

CHAPTER – VIII

ENVIRONMENT MANAGEMENT PLAN

8.0 INTRODUCTION

The environmental management plan consists of the set of mitigation, management, monitoring and institutional measures to be taken during implementation and operation to eliminate adverse environmental impacts or reduce them to acceptable levels. The present environmental management plan addresses, the components of environmental affected during construction of the plant and by the different activities forming part of the processes of manufacturing of Insecticides.

The aims of EMP are:

- Overall conservation of environment.
- Minimization of waste generation and pollution.
- Judicious use of natural resources and water.
- Safety, welfare and good health of the work force and populace.
- Ensure effective operation of all control measures.
- Vigilance against probable disasters and accidents.
- Monitoring of cumulative and long time impacts.
- Ensure effective operation of all control measures.

8.1 POST-PROJECT OPERATIONS

Detailed study of the pre-project commissioning environment as also the likely (and predicted) implications after the plant commissioning suggests that the following preventive/control measures are considered necessary to reduce the adverse impact to the utmost practicable limit.

8.1.1 Air Environment

1. The ambient air monitoring was carried out in the work zone and surrounding areas, which shows that ambient air levels of the contaminants, are well below the stipulated norms.
2. The SO₂, NO_x, SPM, generated from boiler will be discharged through stack of adequate height. A 45-meter high stack of rice husk /coal/Pet coke/ PNG fired boiler equipped with the bag filters / ESP will be provided with boiler.
3. D.G. Sets will be provided with adequate stack heights. Four D.G. Sets with the following capacity & stack height will be used:

Capacity	Stack Height
2 X 2000 KVA	9 m above roof level
1 X 1000 KVA	7 m above roof level

4. Green belt will be developed within the Plant premises covering a total area of about 8 acre (approx. 33% of total Plant area) of the total plot area. The plantation work for green belt development will be carried out as per CPCB guidelines, local species would be preferred.
5. Ambient air quality and stack emission would be regularly monitored to ensure that ambient air quality standards and suggested limits on stack emission loads would be met honestly at all the time.
6. From the foregoing account, it is quite clear that there shall be no significant effect on the air quality.

8.1.2 Water Environment

1. The proposed Grain/ Malt Spirit based distillery would be a “Zero Discharge” distillery.
2. Water requirement of the plant would be around 3072 KLPD. Water requirement of the plant is proposed to be met by tube wells and internal recycling of water. Efforts would be made to conserve as much water as possible by recycling and reusing.

3. Liquid effluent would be evaporated entirely and its process condensate will be utilized in fermentation/process.
4. Record of wastewater returned back to process for utilization in liquefaction/fermentation/cooling tower and to gardening would be kept (both the quantity and quality details).
5. Rainwater would be utilized to recharge the underground resource through scientifically designed rainwater harvesting system.
6. There is no source of surface water or accumulation of water with in the study area hence there is no significant adverse impacts on water sources.

8.1.2.1 Treatment of Effluent

Decantation section will comprise of Centrifuge Decanter for separation of suspended solids from Spent Slops coming out of Distillation Plant. Wet cake has 30-35% w/w solids as removed from bottom of Decanter and will be directly loaded on the trolleys parked below. Thin slops coming out of Decanter will be collected in a tank and transferred for part recycle & further for Evaporation. After evaporation, solids will be mixed with wet cake and used as cattle feed. Condensate will be recycled back into the process.

8.1.3 Solid Waste Environment

- Fly ash from the Boiler would be disposed / utilized in brick manufacturing.
- The Solid waste from the Grain based operations generally comprises the Fibres and proteins in the form of Wet Cake, ideally used as Cattle Feed.
- The Yeast sludge will be sent to the Sludge Drying Beds or may be added to the Wet Cake.

TABLE – 8.1

DETAILS RELATED TO THE SOILD WASTE GENERATION AND MANAGEMENT

TYPE OF WASTE	QUANTITY	STORAGE	UTILIZATION/ DISPOSAL
Wet Cake/DWGS	440 TPD	Covered shed	Sold as cattle feed directly
Boiler ash	260 TPD	Covered shed	Brick making or land filling
Yeast Sludge	NEGLEGIBLE	Pits	Cattle feed

8.1.4 Noise/Odour Environment

Various components of industrial operations will cause some amount of noise, which will be controlled by proper maintenance and compact technology.

- Noise generating units like manufacturing plant, canteen etc will be well insulated with enclosure doors. A high standard of maintenance will be practiced for plant machinery and equipments, which helps to avert potential noise problems.
- D.G. Set will be enclosed in a proper acoustic enclosure to reduce the noise emanating from it.
- Maintenance of Machinery & vehicles will be done in a sustainable manner to ensure best performance and less noise.
- Vehicles would not be allowed to queue outside the plant on the highway. Vehicle and people flow during shift changes should be regulated by allowing exits in a phased manner.
- Moreover, the working team will avoid continuous exposure of workers in noise generating units before a maximum exposure period of one month. These workers will be subjected to regular medical examination for any symptoms of hearing loss. If any ill effects will notice, those workers will be discontinued in these units.
- The green belt will help in reducing noise levels in the campus as a result of attenuation of noise generated due to plant operations, and transportation.
- Earmuffs would be used while running the equipments of the plant.

8.1.5 Odour Management

Sources of Emissions

- Typical odour compounds in distillery are alcohol, iso amyl & iso butyl alcohol (fusel oils), acetic acid & H₂S.
- Causes of odour are bad management of fermentation house, long retention of fermented wash, unattended drains & ETP (H₂S from primary treatment of spent wash ammonia from secondary biological treatment of spent wash & smell from bio-composting plant).

MANAGEMENT:

- Better house keeping by regular steaming of all fermentation equipments.
- Regular steaming of all fermentation equipment.
- Use of efficient bio-cides to control bacterial contamination.
- Control of temperature during fermentation to avoid in-activation / killing of yeast.
- Avoiding staling of fermented wash.
- Regular use of bleaching powder in the drains to avoid generation of putrefying micro-organisms.

8.1.6 Rain Water Harvesting

Rain water harvesting measures will be taken at the time of design and construction of the buildings for the proposed projects to help Rainwater recharge the ground as much as possible.

8.1.7 Green Belt Development

Green belt planning has been done with ecological perspectives for distillery plant of NV Distilleries & Breweries (North East) Pvt. Ltd., taking into consideration the nature of pollutants, availability of space and dominant wind directions. Recommendations given by expert committee on plantation requirements in the premises of the plant would be fully implemented. This will help in reducing the concentration of pollutants and will also be effective in attenuating noise levels

NV Distilleries & Breweries (North East) Pvt. Ltd. has social obligation to recreate the environmental status by providing thick green cover to suppress fugitive emission and provide aesthetic beauty. Trees form the important part of the biosphere in the Eco-system.

The following characteristics would be taken into consideration while selecting plant species for green belt development and tree plantation.

- Fast growing and tall trees.
- They should have large leaf area index.
- They should not have any noticeable effect on the plant yield due to gaseous pollutants.
- The planting should be in appropriate alternate rows around the proposed site to prevent lateral pollution dispersion.
- Since tree trunks are devoid of foliage. Scrub should form there from to give coverage to the trunks.
- The trees should maintain regional ecological balance and conform to soil and hydrological conditions. Indigenous species would be preferred.

8.1.7.1 Eco System

Environment, which is the sum of both non-living & living factors existing at a place, interacts and influences the ecology of the area. Ecology is an important component comprising of flora (Vegetation & micro plant species) and fauna (Wildlife and terrestrial micro organisms).

The biotic or physical factors include topography, soils, climate etc. that are influenced by natural perils and/or pollution. On the other hand, biotic factors include living things such as flora, fauna, wildlife and human beings. A change in the physical factors can bring about a change in the biotic factors thereby changing the ecology of the area.

Living beings generally adapted to a particular setting (habitat or ecosystem) and are organized into natural groupings (communities) with mutual dependencies among their members. An ecosystem comprises of both plant and animal populations that involve total nutrient and energy economics associated with the entire system. A series of recognizable ecosystem alterations, called ecological successions, may occur due to certain imposed changes in the natural community.

Living beings show various responses and sensitivities to outside influences resulting in an ecological imbalance or change in habitat or ecosystem. Moreover, changes in pollution levels due to project activities may also alter the ecology of the environment. Project activities may produce adverse ecological impact of direct or indirect nature, which can be either short term or long term, depending on the nature of the action. Although every impacted environment has some recovery potential, the extent of recovery would depend on the type, degree and location of the impact as well as on mitigative measures initiated to achieve recovery.

Generally, short-term impacts are immediate and direct result of environmental changes that may occur at the inception of the proposed project. These changes may be self-corrective through natural recovery processes, after the completion of the construction phase. On the other hand, long-term impacts result from major indirect environmental changes, which are caused during the operational phase of a project.

8.1.7.2 Plantation Techniques

Green belt will be developed within the Plant premises covering a total area of about 8 acre (approx. 33% of total Plant area) of the total plot area. The plantation work for green belt development will be carried out as per CPCB guidelines, local species would be preferred.

8.1.7.3 Aftercare and Monitoring

Investment on reclamation would be futile without adequate and timely aftercare. Aftercare includes weeding, soil working, mulching and

fertilizing, and if possible, irrigation to promote better growth of the planted seedlings. The vegetated area would be protected from grazing of animals until the plants are above the level of damage. Wherever necessary, fencing would be erected on the boundaries of reclaimed areas.

Monitoring of the programme is the only way to improve both the long-term and short-term planning. It involves two important aspects, namely site investigation and record keeping.

8.1.7.4 Baseline data & Potential Impacts of the Study Area

The flora and fauna of an area shows a certain affinity to the existing environmental setting. Due to the proposed facility, there could probably be a change in the environmental surroundings for a short duration due to the construction phase and for a long term due to the operation of the project activities. Thus, in order to predict the ecological impacts from the proposed project, it is necessary to detail the baseline data.

The baseline data has been generated based on information obtained from district Head Quarter.

The potential impacts on the ecology of the study area are discussed below:

- As no wastewater from the proposed project will be discharged outside the premises, there will be no impact on the ecology of the study area due to wastewater arisen from the proposed project.
- The flora and fauna of the area could be disturbed if the various air pollutants discharged from the proposed facility would not be maintained within specified permissible limits. But project authority has already mentioned the adequate stack height, etc. Thus, the potential impact of air emission can be rated as no impact.
- Moreover, the proposed green belt would help in reducing the adverse impacts further if any.
- On the periphery of the plant a series of trees will also be planted.

8.1.7.5 Recommendation of Green Belt Development

In urban planning, the industrial zone is isolated from the residential zone. However neither the residential zone nor the surrounding remote areas remain completely out of the adverse effects of pollution, mostly air pollution. Secondly the nature of polluting substances depends on the nature of production in the plant in the industrial zone. A green belt or tree plantation around the proposed plant shall help to arrest the effects of particulate matter and gaseous pollutants in the area besides playing a major role in environmental conservation efforts.

For effective control of air pollutants in and around the proposed industry, a suitable green belt is proposed by taking into consideration the following criteria. The green belt would;

- Mitigate gaseous emissions
- Have sufficient capability to arrest accidental release.
- Effective in wastewater reuse.
- Maintain the ecological balance.
- Control noise pollution to a considerable extent.
- Prevent soil erosion.
- Improve the Aesthetics.

Moreover, keeping in view the characteristics of soil, water quality and topography of the area the following additional aspects have also been considered –

- Tolerance to inorganic chemicals
- Large leaf area index.
- Vertical root development system.
- Locally available.
- Fast growing and perennial.
- Low water requirement.

Taking the above-mentioned criteria into consideration, the proposed green belt would be covering around 33% of the total area. The green belt would be consisting of shrubs, trees, avenue trees, revenue trees, crops and potted plants. All the species suggested are pollution tolerant, besides having an aesthetic appeal.

The following plant species will be planted according to CPCB Guidelines.

The vegetation of varied types has the potentiality to respond to the hazards of pollution. Trees also act as wind breakers and stop the particulate matter from crossing over. The plants species would be planted in such as way that they are able to control the effects of pollutants. There are strip cultivation, agroforestry, staggered cultivation, social forestry type of cultivation and the likes.

8.1.8 Socio-Economic Environment

- NV Distilleries & Breweries (North East) Pvt. Ltd. will give preference to the local population for employment in the semi-skilled and unskilled category. The skilled employees will be recruited through open recruitment process.
- The company will provide an appropriate contribution in providing medical and educational facilities for the villagers.
- Trained operators and workers in various aspects of ESH (Environment, Safety and Health) would be employed.
- The managers and officers involved in Environment Management cell would undergo refresher workshop, internal training programmes and up gradation of information on various environmental issues from time to time.
- The industry would help in promoting the activities related to environmental and social awareness in nearby villages.
- The industry would further lookout for new technology which will be more environment friendly.

8.1.9 Occupational Health & Safety

In order to ensure good health of workers, regular health check-up of the plant workers will be carried out.

Occupational health surveillance programme will be taken as a regular exercise for all the employees and their record will be maintained.

Production of Rectified Spirit and ENA and subsequent production of IMFL involve storage handling and use of several chemicals. Some of these chemicals are toxic and hazardous in nature. Information about these chemicals is therefore important for the safety of the employees and the plant. Besides, the health status of the employees is also important which may be affected due to exposure to these chemicals. The exposures may be sudden and accidental or for a long period. In both the cases there will be different health effects. Therefore safety measures dealing with these chemicals are of vital importance.

Following table presents the major chemicals stored and handled in the plant

TABLE NO - 8.2
IMPORTANT CHEMICALS

S. No.	Name of each substances/chemical used, handled, produced as intermediate or end products raw materials, etc.	Boiling point	Flash point	Fire rating value	Health Rating	Reactivity rating
1.	Sulphuric Acid	290°C	-	0	3	2
2.	Hydrochloric Acid	85°C	-	0	3	0
3.	Rectified Spirit	78.4°C	12°C	4	-	N.A.
4.	Country Spirit/ Rum Spirit	81°C	30°C	2	-	N.A.
5.	Fusel Oil	137.9°C	38°C	2	-	N.A.

8.1.9.1 Health and Safety Aspects of the Chemicals

A Ethyl Alcohol

Ethyl Alcohol is a flammable liquid requiring a red label by DOT. Its flash point 12°C (closed cup). Vapour concentration between 3.3% and 19.0% by volume in air is explosive. It reacts vigorously with oxidizing materials.

TLV for 8 hr. is 1000 ppm (ACGIH). Minimum identifiable concentration has been reported as 350 ppm. Exposure to concentrations of 5000 - 10000 ppm results in irritation of eyes and mucous membranes of the upper respiratory tract.

TABLE NO – 8.3
EFFECT OF ETHYL ALCOHOL

mg/l	ppm	Effects in human
10-20	5300 – 10,640	Some transient coughing and smarting of eyes and nose, not tolerable
30	15,960	Continuous lacrimation and marked coughing; could be tolerated with discomfort.
40	21,280	Just tolerable for short period
> 40	>21,280	Intolerable

Source: Pre-feasibility Report

There is no evidence that inhalation of ethyl alcohol vapour can cause drunkenness or cause cirrhosis.

8.1.9.2 Hydrochloric Acid

Hydrochloric Acid is also known as muratic acid, chlorohydric acid, hydrogen chloride. It is a colourless gas or colourless fuming liquid, strongly corrosive.

Its Mol.wt is 36.47, melting point -114.3°C, Boiling Point - 84.8°C, Vapour Pressure: 4.0 atm @ 17.8°.

Acute Toxicity Data: Oral LD60 (rabbit) = 900 mg/kg; inhal LC50 (rat) = 3124 ppm for 1hr; inhal LC10 (human) = 1300 ppm for 1/2 hr.

Toxicity Statement (THR): Irritation to skin, eyes, mucous and via oral and inhale routes. Hydrochloric acid is an irritant to the mucous membrane of the eyes and respiratory tract, and a conc. of 35 ppm causes irritation of the throat after short exposure. Conc. of 50-100 ppm is tolerable for 1 hr. More severe exposures result in pulmonary edema, and often-laryngeal spasm. Conc. of 1,000-2,000 ppm is dangerous, even for brief exposures. Mists of hydrochloric acid are considered less harmful than the anhydrous hydrogen chloride, since the droplets have no dehydrating action. In general, hydrochloric causes little trouble in industry, other than from accidental splashes and burns. It is used as a general-purpose food additive. It is a common air contaminant. Violent reactions with acetic anhydride, 2-amino ethanol, NH_4OH , Ca_3P_2 , chlorosulphonic acid, ethylene diamine, ethylene imine, oleum, HClO_4 , B-propiolactone, propylene oxide, ($\text{AgClO}_4 + \text{CCl}_4$), NaOH , H_2SO_4 , U_3P_4 , vinyl acetate. Also CaC_2 , CsC_2H , Cs_2C_2 , Li_6Si , Mg_3B_2 , HgSO_4 , RbC_2H , Rb_2C_2 , Na .

Disaster Hazard: Dangerous; reacts with water or steam to produce toxic and corrosive fumes.

8.1.9.3 Sulphuric Acid

Sulphuric Acid is also known as oil of vitriol, dipping acid. It is a colourless, oily liquid. Formula H_2SO_4 . Mol. Wt. is 98.08. Melting Point 330° Boiling Point 10.49°C .

Acuty Toxicity Data Oral LD50 (rat) is 2140 mg/kg. [3]

Toxicity Statement: MOD via oral route. Extremely irritating, corrosive and toxic to tissue. Contact with the body results in rapid destruction of tissue, causing severe burns. No systemic effects due to continual ingestion of small amounts of this material have been noted. There are systemic effects secondary to tissue damage caused by contact with it. However, repeated contact with dilute solutions can cause dermatitis, and repeated or prolonged inhale of a mist of sulphuric acid can cause an inflammation to the upper respiratory tract leading to chronic bronchitis. Sensitivity to sulphuric acid or mists or vapours varies with individuals. Normally 0.125-0.50 ppm may be mildly annoying and 1.5-2.5 ppm can be definitely unpleasant. 10-20 ppm is unbearable.

8.1.10 Personnel Protective Equipments

Goggles:

The workers will be asked to use goggles who work on washing of bottles, filling, sealing of bottles cap for protection of their eyes in case bottles are broken.

Rubber Gumboots:

These will be provided to person who handles sulphuric acid. Full suit having hand-gloves, goggles, helmet and aprons will be provided.

Face Shield Helmet:

The person deputed for welding work will be provided with face shield helmet.

Medical Facilities

The Factory will be provided with the following medical facilities to handle any emergency:

1. Well equipped First Aid Boxes will be provided in each Section of the factory.
2. The First Aid Boxes will be distinctively marked with a Red Cross on green background and contain the following equipment/accessories:
 - a) Small sterilized dressings.
 - b) Medium size sterilized dressings
 - c) Large size sterilized dressings
 - d) Large size sterilized burn dressings
 - e) Packets sterilized cotton
 - f) Snake bite Lancet
 - g) Pair of scissors
 - h) Bottle of Potassium Permanganate
 - i) Bottle containing 2% of alcoholic solution of iodine.

- j) Bottle of Sol. Volatile having the dose and mode of administration indicated on the label
- k) One copy of first aid leaf-let
- l) Bandages
- n) Adhesive plaster
- o) Triangular bandage
- p) Packets of safety pins
- q) Supply of suitable splints
- r) One tournequet

In case of need factory will be having dispensary to give effective medical facility to workers. In dispensary, sufficient stock of medicines will be available to provide to workers in case of any major emergent situation. We have kept one Registered Medical Practitioner (Qualified Medical Officer) as Incharge of the Dispensary with a Qualified Compounder. A vehicle will be always available to shift the sick/injured person to District Hospital.

8.2 OVERALL RECOMMENDATIONS AND IMPLEMENTATION SCHEDULE

8.2.1 Introduction

The mitigation measures suggested in earlier Chapters are to be implemented so as to reduce the impact on the environment due to proposed project. The implementation of these recommendations could be done in phases so that, the most important mitigation measures would be implemented first and the mitigation measures, which are less important, could be implemented later. These details are discussed earlier in the Chapter.

Along with the implementation of these mitigation measures, monitoring schedule and infrastructural requirements for environmental protection detailed in previous chapter are important for environmental control

measures. The total capital cost of the project is Rs. 243.0 crores and the total amount earmarked for the pollution control measures is Rs 25.0 crore.

8.2.2 Implementation Schedule

The activities involved under proposed mitigation measures are summarized below:

- (a) Providing green belt as discussed earlier.
- (b) Providing maintenance of vehicles and green belt to restrict vibration.
- (c) The estimated duration for construction of the project is 8 to 9 months.
- (d) Mitigation measures for socio-economic aspects
 - ◆ Converting the kuccha road leading to plant site to pucca road.
 - ◆ Funding plantation programme in the surrounding villages.
 - ◆ Funding pucca road construction in the study area.
 - ◆ Arrangement of medical camps especially for family planning in the villages of the study area.

8.2.2.1 Monitoring

Monitoring will be done as per the schedule given in Chapter 4..

8.2.2.2 Meteorological Observation

The meteorological parameters to be monitored are wind speed, wind direction, dry and wet bulb temperature, and cloud cover. The cloud cover can be recorded in terms of Oktas by visual observation. The wind speed can be recorded by means of anemometer and the wind direction by a wind vane. It is proposed that the anemometer and wind vane be of manually recording type. These instruments could be mounted above administrative building.

