize during their free time. This is particularly true where workers' accommodation is located in remote areas far from any communities. Where workers' accommodation is located in the vicinity of a village or a town, existing leisure or social facilities can be used so | Place for rest and religious observance were found.<br><br>Minimal provision for leisure was observed. | **Partially Aligned** | Authority may consider managing recreational facilities for workers.<br><br>Lack of entertainment facilities may cause many anti-social activities. Proponent should be concerned regarding this issue.<br><br>Providing TV, Caram board, chess | No improvement observed |

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| | long as this does not cause disruption to the access and enjoyment of local community members. But in any case, social spaces should also be provided on site. Exercise and recreational facilities will increase workers' welfare and reduce the impact of the presence of workers in the surrounding communities. In addition, it is also important to provide workers with adequate means to communicate with the outside world, especially when workers' accommodation is located in a remote location or where workers live on site without their family or are migrants. Consideration of cultural attitudes is important. Provision of space for religious observance needs to be | | | board in every shed may be a good choice. Establishing separate club for workers is also a good suggestion. EPC contractors; NDE and NEPC, are suggested to follow the requirement. | |

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| | considered, taking account of the local context and potential conflicts in certain situations.<br><br>**Benchmarks**<br><br>1. Basic collective social/rest spaces are provided to workers. Standards range from providing workers multipurpose halls to providing designated areas for radio, TV, cinema.<br>2. Recreational facilities are provided. Standards range from providing exercise equipment to providing a library, swimming pool, tennis courts, table tennis, educational facilities.<br>3. Workers are provided with dedicated places for religious observance if the context warrants.<br>4. Workers have access to public phones at | | | | |

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| | affordable/ public prices (that is, not inflated).<br>5. Internet facilities can also be provided, particularly where large numbers of expatriates/Third Country Nationals (TCNs) are accommodated. | | | | |
| **10** | <u>Health and Safety on Site</u><br><br>The company or body in charge of managing the workers' accommodation should have the prime responsibility for ensuring workers' physical wellbeing and integrity. This involves making sure that the facilities are kept in good condition (ensuring that sanitary standards or fie regulations are respected for instance) and that adequate health and safety plans and standards are designed and | Workers were found using PPE during work.<br><br>Following observations are required to be noted;<br><br>1. No designed health and safety management plans including electrical, mechanical, structural and food safety have been implemented.<br>2. No records are kept on outbreak of any contagious diseases, food poisoning and other important casualties.<br>3. No trained staffs/workers for providing first aid.<br>4. No prepared emergency plans on health and fire safety was observed. | **Partially Aligned** | Proponent BCPCL and EPC contractors; NDE and NEPC, are suggested to meet the requirements. | Improved compared to previous quarterly |

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| | implemented.<br><br>1. Health and safety management plans including electrical, mechanical, structural and food safety have been carefully designed and are implemented.<br>2. The person in charge of managing the accommodation has a specific duty to report to the health authorities the outbreak of any contagious diseases, food poisoning and other important casualties.<br>3. An adequate number of staff/workers is trained to provide first aid.<br>4. A specific fire safety plan is prepared, including training of fire wardens, periodic testing and monitoring of fire safety equipment and periodic drills. | | | | |

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| | 5. Guidance on the detrimental effects of the abuse of alcohol and drugs and other potentially harmful substances and the risk and concerns relating to HIV/AIDS and of other health risk related activities is provided to workers. It is best practice to develop a clear policy on this issue.<br>6. Workers have access to adequate preventive measures such as contraception (condoms in particular) and mosquito nets.<br>7. Workers have easy access to medical facilities and medical staff. Where possible, female doctors/nurses should be available for female workers.<br>8. Emergency plans on health and fire safety are prepared. Depending on | | | | |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
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| | the local context, additional emergency plans are prepared as needed to handle specific occurrences (earthquakes, floods, tornadoes). | | | | |
| **11** | Security of Workers' accommodation<br><br>Ensuring the security of workers and their property on the accommodation site is of key importance. To this end, a security plan must be carefully designed including appropriate measures to protect workers against theft and attacks.<br>1. A security plan including clear measures to protect workers against theft and attack is implemented.<br>2. A security plan including clear policies on the use of force has been carefully designed and is | Proponent BCPCL as well as EPC contractors; NDE and NEPC have separate security plan and numbers of guards. As per the plan, security guards were seen doing their duty during field visit.<br><br>A good numbers of members of Ansar VDP, 50 in numbers, are working currently in the project site. Routinely, 2 Ansars guard each shed.<br><br>A unit of Bangladesh police number of 35 was also seen working in the project area. | **Aligned** | | Improved |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
|---|---|---|---|---|---|
| | implemented.<br>3. Security staff have been checked to ensure that they have not been implicated in any previous crimes or abuses. Where appropriate, security staffs from both genders are recruited.<br>4. Security staff have a clear mandate and have received clear instruction about their duties and responsibilities, in particular their duties not to harass, intimidate, discipline or discriminate against workers.<br>5. Security staffs have received adequate training in dealing with domestic violence and the use of force.<br>6. Security staffs have a good understanding about the importance of respecting workers' rights and the rights of the | | | | |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
|---|---|---|---|---|---|
| | communities.<br>7. Body searches are only allowed in specific circumstances and are performed by specially trained security staff using the least-intrusive means possible. Pat down searches on female workers can only be performed by female security staff.<br>8. Security staff adopt an appropriate conduct towards workers and communities.<br>9. Workers and members of the surrounding communities have specific means to raise concerns about security arrangement and staff. | | | | |
| **12** | Grievance Mechanism<br><br>Grievance mechanism for workers where they can raise reasonable workplace concerns. | There is no formal on-site grievance mechanism for workers.<br><br>Workers in proponent and EPC contractors convey their grievance to their own upper designated workers. | **Partially aligned** | BEPCL must establish mechanism for workers to communicate and place their concerns | Not Improved |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
|---|---|---|---|---|---|
| | 1. Mechanisms for workers' consultation have been designed and implemented. It is best practice to set up a review committee which includes representatives elected by workers.<br>2. Processes and mechanisms for workers to articulate their grievances are provided to workers. Such mechanisms are in accordance with PS2/PR2.<br>3. Workers subjected to disciplinary proceedings arising from behavior in the accommodation should have access to a fair and transparent hearing with the possibility to contest decisions and refer the dispute to independent arbitration or relevant public authorities.<br>4. In case conflicts between workers themselves or | During informal meetings with workers, they confirmed that they are quite happy with the existing informal mechanism. | | as well as suggestions.<br><br>The grievance process should be made accessible for construction workforce and should enable workforce to raise anonymous complaints. | |

| S. No | Requirement | Observation/Gap | Level of Compliance | Recommendation | Comparison to Previous Report |
|---|---|---|---|---|---|
| | between workers and staff break out, workers have the possibility of easily accessing a fair conflict resolution mechanism.<br>5. In cases where more serious offences occur, including serious physical or mental abuse, there are mechanisms to ensure full cooperation with the police authority (where adequate). | | | | |

# CHAPTER 5

## 5. Conclusion

The Project is now at the site development stage and various development activities are in progress. The land development activities of the Project area for are ongoing. There are some environmental compliance measures in environmental management plan that should be at place during this pre-construction stage. From the first quarter environmental monitoring of assessment, some recommendations have been made and it is important to consider these measures to properly implement the proposed Environmental Management Plan.

# ANNEX A: ENVIRONMENTAL MONITORING PHOTOGRAPHS

***Ambient Air sampling at Londa Kheya Ghat***

***Ambient Air sampling at Dhankhali Union Complex***

***Ambient Air sampling at Tiakhali village***

***Ambient Air sampling at Lalua village***

***Ambient Air sampling at Nishanbari village***

***Ambient Air sampling at Project Site***

***Noise Level Monitoringat Char Nishanbari Mosque***

***Noise Level Monitoringat Char Nishanbari Primary School***

***Noise Level Monitoring at Rafique Mia's House, Nishanbari Village***

***Noise Level Monitoring at Londa Kheya Ghat***

***Noise Level Monitoring at Akber Mia's House, Lalua***

***Noise Level Monitoring at Salam Uddin's House, Tiakhali village***

***Noise Level Monitoring at Monir Hossain's House, Nishanbari village***

***Noise Level Monitoring at Sabder Ali's House, Madhupara***

***Ground Water collection at Project Area***

***Ground Water collection at Londa kheya Ghat***

***Surface Water Collection at Rabnabadh Channel***

***Surface Water Collection at Andharmanik River***

# ANNEX-B: HEALTH SAFETY MONITORING PHOTOGRAPHS

**NEPC Workers with PPE**

**NDE Workers without PPE during Working at Height**

**Waste Busket at NCPC Worker shed**

**Bins for Collecting Waste at Labor Shed**

**Fire Extinguisher in Project Site**

**Hazardous Material Without Caution Tape**

| | |
|---|---|
|  |  |
| **NDE Employees' Labor Shed Condition** | **NDE Employees' Labor Shed Sanitary Conditions** |
|  |  |
| **Tap Water For NEPC Subcontractors' Shed** | **Operating batching plant Creates Unbearable Noise Around the Labor Shed Area** |
|  |  |
| **NEPC Subcontractors Labors Sheds' Bed Facilities** | **Canteens At NDE employee shed** |

| | |
|---|---|
|  |  |
| **Water& Electricity Responsible Staffs' Contact Number Shared Around the Labor Shed** | **Fire Extinguisher in NEPC Subcontractor Labor Shed** |
|  |  |
| **Subcontractor Labors' Sheds of NDE** | **Distinct place for religious observance** |
|  |  |
| **Drinking Water Collection Point for Labors at Water Treatment Plant** | **NDE Subcontractor Labors' Canteen Facility** |

| | |
|---|---|
|  |  |
| **NDE Employees' Toilet Facilities** | **Basin facilities for Subcontractor Labors of NDE** |
|  |  |
| **Medicine Shop Beside the Labor Shed (Available 14 hours/day)** | **NEPC Workers Shower and Laundry Facilities** |
|  |  |
| **(NEPC Subcontractor labors) Toilet Doors Were Being Repaired** | **Hygeine Behavior at Canteen Observed During Field Visit** |

| | |
|---|---|
|  |  |
| **LPG Bottle (for cooking) Storage Place** | **NEPC Chinese Employee Shed** |
|  |  |
| **Waste Was Being Burnt Away** | **Kitche Waste Disposed by Labors Instead of Having Waste Bin** |

# ANNEX C: LABORATORY REPORT

SL No: 024745

EQMS

*Ref: EQMS/Ground Water/5001/2018*

**EQMS WET LABORATORY**

**Test Results of Ground Water Quality Analysis**

**Project Name** : Payra 1320 MW Thermal Power Plant Project.
**Description of Sample** : Ground Water Quality
**Sampling Location** : GW1 and GW2
**Sample Collector** : Collected by EQMS Personnel (Toffazal Hossain)
**Sampling Date** : 19th-22th November, 2018
**Date of Analysis** : 28th November, 2018

**Description of Analysis:**

| Parameter | Unit | GW1 | GW2 | Bangladesh Standards* |
|---|---|---|---|---|
| Arsenic | mg/l | <0.010 | <0.010 | 0.05 |
| Chloride | mg/l | 163.2 | 154.7 | 150-600 |
| Conductivity | – | 1040 | 1050 | – |
| Fecal Coliform | CFU (N/100mL) | 0 | 0 | 0 |
| Iron | 0.3-1.0 | 0.12 | 0.10 | 0.3-1.0 |
| Lead | 0.05 | <0.05 | <0.05 | 0.05 |
| pH | 6.5-8.5 | 7.58 | 7.5 | 6.5-8.5 |
| Temperature | 20-30 °C | 25.1 | 25.2 | 20-30 °C |
| Total Coliform | 0 CFU (N/100mL) | 0 | 0 | 0 |
| Total Dissolved Solids | 1000 | 520 | 520 | 1000 |

* *Bangladesh Environment Conservation Rules, 1997- Schedule 3 (Standards for drinking water)*

Received by:
Md. Jahidul Islam
Consultant
EQMS Consulting Limited

Analyzed By:
Md. Abdur Rab
Chemist
EQMS Consulting Limited

Checked by:
SK. Salahuddin Ahammad
Lab In-Charge
EQMS Consulting Limited

EQMS Consulting Limited

**Corporate Office :** Flat # C1, House # 76, Road # 5, Block # F, Banani Dhaka-1213, Bangladesh.
**Toronto Office :** 7 Arnott Street, Scarborough, Ontaria, M1K4B5, Canada.
**Laboratory :** Flat # F1, House # 487/Ta, Bashakhi Sarani, Gulshan-Badda Link Road, Dhaka-1212, Bangladesh.

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SL No: 024742

*Ref: EQMS/Ground Water/5003/2018*

**EQMS WET LABORATORY**

**Test Results of Surface Water Quality Analysis**

**Project Name** : Payra 1320 MW Thermal Power Plant Project.
**Description of Sample** : Surface Water Quality
**Sampling Location** : SW1and SW2
**Sample Collector** : Collected by EQMS Personnel (Toffazal Hossain)
**Sampling Date** : 19th-22th November, 2018
**Date of Analysis** : *29* November, *2018*

**Description of Analysis:**

| Parameter | Unit | SW1 | SW2 | Bangladesh Standards* |
|---|---|---|---|---|
| EC | µmhos/cm | 300 | 240 | - |
| DO | mg/l | 4.5 | 7.3 | 5 or Above |
| Iron | mg/l | 0.31 | 0.38 | - |
| Lead (Pb) | mg/l | <0.01 | <0.01 | - |
| Oil and Grease | mg/l | Less than 5 | Less than 5 | - |
| pH | - | 7.40 | 7.31 | 6.5-8.5 |
| Temperature | °C | 26.4 | 25.2 | - |
| TDS | mg/l | 150 | 120 | - |
| BOD | mg/l | 1.9 | 2.2 | - |
| Turbidity | NTU | 11 | 15 | - |
| Salinity | ppt | 0.13 | 0.11 | - |

** Bangladesh Environment Conservation Rules, 1997- Schedule 3 (Standards for inland surface water).*

Received by:
Md. Jahidul Islam
Consultant
EQMS Consulting Limited

Analyzed By:
Md. Abdur Rab
Chemist
EQMS Consulting Limited

Checked by:
SK. Salahuddin Ahammad
Lab In-Charge
EQMS Consulting Limited

EQMS Consulting Limited

**Corporate Office :** Flat # C1, House # 76, Road # 5, Block # F, Banani Dhaka-1213, Bangladesh.
**Toronto Office :** 7 Arnott Street, Scarborough, Ontaria, M1K4B5, Canada.
**Laboratory :** Flat # F1, House # 487/Ta, Bashakhi Sarani, Gulshan-Badda Link Road, Dhaka-1212, Bangladesh.

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SL No: 024744

EQMS

*Ref: EQMS/Noise Level /5002/2018*

**EQMS ENVIRONMENTAL LABORATORY**

**Test Results of Noise Level Analysis**

| | | |
|---|---|---|
| **Project Name** | : | Payra 1320 MW Thermal Power Plant Project. |
| **Description of Sample** | : | Noise Level |
| **Sampling Location** | : | Collected by EQMS Personnel (Toffazal Hossain) |
| **Sample Collector** | : | EQMS Consulting Limited (EQMS Monitoring Team) |
| **Sampling Date** | : | 19th-22th November, 2018 |
| **Date of Analysis** | : | 28th November, 2018 |

| | |
|---|---|
| NL1 | : Char Nishanbari Primary School |
| NL2 | : Char Nishanbari Mosque |
| NL3 | : Rofiqure Mia's House, Nishanbari Village |
| NL4 | : Londa Kheya Ghat |
| NL5 | : Monir Hossain's House, Nishanbari village |
| NL6 | : Salam Uddin's House, Tiakhali village |
| NL7 | : Akber Mia's House, Lalua |
| NL8 | : Sabder Ali's House, Madhupara |

EQMS Consulting Limited

**Corporate Office :** Flat # C1, House # 76, Road # 5, Block # F, Banani Dhaka-1213, Bangladesh.
**Toronto Office :** 7 Arnott Street, Scarborough, Ontaria, M1K4B5, Canada.
**Laboratory :** Flat # F1, House # 487/Ta, Bashakhi Sarani, Gulshan-Badda Link Road, Dhaka-1212, Bangladesh.

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**Description of Analysis:**

| Location | $Leq_{day}$ | $Leq_{night}$ | Day | Night |
|---|---|---|---|---|
| NL1 | 51.9 | 42.2 | 60 | 50 |
| NL2 | 51.1 | 45.4 | 60 | 50 |
| NL3 | 49.9 | 41.6 | 60 | 50 |
| NL4 | 58.1 | 47.9 | 60 | 50 |
| NL5 | 50.6 | 40.3 | 60 | 50 |
| NL6 | 51.1 | 42.2 | 60 | 50 |
| NL7 | 50.5 | 40.8 | 60 | 50 |
| NL8 | 48.4 | 42.4 | 60 | 50 |
| **Standard (ECR'1997) & Noise Pollution (Control) Rules 2006** | | | | |
| Silent area | | | 50 | 40 |
| Residential area | | | 55 | 45 |
| Mixed area | | | 60 | 50 |
| Commercial Area | | | 70 | 60 |
| Industrial area | | | 75 | 70 |
| **World Bank/IFC Standard** | | | | |
| Residential; Institutional; Educational | | | 55 | 45 |
| Industrial | | | 70 | 70 |

Collected by:

Toffazzal Hossain
Field Coordinator
EQMS Consulting Limited

Analyzed By:

Md. Jahidul Islam
Consultant
EQMS Consulting Limited

Checked by:

SK. Salahuddin Ahammad
Lab In-Charge
EQMS Consulting Limited

EQMS Consulting Limited

**Corporate Office :** Flat # C1, House # 76, Road # 5, Block # F, Banani Dhaka-1213, Bangladesh.
**Toronto Office :** 7 Arnott Street, Scarborough, Ontaria, M1K4B5, Canada.
**Laboratory :** Flat # F1, House # 487/Ta, Bashakhi Sarani, Gulshan-Badda Link Road, Dhaka-1212, Bangladesh.

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SL No: 024822

EQMS

*Ref: EQMS/Ground Water/6003/2018*

**EQMS WET LABORATORY**

**Test Results of Surface Water Quality Analysis**

**Project Name** : Payra 1320 MW Thermal Power Plant Project.
**Description of Sample** : Surface Water Quality
**Sampling Location** : SW1and SW2
**Sample Collector** : Collected by EQMS Personnel (Toffazal Hossain)
**Sampling Date** : 18th - 22th December, 2018
**Date of Analysis** : 27th December, 2018

**Description of Analysis:**

| Parameter | Unit | SW1 | SW2 | Bangladesh Standards* |
|---|---|---|---|---|
| EC | µmhos/cm | 840 | 500 | - |
| DO | mg/l | 5.5 | 4.8 | 5 or Above |
| Iron | mg/l | 0.35 | 0.41 | - |
| Lead (Pb) | mg/l | <0.01 | <0.01 | - |
| Oil and Grease | mg/l | Less than 5 | Less than 5 | - |
| pH | - | 7.60 | 7.85 | 6.5-8.5 |
| Temperature | °C | 22.7 | 22.9 | - |
| TDS | mg/l | 420 | 250 | - |
| BOD | mg/l | 1.9 | 2.1 | - |
| Turbidity | NTU | 09 | 13 | - |
| Salinity | ppt | 0.42 | 0.25 | - |

** Bangladesh Environment Conservation Rules, 1997- Schedule 3 (Standards for inland surface water).*

Received by:
Md. Jahidul Islam
Consultant
EQMS Consulting Limited

Analyzed By:
Md. Abdur Rab
Chemist
EQMS Consulting Limited

Checked by:
SK. Salahuddin Ahammad
Lab In-Charge
EQMS Consulting Limited

EQMS Consulting Limited

**Corporate Office :** Flat # C1, House # 76, Road # 5, Block # F, Banani Dhaka-1213, Bangladesh.
**Toronto Office :** 7 Arnott Street, Scarborough, Ontaria, M1K4B5, Canada.
**Laboratory :** Flat # F1, House # 487/Ta, Bashakhi Sarani, Gulshan-Badda Link Road, Dhaka-1212, Bangladesh.

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SL No: 024825

EQMS

*Ref: EQMS/Ground Water/6001/2018*

**EQMS WET LABORATORY**

**Test Results of Ground Water Quality Analysis**

**Project Name** : Payra 1320 MW Thermal Power Plant Project.
**Description of Sample** : Ground Water Quality
**Sampling Location** : GW1 and GW2
**Sample Collector** : Collected by EQMS Personnel (Toffazal Hossain)
**Sampling Date** : 18th - 22th December, 2018
**Date of Analysis** : 30th December, 2018

**Description of Analysis:**

| Parameter | Unit | GW1 | GW2 | Bangladesh Standards* |
|---|---|---|---|---|
| Arsenic | mg/L | <0.010 | <0.010 | 0.05 |
| Chloride | mg/L | 155.6 | 150.9 | 150-600 |
| Conductivity | µmhos/*cm* | 1040 | 1060 | – |
| Fecal Coliform | CFU (N/100mL) | 0 | 0 | 0 |
| Iron | mg/L | 0.16 | 0.12 | 0.3-1.0 |
| Lead | mg/L | <0.05 | <0.05 | 0.05 |
| pH | – | 7.74 | 7.72 | 6.5-8.5 |
| Temperature | °C | 22.8 | 22.8 | 20-30 °C |
| Total Coliform | 0 CFU (N/100mL) | 0 | 0 | 0 |
| Total Dissolved Solids | mg/L | 520 | 530 | 1000 |

* *Bangladesh Environment Conservation Rules, 1997- Schedule 3 (Standards for drinking water)*

Received by:
Md. Jahidul Islam
Consultant
EQMS Consulting Limited

Analyzed By:
Md. Abdur Rab
Chemist
EQMS Consulting Limited

Checked by:
SK. Salahuddin Ahammad
Lab In-Charge
EQMS Consulting Limited

EQMS Consulting Limited

**Corporate Office :** Flat # C1, House # 76, Road # 5, Block # F, Banani Dhaka-1213, Bangladesh.
**Toronto Office :** 7 Arnott Street, Scarborough, Ontaria, M1K4B5, Canada.
**Laboratory :** Flat # F1, House # 487/Ta, Bashakhi Sarani, Gulshan-Badda Link Road, Dhaka-1212, Bangladesh.

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SL No: 024824

*Ref: EQMS/Noise Level/6002/2018*

## EQMS ENVIRONMENTAL LABORATORY

### Test Results of Noise Level Analysis

| | | |
|---|---|---|
| **Project Name** | : | Payra 1320 MW Thermal Power Plant Project. |
| **Description of Sample** | : | Noise Level |
| **Sampling Location** | : | Collected by EQMS Personnel (Toffazal Hossain) |
| **Sample Collector** | : | EQMS Consulting Limited (EQMS Monitoring Team) |
| **Sampling Date** | : | 18th - 22nd December, 2018 |
| **Date of Analysis** | : | 28th December, 2018 |

| | |
|---|---|
| NL1 | : Char Nishanbari Primary School |
| NL2 | : Char Nishanbari Mosque |
| NL3 | : Rofiqure Mia's House, Nishanbari Village |
| NL4 | : Londa Kheya Ghat |
| NL5 | : Monir Hossain's House, Nishanbari village |
| NL6 | : Salam Uddin's House, Tiakhali village |
| NL7 | : Akber Mia's House, Lalua |
| NL8 | : Sabder Ali's House, Madhupara |

EQMS Consulting Limited

**Corporate Office :** Flat # C1, House # 76, Road # 5, Block # F, Banani Dhaka-1213, Bangladesh.
**Toronto Office :** 7 Arnott Street, Scarborough, Ontario, M1K4B5, Canada.
**Laboratory :** Flat # F1, House # 487/Ta, Bashakhi Sarani, Gulshan-Badda Link Road, Dhaka-1212, Bangladesh.

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SL No: 024823

EQMS

**Description of Analysis:**

| Location | $Leq_{day}$ | $Leq_{night}$ | Day | Night |
|---|---|---|---|---|
| NL1 | **57.0** | **41.6** | 50 | 40 |
| NL2 | **53.2** | **43.0** | 50 | 40 |
| NL3 | **48.4** | **42.4** | 55 | 45 |
| NL4 | **62.0** | **48.7** | 70 | 60 |
| NL5 | **47.6** | **42.1** | 55 | 45 |
| NL6 | **46.2** | **40.6** | 55 | 45 |
| NL7 | **47.2** | **41.9** | 55 | 45 |
| NL8 | **50.1** | **43.3** | 55 | 45 |
| NL9 | **52.3** | **42.8** | 60 | 50 |
| **Standard (ECR'1997) & Noise Pollution (Control) Rules 2006** | | | | |
| Silent area | | | 50 | 40 |
| Residential area | | | 55 | 45 |
| Mixed area | | | 60 | 50 |
| Commercial Area | | | 70 | 60 |
| Industrial area | | | 75 | 70 |
| **World Bank/IFC Standard** | | | | |
| Residential; Institutional; Educational | | | 55 | 45 |
| Industrial | | | 70 | 70 |

Collected by:
Toffazzal Hossain
Field Coordinator
EQMS Consulting Limited

Analyzed By:
Md. Jahidul Islam
Consultant
EQMS Consulting Limited

Checked by:
SK. Salahuddin Ahammad
Lab In-Charge
EQMS Consulting Limited

EQMS Consulting Limited

**Corporate Office :** Flat # C1, House # 76, Road # 5, Block # F, Banani Dhaka-1213, Bangladesh.
**Toronto Office :** 7 Arnott Street, Scarborough, Ontario, M1K4B5, Canada.
**Laboratory :** Flat # F1, House # 487/Ta, Bashakhi Sarani, Gulshan-Badda Link Road, Dhaka-1212, Bangladesh.

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SL No: 023559

*Ref: EQMS/Ground Water/11001/2018*

**EQMS WET LABORATORY**

**Test Results of Ground Water Quality Analysis**

**Project Name** : Payra 1320 MW Thermal Power Plant Project.

**Description of Sample** : Ground Water Quality

**Sampling Location** : GW1and GW2

**Sample Collector** : Collected by EQMS Personnel (Toffazal Hossain)

**Sampling Date** : 15th-20th January, 2019

**Date of Analysis** : 7th February, 2019

**Description of Analysis:**

| Parameter | Unit | GW1 | GW2 | Bangladesh Standards* |
|---|---|---|---|---|
| Arsenic | mg/L | <0.010 | <0.010 | 0.05 |
| Chloride | mg/L | 134.19 | 142.31 | 150-600 |
| Conductivity | -- | 1080 | 1050 | -- |
| Fecal Coliform | CFU (N/100mL) | 0 | 0 | 0 |
| Iron | mg/L | 0.21 | 0.16 | 0.3-1.0 |
| Lead | mg/L | <0.05 | <0.05 | 0.05 |
| pH | - | 8.07 | 7.92 | 6.5-8.5 |
| Temperature | °C | 23.9 | 23.8 | 20-30 °C |
| Total Coliform | 0 CFU (N/100mL) | 0 | 0 | 0 |
| Total Dissolved Solids | mg/L | 540 | 530 | 1000 |

* *Bangladesh Environment Conservation Rules, 1997- Schedule 3 (Standards for drinking water)*

Received by:
Md. Jahidul Islam
Consultant
EQMS Consulting Limited

Analyzed By:
Md. Abdur Rab
Chemist
EQMS Consulting Limited

Checked by:
SK. Salahuddin Ahammad
Lab In-Charge
EQMS Consulting Limited

EQMS Consulting Limited

**Corporate Office :** Flat # C1, House # 76, Road # 3, Block # F, Banani Dhaka-1213, Bangladesh.
**Toronto Office :** 7 Arnott Street, Scarborough, Ontaria, M1K4B5, Canada.
**Laboratory :** Flat # F1, House # 487/Ta, Bashakhi Sarani, Gulshan-Badda Link Road, Dhaka-1212, Bangladesh.

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SL No: 023560

*Ref: EQMS/Noise Level /11002/2018*

**EQMS ENVIRONMENTAL LABORATORY**

**Test Results of Noise Level Analysis**

| | | |
|---|---|---|
| **Project Name** | : | Payra 1320 MW Thermal Power Plant Project. |
| **Description of Sample** | : | Noise Level |
| **Sampling Location** | : | Collected by EQMS Personnel (Toffazal Hossain) |
| **Sample Collector** | : | EQMS Consulting Limited (EQMS Monitoring Team) |
| **Sampling Date** | : | 15th-20th January, 2019 |
| **Date of Analysis** | : | 7th February, 2019 |

| | |
|---|---|
| NL1 | : Char Nishanbari Primary School |
| NL2 | : Char Nishanbari Mosque |
| NL3 | : Rofiqure Mia's House, Nishanbari Village |
| NL4 | : Londa Kheya Ghat |
| NL5 | : Monir Hossain's House, Nishanbari village |
| NL6 | : Salam Uddin's House, Tiakhali village |
| NL7 | : Akber Mia's House, Lalua |
| NL8 | : Sabder Ali's House, Madhupara |

EQMS Consulting Limited

**Corporate Office :** Flat # C1, House # 76, Road # 5, Block # F, Banani Dhaka-1213, Bangladesh.
**Toronto Office :** 7 Arnott Street, Scarborough, Ontaria, M1K4B5, Canada.
**Laboratory :** Flat # F1, House # 487/Ta, Bashakhi Sarani, Gulshan-Badda Link Road, Dhaka-1212, Bangladesh.

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SL No: 023561

EQMS

**Description of Analysis:**

| Location | $Leq_{day}$ | $Leq_{night}$ | Day | Night |
|---|---|---|---|---|
| NL1 | 53.7 | 40.9 | 60 | 50 |
| NL2 | 51.5 | 41.4 | 60 | 50 |
| NL3 | 49.6 | 41.2 | 60 | 50 |
| NL4 | 64.1 | 49.8 | 60 | 50 |
| NL5 | 50.9 | 43.7 | 60 | 50 |
| NL6 | 49.3 | 41.5 | 60 | 50 |
| NL7 | 48.5 | 40.6 | 60 | 50 |
| NL8 | 51.7 | 42.0 | 60 | 50 |
| **Standard (ECR'1997) & Noise Pollution (Control) Rules 2006** | | | | |
| Silent area | | | 50 | 40 |
| Residential area | | | 55 | 45 |
| Mixed area | | | 60 | 50 |
| Commercial Area | | | 70 | 60 |
| Industrial area | | | 75 | 70 |
| **World Bank/IFC Standard** | | | | |
| Residential; Institutional; Educational | | | 55 | 45 |
| Industrial | | | 70 | 70 |

Collected by:
Toffazzal Hossain
Field Coordinator
EQMS Consulting Limited

Analyzed By:
Md. Jahidul Islam
Consultant
EQMS Consulting Limited

Checked by:
SK. Salahuddin Ahammad
Lab In-Charge
EQMS Consulting Limited

EQMS Consulting

**Corporate Office :** Flat # C1, House # 76, Road # 5, Block # F, Banani Dhaka-1213, Bangladesh.
**Toronto Office :** 7 Arnott Street, Scarborough, Ontaria, M1K4B5, Canada.
**Laboratory :** Flat # F1, House # 487/Ta, Bashakhi Sarani, Gulshan-Badda Link Road, Dhaka-1212, Bangladesh.

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SL No: 023562

EQMS

*Ref: EQMS/Ground Water/11003/2018*

**EQMS WET LABORATORY**

**Test Results of Surface Water Quality Analysis**

**Project Name** : Payra 1320 MW Thermal Power Plant Project.

**Description of Sample** : Surface Water Quality

**Sampling Location** : SW1and SW2

**Sample Collector** : Collected by EQMS Personnel (Toffazal Hossain)

**Sampling Date** : 15th-20th January, 2019

**Date of Analysis** : 7th February, 2019

**Description of Analysis:**

| Parameter | Unit | SW1 | SW2 | Bangladesh Standards* |
|---|---|---|---|---|
| EC | µmhos/cm | 1190 | 2380 | - |
| DO | mg/l | 8.5 | 7.8 | 5 of more |
| Iron | mg/l | 0.42 | 0.45 | - |
| Lead (Pb) | mg/l | <0.01 | <0.01 | - |
| Oil and Grease | mg/l | Less than 5 | Less than 5 | - |
| pH | - | 8.07 | 8.06 | 6.5-8.5 |
| Temperature | °C | 23.8 | 23.9 | - |
| TDS | mg/l | 600 | 1190 | - |
| BOD | mg/l | 3.1 | 2.9 | 6 or less |
| Turbidity | NTU | 10 | 15 | - |
| Salinity | ppt | 0.61 | 1.27 | - |

** Bangladesh Environment Conservation Rules, 1997- Schedule 3 (Standards for inland surface water).*

Received by:
Md. Jahidul Islam
Consultant
EQMS Consulting Limited

Analyzed By:
Md. Abdur Rab
Chemist
EQMS Consulting Limited

Checked by:
SK. Salahuddin Ahammad
Lab In-Charge
FQMS Consulting Limited

EQMS Consulting Limited

**Corporate Office :** Flat # C1, House # 76, Road # 5, Block # F, Banani Dhaka-1213, Bangladesh.
**Toronto Office :** 7 Arnott Street, Scarborough, Ontana, M1K4B5, Canada.
**Laboratory :** Flat # F1, House # 487/Ta, Bashakhi Sarani, Gulshan-Badda Link Road, Dhaka-1212, Bangladesh.

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SL No: 023567

*Ref: EQMS/Ambient Air/11004/2018*

**EQMS ENVIRONMENTAL LABORATORY**

**Test Results of Ambient Air Quality Analysis**

**Project Name** : Payra 1320 MW Thermal Power Plant Project.

**Description of Sample** : Ambient Air Quality

**Sample Collector** : Collected by EQMS Personnel (Toffazal Hossain)

**Sampling Date** : 15th-20th January, 2019

**Date of Analysis** : 7th February, 2019

**Sampling Location** :

| Station Code | Sampling Station Name | GPS Coordinate | Location Setting |
|---|---|---|---|
| AQ1 | Project site (Nishanbari) | 21°59'36.71"N 90°18'3.29"E | Village and Rural Setting |
| AQ2 | Londa Kheya Ghat | 22° 0'40.67"N 90°16'43.35"E | |
| AQ3 | Dhankhali Union Complex | 22° 2'17.32"N 90°19'23.42"E | |
| AQ4 | Tiakhali village | 21°59'16.74"N 90°16'32.70"E | |
| AQ5 | Lalua village | 21°58'26.19"N 90°18'0.26"E | |
| AQ6 | Nishanbari village | 22° 0'27.59"N 90°18'36.73"E | |

**Description of Analysis:**

| Location | Sampling Date | Ambient Air Pollutants Concentration in µg/m³ | | | | | CO ppm |
|---|---|---|---|---|---|---|---|
| | | SPM | $PM_{10}$ | $PM_{2.5}$ | $SO_2$ | NOx | |
| AQ1 | 15.01.2019 | 69.23 | 50.29 | 11.59 | 6.19 | 16.26 | <2 |
| AQ2 | 17.01.2019 | 98.28 | 78.18 | 13.10 | 5.88 | 13.31 | <2 |
| AQ3 | 19.01.2019 | 79.89 | 56.17 | 10.37 | 4.20 | 10.24 | <2 |
| AQ4 | 18.01.2019 | 81.11 | 67.21 | 12.27 | 3.49 | 11.39 | <2 |
| AQ5 | 20.01.2019 | 74.16 | 58.54 | 10.67 | 5.18 | 09.11 | <1 |
| AQ6 | 16.01.2019 | 55.42 | 51.59 | 15.86 | 3.57 | 10.27 | <1 |
| **Duration (hr)** | | 8 | 24 | 24 | 24 | 24 | 8 |
| *ECR, 1997 and amendment in 2006 Standard (Schedule-2)* | | **200** | **150** | **65** | **365** | **100** | **9** |
| **Method of Analysis** | | Gravimetric | Gravimetric | Gravimetric | West-Geake | Jacob & Hochheiser | CO Meter |

EQMS Consultants (Pvt.) Ltd.

**Corporate Office :** Flat # C1, House # 76, Road # 5, Block # F, Banani Dhaka-1213, Bangladesh.
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*Note: *Regular Checkup and calibration of the equipments are done by the manufacturers and EQMS personnel to avoid any error*

**Legend:**

*SPM -Suspended Particulate Matter, $PM_{10}$ -Particulate Matter of a diameter of 10 micron or less, $PM_{2.5}$ - Particulate Matter of a diameter of 2.5 micron or less, SOx -Sulphur Di-Oxide, NOx -Oxides of Nitrogen, CO - Carbon Monoxide*

| Received by: | Analyzed By: | Checked by: |
|---|---|---|
| Md. Jahidul Islam<br>Consultant<br>EQMS Consulting Limited | Md. Abdur Rab<br>Chemist<br>EQMS Consulting Limited | SK. Salahuddin Ahammad<br>Lab In-Charge<br>EQMS Consulting Limited |

**Corporate Office :** Flat # C1, House # 76, Road # 5, Block # F, Banani Dhaka-1213, Bangladesh.
**Toronto Office :** 7 Arnott Street, Scarborough, Ontario, M1K4B5, Canada.
**Laboratory :** Flat # F1, House # 487/Ta, Bashakhi Sarani, Gulshan-Badda Link Road, Dhaka-1212, Bangladesh.

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# ANNEX D: CHECKLIST ON WORKERS'ACCOMMODATION

| General regulatory framework | Y | N | N/A | Comments |
|---|---|---|---|---|
| Have the international/national/local regulatory frameworks been reviewed? | | | | |
| Are mandatory provisions on workers' accommodation identified? | | | | |

**Assessing the need for workers' accommodation**

**Availability of the workforce**

| General regulatory framework | Y | N | N/A | Comments |
|---|---|---|---|---|
| Has there been an assessment of workers' availability in the neighboring communities? | | | | |
| Has there been an assessment of the skills and competencies of the local workforce and how do those skills and competencies fit the project's need? | | | | |
| Has there been an assessment of the possibility of training a local workforce in order to fulfill the project's needs? | | | | |
| **Availability of housing** | | | | |
| Has there been a comprehensive assessment of the different type of housing available in the surrounding communities prior to building any workers' accommodation? | | | | |
| For a larger project: is that assessment included in the Environmental and Social Impact Assessment? | | | | |
| Has there been an assessment of the impact on the communities of using existing housing opportunities? | | | | |
| Have measures to mitigate adverse impacts on the local housing market been identified and included in the Environmental and Social Action Plan (ESAP) or other relevant action plan? | | | | |

| General regulatory framework | Y | N | N/A | Comments |
|---|---|---|---|---|
| **Assessing impacts of workers' accommodation on communities** | | | | |
| Has a community impact assessment been carried out as part of the Environmental and Social Assessment of the overall protect with a view to mitigate the negative impacts of the workers' accommodation on the surrounding communities and to enhance the positive ones? | √ | | | |
| Have the potential health and safety impacts and consequences of land acquisition and involuntary resettlement occurring during the construction phase of the workers' accommodation been included in the assessment? | √ | | | |
| Have the impacts of workers1 accommodation on community infrastructures, services and facilities been included in the assessment? | √ | | | |
| Have the impacts on local community's businesses and local employment been included in the assessment? | √ | | | |
| Have general impacts of workers' accommodation on communities' health, (notably the increased risk of road accidents and of communicable diseases), and community social cohesion been included in the assessment? | √ | | | |
| Does the assessment include appropriate mitigation measures to address any adverse impacts identified? | √ | | | |
| **Types of workers' accommodation** | | | | |
| Has consideration been given to provision of family accommodation? | | √ | | |
| Are individual accommodations comprising bedrooms, sanitary and cooking facilities provided as part of the family accommodation? | | √ | | |
| Are adequate nursery/school facilities provided? | | √ | | |
| **Standards for workers' accommodation** | | | | |
| **National/local standard** | √ | | | International Standard |
| Have the relevant national/local regulations been identified and | √ | | | |

| General regulatory framework | Y | N | N/A | Comments |
|---|---|---|---|---|
| implemented | | | | |
| **General living facilities** | | | | |
| Is the location of the facilities designed to avoid flooding or other natural hazards? | √ | | | |
| Are the living facilities located within a reasonable distance from the worksite? | √ | | | Very close to worksite. |
| Is transport provided to worksite safe and free? | | √ | | |
| Are the living facilities built using adequate materials, kept in good repair and kept clean and free from rubbish and other refuse? | √ | | | |
| **Drainage** | | | | |
| Is the site adequately drained? | √ | | | Adequately drained in most cases |
| **Heating, air conditioning, ventilation and light** | | | | |
| Depending on climate are living facilities provided with adequate heating, ventilation, air conditioning and light systems including emergency lighting? | √ | | | Fans, windows and lights are available |
| **Water** | | | | |
| Do workers have easy access to a supply of clean/ potable water in adequate quantities? | √ | | | |
| Does the quality of the water comply with national/local requirements or WHO standards? | √ | | | |
| Are tanks used for the storage of drinking water constructed and covered to prevent water stored therein from becoming polluted or contaminated? | √ | | | |
| Is the quality of the drinking water regularly monitored? | √ | | | |
| **Wastewater and solid waste** | | | | |
| Are wastewater, sewage, food and any other waste materials adequately discharged in compliance with local or World Bank standards and | | | | |

| General regulatory framework | Y | N | N/A | Comments |
|---|---|---|---|---|
| without causing any significant impacts on camp residents, the environment or surrounding communities? | √ | | | |
| Are specific containers for rubbish collection provided and emptied on a regular basis? | √ | | | |
| Are pest extermination, vector control and disinfection undertaken throughout the living facilities? | √ | | | Small scale |
| **Rooms/dormitories facilities** | | | | |
| Are the rooms/dormitories kept in good condition? | √ | | | |
| Are the rooms/dormitories aired and cleaned at regular intervals? | √ | | | Small Scale |
| Are the rooms/dormitories built with easily cleanable flooring material? | √ | | | |
| Are the rooms/dormitories and sanitary facilities located in the same buildings? | √ | | | Exceptions found in NDE subcontractors Labors' Sheds |
| Are residents provided with enough space? | √ | | | Exceptions found in subcontractors labors' shed |
| Is the ceiling height high enough? | √ | | | |
| Is the number of workers sharing the same room/dormitory minimized? | √ | | | Not all cases |
| Are the doors and windows lockable and provided with mosquito screens when necessary? | √ | | | |
| Are mobile partitions or curtains provided? | | √ | | |
| Is suitable furniture such as table, chair, mirror, bedside light provided for every worker? | √ | | | |
| Are separate sleeping areas provided for men and women? | | | √ | No women are available |
| Bed arrangements and storage facilities | √ | | | |
| Is there a separate bed provided for every worker? | √ | | | |
| Is the practice of "hot-bedding" prohibited? | √ | | | |

| General regulatory framework | Y | N | N/A | Comments |
|---|---|---|---|---|
| Is there a minimum space of 1 metre between beds? | √ | | | Not All Cases |
| Is the use of double deck bunks minimized? | √ | | | Only Chinese Workers use double bunks |
| When double deck bunks are in use, is there enough clear space between the lower and upper bunk of the bed? | √ | | | |
| Are triple deck bunks prohibited? | √ | | | |
| Are workers provided with comfortable mattresses, pillows and clean bed linens? | √ | | | Exceptions found in subcontractors labors' sheds |
| Are the bed linen washed frequently and applied with adequate repellents and disinfectants (where conditions warrant)? | √ | | | |
| Are adequate facilities for the storage of personal belongings provided? | | √ | | |
| Are there separate storages for work clothes and PPE and depending on condition, drying/airing areas? | | √ | | They keep these here and there in the living room |
| **Sanitary and toilet facilities** | | | | |
| Are sanitary and toilet facilities constructed from materials that are easily cleanable? | √ | | | |
| Are sanitary and toilet facilities cleaned frequently and kept in working condition? | √ | | | Exception found in Sub contractor labor shed |
| Are toilets, showers/bathrooms and other sanitary facilities designed to provide workers with adequate privacy including ceiling to floor partitions and lockable doors? | √ | | | |
| Are separate sanitary and toilet facilities provided for men and women? | | √ | | No women are available |
| **Toilet facilities** | | | | |
| Is there an adequate number of toilets and urinals? | √ | | | |
| Are toilet facilities conveniently located and easily accessible? | √ | | | |
| **Showers / bathrooms and other sanitary facilities** | | | | |

| General regulatory framework | Y | N | N/A | Comments |
|---|---|---|---|---|
| Is the shower flooring made of anti-slip hard washable materials? | √ | | | |
| Is there an adequate number of hand wash basins and showers / bathrooms facilities provided? | √ | | | |
| Are the sanitary facilities conveniently located? | √ | | | |
| Are shower facilities provided with an adequate supply of cold and hot running water? | √ | | | No hot water |
| **Canteen, cooking and laundry facilities** | | | | |
| Are canteen, cooking and laundry facilities built with adequate and easy to clean materials? | √ | | | |
| Are the canteen, cooking and laundry facilities kept in clean and sanitary condition? | √ | | | |
| If workers cook their own meals, is kitchen space provided separately from the sleeping areas? | | √ | | Found at sub-contractor labor shed |
| **Laundry facilities** | | | | |
| Are adequate facilities for washing and drying clothes provided? | √ | | | National Standard |
| **Canteen and cooking facilities** | | | | |
| Are workers provided with enough space in the canteen? | √ | | | |
| Are canteens adequately furnished? | √ | | | |
| Are kitchens provided with the facilities to maintain adequate personal hygiene are places for food preparation adequately ventilated and equipped? | √ | | | |
| Are kitchen floor, ceiling and wall surfaces adjacent to or above food preparation and cooking areas built in non-absorbent, durable, non-toxic, easily cleanable materials? | √ | | | |
| Are wall surfaces adjacent to cooking areas made of fie-resistant materials and food preparation tables equipped with a smooth, | √ | | | |

| General regulatory framework | Y | N | N/A | Comments |
|---|---|---|---|---|
| durable, non-corrosive, non-toxic, washable surface? | | | | |
| Are adequate facilities for cleaning, disinfecting and storage of cooking utensils and equipment provided? | √ | | | |
| Are there adequate sealable containers to deposit food waste and other refuse? | √ | | | |
| Is refuse frequently removed from the kitchen to avoid accumulation? | √ | | | |
| **Standards for nutrition and food safety** | | | | |
| Is there a special sanitary process such as the WHO "5 keys to safer food" implemented in relation to food safety? | √ | | | Couldn't be measured |
| Does the food provided contain appropriate nutritional value? | √ | | | Couldn't be measured |
| Does the food provided take into account workers' religious/cultural backgrounds? | √ | | | |
| **Medical facilities** | | | | |
| Are first aid kits provided in adequate numbers? | | √ | | Very small amount |
| Are first-aid kits adequately stocked? | √ | | | |
| Is there an adequate number of staff/workers trained to provide first aid? | √ | | | |
| Are there any other medical facilities/services provided on site? If not, why? | | √ | | |
| **Leisure, social and telecommunications facilities** | | | | |
| Are basic social collective spaces and adequate recreational areas provided to workers? | √ | | | Small amount |
| Are workers provided with dedicated places for religious observance? | √ | | | |
| Can workers access a telephone at an affordable/public price? | | | √ | |
| Are workers provided with access to internet facilities? | | | √ | |

| General regulatory framework | Y | N | N/A | Comments |
|---|---|---|---|---|
| **Managing workers' accommodation Management and staff** | | | | |
| Are there carefully designed worker camp management plans and policies especially in the field of health and safety (including emergency responses), security, workers' rights and relationships with the communities? | √ | | | |
| Where contractors are used, have they clear contractual management responsibilities and duty to report? | √ | | | |
| Does the person appointed to manage the accommodation has the required background, competency and experience to conduct his mission and is he/ she provided with the adequate responsibility and authority to do so? | √ | | | |
| Is there enough staff to ensure the adequate implementation of housing standards (cleaning, cooking and security in particular)? | √ | | | |
| Are staff members recruited from surrounding communities? | √ | | | Some staffs found |
| Have the staffs received basic health and safety training? | | | | Not found |
| Are the persons in charge of the kitchen particularly trained in nutrition and food handling and adequately supervised? | | | | Not found |
| **Charging fees for accommodation and services** | | | | |
| Are the renting arrangements fair and transparent? | | √ | | **No rent** |
| Are workers provided with adequate information about payment made? | | √ | | **No rent** |
| Where appropriate, are renting arrangements and regulations clearly included in workers' employment contracts? | | √ | | **No rent** |
| Are food and other services provided for free or reasonably priced, that is, not above the local market price? | | √ | | |
| Is the payment in kind for accommodation and services prohibited? | √ | | | |
| **Health and safety on site** | | | | |

| General regulatory framework | Y | N | N/A | Comments |
|---|---|---|---|---|
| Have health and safety management plans including electrical, mechanical, structural and food safety been designed and implemented? | √ | | | |
| Has the accommodation manager a duty to report to the health authority specific diseases, food poisoning or casualties? | √ | | | |
| Is there an adequate number of staff/workers trained in providing first aid? | √ | | | Small Scale |
| Has a specific and adequate fire safety management plan been designed and implemented? | √ | | | |
| Is guidance on alcohol, drug and HIV/AIDS and other health risk-related activities provided to workers? | √ | | | Small Scale |
| Are contraception measures (condoms in particular) and mosquito nets (where relevant) provided to workers? | | | √ | |
| Do workers have an easy access to medical facilities and medical staff, including female doctors/nurses where appropriate? | | √ | | Only First Aid |
| Have emergency plans on health and fire safety been prepared? | √ | | | |
| Depending on circumstances, have specific emergency plans (earthquakes, floods, tornadoes) been prepared? | | √ | | |
| **Security on workers' accommodation** | | | | |
| Has a security plan including clear measures to protect workers against theft and attack been designed and implemented? | √ | | | |
| Has a security plan including clear provisions on the use of force been designed and implemented? | √ | | | |
| Have the backgrounds of security staff been checked for previous crimes or abuses? | √ | | | |
| Has the recruitment of security staff from both genders been considered? | | √ | | Only Male |

| General regulatory framework | Y | N | N/A | Comments |
|---|---|---|---|---|
| Have security staffs received clear instruction about their duty and responsibility? | √ | | | |
| Have security staffs been adequately trained in dealing with domestic violence and the use of force? | √ | | | |
| Are body searches only performed in exceptional circumstances by specifically trained security staff of both genders? | | | √ | |
| Do security staffs have a good understanding about the importance of respecting workers' rights and the rights of the surrounding communities and adopt appropriate conduct? | √ | | | |
| Do workers and communities have specific means to raise concerns about security arrangements and staff? | √ | | | |
| **Workers' rights, rules and regulations on workers' accommodation** | | | | |
| Are limitations on workers' freedom of movement limited and justified? | √ | | | |
| Is an adequate transport system to the surrounding communities provided? | | √ | | |
| Is the practice of withholding workers' ID papers prohibited? | √ | | | |
| Is freedom of association expressly respected? | √ | | | |
| Are workers' religious, cultural and social backgrounds respected? | √ | | | |
| Are workers made aware of their rights and obligations and provided with a copy of the accommodations' internal rules, procedures and sanction mechanisms in a language or through a media they understand? | √ | | | |
| Are house regulations nondiscriminatory, fair and reasonable? | √ | | | |
| Is a fair and non-discriminatory procedure to implement disciplinary procedures, including the right for workers to defend themselves, set up? | √ | | | |

| General regulatory framework | Y | N | N/A | Comments |
|---|---|---|---|---|
| **Consultation and grievance mechanisms** | | | | |
| Have mechanisms for workers' consultation been designed and implemented? | | √ | | Not found |
| Are workers provided with processes and mechanisms to articulate their grievances in accordance with PS2/PR2? | | √ | | Not found |
| Have workers subjected to disciplinary proceedings arising from conduct in the accommodation had access to a fair and transparent hearing with the possibility to appeal the decision? | | √ | | |
| Are there fair conflict resolution mechanisms in place? | | √ | | |
| In cases where serious offences occur, are there mechanisms to ensure full cooperation with police authorities? | | | | |
| Management of community relations | | | | |
| Have community relation management plans addressing issues around community development, community needs, community health and safety and community social and cultural cohesion been designed and implemented? | | √ | | |
| Do community relation management plans include the setting up of liaison mechanisms to allow a constant exchange of information and consultation of the surrounding communities? | | √ | | |
| Is there a senior manager in charge of implementing the community relation management plan? | | √ | | |
| Is there a senior manager in charge of liaising with the surrounding communities? | | √ | | |
| Are the impacts generated by workers' accommodation periodically reviewed, mitigated or enhanced? | | √ | | |
| Are community representatives provided with easy means to voice their | | √ | | |

| General regulatory framework | Y | N | N/A | Comments |
|---|---|---|---|---|
| opinions and lodge complaints? | | | | |
| Is there a transparent and efficient process for dealing with community grievances, in accordance with PS1/PR10? | | √ | | |