Bangladesh Privatization Program: 
Policies and Procedures for Environmental Liability  
and Compliance Assessment

FINAL REPORT

Prepared By

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1. Background

The Enterprise Growth and Bank Modernization Project (the Project) will provide support to strengthen the capacity of the Government of Bangladesh (the Government) to manage its program of privatization of State-Owned Enterprises (SOEs). As part of this support, the Project will assist the Government in the development and implementation of a set of principles and procedures to manage the environmental liabilities associated with the past operation of these facilities and the future use of these sites. In addition, the Project will help address some of the factors constraining the growth of Small and Medium Enterprises (SMEs), and in doing so will help ensure that the development of this sector is consistent with national environmental requirements and relevant World Bank guidelines. Accordingly, the Government of Bangladesh (GoB) has initiated a comprehensive program of closure and privatization of State-Owned Enterprises (SOEs), which is being led by the Privatization Commission (PC). GoB has identified about sixty-seven SOEs to be closed or privatized, in a variety of sectors of production. The major environmental issues relating to the proposed privatization or closure of the SOEs are: (i) the potential environmental liabilities associated with past pollution, or the pollution stocks, and (ii) the on-going environmental compliance of each SOE, or the pollution flows.

In order to address these environmental issues, the PC requires establishing the policies and procedures that will be applied in identifying, assessing and managing environmental liabilities and compliance. For this purpose, an Environmental Specialist (ES) has been appointed to formulate the policies and procedures. Accordingly, the ES will prepare a draft final report for review and comment by GoB and the World Bank, following which the report will be finalized. The draft report prepared by ES would be in the following order:

- Task 1 - Review of legislation;
- Task 2 - Preliminary screening of enterprises (desk-based, with visits to a sample for corroboration if possible);
- Task 3 - Draft policies and agreements regarding indemnification, remediation and compliance;
- Task 4 - Draft terms of reference for environmental reviews and audits.

Keeping the above objectives in mind the Environmental Specialist started the work. Having limitations in arranging field visit to any of the sample industry the ES started a desk-based report preparation. However, in future if any field visit could be arranged the ES would be very much encouraged to avail the same. In the subsequent sections, the observation of the study is presented accordingly.

**Task –1**

**Review of legislation**

1.1 Background
The severe floods of 1987 and 1988, and the resurgence of concern about environmental issues, have heightened in improving environmental conditions of the country through promulgation of numbers of policies and legislation in the country. All of the policies or legislation aimed at the conservation and protection of the environment. The existing policies and legislation, which are relevant to the environment, are described in the following sections.

1.2 Policies

1.2.1 Industrial Policy 1991

The Industrial policy of 1991 contains the following clauses in respect of environmental protection:

- To conserve ecological balance and prevent pollution during industrialization.
- To take effective steps for pollution control and conservation of environment during industrialization.

To ensure embodying of necessary pollution control and preventive measures by industrial investment project endangering environment

1.2.2 National Environmental Policy 1992

Bangladesh National Environmental Policy (GoB, 1992) was approved in May 1992, and sets out the basic framework for environmental action, together with a set of broad sectoral action guidelines. Key elements of the policy are:

- Maintenance of the ecological balance and overall progress and development of the country through protection and improvement of the environment.
- Protection of the country against natural disasters.
- Identification and regulation of all types of activities which pollute and degrade the environment.
- Ensuring sustainable utilization of all natural resources.
- Active association with all environmentally related international initiatives.

Environmental policy contains the following specific objectives with respect to the industrial sector:

- To adopt corrective measures in phases in industries that causes pollution.
- To conduct Environmental Impact Assessments (EIAs) for all new public and private industries.
- To ban the establishment of any industry that produces goods that cause environmental pollution, closure of such existing industries in phases and discouragement of the use of such goods through the development and/or introduction of environmentally sound substitutes.
- To ensure sustainable use of raw materials in industries and to prevent their wastage.

1.2.3 National Safe Drinking Water Supply and Sanitation Policy 1998

National Safe Drinking Water Supply and Sanitation Policy (NSDWSSP, 1998) was drafted in 1998, and sets out the basic framework for the improvement of public health quality and to ensure improved environment, together with a set of broad sectoral action guidelines. The draft policy offered various objectives to achieve the goal and these are:

- To manage water supply and sanitation related basic needs for all.
- To bring the positive change of peoples attitude, regarding water and sanitation.
- To reduce the outbreak of water borne diseases.
- To increase the efficiency of the Local Government and associated community for handling more effectively the problems related to water supply and sanitation.
- To improve sustainable water supply and sanitation system.
• To ascertain proper conservation, management and use of surface water, and to control water pollution due to the scarcity of underground water.
• To take necessary steps to use and conserve rain water.
• To ascertain the rain water disposal in the urban areas.

1.2.4 National Conservation Strategy

National Conservation Strategy (GoB/IUCN, 1992) was drafted in late 1991 and submitted to the Government in early 1992. Meanwhile it underwent a number of modifications over the last five years.

For sustainable development in industrial sector, the report offered various recommendations; some of those are as follows:

• Industries based on nonrenewable resources should be made to adopt technology which conserves raw materials, and existing industries should be given incentives to install technical fixes to reduce wastage rate.
• All industries, specially those based on imported raw materials, should be subjected to EIA and adoption of pollution prevention/control technologies should be enforced.
• No hazardous or toxic materials/wastes should be imported for use as raw material.
• Import of appropriate and environmentally sound technology should be ensured.
• Complete dependence on imported technology and machinery for industrial development should gradually be reduced, so that industrial development is sustainable with local skills and resources.

1.2.5 National Environmental Management Action Plan (NEMAP)

National Environmental Management Action Plan, also referred to as NEMAP (GoB, 1995) is a wide-ranging and multi-faceted plan, which builds on and extends the statements set out in the National Environmental Policy. NEMAP was developed to address issues and management requirements during the period 1995 to 2005, and sets out the framework within which the recommendations of the National Conservation Strategy are to be implemented.

NEMAP has the broad objectives of:
• identification of key environmental issues affecting Bangladesh.
• identification of actions necessary to halt or reduce the rate of environmental degradation.
• improvement of the nature and built environment.
• conservation of habitats and biodiversity.
• promotion of sustainable development.
• improvement in the quality of life of the people.

One of the key elements of NEMAP is that sectoral environmental concerns are identified. In outline, the environmental issues of the industrial sector include the following:
• Pollution arising from various industrial processes and plants throughout the country causing varying degrees of degradation of the receiving environment (Air, Water, and Land).
• There is a general absence of pollution abatement in terms of waste minimization and treatment.
• Low level of environmental awareness amongst industrialists and entrepreneurs.
• Lack of technology, appropriate to efficient use of resources and waste minimization leading to unnecessary pollution loading in the environment.
• Economic constraints on pollution abatement and waste minimization such as the cost of new technology, the competitiveness of labor, and intensive production methods as compared to more modern methods.
• Concentration of industry and hence pollution in specific areas which exacerbate localized environmental degradation and exceed the carrying capacity of the receiving bodies.
• Unplanned industrial development has resulted in several industries located within or close to residential areas which adversely affects human health and quality of human environment.
• Establishment of industries at the cost of good agricultural lands and in the residential areas.
• Lack of incentives to industrialists to incorporate emission/discharge treatment plant in their industries.

1.2.6 Conventions, Treaties and Protocols

Bangladesh has consented to be bound by the terms of some 21 of the 44 principal international conventions, treaties and protocols relating to the environment (Islam, 1996). Those with partial and indirect relevance to industrial projects are the Paris convention of 1972 concerning the protection of the World cultural and natural Heritage, Convention concerning safety in the use of chemicals at work, Geneva 1990, Biodiversity convention, Rio-de-Janeiro, 1992, Convention concerning occupational health services, Geneva 1985 etc.

1.3 National Legislation

1.3.1 Environment Conservation Act 1995 (ECA 1995)

Formal concern at the national level, for the state of environment in Bangladesh can be traced back to at least Independence and passing of the Water Pollution Control Act in 1973. Under this a small unit was established in the Directorate of Public Health Engineering (DPHE) to monitor pollution of ground water and surface water.

In order to expand the scope of environmental management and to strengthen the powers for achieving it, the Government issued the Environmental Pollution Control Ordinance in 1977. The ordinance provided for the establishment of an Environmental Pollution Control Board, which was charged with formulating policies and proposing measures for their implementation. In 1982, the board was renamed as Department of Environmental Pollution Control (DEPC). Four divisional offices were established in Dhaka, Chittagong, Khulna and Bogra.

A special presidential order again renamed the DEPC to the Department of Environment (DOE) and placed under newly formed ministry of Environment and Forest (MoEF) in 1989.

The national environmental legislation known as Environmental Conservation Act, 1995 (ECA’95) is currently the main legislative document relating to environmental protection in Bangladesh, which repealed the earlier environment pollution control ordinance of 1997 and has been promulgated in Environmental Conservation Rules, 1997 (ECR’97).

The main objectives of ECA’95 are:
• conservation and improvement of environment, and
• control and mitigation of pollution of environment.

The main strategies of the act can be summarized as:
• Declaration of ecologically critical areas, and restriction on the operation and process, which can be carried, out or can not be initiated in the ecologically critical areas.
• Regulation in respect of vehicles emitting smoke harmful for the environment.
• Environmental clearance.
• Regulation of the industries and other development activities - discharge permit.
• Promulgation of standards for quality of air, water, noise and soil for different areas for different purposes.
• Promulgation of standard limit for discharging and emitting waste.
• Formulation and declaration of environmental guidelines.

The Act is being implemented by Department of Environment (DOE). DOE is under the ministry of Environment and Forest and is headed by a Director General (DG). The DG has complete control over the DOE. The power of DG, as given in the Act, may be outlined as follows:

- The DG has the power to close down the activities considered harmful to human life or the environment. Provided that- (a) the DG shall, before issuing a direction of closure or prohibition of an industry, undertaking or process, send to the owner or occupier thereof a written notice so that he gets reasonable opportunity to make that industry, undertaking or process environmentally sound; and (b) where the DG considers it appropriate, he may also specify in the notice that he may direct the provider of electricity, gas, telephone or water or all such services or any other service provided to the industry, undertaking or process to disconnect the service, if, pursuant to the notice, measures are not taken to make the relevant activities environmentally sound. The operator does have the right to appeal and procedures are in place for this. However, if the incident is considered an emergency, there is no opportunity for appeal.

- The DG may specify a time limit for carrying out a direction issued for closure or prohibition of an industry, undertaking or process.

- The DG has the power to declare an area affected by pollution as an ecologically critical area. DOE would govern the type of work or process, which can take place in such an area.

- Before going for any new development project, the project proponent must have to take Environmental Clearance from DOE. The procedures to take such clearance are in place.

- Failure to comply with any part of ECA’95 may result in punishment by a maximum of 10 years imprisonment or a maximum fine of Tk. 1 million or both.

1.3.2 Environment Conservation Rules (ECR 1997)

The Department of Environment has promulgated (August, 1997) a set of relevant rules to implement the ECA’95 to “evaluate, review the environmental impact assessment (EIA) of various projects and activities, and procedures be established for approval”. The rules mainly consist of:

- a list of industries, indicating their allocation to the Green, Orange-A, Orange-B and Red categories;
- application format to take environmental clearance;
- ambient standards in relation to water pollution, air pollution and noise, as well as permitted discharge/emission levels of water and air pollutants and noise by industries.

The Rules incorporate "inclusion lists" of projects requiring varying degrees of environmental investigation.

Green List Industries are considered relatively pollution-free and therefore do not require an environmental clearance certificate from the DOE and no environmental study.

Orange-A List Industries are required to submit general information, a feasibility report, a process flow diagram and schematic diagrams of waste treatment facilities along with their application for obtaining DOE environmental clearance.

Orange-B List industries are required to submit an Initial Environmental Examination (IEE) report, along with their application and the information and papers specified for Category A industries.

Red List Industries are those which may cause ‘significant adverse’ environmental impacts and are, therefore, required to submit an EIA report. It should be noted that they might obtain an initial site clearance on the basis of an IEE report, and subsequently submit an EIA report for obtaining environmental clearance along with other necessary papers, like the feasibility study report, no objection from local authority.
As per ECR’97 all existing industries/projects in Amber-B and Red category require an Environmental Management Plan (EMP) (not IEE or EIA) to be prepared and submitted along with necessary other papers while applying for environmental clearance.

Environmental standards in operation in Bangladesh also promulgated under the Environment Conservation Rules 1997. There are standards prescribed for varying water sources, ambient air, noise, odor, industrial effluent and emission discharges, vehicular emission etc.

The Bangladesh standards intend to impose restrictions on the volume and concentrations of wastewater/solid waste/ gaseous emission etc. discharged into the environment. In addition a number of surrogate pollution parameters like Biochemical Oxygen Demand, or Chemical Oxygen Demand; Total Suspended Solids, etc. are specified in terms of concentration and/or total allowable quality discharged in case of wastewater/solid waste. Additionally specific parameters depending on the manufacturing process are specified such as phenol, cyanide, copper, zinc, chromium etc. Air emission quality standards refer mostly to concentration of mass emission of various types of particulate, sulfur dioxide, oxides of nitrogen and in some cases volatile organic compounds and other substances.

The Bangladesh standards in general are less stringent compared to the developed countries. This is in view to promote and encourage industrialization in the country. The Bangladesh standards are not for any specific period of time. There is no provision for partial compliance too.

**Application format** for environmental clearance is in place can be collected from divisional offices of DOE.

### 1.3.3 Other Legislation

Bangladesh legislation contains numerous laws, which are indirectly related to the environment. A compendium of these laws has been prepared recently (Farooque & Hasan, 1996). Other legislation, which is relevant, to various aspects of industrial project in general include:

- **The workman's Compensation Act of 1923**, which provides legal basis for the payment by certain classes of employers to their workmen of compensation for injury by accident.

- **The Factories Act of 1965** contains adequate provisions to keep clean and hygienic environment within the factories. The Act has made ample provisions for health and sanitary measures for the protection of workers from health hazards. This law requires every factory employing ten or more workers to be kept clean and free from effluvia arising from any drain privy or other nuisance and in particular to regularly wash and clean all accumulated dirt and to provide for drainage wherever the factory premises accumulate water that can be drained out. Effective arrangements have to be made for disposal of wastes and effluents due to the manufacturing process. Effective and suitable provisions shall have to be made by the factories for securing adequate ventilation by the circulation of fresh air and to maintain reasonably comfortable temperature inside the factory buildings. Steps are to be taken by every factory to prevent accumulation of dust or fume or other impurities of such a nature that may be injurious or offensive to health. Factories are also required to make effective arrangements to provide and maintain sufficient supply of wholesome drinking water. Every factory shall have sufficient latrines and urinals in a clean and sanitary condition.

- **The Factory Rules 1979** specify some responsibilities relating to disposal of wastewater and supply of drinking water to be shouldered by factory management.

- **The tea plantation labour ordinance 1962 and Rules of 1977**, The Penal Code of 1860 prescribes certain acts viz.'Voluntary corrupting or fouling the water of any public spring or reservoir, selling impure food, drinks, noxious drugs and medicines,' punishable which is in fact directed to protect the environmental health of the public at large.
1.3.4 The other legislation which has direct relevance to Environment as a whole

<table>
<thead>
<tr>
<th>Legislation</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Land Acquisition</strong></td>
<td></td>
</tr>
<tr>
<td>Requisition and acquisition of immovable properties</td>
<td>Current GOB Act, relating to Acquisition of land</td>
</tr>
<tr>
<td>The East Bengal State acquisition and Tenancy Act, 1950</td>
<td>Acquisition of Wasteland Act, 1950</td>
</tr>
<tr>
<td>The Non-Agricultural Tenancy Act, 1947</td>
<td>Applicable in case of acquisition by GOB within Municipal area</td>
</tr>
<tr>
<td>Bangladesh Petroleum Act, 1974</td>
<td>In case the acquisition of land is done by BOGMC for and on behalf of petroleum operation</td>
</tr>
<tr>
<td><strong>Construction</strong></td>
<td></td>
</tr>
<tr>
<td>Civil Construction Act, 1984 (of RAJUK)</td>
<td>Followed in Urban Areas (same as RAJUK)</td>
</tr>
<tr>
<td>Guidelines of the LGED</td>
<td>To protect endangered flora and reserve forests during sub-project execution</td>
</tr>
<tr>
<td>The Embankment Act, 1952</td>
<td></td>
</tr>
<tr>
<td>The Forest Act, 1982 (amended in 1989)</td>
<td>To protect fisheries during sub-project execution</td>
</tr>
<tr>
<td>East Bengal Protection &amp; Conservation of Fish Act, 1950 (amended in 1982)</td>
<td>To protect wildlife from sub-project activities and wildlife protection during construction</td>
</tr>
<tr>
<td><strong>Antiquities act, 1968</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Natural Resources Extraction</strong></td>
<td></td>
</tr>
<tr>
<td>The Petroleum Act, 1974</td>
<td>Both BOGMC and PSDIP or any other operator in the oil and gas sector have to follow the guidelines of the Petroleum Act, 1974. This also contains clauses on environmental protection, although in very broad terms</td>
</tr>
<tr>
<td>Petroleum Policy</td>
<td>Provide policy frame-work for addressing environmental issue relating Petroleum and Gas sector</td>
</tr>
</tbody>
</table>

From the above review of the related environmental legislation it is conceived that any industry either private or State Owned Enterprise (SOE) would have an updated environmental clearance certificate from DOE. These legislations are the basis for preparing the guiding principles for integrating environmental matters into the privatization and closure program.
Task-2

Preliminary Screening

2.1 Preliminary screening of enterprises according to ECA’95 & ECR’97

Screening is the first and the simplest tier of project evaluation from the environmental viewpoint. Screening helps in identifying the type of projects, which are not likely to cause environmental problems.

The screening exercise may be carried out based on several criteria such as type of project, its size and location. The exercise itself can also be of analytical type or normative type. In Bangladesh normative screening has been preferred, according to which following categories have been made and presented in Table-1. Based on the nature of pollution and manufacturing process of the industries two actions viz. review and audit have been suggested for different industries. The industries, which fall under Green, Orange-A and Orange-B category, would be studied through review action however the industries under red category requires detail environmental auditing.

2.2 Definition of review and audit

The sectoral reviews of environmental liability and compliance is required to identify common contaminants and emissions, and concerns regarding natural resource use, and health and safety issues. A site visit is essential for a sample of the facilities covered by each review. Based on this, the reviews should provide a description of the expected forms of environmental liability for which indemnity will be provided in each sector, and the principal actions that are likely to be required to bring facilities into compliance with environmental legislation.

The EPA defines environmental auditing as a “systematic, documented, periodic, and objective review by a regulated entity of facility operations and practices related to meeting environmental requirements.” Such a definition stresses regulatory compliance, and verification of compliance was the driving force behind the initial developments in the environmental auditing. Today, it still remains one of the main reasons for conducting audits. Audits with this objective are termed compliance audits.

Another type of environmental audit is a liability audit. These are typically done for prospective buyers of real state and proposed mergers and acquisitions. Such audits identify environmental problems that could reduce the value of a property or expose the buyer to liability. Not conducting such audits before acquiring property is done at the buyer’s peril. The liability and compliance audits will be designed to identify the specific contamination, emission, natural resource, and health and safety concerns associated with individual enterprises. The audit process requires detailed site inspection of the industries and eventually identifies

- substance types, conditions and concentrations;
- exposure pathways, and potential human and environmental impacts;
- past exposure of workers and community;
- unsustainable use of natural resource inputs to the production process;
- clean-up or containment objectives and criteria;
- remedial alternatives, costs and time requirements.

Table-1: Screening list of different industries.

<table>
<thead>
<tr>
<th>Industrial Sector</th>
<th>Number</th>
<th>Status</th>
<th>Category</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jute</td>
<td>7</td>
<td>5 closed, 2 sold</td>
<td>Orange -B</td>
<td>Review</td>
</tr>
<tr>
<td>Textile</td>
<td>14</td>
<td>10 closed, 3 under service contract 1 sold</td>
<td>Red</td>
<td>Audit</td>
</tr>
<tr>
<td>Handloom</td>
<td>5</td>
<td>4 closed</td>
<td>Orange -A</td>
<td>Review</td>
</tr>
<tr>
<td>Industries</td>
<td>Units</td>
<td>Operating</td>
<td>Closed</td>
<td>Category</td>
</tr>
<tr>
<td>------------------------------------</td>
<td>-------</td>
<td>-----------</td>
<td>--------</td>
<td>-----------</td>
</tr>
<tr>
<td>Edible oils and flour</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>Orange-B</td>
</tr>
<tr>
<td>Hardboard</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>Red</td>
</tr>
<tr>
<td>Pulp and paper</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>Red</td>
</tr>
<tr>
<td>Battery</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>Red</td>
</tr>
<tr>
<td>Engineering</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>Red</td>
</tr>
<tr>
<td>Sugar &amp; Food</td>
<td>7</td>
<td>4</td>
<td>1</td>
<td>Red</td>
</tr>
<tr>
<td>Timber</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>Orange-A</td>
</tr>
<tr>
<td>Wood treatment</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>Orange-B</td>
</tr>
<tr>
<td>Furniture</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>Orange-A</td>
</tr>
<tr>
<td>Oil marketing, LPG, oil and lubricants</td>
<td>6</td>
<td>6</td>
<td>1</td>
<td>Red</td>
</tr>
<tr>
<td>Tea</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>Orange-B</td>
</tr>
<tr>
<td>Finance</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>Green</td>
</tr>
</tbody>
</table>

### 2.2 Responsibility of industries

#### 2.2.1 What factors broadly constitute compliance by industries with the ECA and ECR?

As per Clause 7 of the ECR '97, existing industries must apply for Environmental Clearance. The discharges from the industries should conform to the limits of discharges as per Environmental Quality Standards detailed in Schedules 2-11 of the ECR '97.

#### 2.2.2 Procedure for Granting Environmental Clearance

1. For the purpose of granting Environmental clearance certificate, industrial units and projects has been divided into four categories depending upon environmental impact and location:
   - (a) Green
   - (b) Orange A
   - (c) Orange B, and
   - (d) Red

   Followings must be submitted with the application mentioned in Sub-clause (5):

   - **For Green Category**
     - (i) General information on the industrial unit or project.
     - (ii) Proper description of the manufactured product and raw materials.
     - (iii) No Objection Certificate from the local authority.

   - **For Orange A Category**
     - (i) General information on the industrial unit or project.
     - (ii) Adequate description of the manufactured product and raw materials.
     - (iii) No Objection Certificate from the local authority.
     - (v) Layout Plan (showing Effluent Treatment Plant).
     - (vi) Waste discharge arrangement.
     - (vii) Outline of relocation or rehabilitation plan (where applicable).
(viii) Other necessary information (where applicable).

c) For Orange B Category

i) Feasibility Report of the industrial unit or project (applicable only for proposed industrial unit or project).

ii) Initial Environmental Examination (IEE) Report of the industrial unit or project (applicable only for proposed industrial unit or project) including Process Flow Diagram, Layout Plan (showing location of Effluent Treatment Plant (ETP), diagram of ETP.

iii) Environmental Management Plan (EMP) Report including Process Flow Diagram of the industrial unit or project, Layout Plan (showing location of ETP), diagram of ETP with information on its function (applicable only for existing industrial unit or project).

iv) No Objection Certificate of the local authority.

v) Pollution Effect Abatement Plan along with Emergency Plan for adverse environmental impact.

vi) Outline of relocation or rehabilitation plan (where applicable).

vii) Other necessary information (where applicable).

d) For Red Category

i) Feasibility Report of the industrial unit or project (applicable only for proposed industrial unit or project).

ii) IEE Report including program outline of Environment Impact Assessment (EIA), unit or project, or EIA Report based on program outline previously approved by the Department including Layout Plan (showing location of ETP) of the industrial unit or project, Process Flow Time Frame Diagram (applicable only for proposed industrial unit or project).

iii) EMP Report including Process Flow Diagram of the industrial unit or project, Layout Plan (showing location of ETP), diagram of ETP with information on function (applicable only for existing industrial unit or project).

iv) No Objection Certificate of the local authority.

v) Pollution Effect Abatement Plan along with Emergency Plan for adverse environmental impact.

vi) Outline of relocation or rehabilitation plan (where applicable).

vii) Other necessary information (where applicable).

2.2.3 Validity of Environmental Clearance

(1) The validity of Environmental Clearance shall be 3 years for green category and 1 year for other categories from the date of issue.

(2) Every Environmental Clearance must be renewed 30 days before expiry date of the certificate.

Task-3

Draft policies and agreements regarding indemnification, remediation and compliance

3.1 Background

As mentioned earlier the Enterprise Growth and Bank Modernization Project will provide support to strengthen the capacity of the Government of Bangladesh to manage its program of privatization of State-Owned Enterprises (SOEs). As part of this support, the Project will assist the Government in the development and implementation of a set of principles and procedures to manage the environmental liabilities associated with the past operation of these facilities and the future use of these sites. In
addition, the Project will help address some of the factors constraining the growth of Small and Medium Enterprises (SMEs), and in doing so will help ensure that the development of this sector is consistent with national environmental requirements and relevant World Bank guidelines. The assistance to be provided for improved environmental management in the Project is described in more detail in the following section.

3.2 Institutional Strengthening.

The Government has initiated a comprehensive and ambitious program of closure and privatization of SOEs, which is being led by the Privatization Commission (PC). To support this program, the project will support capacity building of the PC, which will include strengthening the capacity of the PC to address the environmental liabilities associated with the sale of SOEs and their assets.

About 77 enterprises have been identified for closure or restructuring, covering a wide range of sectors of production and a variety of potential environmental risks. To meet these concerns a set of principles and procedures for the management of environmental liabilities has been agreed with the PC, as described below.

3.2.1 Principles and Procedures for Sale of Site

It is anticipated that many SOEs will be closed and their assets liquidated, including the sale of land. In such cases, environmental reviews and audits will be conducted in advance of sales to identify and assess any environmental liabilities, particularly any contamination of soil or water (including both surface and groundwater). A two stage procedure will be followed, in which an initial review of records, interviews, and a visual inspection will be used to determine whether a more detailed site audit is required.

When a detailed site audit is deemed necessary, this will be contracted externally by the PC, and will include the collection and laboratory analysis of soil and water samples. The audit will identify any remedial actions required to ensure that the site meets national environmental quality standards for the area’s intended use, and the audit results will include estimates of the cost and time necessary to undertake these measures. Audit reports will be submitted for approval by the PC, and for review by the Department of Environment (DoE) and the World Bank.

In submitting a bid to purchase a site for which remediation measures are required, the purchaser will also submit a time-bound Environmental Management Plan (EMP), with associated costs, for the implementation of these measures. The EMP of the preferred bid will be submitted for review by the DoE and the World Bank, and will be agreed at the time of sale by the PC and the purchaser. On completion of the measures agreed in the EMP, the purchaser will submit a completion report to the PC, DoE and World Bank. The approved audit report and reviewed EMP of the preferred bid would be publicly available.

The sales documents for the site will indicate that:

- The results of the site audit establish the record of historical contamination. Any further contamination that may be identified at the site in the future will become the liability of the purchaser;
- Failure of the purchaser to implement the EMP according to the agreed timetable will lead to the purchaser assuming liability for contamination identified in the audit record.

When the initial review and visual inspection of a site indicates that no site audit is necessary, the sales documents will establish that any contamination identified at the site in the future will become the liability of the purchaser.

3.2.2 Principles and Procedures for Sale of Going Concern

In some cases SOEs may be sold as going concerns. In these circumstances, when the initial review of the facility indicates that an environmental audit is required, the audit will also assess the compliance of the operation with national environmental legislation. The audit report, in addition to identifying contamination and establishing remediation requirements as described above for the sale of sites, will also list failures of environmental compliance in the current operation, and will provide an estimate of the time necessary to rectify these failures.

Audit reports for going concerns will be submitted for approval by the PC, and for review by the Department of Environment (DoE) and the World Bank. In reviewing the audit report, the PC will seek
confirmation from the DoE that the proposed timeframe for achieving environmental compliance is acceptable, and that during this period the facility will not be subject to sanction for the identified instances of non-compliance.

In addition to covering remediation requirements, the EMP submitted by a purchaser interested in a going concern will include a plan to achieve environmental compliance within the timeframe approved by the DoE, with estimates of associated costs. The EMP of the preferred bid will be submitted for review by the DoE and the World Bank, and will be agreed at the time of sale by the PC and the purchaser. On completion of the remediation and compliance measures agreed in the EMP, the purchaser will submit a completion report to the PC, DoE and World Bank. The approved audit report and reviewed EMP of the preferred bid would be publicly available.

In addition to the clauses specified above for the sale of sites, the sales documents for going concerns will also indicate that:

- During the agreed timeframe for achieving compliance, the DoE has agreed that the facility will not be subject to sanction for instances of environmental non-compliance identified in the audit report;
- Any further non-compliance, either of a form not identified in the audit report or beyond the agreed timeframe for achieving compliance, may be subject to sanction according to national legislation.

When the initial review and visual inspection of a site indicates that no site audit is necessary, the sales documents will establish that (i) any contamination identified at the site in the future will become the liability of the purchaser, and (ii) any environmental non-compliance may be subject to sanction under national legislation.

### 3.3 Remedial objectives

The cleanup of an existing industrial site requires thorough site characterization, an assessment of risk and the analysis of remedial alternatives.

The specific remedial objectives vary from site to site, state to state, and country to country. In the broadest sense, the objective of any cleanup program is to render the site safe for its intended future use. To do this the remediation scheme must minimize or eliminate the hazard to human health and the environment. There are many remediation approaches which vary with each other. In some cases removal of the pollutant is the most cost-effective and environmentally protective solution. In others, on-site treatment may be selected. In still others, containment may suffice. In all cases, the question of risk must be addressed and the selection of remedial alternatives will be influenced by their ability to reduce risk.

#### Task-4

**Draft Terms of Reference (ToR) for Environmental Reviews and Audits**

**4.1 Background**

4.1.1 The Government of Bangladesh (GoB) has initiated a comprehensive program of closure and privatization of State-Owned Enterprises (SOEs), which is being led by the Privatization Commission (PC). GoB has identified about sixty-seven SOEs to be closed or privatized, in a variety of sectors of production. The major environmental issues relating to the proposed privatization or closure of the SOEs are: (i) the potential environmental liabilities associated with past pollution, or the pollution stocks, and (ii) the on-going environmental compliance of each SOE, or the pollution flows. The preliminary screening described under Task-2 determines few SOE’s to be included in a sectoral review of environmental liability and compliance issues, and other subject to an enterprise-specific liability and compliance audit. In spite of the under Task-2 the World Bank will agree with the Government of Bangladesh, which facilities on the privatization list should be subjected to an environmental audit. An
environmental audit ToR for Chittagong Steel Mills (CSM) has been prepared (see Appendix I) and will serve as the model for any further environmental audits that may be required for closed industries.

4.1.2 When the initial review of the facility indicates that an environmental audit is required for a going concern, the audit will also assess the compliance of the operation with national environmental legislation. The audit report, in addition to identifying contamination and establishing remediation requirements as described above for the sale of sites, will also list failures of the current operation to comply with national environmental regulations, and will provide an estimate of the time necessary to rectify these failures.

References

Appendix I

Terms of Reference for Environmental Site Assessment (ESA)
At Chittagong Steel Mill, Chittagong, Bangladesh

1 Drafted by Prasad Modak (Second revision) – pmodak@vsnl.com
Terms of Reference for Environmental Site Assessment (ESA)  
At Chittagong Steel Mill, Chittagong, Bangladesh

1.0 Introduction

The Government of Bangladesh (GoB) has initiated a comprehensive and ambitious program of closure and privatization of State Owned Enterprises (SOEs). This program is led by the Privatization Commission (PC) of GoB. The World Bank is providing technical and financial assistance to the PC for its implementation.

The PC has identified about 95 enterprises for closure or restructuring, covering a wide range of sectors of production and a variety of potential environmental risks. For the enterprises that are closed, Environmental Site Assessments (ESA) are proposed to be conducted in advance of sales to identify and assess any environmental liabilities. The ESAs will identify any remedial actions that are required to ensure that the site meets national environmental quality standards for the area’s intended use. The results will include estimates of the cost and time necessary to undertake these measures.

The ESA reports will be submitted for approval by the PC, and for review by the Department of Environment (DoE) and the World Bank. On finalization, these reports will become part of the legal documents of transaction to allocate responsibilities between the seller, purchaser and the regulator i.e. DoE.

The Chittagong Steel Mill (CSM) is the first SOE that is proposed to be assessed following the above framework.

2.0 About Chittagong Steel Mill

CSM is an enterprise of Bangladesh Steel and Engineering Corporation. CSM was established in 1963 through agreement with Messer’s Kobe Steel Ltd of Japan, financed under Japan yen credit. On completion, trial production at CSM began from 1st February 1967. The initial production capacity at CSM was 150,000 Metric Tons (MT) ingots on an annual basis. This capacity was subsequently enhanced to 250,000 MT through an expansion plan that commenced on March 17, 1967. Annex A provides details on the production profile and various units operating at CSM. Annex B provides a statement of annual material requirements at CSM just before its closure.

CSM ceased its production on July 7, 1999. In 2003, it was decided that part of the area of CSM will be transferred to Bangladesh Export Promotion Zone Authority (BEPZA) for development of industrial estate. Accordingly, an area of 74 acres was allocated for BEPZA out of the total area of 292.03 acres. BEPZA proposes to develop this area as an Export Promotion Zone (EPZ) where plots will be sold to interested enterprises for building various industrial structures.

Annex C provides a break up of the area statement at CSM. Drawing No 1 provides plant layout and demarcation of the 74 acres area that BEPZA intends to develop on an immediate basis. Much of this area has been used by CSM to dispose various kinds of waste materials such as steel slag, metal scrap, spent furnace liners, metal dust etc. The scope of the proposed ESA is restricted to this area herein referred as the “site”. Only in Task 6 Consultants assessment and recommendations are requested for the remaining area of CSM where redevelopment is expected at a later date.

The consultant will complete the tasks and produce various outputs specified under each task as outlined below. While responding to these tasks, the Consultant is recommended to follow the Environmental Assessment Sourcebook Update (March, 1994 No 6) titled Privatization and Environmental Assessment – Issues and Approaches as available at http://www.worldbank.org

Task 1: Conduct Initial Review

2 For the operating enterprises that are to be closed, the ESA will in addition assess the compliance of the operation with national environmental legislation.

3 For the operating enterprises that are to be closed, the ESA report, in addition to identifying contamination and establishing remediation requirements will list failures of environmental compliance in the current operation, and will provide an estimate of the time necessary to rectify these failures.

4 Attached and prepared in AutoCAD™
Under this task, the Consultant will identify potential sources of contaminants and environmental concerns at the site. Initial review will comprise literature review; site visit or walk-through; and interviews with informed persons.

As the CSM was closed in 1999 and the staff subsequently retrenched, records on past operation of the plant, especially on the waste disposal practices, spills, decommissioned storage and underground tanks etc may not exist or may no longer be accessible. Similarly, reports on the site specific hydro-geological data such as topography, groundwater and geological conditions may not be available in an updated and compiled form. Thus, the Consultant will need to focus more on the site visit and walkthrough for a reasonable initial review of the site.

Based on the above information and information obtained from CSM and BEPZA, the Consultant will carry out a detailed site visit for a visual inspection of the property. For a comprehensive assessment, the Consultant will cover the entire 292.03 acres area for the walk-through but focus more on the 74 acres of the site that is to be immediately redeveloped. The walk-through will also identify areas of potential environmental concerns. For the guidance of the consultant, some of the key locations of contamination at the site are listed. The Consultant will however not limit the investigations to the list below.

| Waste disposal area – CSM operated on the 74 acre site two separate waste disposal areas – one reserved for the slag and the other for disposal of metal dust and scrap. These waste disposal areas did not have any special lining and provisions for leachate collection and treatment. Several years of waste disposal practices led to formation of heaps as much as 3 to 4 meters on the ground. In order to transfer the site to BEPZA, CSM began clearance operations at this site with effect from May 19, 2003. Annex D provides information on the materials that have been cleared from both of these waste disposal areas since May 19, 2003. By March 2004, the site is expected to be fully leveled and compacted for the use by BEPZA5. (See Figures 1 (a), (b) and (c) –Annex E). |
| Storm water drains: The storm water, quench water, scrubber effluent and pickling liquors from the galvanizing shop were discharged through open channels that crisscross over the 290 acres area (including the 74 acre site) diverting the waters into river Karnaphully without any treatment. (See Figure 2 – Annex E). Annex F provides information on rainfall and humidity and temperature in the Chittagong district. |

As almost all the staff that worked at CSM has now left, the Consultant will need to conduct interviews with the caretaking site staff6 as well as by contacting some of the CSM staff that worked earlier with emphasis on the latter. It will be also useful to hold discussions with key staff of the neighboring industries – especially the cement and fertilizer companies that are at the boundaries of CSM as well as management of Chittagong EPZ. In addition, local residents, especially from the neighboring housing colonies, may be knowledgeable about the site's history and conditions. The Consultant may like to meet the officials at DoEs local office at Chittagong for any relevant regulatory information.

Finally, the review must consider the risks of possible contamination existing at the site on the proposed redevelopment. To assess this aspect, the Consultant will hold meetings with BEPZA officials in Dhaka as well as in Chittagong and obtain information on the proposed site layout, site preparation activities, site foundations and structures including key infrastructure, expected types of industries and maximum worker population that will be present on the site. Such a review will assist in establishing site sensitivities, e.g. risks due to contaminated soil and groundwater to human health, neighborhood environment and on the safety of proposed structures.

At the end of this Task, the Consultant will submit an Initial Review Report, annexed with statement of likely risks and aspects that need to be surveyed and sampled.

5 The remaining area of the plot (i.e. 292.03 – 74=218.03 acres) is not cleared with plants and various equipment on this area left as it is since the closure of the plant.

6 CSM operates a site office with skeleton staff mainly to oversee the site clearance operations. Much of the staff on the site is drawn from Bangladesh Steel and Engineering Corporation and have not worked previously at the CSM
Task 2: Establish Environmental Quality Guidelines

Under this task, the Consultant will establish the Environmental Quality Guidelines (EQG), considering likely or anticipated risks and relevant international practices.

EQG essentially define acceptable quality of soil, water and sediments. A site is generally considered contaminated when one or more samples contain contaminant concentrations in excess of the appropriate EQG. If contaminant concentrations do not exceed the EQG, then no further action is required. EQG are thus important for the purpose of evaluating:

- degree of contamination at the site;
- whether further site investigations are required; and
- whether remediation/management actions are necessary.

The Environmental Conservation Act of GoB specifies standards for groundwater and surface water quality limited to conventional environmental quality parameters. Guidelines on soil quality are available only for agricultural uses of land, as specified by the Ministry of Agriculture.

The Consultant will need to meet these gaps by proposing a comprehensive set of EQGs based on reasonable international practices, intended site use and site specific characteristics assessed in Task – 1. Based on the above, the Consultant will make recommendations on how the Environmental Conservation Act of GoB could be amended and appropriately strengthened.

At the end of this Task, the Consultant will develop and submit

- EQGs applicable for the site at CSM
- Recommendations for possible amendment of the Environmental Conservation Act of GoB to address a generic and comprehensive set of EQGs

Task 3 Carry out Preliminary Site Survey and Sampling

Under this task, the Consultant will carry out a rapid geophysical survey, focused intrusion sampling (using test pits, boreholes and observation wells) and limited groundwater and surface water quality sampling.

The objective of such a survey will be to assess the extent of contamination caused by the past operations at the CSM. The specific questions that this Task should address are

- What is the extent (specific locations and contours to determine the size/dimensions, volume) of soil contamination and what are the specific contaminants?
- Is groundwater contaminated? If so, what are the contaminants? Is SM a responsible party for this contamination? If so, are there other potential responsible parties?

Before commencing such a site survey and sampling, the Consultant will develop a suitable work plan in response to the outcome of the Initial Review (Task 1)

The work plan will consist of

- Scope and strategy of field data collection, stating various parameters/items, number of samples, sampling locations, duration and the purpose
- Proposed methodology supported by technically sound survey, sampling/in-situ/laboratory procedures

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7 Refer to [http://www.doe-bd.org](http://www.doe-bd.org) for accessing the environmental legislation promulgated by the DoE, Bangladesh
8 As there are no site assessment related regulations presently established by the DoE, the Consultant will need to define the methodology and procedures that will be followed in field surveys and sampling. Commonly agreed and followed international practices are recommended such as codes developed by American Society for Testing Materials (ASTM).
• Quality assurance/quality control systems that will be followed and the laboratories that will be used for the purpose of analyses

• Implementation plan for conducting the survey and sampling as per above

The Consultant will submit the work plan to a Technical Committee consisting representatives of PC, the World Bank, DOE and other technical experts for comments and approval.

For a rapid hydro-geophysical survey, the Consultant will use combination of methods (e.g. Ground Penetrating Radar Electromagnetic Survey (EM), Electrical Earth Resistivity, Magnetometer Mapping of Conductive Leachates etc) to identify location, depth, distribution and horizontal extent of the likely contaminant plume. The geophysical survey will cover thickness and areal extent of geological features, description and logging of subsurface geologic materials; analysis of physical properties and mineral content; type of bedrock lithology, petrology structure (e.g. faults, folds) discontinuities (e.g. joints, fractures). Hydrological profile will include elevation contours of water table9, hydraulic gradient10, direction of groundwater flow and most likely pathways of contaminant migration. The objective of the rapid geophysical survey will be to identify subsurface contamination that may be in solid or liquid form, thus allowing a more focused intrusive investigation approach. Annex G provides some basic information on the soil and lithological profile of data collected at the Chittagong EPZ that is within 3 kms of the site at CSM.

Typical intrusive techniques will include a combination of hand augering, test pitting and drilling procedures to retrieve soil and groundwater samples for subsequent in-situ and laboratory analyses. Again, a two step approach is recommended where large number of inexpensive test pits will be used to guide strategic locations of boreholes and groundwater wells.

The Consultant will collect subsurface soil samples through the excavation of test pits, using hand augers and drilling of boreholes. Boreholes will be used to collect undisturbed soil samples to perform permeability testing11. Here, soil samples from different depths will be collected for the purpose of in-situ and laboratory analyses. Soil characteristics to be established will include soil type, holding capacity, temperature, biological activity, engineering properties, solubility, adsorption coefficients, leachability, cation exchange capacity, mineral partition coefficients, chemical and sorptive properties. At least ten test pits and five boreholes will be opened on the site on an initial basis to draw soil samples and study the soil characteristics. At the boreholes, samples will be drawn at a minimum of three different representative depths considering the profile up to the bedrock. At least one borehole will be sited at the upstream of contamination for recording background characteristics.

Groundwater samples will be collected through the installation of monitoring wells at strategic borehole locations. A minimum of three groundwater wells will be needed to estimate the groundwater flow direction. Ground-water quality will need to be assessed through analysis of samples12 (through a combination of in situ and laboratory techniques) from the observation wells covering pH, total dissolved solids, salinity and specific contaminants such as lead, arsenic, cadmium, chromium, copper, mercury, nickel, selenium, zinc, PCBs, hydrocarbons etc. This is only a suggested list and Consultant will need to establish a list of specific contaminants in the work plan based on the outcomes of the Initial Review (Task -1). Groundwater quality sampling will need to cover areas surrounding the site, covering the plot of CSM and if required in areas immediately outside CSM’s boundary, especially groundwater levels and quality at the wells located in the neighboring industrial units and residential colonies. Surface water quality will need to be assessed on similar parameters at the water reservoir/treatment plant at the site and at locations in river Karnaphully, downstream the CSM.

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9 Discussions with CSM officials revealed that the groundwater is found at a depth of 3 to 4 meters.

10 Local data on site contours is not available however the ground at CSM dips gradually towards river Karnafuly

11 Bore pit data at the CSM site is not available. However, results of the bores taken at the Chittagong EPZ can be accessed from BEPZA

12 Discussions with CSM officials revealed that acceptable water quality is found only around 30 m depth.
At the end of this Task, the Consultant will submit the following outputs

- Approved Work Plan followed for survey and sampling
- Results (with summaries, extrapolations over the site supported by raw data)
- Salient observations/interpretations
- Any adaptations of the EQGs arrived based on results of survey and sampling obtained in Task 3

annexed by

- Methodologies and procedures followed
- Quality assurance/quality control protocols used.

Task 4: Identify Risks

Under this Task, the Consultant will use information obtained during initial review (Task-1), results of surveys and sampling (Task-2) and agreed EQGs (Task-3) to identify risks at the CSM site considering the proposed redevelopment.

The Consultant will identify risks through a preliminary conceptual model that is based on three logical components viz. contaminants, potential receptors, and exposure pathways. The conceptual model will essentially be a desk-top approximation of the physical and chemical (contaminant) site conditions emphasizing the type and magnitude of the subsurface contamination. Importantly, this model will define the pathways for contaminant migration based on understanding of the ground-water flow and directions. The receptors will include future population and vegetation at the site, existing neighborhood population and vegetation surrounding the site, surface and groundwater resources and foundations and structures that will be established after redevelopment.

Risks will be expressed in terms of likely impact on various receptors over time with associated estimates of probability. A base scenario will be developed considering no interventions are made.

If it is not possible to assess the risks using the conceptual model, then the Consultant will recommend additional site specific surveys and sampling that may be needed to address the critical information gaps. In such a case the Consultant will prepare a work plan for detailed site survey and sampling and recommend a budget to this effect.

At the end of this Task, the Consultant will provide following outputs

- Precautionary recommendations and conditionalities that would address the safety of foundations and structures that will be developed at the site.
- Site Risk-Map showing potential risk zones, likely risks and aspects that will be addressed through remediation
- Any additional site surveys and sampling required

Task 5: Recommend a Remediation Strategy

The results of Tasks 2, 3 and 4 will establish whether the site is contaminated. If the site is found not to be contaminated, then the Consultant will make precautionary recommendations and state conditionalities as relevant that would address the safety of foundations and structures that will be developed at the site.

If the site is found to be contaminated, then The Consultant will generate scenarios considering various possible interventions to attenuate and/or remediate and/or eliminate/evacuate the source of contamination. Each alternate intervention will be assessed considering estimate of costs (capital and operating), effectiveness (in terms of meeting EQGs), ease of implementation and associated risks.

The Consultant will come up with recommended remediation strategy, supported budgetary estimates and needed post-remediation monitoring and control measures. The remediation strategy will include precautionary recommendations and conditionalities if any that would address the safety of foundations and structures that will be developed at the site.

At the end of this Task, depending on the identification of risks, the Consultant will provide following outputs
• Remediation Strategy report that is based on analysis of alternatives

Task 6: Provide guidelines for future site clearance operations at the remaining area at CSM

It is likely that CSM will undertake site clearance for the remaining area of the plot for handing over the BEPZA in future as a part of second phase. This part of the plot includes principal manufacturing or steel making facilities.

For the future site clearance operations, the Consultant will develop an environmentally sound plan, after conducting a walk-through on the remaining area of the CSM site (i.e. other than 74 acres) listing all the necessary record keeping and precautionary measures, that would have to be followed by CSM. This plan shall look into all possible risks in dismantling, temporary site storage, segregation, sale, transportation, secondary use and disposal of all waste and to be salvaged material.

The plan will be prepared in a model format that could be used for all other site clearance operations that will be undertaken under the privatization of the SOE programme.

At the end of this Task, the Consultant will provide following outputs

• Environmentally sound guidelines for clearance of the remaining area of the CSM site that may be taken up by BEPZA in the second phase.

Task 7: Disclose the results by Conducting Consultation with Key Stakeholders

Under this task, the Consultant will summarize all the outputs of the various tasks outlined above and conduct a consultative workshop inviting key stakeholders. This summary document will be circulated to the invitees at least one week prior to the workshop. The workshop will be conducted at the site office of CSM followed by a site visit.

The key stakeholders at the minimum will include representatives of PC, CSM, Bangladesh Steel and Engineering Corporation/ Ministry of Steel, DoE (Dhaka as well as Chittagong), BEPZA, Neighborhood industries and communities and the World Bank.

The Consultant will finalize all the outputs for submittal to the PC based on discussions at the disclosure cum consultation workshop and the comments received. The final versions of all outputs will be submitted in 10 hard copies, each accompanied with a CD ROM, containing soft copies.

Consultant Qualifications and Team Composition

The Consultant company should have prior experience in conducting ESAs, especially for decommissioned steel plants. The consultant team should consist of a minimum of following members

• Hydro-geologist experienced in directing Phase-I and Phase-II ESAs as per international practices
• Chemist trained in analytical procedures for monitoring site contamination, and is conversant with quality assurance/quality control procedures.
• Environmental risk assessment specialist having experience in setting up site contamination and risk models and setting environmental quality guidelines
• Remediation specialist who holds a considerable experience in remediation technologies, costing and implementing site remediation
### Annex A: Production Profile at CSM

CSM operated seven main production units with details as in Table below:

<table>
<thead>
<tr>
<th>Unit</th>
<th>Products</th>
<th>Capacity / Year</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Melting Shop (A-1)</strong></td>
<td>Steel Ingot : 600 kg &amp; 1000 kg square</td>
<td>Rated: 2,50,000 M.T.</td>
</tr>
<tr>
<td></td>
<td>900 Kg 1200 kg &amp; 1600 kg slab</td>
<td>Assessed : 1,63,000 M.T. by M/s Atkins</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Planning (UK)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Attainable : 1,50,000 M.T.</td>
</tr>
<tr>
<td><strong>Blooming Mill (B-1)</strong></td>
<td>Billet : 110 x 110 mm to 85 x 85mm</td>
<td>Rated : 1,46,000 M.T.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Assessed : 1,47,000 M.T. by M/s Atkins</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Planning (UK)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Attainable : 1,30,000 M.T.</td>
</tr>
<tr>
<td><strong>Bar Mill (B-2)</strong></td>
<td>Billet : 65 x 65 mm² &amp; 50 x 50 mm²</td>
<td>Rated : 55,000 M.T. for Rod only</td>
</tr>
<tr>
<td></td>
<td>Rod : 28mm to 500 mm</td>
<td>Assessed : 107,000 M.T. by Billet Only</td>
</tr>
<tr>
<td></td>
<td></td>
<td>by M/s Atkins Planning (UK)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Attainable : 1,00,000 M.T for Billet</td>
</tr>
<tr>
<td><strong>Sheet &amp; Plate Mill (B-3)</strong></td>
<td>BP Sheet : 18G to 24Gx3x6 to 8</td>
<td>Rated : 45,000 M.T. – 60,000 M.T.</td>
</tr>
<tr>
<td></td>
<td>Thin Plate : 6 mm below 4x8</td>
<td>15,000 M.T.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Assessed : 10,000 M.T. – 40,000 M.T.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30,000 M.T. by M/s Atkins Planning (UK)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Attainable : 17,000 M.T.</td>
</tr>
<tr>
<td><strong>Galvanizing Shop (B-4)</strong></td>
<td>G.P./C.G. Sheet : 24G &amp; 26G</td>
<td>Rated : 60,000 M.T.</td>
</tr>
<tr>
<td></td>
<td>3 x 6 to 10 length</td>
<td>Assessed : 48,000 M.T. by M/s Atkins</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Planning (UK)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Attainable : 50,000 M.T.</td>
</tr>
<tr>
<td><strong>Heavy Plate Mill (B-5)</strong></td>
<td>M.S. Plate</td>
<td>Rated : 57,000 M.T.</td>
</tr>
<tr>
<td></td>
<td>Thickness : 6mm to 25 mm</td>
<td>Assessed : 54,000 M.T. by M/s Atkins</td>
</tr>
<tr>
<td></td>
<td>Size : 4 to 5 x 6 to 10</td>
<td>Planning (UK)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Attainable : 36,000 M.T.</td>
</tr>
<tr>
<td><strong>Casting &amp; Forging Shop (C-2)</strong></td>
<td>Steel Casting, Cast Iron Casting, Non Ferrous Casting &amp; Forging for various</td>
<td></td>
</tr>
<tr>
<td></td>
<td>spare parts, Consumables and Ingot Mould Production</td>
<td></td>
</tr>
</tbody>
</table>

Brief description of the above production units is as follows:

1. **Melting Shop** : The melting shop had four Open Hearth Furnaces (OHF) with capacity of 60MT/Charge with fuel burner (dual fuel based on Gas & Oil\(^{13}\)). Steel was produced through the process of melting and refining of pig iron and steel scrap. Liquid Steel from OHF was casted in ingot mould through bottom pouring system. To control air pollution, waste gas was treated in wet scrubbers and Electrostatic Precipitators (ESPs). The treated waste gas was released through 40M high chimneys. Each furnace had a waste heat boiler of 4T/hr steam generating capacity. ESP dust was sent to the waste disposal area i.e. the site where redevelopment is currently proposed.

2. **Blooming Mill** : Steel ingot from melting shop was heated to 1050° - 1300° C and rolled into billets and angles. This was done using pusher type gas fired reheating furnaces with capacity 35 MT/hr. Other machineries included roller table, tilting table, cooling bed, hot shear and gas cutting etc.

\(^{13}\) Although there was a provision of dual fuel, CSM used natural gas as the fuel since early 1990s.
3. **Sheet & Plate Mill**: Steel sheet bars and slabs were reheated and rolled into B.P. Sheets and thin plates. Mill had following equipment

   a) Three similarly equipped production lines consisted three high roughing, two high finishing and two high skin pass Mill Roll, one pack furnace in each unit. There were two furnaces for facilitating of box annealing of sheets.

   b) 1 (one) Thin plate Mill Consisting 2 – high roughing and 2 – high finishing Mill rolls (One) pair furnace, 1 (one) pack furnace, 1 (one) continuous type normalizing furnace. other items were sheet bar shear square shears in doublers, conveyors

4. **Galvanizing Shop**: B.P Sheets from Sheet & Plate Mill and imported C.R. Coil were cutting to required length and sent for pickling through hydrochloric acid14 GP sheets were produced using Hot-dip Galvanizing process. These G.P. Sheets were then corrugated to CGI sheets

   Three identical hot-dip galvanizing units: other equipment consisted cut-to-length machine, pickling bath, furnace, hot dip galvanizing zinc pot, chromate treatment unit, corrugators, cranks etc.

5. **Heavy Plate Mill**: One 3-high laugh type Mill, rolls 800 mm – 520 mm – 800 mm x 2000 mm, Gas fired reheating furnace capacity 22 MT/hr. Slab steel Ingot from Melting Shop were reheated in thin furnace to a temperature of about 1300° C and were rolled to Plates. One direct firing roller hearth non-continuous type normalizing furnace, capacity 7 MT/hr. Other machineries Shearing with heavy shear, roller tables, cranes etc.

6. **Casting and Forging Shop**: Was equipped with 3MT/charge capacity EAF and a Cupola Furnace having capacity 7 MT/hr. Other equipments were Forging Press, Forging Hammer, Normalizing Furnace, Mould drying furnace, Crucible Furnace and Shot Blast Machine. Alloy steel, spare parts, consumables including ingot moulds were produced here

Apart from the above, CSM has the following service units

1. Oxygen shop: There were two oxygen generating units of capacity 550 m3/hr each. Oxygen was used for quick melting and refining of steel by blowing oxygen directly in steel bath. Also there were 4 air compressors

2. Calcination Shop: consisted 3 Nos of Shaft Kilns, 2 Nos for calcining of Limestone and one for burning Dolomite. All three kilns were dual fuel type firing gas and hard coke15. Also there was one Rotary Kiln, 40MT/day, for dead burning of dolomite

3. Machine Shop: Was equipped with machines much as lather, Drill Milling machine, Hobbing, Shaping machine, Grinding machine, Planning machine etc. Fabrication, repair and maintenance of various spares & consumables were done here.

4. Roll Turning Shop: rolls used in rolling Mills were dressed in roll Turning Shop. Dressing was done in two ways: by turning in rolls lathe and grinding in Roll Grinding Machine. There were three big roll lathes for dressing of Blooming Mills rolls and five Small roll lathes for dressing of Bar Mill rolls and three roll grinding machine for dressing Sheet Mill and Heavy Plate Mill rolls. In addition there were four tool grinders and one surface grinder

5. Pattern Shop: Was equipped with good number of modern wood dorking machineries for making patterns for different casting of spares / consumable and other wood works

6. Electric Repair Shop : It had the facility of rewinding of all L.T. motors used in CSM by importing special winding and insulating material / locally available materials. It could undertake the work of repairing / overhauling of all motors, coils, brakes etc. and testing facilities of repaired equipment

8. Service Units :
   a. Electricity : The BPDB supplied electricity a 33,000 volts by two independent transmission lines. The electricity was stepped down to 3300 volts by three 10000 KVA transformers of main sub-station. Electricity was distributed to different shop sub-stations at 3300 volts and again the voltage is lowered accord to need of different units. Connected electrical load to CSM was 26 MW and at full operations the peak load was 18 MW. In addition, 2 Nos of emergency diesel generators – 625 KVA rated capacity each were provided.

   b. Water Supply :
i. Industrial Water: Total requirement of industrial water was 3200 M³/hr. Water was circulated by two re-circulating units leaving a balance of about 900 M³/hr of industrial water and this quantity was pumped in from Karnafuly River. The raw water from Karnafuly River was pumped into water basin and treated chemically with alum, chlorine, sodium phosphate etc. and the treating capacity is 2000 M³/hr.

ii. Drinking Water: There were three units drinking water supply installation capacity 50 M³/hr each. Ground water pumped into water treatment plant treated to adjust pH to remove turbidity and iron. Treatment consists of addition of alum, chloride, soda ash and filtration.

c. Material Handling: There were 35 Nos overhead crane in different shops of capacity 5-100 to including 2 floor charges crane of capacity 5 ton each 2 Nos. Lifter were installed in calcinations shop for lifting limestone / dolomite for charging in Kiln for calcinations.

d. Instrument Section: It had the facilities of repairing, overhauling and calibration works of temp. controllers / Indicators.

e. Scrap Yard: Had storage and handling facilities for 30,000 Mt Pig Iron and 30000 MT of steel Scrap.

f. Ingo Yard: Had storage and stacking facility for 10000 MT ingots including its cooling sorting and dressing etc.

g. Store: Store was a service unit of the Mill. It dealt with receiving storage and issue of Row and Subsidiary Raw Materials, Refectory Bricks, Spare Parts and consumables, oils and Lubricants, consisting about 20,000 items. There were 9 covered godowns, 2 open sheds, 6 old covered sheds and 1 office Room, covering 17950 square meters. The godowns were located adjacent to respective production unit to feed the Mills with minimum loss of handling time.

h. Metallurgical Laboratory & Control Department: Chemical Section was equipped for common analysis required for testing elements of Iron & Steel. Facilities for analysis of water, limestone, brass, alum etc are also in existence. Physical section was equipped with 100 MT universal testing machine for testing of Tensile strength. Besides hardness testing facilities, micro structure, metallography and ultrasonic testing equipments were also in existence.

Energy Consumption:

a) Electricity: Average Monthly 3.5 Million units

b) Natural Gas: Average Monthly – 100 million CFT.
### Annex B: CSM's Approximate Annual Material Requirements

<table>
<thead>
<tr>
<th>Item</th>
<th>Metric tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pig Iron</td>
<td>75,000</td>
</tr>
<tr>
<td>Steel Scrap</td>
<td>75,000</td>
</tr>
<tr>
<td>Ferro-alloys</td>
<td>1,600</td>
</tr>
<tr>
<td>Limestone</td>
<td>13,000</td>
</tr>
<tr>
<td>Dolomite</td>
<td>10,000</td>
</tr>
<tr>
<td>Refractories</td>
<td>8,000</td>
</tr>
<tr>
<td>B.P. Sheet/ CR Coil</td>
<td>45,000</td>
</tr>
<tr>
<td>Zinc Ingot</td>
<td>5,000</td>
</tr>
<tr>
<td>Lead Ingot</td>
<td>85</td>
</tr>
<tr>
<td>Tin Ingot</td>
<td>3</td>
</tr>
<tr>
<td>Antimony Ingot</td>
<td>3</td>
</tr>
<tr>
<td>Ammonium Chloride</td>
<td>500</td>
</tr>
<tr>
<td>Hydrochloric Acid</td>
<td>300</td>
</tr>
<tr>
<td>Chromic acid</td>
<td>3</td>
</tr>
<tr>
<td>Alum</td>
<td>200</td>
</tr>
</tbody>
</table>
Annex C : A Breakup of the Area Statement of CSM

CSM occupies a total of 292.03 acres of area with a break up as below.

<table>
<thead>
<tr>
<th>Type</th>
<th>Area in acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Covered area</td>
<td>120.75</td>
</tr>
<tr>
<td>Rail, track, vacant land, road, drain etc</td>
<td>50.33</td>
</tr>
<tr>
<td>Essential housing colony</td>
<td>30.25</td>
</tr>
<tr>
<td>Integrated housing colony</td>
<td>15.00</td>
</tr>
<tr>
<td>Area adjacent to outside boundary wall</td>
<td>1.70</td>
</tr>
<tr>
<td>Area to be handed over to BEPZA as the first stage of redevelopment</td>
<td>74.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>292.03</strong></td>
</tr>
</tbody>
</table>

Drawing 1 shows the plot of CSM and area demarked for handing over to BEPZA as the first stage of development. The focus of the proposed ESA is this very area.
Annex D
Materials cleared from the proposed redevelopment area of 74 acres
since May 19, 2003

<table>
<thead>
<tr>
<th>Items cleared/sold</th>
<th>Estimated quantity in tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shredded metal scrap</td>
<td>10219 (cleared) and 9493 sold</td>
</tr>
<tr>
<td>Slag</td>
<td>More than 5000</td>
</tr>
<tr>
<td>Slag mixed waste</td>
<td>More than 2500</td>
</tr>
<tr>
<td>Mild Steel Plates and Cuttings</td>
<td>More than 1000</td>
</tr>
<tr>
<td>Runners</td>
<td>150</td>
</tr>
<tr>
<td>Lime and dolomite dust</td>
<td>500</td>
</tr>
<tr>
<td>Used fire bricks</td>
<td>More than 1000</td>
</tr>
<tr>
<td>Corrugated sheets</td>
<td>150</td>
</tr>
</tbody>
</table>
Annex E : Photographs at the CSM Site

Figure 1(a): Site clearance in progress - Earthmoving

Figure 1(b): Labour carrying out waste segregation work on the site

Figure 1(c): Leveled portion of the site
Figure 2: View of a storm water drain that carried galvanizing wastewater
Annex F
Weather Information for Chittagong District, 1999

<table>
<thead>
<tr>
<th>Rainfall (mm)</th>
<th>879 in June</th>
<th>848 in August</th>
<th>January - April 00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humidity</td>
<td>88% in August</td>
<td>71% in February</td>
<td></td>
</tr>
<tr>
<td>Temperature (°C)</td>
<td>33.8 in April</td>
<td>14.5 in January</td>
<td></td>
</tr>
</tbody>
</table>

### Annual Total Rainfall (mm) at Chittagong District

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rain</td>
<td>2985</td>
<td>2698</td>
<td>2274</td>
<td>3360</td>
<td>2260</td>
</tr>
<tr>
<td>Humidity</td>
<td>2445</td>
<td>2390</td>
<td>2687</td>
<td>3863</td>
<td>3194</td>
</tr>
</tbody>
</table>

Bangladesh Bureau of Statistics, Dhaka, Bangladesh.
Annex G

Observations from Sub-Soil Investigation near CSM Site<sup>16</sup>

1. Groundwater table was found at 5.5 ft depth

2. General stratification of lithologic formation was found as below

<table>
<thead>
<tr>
<th>Depth</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upto 11 ft</td>
<td>Brownish grey, medium dense, silt, sand (11 to 20%)</td>
</tr>
<tr>
<td>11 ft to 33 ft</td>
<td>Grey, very loose, silt, sand (11 to 20%) and clay</td>
</tr>
<tr>
<td>More than 33 ft</td>
<td>Grey, medium dense, sand, silt (20 to 35%)</td>
</tr>
</tbody>
</table>

3. Tentative bearing capacities in Kg/cm<sup>2</sup> assessed at 4 different boreholes

<table>
<thead>
<tr>
<th>Depth in ft</th>
<th>Bore 1</th>
<th>Bore 2</th>
<th>Bore 3</th>
<th>Bore 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>1.00</td>
<td>1.32</td>
<td>1.10</td>
<td>1.21</td>
</tr>
<tr>
<td>10</td>
<td>1.21</td>
<td>1.21</td>
<td>1.00</td>
<td>0.44</td>
</tr>
<tr>
<td>15</td>
<td>0.22</td>
<td>0.11</td>
<td>0.22</td>
<td>0.44</td>
</tr>
<tr>
<td>20</td>
<td>2.31</td>
<td>1.43</td>
<td>1.00</td>
<td>1.43</td>
</tr>
<tr>
<td>25</td>
<td>0.22</td>
<td>0.22</td>
<td>0.11</td>
<td>0.22</td>
</tr>
<tr>
<td>30</td>
<td>0.33</td>
<td>0.22</td>
<td>0.33</td>
<td>0.33</td>
</tr>
<tr>
<td>35</td>
<td>1.87</td>
<td>1.87</td>
<td>2.20</td>
<td>0.44</td>
</tr>
<tr>
<td>40</td>
<td>1.43</td>
<td>1.76</td>
<td>2.86</td>
<td>2.31</td>
</tr>
<tr>
<td>45</td>
<td>0.88</td>
<td>3.74</td>
<td>0.66</td>
<td>0.88</td>
</tr>
<tr>
<td>50</td>
<td>1.00</td>
<td>1.87</td>
<td>1.21</td>
<td>1.43</td>
</tr>
</tbody>
</table>

Allowable bearing capacity is recommended as 1.00 Kg/cm<sup>2</sup>

<sup>16</sup>This data is taken from Report on Sub-soil investigation for the B&C Type Staff Quarter at Chittagong, EPZ conducted in 1999 Data has been obtained from BEPZA.