11.0 ENVIRONMENTAL MANAGEMENT PLAN

11.1 ENVIRONMENTAL MANAGEMENT

Environmental Management Plan (EMP) is the key to ensure a safe and clean environment. A project may have taken proper pollution control measures, but without a proper management plan, the desired results may not be obtained. Environmental Management Plan is planning and implementation of various pollution abatement measures for any proposed project. It is required to ensure environmentally and ecologically sustainable developmental activities in the study area. The Environmental Management Plan brings transparency related to environmental degradation between the project proponent and pollution control regulatory agency at State & Central level may be a governmental or non-governmental agencies. It has been evaluated that the environment and the ecosystem of the study area will not be affected adversely due to the proposed POL depot. Mitigation measures at the source level and an overall Management Plan are elicited so as to improve the supporting capacity of the area in concern and also to preserve the assimilative capacity of the receiving bodies.

The Management Action Plan aims at controlling pollution at the source level to the possible extent with the best techno-economically feasible and available methodology before they are discharged.

11.2 MANAGEMENT PLAN DURING CONSTRUCTION PHASE

Pollution expected during construction phase of proposed project is considerably insignificant. The impact of the pollution during construction phase on the environment would be basically of transient nature and are expected to wear out gradually on completion of the construction phase. However, once the construction job related to the proposed units is completed and operation of units started, the operation stage impacts would overlap the impacts due to the construction activities. Following factors shall require due consideration during construction phase.
11.2.1 Site Preparation

The site of the proposed project bears a barren look and is devoid of floral species. It is envisaged that minor levelling of land will be required for the proposed project. Stock piling of earthen material would be required during foundation works of the proposed project. The earth work will generate dust which will be controlled by periodical sprinkling of water during working period.

11.2.2 Sanitation

The site shall be provided with adequate and suitable sanitary facilities to maintain proper hygiene for construction workers. These facilities shall include water supply, bath toilets, rest room, etc. as per standard practice of IOCL.

11.2.3 Construction Equipment & Waste

Care shall be taken to prevent accidental spillage of any oil from construction equipment. Combustible waste and other wastes shall be disposed-off by adopting environmentally compatible methodology.

The earthy materials will be generated during erection of campus walls, foundations etc. The generated waste shall be used in filling / levelling of low lying areas, dyke walls preparation etc.

During construction of tanks and laying of pipes some solid materials will be generated as solid waste. These materials will be sold through registered scrap dealers. The gas cylinders used for welding shall be returned back to the supplier. Cement bags, coal tar drums and other containers used during construction and discarded as wastes shall be auctioned through registered vendors as per standard practices adopted by IOCL. Similarly, the damaged tools shall be disposed in the above manner.

11.2.4 Storage of Hazardous Materials

The hazardous material such as, lubricating oils, compressed gases (for welding), paints, varnishes, etc. are required to be stored at the site during construction phase. Since, these materials are hazardous; will be stored as per the prescribed / accepted safety norms stated below.
11.2.5 Solid / Hazardous Waste Disposal

The hazardous materials used during the construction may include diesel, welding gas and paints. These materials would be stored and handled according to the guidelines specified under Solid Waste (Management, Handling & Trans-boundary Movement) Rules dated 24th September 2008 by MoEF. Some of the precautions of storage and handling of the hazardous materials includes the following:

- Dyked enclosures would be provided wherever necessary for storage of hazardous materials.
- Diesel and other fuels would be stored in separate dyke enclosures.
- Vehicle maintenance area shall be selected properly to prevent contamination of soil and ground water by accidental spillage of oil, and other wastes.

11.3 MANAGEMENT PLAN DURING OPERATION PHASE

11.3.1 Air Environment

There is no continuous source of air pollution. The sources of air pollution are limited to the DG Sets and the Fire water pumps. These sources of air pollution are intermittent. During operation, these sources would emit the exhaust gases containing NO\textsubscript{x} and SO\textsubscript{2}, and negligible quantity of particulate matter. Control of air pollution from these sources would be achieved by providing adequate heights to the respective exhaust ducts. For computing the minimum height of these exhausts ducts, the following formula, specified by the Central Pollution Control Board, has been used.

\[ H = h + 0.2 \times (\text{KVA})^{0.5} \]

Where,

- \( H \) = Total height of stack, m
- \( h \) = height of the building where the DG Set is installed, m, and
- \( \text{KVA} \) = Total generation capacity of the DG Set, KVA.

The minimum required heights for proposed DG Sets (height of the shed 3 metres above the ground level) are as follows:
Table - 11.1
DETAILS OF DG SETS

<table>
<thead>
<tr>
<th>DG Set Capacity</th>
<th>Height Required, m</th>
</tr>
</thead>
<tbody>
<tr>
<td>250 KVA</td>
<td>3.0 + 3.16 = 6.16 m</td>
</tr>
</tbody>
</table>

11.4 WATER ENVIRONMENT

11.4.1 Waste Water Generation

The sources of waste water generation in the proposed depot are as follows:

(a) Sanitary Waste Water from toilets, wash-rooms and canteen.
(b) Oily Waste Water from storage, pumping and filling.
(c) Oil spilled in pumping, loading and storage areas.

11.4.2 Waste Water Treatment & Disposal

Sanitary Waste Water from toilets, canteen and wash rooms will be treated in septic tanks and disposed in soak pits. Waste Water generated during mock fire drills will be passed through Oil Water Separators. The oil free wastewater shall be quantitatively used for irrigation of green belt.

During normal operation, no wastewater would be discharged in storm water drain. In upset conditions such as rainy season, the treated wastewater shall be discharged in to the Nallah which passes adjacent to the proposed site. The drainage pattern of the Nallah is from south to north.

11.4.3 Oil Water Separator / Oil Trap

Oil water separators shall be provided for Tank Farm, TLF Gantry & Pump House, and the Main Drain. The storage tanks, the pump house and the TLF areas shall be provided with enclosure walls to retain any spillage, washing, fire water or rain water within the walls. Waste Water from these areas will be fed to Oil-water separators. The dimensions of the various components of the oil water separator have been worked out for the desired capacities.

The over-flow of the ground water recharging system shall be sent to deep tube well for recharging of ground water table.
11.4.4 Rain Water Harvesting System

A rain water harvesting system has been proposed for the storm water drain. The systems shall be installed at such location of the plot so as to facilitate most of the rain water within the plot as well as the treated effluent. The bores shall be provided within 3 - meters deep enclosures, which will be provided with layers of boulders, gravel and coarse sand so as to separate suspended matter from the water.

**Rain water Harvesting from Building Roof & other Virgin Area**

Rain water from all the building and clean area shall be harvested and systematically routed to ground water recharging systems.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rain water Harvesting Area</td>
<td>100,000 m²</td>
</tr>
<tr>
<td>Recharging Factor</td>
<td>0.30</td>
</tr>
<tr>
<td>Yearly rain fall mean in meter</td>
<td>0.96</td>
</tr>
<tr>
<td>Volume of Rechargeable Water (Say)</td>
<td>96,000 m³</td>
</tr>
<tr>
<td>(Say)</td>
<td>90,000 m³</td>
</tr>
</tbody>
</table>

Dimension of Rain Water Collection Pond: 100M x 100M x 4.5M

- Loss through Trans-evaporation upto the depth of 2-m (100 M x 100 M X 2 M) : 20,000 m³
- Net water available during dry period : 70,000 m³
- Annual Water Requirement (365days x 5m³) : 1,825 = Say 2000 m³
- Net water saving : 68,000 m³

**BLOCK DIAGRAM FOR PROPOSED RAIN WATER HARVESTING PRETREATMENT SYSTEM**

From Drains → Grit Chamber → Oil Trap → Sedimentation Unit → Groundwater Aquifer
11.5 NOISE ENVIRONMENT

11.5.1 Sources of Noise

The sources of noise in the proposed depot are limited to the DG Sets, fire water pumps and movement of tank lorries. Noise level (SPL) at a distance of 1 meter from the sheds housing the above sources are supposed to be as under:

Table - 11.2
NOISE LEVEL OF DIFFERENT SOURCES

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Source of Noise</th>
<th>SPL dB(A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>01.</td>
<td>DG Set shed</td>
<td>85</td>
</tr>
<tr>
<td>02.</td>
<td>Fire Water Pump House</td>
<td>85</td>
</tr>
</tbody>
</table>

11.5.2 Control of Noise

The following measures are proposed for control and abatement of noise & vibration.

a) The foundations of DG Sets and Fire Water pumps shall be provided with anti-vibration padding.

b) The DG Sets and FW Pumps will be designed to produce noise within the permissible limit and strict compliance of this will be ensured during procurement.

c) The DG Set will be housed inside a building so that the noise is reduced by the acoustic enclosures.

d) Regular condition monitoring e.g. speed, vibration and regular preventive maintenance including schedule lubrication will be done for the moving machines to keep them in good condition and also to reduce vibration.

e) Trees grown in the green belt around the facilities would also facilitate reduction of noise level beyond the boundary walls.

11.6 SOLID WASTE MANAGEMENT

11.6.1 Environmental Management with respect to solid waste management may be summarized as under:
• No hazardous solid waste shall be generated from the proposed POL depot. The oil collected in the oil water separator will be collected in storage containers and returned to the refinery for reprocessing.
• Used oil, grease and empty drums shall be disposed of through registered vendors as per Hazardous Waste (Management, Handling & Trans-boundary Movement) Rules, 2008 & subsequent amendments.

11.7 LAND LOSERS / OUSTERS
The site for proposed POL depot has allotted by Government of Assam. The site is almost a barren land devoid any floristic component. As no dwelling units are located within the proposed site, no family will be rendered homeless. The land has been procured from Assam Government and the land ousters have been compensated adequately as per administrative guidelines.

11.8 AFFORESTATION
11.8.1 Trees and plants are well known for trapping noise, particulate matters, and gaseous pollutants and also in controlling soil erosion. A 10-m wide green belt will be provided along the boundary wall. Evergreen trees having thick foliage will be planted within the green belt. Only native species of trees, observed to prosper well in the area, will be planted. Trees will also be planted on roadsides, and around plants & offices. Lawns and gardens will be developed in vacant areas within the campus.

11.9 SAFETY & FIRE FIGHTING
11.9.1 Safety
The main safety features associated with the proposed POL Depot are as follows:

a) The layout and fire fighting systems conform to the latest editions of OISD - 118 & 117 respectively.

b) Dyke Walls of adequate capacities have been provided in suspected spillage or leakage areas.

c) External Floating roof tanks have been provided for storage of M.S.

d) A 3-m high compound wall with 0.6 m high barbed wire fencing shall be provided around the facilities in all directions.
e) To segregate de-licensed area from licensed area, 1.80 m high chain Link fencing shall be provided.

f) Adequate nos. of gates, main gate and emergency gate has been provided.

g) All electrical fittings provided in sensitive areas shall be flame proof and intrinsically safe.

h) Tank lorry parking area of adequate capacity has been provided away from the National Highway.

11.9.2 Fire Fighting Facilities

The fire fighting system in the proposed facilities consists of Fire Water Storage, Fire Water Pumps and Fire Hydrant System. Fire Hydrant rings covering all facilities will be provided as per OISD - 117 requirements. Double hydrants (with hose boxes, hoses and nozzles) and fire water monitors have been provided as per OISD-117 stipulations.

11.9.3 Safety Organization

The fire and safety department shall be under the control of trained and responsible officer. All the officers and staff of the TOP shall be trained in combating fire and use of safety equipment.

11.9.4 Security

The following security arrangement has been provided for the proposed installation:

- The facilities will be guarded round the clock by efficient security personnel. They will prevent any unauthorized entry inside the plant.
- Watch towers will be provided and manned round the clock to watch unauthorised entry from outside.
- A boundary wall will be provided around the installation to resist any unauthorized entry.

11.9.5 Safety & Environmental Audit

In view of the high hazard potential of petroleum products, extreme care is taken to maintain the safety needs of the installation. Safety audits will be done regularly by the Plant -in-charge along with safety officer, other engineering officers and the workers. The safety audit will include operating procedures, housekeeping, provision of fire fighting and safety gadgets, mock drills etc.
11.9.6 Occupational Safety and Health

Safety Department in the plant looks after the occupational safety aspects of the workers also. Workers will be informed about the preventive measures and safe operating practices to be followed for various types of job. Training course will be organized for the workmen and the officers before they are put on the job. Contractor’s labourers will also be trained and educated to ensure safe operating practices for the jobs.

11.9.7 Tools & Tackles

In Hydrocarbon industry, it is customary to use non-sparking type tools (spanners, wrenches etc). Electrical hand tools like torches, lamp etc. to be used in the hazardous area will be flame proof type. All tools will be of approved quality and make and will be purchased with test certificates.

11.9.8 Preventive Maintenance & Planned Inspection

To facilitate inspection and maintenance service in planned manner, a schedule will be made and jobs to be done daily, weekly, bi-weekly, monthly, half yearly and yearly will be prepared. Record of the jobs done will be kept properly. The inspection & maintenance schedule will be done as per the directive & procedure laid down by OISD as well as instructions of suppliers. The planned inspection will also include statutory inspection of pressure vessels, storage tanks, safety valves etc.

IOCL pays proper attention to improve the working environment by adopting the principle of Ergonomics in the following line of action:

“In order to maximise the working and skill capability of the work-men, the Environmental Management Plan considers the strategy and goal of Ergonomics. The application of ergonomics will reduce the Muscular Skeletal Disorder (MSD).

Attempts shall be made to make the Working Environment to fit the Workmen instead of forcing a workman to adopt the Working Environment.”