CHAPTER – X

ENVIRONMENTAL MANAGEMENT PLAN

10.0 INTRODUCTION

The major objective and benefit of utilizing Environmental Impact Assessment in project planning stage itself, is to prevent avoidable losses of environmental resources and values as a result of Environmental Management. Environmental Management includes protection / mitigation / enhancement measures as well as suggesting post project monitoring programme. Environmental management may suggest revision of project site or operation to avoid adverse impacts or more often additional project operations may have to be incorporated in the conventional operation.

The industrial development in the study area needs to be intertwined with judicious utilization of non-renewable resources of the study area and with in the limits of permissible assimilative capacity. The assimilative capacity of the study area is the maximum amount of pollution load that can be discharged in the environment without affecting the designated use and is governed by dilution, dispersion, and removal due to Physico-chemical and biological processes. The Environment Management Plant (EMP) is required to ensure sustainable development in the study area of the proposed plant site, hence it needs to be an all encompassive plan for which the proposed industry, Government, Regulating agencies like Pollution Control Board working in the region and more importantly the affected population of the study area need to extend their cooperation and contribution.

It has been evaluated that the study area has not been affected adversely and is likely to get new economical fillip.

The affected environmental attributes in the region are air quality, water quality, soil, land use, ecology and public health. The Management Action Plan aims at controlling pollution at the source level to the possible extent with the available and affordable technology followed by treatment measures before they are discharged.
Environmental Management aims at the preservation of ecosystem by considering the pollution abatement facilities at the plant inception. In the upcoming modern Asbestos manufacturing units, pollution abatement has become an integral part of planning and design along with Techno economic factors.

10.1 MANAGEMENT DURING CONSTRUCTION PHASE

Environmental pollution is inevitable during the construction phase. The project proponent should take appropriate steps to control pollution during construction phase. The following are the factors requiring control during construction phase.

10.1.1 SITE PREPARATION

There will not be any new construction activities proposed for production capacity enhancement. Hence there will not be any soil and debris and produce unstable material. No leveling operations will be carried out for the proposed project.

10.1.2 WATER SUPPLY AND SANITATION

The existing water supply and sanitation facilities are adequate for the proposed expansion project also. As there will not be any construction activities proposed for the proposed production capacity enhancement.

10.1.3 NOISE

No Noise pollution is anticipated during the construction, as no construction activities are envisaged for the proposed expansion project.

10.1.4 MAINTENANCE OF VEHICLES

One should be very careful in selecting the site for vehicle maintenance, so as to prevent the ground water contamination due to the spillage of oil. Both diesel and petrol engine vehicles shall be maintained properly. Unauthorized dumping of waste oil should be prohibited. Wastes should be disposed off to the SPCB approved vendors.

10.1.5 WASTE

There will not be any solid waste generation due to the proposed expansion activity.
10.1.6 STORAGE OF HAZARDOUS MATERIAL

The following hazardous materials need to be stored at the site during modifications in the existing plant & machinery.

a. Gas for welding purpose
b. LDO
c. Painting materials

All these materials would be stored as per international safety standards.

10.1.7 LAND ENVIRONMENT

The proposed expansion project will not create any major impact on land environment. As there will not be any construction activities envisaged for the proposed expansion project.

10.2 POST CONSTRUCTION PHASE

10.2.1 AIR EMISSION MANAGEMENT [TOR # 19 (vi, vii, viii), 20]

The following Air pollution control systems are already provided in the existing plant. However some modifications will be carried out in the Air Pollution Control systems to control the emissions after the proposed capacity enhancement.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Stack attached to</th>
<th>Control Equipment Provided</th>
<th>Stack Height (m)</th>
<th>Particulate emission at the outlet of Stack</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fibre processing section</td>
<td>Bag Filter</td>
<td>18.0</td>
<td>&lt; 2 mg/Nm³</td>
</tr>
<tr>
<td>2</td>
<td>Cement &amp; Fly Ash feeding section</td>
<td>Bag Filter</td>
<td>18.0</td>
<td>&lt; 50 mg/ Nm³</td>
</tr>
</tbody>
</table>

**Note:**

All the above Stacks are already provided in the existing Plant. The production enhancement will be achieved by Optimizing the plant and machinery & Air emission control systems.

**Sources of Air Emissions from Asbestos fibre handling and processing**

The asbestos dust is generally generated at the following operations:

- During the cutting of pressure packed asbestos bags mechanically.
- While feeding the opened asbestos fibre bags to the charger of the mill.
- While charging the fibre in to the mill.
- While milling the fibre.
✓ All the laws regarding use and handling of asbestos are being strictly followed and will be continued after expansion also.
✓ Automatic handling / opening of asbestos fiber bags system is provided which is adequate to handle the additional capacity enhancement.
✓ Fully automatic asbestos fiber debagging system has already been installed in the existing plant, which is adequate after expansion also.
✓ Dust collectors have already been installed in the existing plant to control air emissions, which are sufficient after Expansion also.
✓ Bags containing asbestos fibre are stored in enclosed area to avoid fugitive emission of asbestos fibre from damaged bags, if any and the similar practice will be continued after expansion also.
✓ Compliance with the total dust emission limit of 5 mg/Nm$^3$ for fibre processing section as notified under EP Act 1996.
✓ Adequate measures to achieve Stack emission of asbestos fibre not to exceed 0.2 fibre / cc and work zone area dust levels not to exceed 0.1 fibre / cc.
✓ Floor is being cleaned by vacuum cleaner only and similar practice will be continued after expansion also.
✓ Extensive greenbelt has already taken up all around the plant area to further reduce the emissions.

**Specification of Bag Filter for Fibre Section**

<table>
<thead>
<tr>
<th>Fan Capacity</th>
<th>5400 m$^3$/hr. centrifugal fan.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor</td>
<td>10 Hp x 3000 rpm.</td>
</tr>
<tr>
<td>Fan speed</td>
<td>3000 rpm.</td>
</tr>
<tr>
<td>Bags Cleaning</td>
<td>Reverse pulse jet with sequential Timer.</td>
</tr>
<tr>
<td>No. of bags</td>
<td>36 nos.</td>
</tr>
<tr>
<td>Size</td>
<td>Dia. 150mm x 2050 mm Length.</td>
</tr>
<tr>
<td>Filtering Area</td>
<td>35 sq.m.</td>
</tr>
</tbody>
</table>

**10.2.1.2 CONTROL OF FUGITIVE EMISSIONS FROM PROPOSED ASBESTOS UNIT**

[TOR # 19 (ix)]

i. Cement Feeding section

ii. Fly Ash Feeding Section
1. These sections are provided with identical Bag filter (with auto cleaning system) type provided with stacks of adequate height.
2. Compliance with the total dust emission limit of 50 mg/Nm$^3$ for Fly ash & Cement feeding section.
3. All the internal roads are already made pucca to reduce the fugitive dust emission due to the vehicular movement.

**Specifications of bag filter connected to Cement & fly ash feeding sections**

Fan Capacity : 7500 m$^3$/hr.
Motor : 20 Hp
Fan speed : 3000 rpm.
Bags Cleaning : Reverse pulse jet with sequential Timer.
No. of bags : 64 nos.
Size : Dia. 150mm x 3650 mm Length.
Filtering Area : 110 sq. m.

10.2.1.3 DUST SUPPRESSION SYSTEM
Water sprinklers will be provided at the unloading areas of the raw materials for dust suppression. Dust suppression system with plain water - comprising piping network, valves pumps, instrumentation & control, water tank etc. will be provided.

10.2.1.4 INTERNAL ROADS
All internal roads will be made pucca to prevent the fugitive dust emission due to vehicular movement.

10.2.1.5 COMPLIANCE ON CREP RECOMMENDATIONS [TOR # 49]
No separate CREP recommendations have been stipulated for Asbestos plant. However all required environmental management systems are being / will be implemented and operated to comply with MoEF / CPCB / SPCB norms. All the codes stipulated by BIS will be strictly implemented.
### BIS STANDARDS FOR ASBESTOS SHEET MANUFACTURING UNITS

<table>
<thead>
<tr>
<th>IS:</th>
<th>Method of determination of airborne asbestos</th>
</tr>
</thead>
<tbody>
<tr>
<td>IS:11450-1986</td>
<td>Recommendations of safety and health requirements</td>
</tr>
<tr>
<td>IS:11767-1986</td>
<td>Recommendations for cleaning of premises and plants</td>
</tr>
<tr>
<td>IS:11786-1986</td>
<td>Recommendations for disposal of asbestos waste material</td>
</tr>
<tr>
<td>IS:11769(P-I)1987</td>
<td>Guidelines for safe use of Asbestos Cement products</td>
</tr>
<tr>
<td>IS:11770 (P-I) 1987</td>
<td>Recommendations of control of emissions of asbestos dust</td>
</tr>
<tr>
<td>IS:12078-1987</td>
<td>Recommendations for personal protection of workers engaged in handling Asbestos</td>
</tr>
<tr>
<td>IS:12079-1987</td>
<td>Recommendations for Packing, transport and storage of Asbestos</td>
</tr>
<tr>
<td>IS:12080-1987</td>
<td>Recommendations for local exhaust ventilation systems in premises</td>
</tr>
<tr>
<td>IS:12081 (P-I)-1987</td>
<td>Recommendations for pictorial warning signs and precautionary notices</td>
</tr>
<tr>
<td></td>
<td>– Workplaces</td>
</tr>
<tr>
<td>IS:12081 (P-2)-1987</td>
<td>Recommendations for pictorial warning signs and precautionary notices-Asbestos and its products</td>
</tr>
</tbody>
</table>

#### 10.2.1.6 GOOD HOUSE KEEPING

During the maintenance period these milling machines are cleaned with the assistance of vacuum cleaners, sprinkling of water to zero down the flotation of dust.

**Recommendations**

a) The proposed air pollution control equipment will be installed prior to commissioning the proposed plant.

b) All the internal roads will be made pucca to reduce the fugitive dust due to truck movement.

#### 10.2.2 WATER POLLUTION MANAGEMENT

No process water will be discharged and zero discharge will be adopted and entire process effluent will be reused / recycled in the manufacturing process. The domestic wastewater will be treated in Septic tank followed by Soak pit.

No waste is disposed either in liquid or solid form and there is no possibility of leaching. The small amount of waste water generated is recycled back into the process itself.
There is no possibility of Oil and grease getting mixed with water in the process. There is no effluent discharged into the soil. Therefore there is no possibility of pollution and contamination into the ground and ground water. Also no stock piles exist.

Hence there will not be any adverse impact on water environment due to the proposed expansion project.

10.2.3 SOLID WASTE GENERATION & DISPOSAL [TOR # 18, 27]

- Entire solid waste generated including process, sheet cuttings, rejects, dust from bag filters will be recycled and reused in the manufacturing process.

- The cut and damaged fibre bags will be immediately repaired with adhesive tape to ensure no spillages.

The empty bags of the fibre are shredded to convert in fine particles and are used in the process along with raw material.

The following are the details of solid waste generation

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Material</th>
<th>Existing (TPA)</th>
<th>Expansion (TPA)</th>
<th>Total After expansion (TPA)</th>
<th>DISPOSAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rejected materials in the form of A.C. Sheets pieces.</td>
<td>1000</td>
<td>400</td>
<td>1400</td>
<td>Recycled into the process.</td>
</tr>
</tbody>
</table>

HAZARDOUS WASTE GENERATION

<table>
<thead>
<tr>
<th>S.No</th>
<th>Description</th>
<th>Quantity</th>
<th>Disposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Asbestos Containing Residue</td>
<td>10 Kg / month</td>
<td>Recycled into the Process</td>
</tr>
<tr>
<td>2</td>
<td>Spent oil</td>
<td>2 KL/Year</td>
<td>Given to the PCB Authorized vendors / Reprocessor.</td>
</tr>
</tbody>
</table>

10.2.4 NOISE LEVEL MANAGEMENT

The major noise generating sources in the plant will be machinery and DG sets. All machinery will be manufactured as per MoEF guidelines. The major noise levels will be confined to the working zones of the plant. The Leq of eight hours will be within the
prescribed standards. Community noise levels are not likely to be effected due to the thick green belt which has already been developed and attenuation due to the physical barriers. The ambient noise levels will be less than 75 dBA during day time & less than 70 dBA during night time. Hence there will not be any adverse impact on nearby habitations due to the proposed expansion project activities.

Recommendations

a) The impact can reduce by adopting shock absorbing techniques.

b) Ear plugs shall be provided to the workers and this shall be enforced strictly.

c) Extensive greenbelt shall be developed for further attenuating the noise levels.

10.2.5 LAND ENVIRONMENT

All the required Air emission Control systems will be provided in the proposed project. There will not be any effluent generation from the proposed activities, as closed circuit cooling system will be adopted. All the solid waste generated will be recycled into the process. Hence there will not be any adverse impact on land environment due to the solid waste generated from the proposed project activities. Hence there will not be any impact on land environment due to the proposed project. Extensive greenbelt development will have positive impact on land environment. Land prices in the area will increase due to the proposed project.

Recommendations

Landscaping can be done around the Administrative building, raw material storage sheds etc. This will help in preserving the ecological conditions.

10.2.6. MEASURES FOR IMPROVEMENT OF ECOLOGY

There are no National Parks, Wild life sanctuaries, Bird sanctuaries, within 10 Km. radius of the site. No significant vegetation occurs in and around the project site. No significant fauna exists in the area. Hence there will not be any adverse impact on flora & fauna due to the proposed project.

Recommendations
Plantation programme should be undertaken at several areas. They should include plantation, along the internal and external roads and along the administrative buildings and the stacking yards.

People should be educated and trained in social forestry activities by local governmental and non-governmental organizations.

10.2.7 GREEN BELT DEVELOPMENT [TOR # 42, 43, 47 & 54]

Extensive greenbelt is already been developed with in the plant premises. This will further mitigate the pollution impacts. 5 m wide greenbelt has already been developed all around the plant. A detailed greenbelt plan will be developed in as per CPCB guidelines in consultation with local DFO.

**Greenbelt plantation**

Greenbelt will be developed in a set of rows of trees planted in such a way that they form an effective barrier between the plant and the surroundings. The main purpose of greenbelt development is to contribute to the following factors.

- To maintain the ecological homeostasis.
- To attenuate the air emissions and the fugitive dust emissions.
- To prevent the soil erosion.
- To attenuate the noise levels.

Plantation of grass, flowers, bushes and trees will be taken up to reduce the generation of dust from the bare earth and to enhance the aesthetic value.

**Plantation species**

Plantation species will be considered based on the following.

- Suitable to the Geo-climatic conditions of the area.
- Mix of round, spreading, oblong and conical canopies.
- Ever green trees.
- Different heights ranging from 4m to 20m.

**Plantation for arresting dust**
Trees particularly having compact branching closely arranged leaves of simple elliptical and hairy structure, shiny or waxy leaves and hairy twigs are efficient filters of dust. The following species are suggested to arrest the dust:

- Alstonia Scholaris
- Bauhinia purpurea
- Cassia siamea
- Peltoferrum ferrugineum
- Butea monosperma
- Tamarindus indica
- Azadirachta indica

**Plantation to absorb SO₂ emissions**

The following plants are suggested for plantation to absorb SO₂ in the air.

- Azadirachta indica
- Albizia lebbeck
- Alstonia scholaris
- Lagerstroemia flosregineae
- Melia azedarach
- Minusops elangi

**Plantation to reduce noise pollution**

Trees having thick and flushy leaves with petioles are suitable. Heavier branches and trunks of trees also deflect the sound waves. The following plant species are suggested to reduce noise pollution.

- Alstonia scholaris
- Azadirachta indica
- Melia monosperma
- Grevillea peridifolia
- Tamarindus indica
- Greavillea robusta

**Plantation along the roads (Avenue plantation)**
Alstonia scholaris
Cassia fistula
Bauhinia purpurea
Mimusops elangi
Pongamia pinnata
Polyalthia longifolia
Poluferrum ferrugineum
Lagerstroemia flosreginea
Cassia siamea.

Greenbelt development plan
- Local DFO will be consulted in developing the green belt.
- Greenbelt of 3765.799 Sq.m will be developed (inclusive of existing) in the plant premises.
- 5 m wide greenbelt is already been developed all around periphery of the plant.
- The tree species selected for the plantation are pollutant tolerant, fast growing, wind firm, deep rooted.
- Greenbelt will be developed as per CPCB guidelines.
- 600 plants will be planted per acre as per CPCB norms.

10.2.8 RAINWATER HARVESTING [TOR # 26]

Rainwater harvesting structures will be constructed to harvest the run-off water from roof tops by laying a separate storm water drainage system for recharging of ground water. 4 nos. of rain water harvesting structures each of size 5m x 5m will be provided in the plant to recharge the precious ground water. Rain water harvesting pits will be constructed in consultation with State Ground Water Board. The harvested water will be utilized for greenbelt development. Rain water harvesting and groundwater recharge structures also will be constructed outside the plant premises in consultation with local Gram Panchayat and Village Heads to augment the ground water level. The water conserved will be used to meet the plant water requirement.
TOTAL HARVESTED RAINWATER

Rain water harvesting structures will be constructed to harvest the run-off water from roof tops by laying a separate storm water drainage system for recharging of ground water.

Total roof top area that can contribute to Harvesting : 2739.2 m²
Annual Rainfall : 2634 mm
: 2.634 m
Total volume of Rainfall : 7215.0528 m³

The conserved water will be used to meet the plant water requirement.

10.2.9 GROUND WATER RECHARGE [TOR # 28, 29, 31 & 35]

Presence of aquifer / aquifers within 1 Km of the project boundaries

Multifer aquifer system occurs in general of 20 to 25 M bgl (below ground level), around the Study zone.

Pits: - Recharge pits will be constructed for recharging the shallow aquifer. These are constructed 1 to 2 m, wide and to 3 m. deep which are back filled with boulders, gravels, coarse sand.

Trenches: - These will be constructed when the permeable stram is available at shallow depth. Trench may be 0.5 to 1 m. wide, 1 to 1.5m. deep and 10 to 20 m. long depending up availability of water. These are back filled with filter materials.
Dug wells: - Existing dug wells will be utilized as recharge structure and water should pass through filter media before putting into dug well.

Hand pumps: - The existing hand pumps will be used for recharging the shallow/deep aquifers, if the availability of water is limited. Water should pass through filter media before diverting it into hand pumps.

Recharge wells: - Recharge wells of 100 to 300 mm. diameter are generally constructed for recharging the deeper aquifers and water is passed through filter media to avoid choking of recharge wells.

Recharge Shafts: - For recharging the shallow aquifer which are located below clayey surface, recharge shafts of 0.5 to 3 m. diameter and 10 to 15 m. deep are constructed and back filled with boulders, gravels & coarse sand.

Lateral shafts with bore wells: - For recharging the upper as well as deeper aquifers lateral shafts of 1.5 to 2 m. wide & 10 to 30 m. long depending upon availability of water with one or two bore wells is constructed. The lateral shafts is back filled with boulders, gravels & coarse sand.

10.3 POST PROJECT MONITORING STRATEGY

The monitoring of various environmental parameters is necessary which part of the environmental protection measures is. Monitoring is an important feature because the efficiency of control measures can only be determined by monitoring. A comprehensive monitoring programme is given under.

Locations and frequency of monitoring as per the guidelines of APPCB and MOEF are tabulated below.

**MONITORING SCHEDULE FOR ENVIRONMENTAL PARAMETERS**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Particulars</th>
<th>Frequency of Monitoring</th>
<th>Duration of sampling</th>
<th>Parameters required to be monitored</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Water &amp; Waste water quality</td>
<td>A. Water quality in the area</td>
<td>Once in 6 months except for heavy metals which will be monitored on quarterly basis.</td>
<td>Grab sampling</td>
<td>As per IS: 10500</td>
</tr>
<tr>
<td></td>
<td>B. Waste water</td>
<td>Once in Month</td>
<td>Composite sampling (only sanitary wastewater)</td>
<td>As per IS: 2490</td>
</tr>
</tbody>
</table>
2. Air Quality

<table>
<thead>
<tr>
<th>A.</th>
<th>Stack Monitoring</th>
<th>Once in a month</th>
<th>Fibre &amp; PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.</td>
<td>Ambient Air quality</td>
<td>Once in a month (for each location)</td>
<td>Personal /Static</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>24 hrs continuously</td>
</tr>
<tr>
<td>C.</td>
<td>Fugitive emission monitoring</td>
<td>Once in a month</td>
<td>Particulate matter, Fibre</td>
</tr>
</tbody>
</table>

3. Meteorological Data

| Meteorological data to be monitored at the plant. | Daily | Continuous monitoring | Temperature, Relative Humidity, rainfall, wind direction & wind speed. |

**Infrastructure for Environmental Protection**

**Man Power**

The project proponent shall provide a fully equipped laboratory to carry out the analysis. The following manpower shall be provided on regular basis.

1. **Chemist**

He should be a qualified chemist to carry out the analysis of various samples. He will be responsible for implementing and monitoring the environmental impacts and all the safety aspects. He should be a liaisoning officer between the proposed plant and with regulatory agencies like SPCB, CPCB etc.

2. **Monitoring equipment and Consumables**

Environmental monitoring during the operation phase of the plant is being entrusted to a third party. Monitoring is being carried out as per CPCB/SPCB norms and the same will be continued after expansion also. A budgetary allocation of Rs. 4 Lakhs (for Existing & Expansion) will be earmarked for Environmental monitoring.

3. **Noise levels**

A sound level meter is used to record noise levels in different scales like A, B and C with slow and fast response options at various generating source from D.G set which is being used only when there is an interruption in the power supply of Assam State Electricity Board.
10.4 ACTION PLAN FOR COMPLIANCE OF THE DIRECTIONS OF THE HON'BLE SUPREME COURT OF INDIA [TOR # 46]

<table>
<thead>
<tr>
<th>S.No</th>
<th>Supreme Court Directions</th>
<th>NERPL reply</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>To maintain and keep maintaining the health record of every worker up to a minimum period of 40 years from the beginning of the employment or 15 years after retirement or cessation of the employment whichever is later.</td>
<td>Medical examination of employees carried out by competent occupational health physician periodically for sputum, lung functional test (PFT), X-ray and general medical check-up. Pre-employment test are carried out as per factory act and all records pertaining to health checkup are maintained as per IS 11451.</td>
</tr>
<tr>
<td>2</td>
<td>The Membrane Filter Test to detect asbestos fibre should be adopted by all the factories or establishments at par with the Metalliferrous Mines Regulations, 1961 and Vienna Convention and Rules issued thereunder.</td>
<td>The membrane filter tests in work place is adopted regularly and reports are submitted to state pollution control board. In addition to that the asbestos fiber count in the work zone and stack are tested by a competent &amp; approved third party monitoring agency.</td>
</tr>
<tr>
<td>3</td>
<td>All the factories whether covered by the Employees State Insurance Act or Workmen's Compensation Act or otherwise are directed to compulsorily insure health coverage to every worker.</td>
<td>All our employees are covered under medical insurance.</td>
</tr>
<tr>
<td>4</td>
<td>The Union and the State Governments are directed to review the standards of permissible exposure limit value of fibre/cc in tune with the international standards reducing the permissible content as prayed in the writ petition referred to at the beginning. The review shall be continued after every 10 years and also as an when the I.L.O. gives directions in this behalf consistent with its recommendations or any Conventions.</td>
<td>The air pollution measurement in relation to fibre/cc is monitored regularly and the reports are submitted to the state pollution control board.</td>
</tr>
</tbody>
</table>

10.5 COST OF THE PROJECT

Total cost for the proposed expansion project is Rs.4.5 Crores.

10.5.1 COST FOR ENVIRONMENTAL PROTECTION

Capital Cost for Environment Protection for proposed expansion project: Rs. 17 Lakhs
Recurring Cost spent towards Environmental protection is Rs. 4 Lakhs