

CHAPTER 6: ENVIRONMENTAL MONITORING PROGRAMME (EMP)

6.1 INTRODUCTION

Environmental monitoring describes the processes and activities that need to take place to characterize and monitor the quality of the environment. Environmental monitoring is used in the preparation of environmental impact assessments, as well as in many circumstances in which human activities carry a risk of harmful effects on the natural environment. All monitoring strategies and programmes have reasons and justifications which are often designed to establish the current status of an environment and Prediction of the impact of future development and/or alteration in the operation and design of existing installations. Environmental Monitoring Network is operation phase of the project for monitoring of various environmental parameters like air, water, noise, soil etc.

A well defined environmental monitoring programme would be employed with trained and qualified staff of Environmental Management Cell of the proposed expansion project to monitor the environmental attributes of the area with respect to EMP as well as the guidelines of the GPCB/CPCB. Environment monitoring schedule proposed to be adopted by the project.

6.2 OBJECTIVES OF ENVIRONMENTAL MONITORING PLAN

- To comply with the statutory requirements of monitoring for compliance with conditions of NOC and CC&A.
- To comply with the provision of Factory Act & MSIHC Rules.
- To verify the results of the impact assessment study in particular with regards to new development.
- Identification of any significant adverse transformation in environmental condition to plan additional mitigation measures; if & as required.
- To check or assess the efficiency of the controlling measures.
- To ensure that new parameters, other than those identified in the impact assessment study, do not become critical through the commissioning of new project.
- To establish a data base for future Impact Assessment Studies for new project.

6.3 IMPLEMENTATION ARRANGEMENT

The various components of the environment needs to be monitored on regular basis during construction and operation phase of the project, as per the requirements of regulating agencies as well as for trend monitoring of the pollutants levels in various environmental matrices.

The mitigation measures suggested in the Chapter-4 should be implemented so as to reduce the impact on environment due to the operations of the proposed project. In order to facilitate easy implementation, mitigation measures are phased as per the priority implementation. The priority of the implementation schedule is given in Table 6.1.

Table 6.1 IMPLEMENTATION POLLUTION CONTROL MEASURES

Sr. No.	Required Measures	Stage	Remarks
1.	Air pollution control measures	During operation stage.	Double packed tower consist of HCl Recovery followed by Alkali tower system.
2.	Ground Water Criteria and Drinking Water parameter.	During operation stage.	As per IS 10500 Standard Quarterly monitor quality of water.
3.	Waste Water Treatment	Operation phase of the project.	Treated at ETP with RO & MEE.
4.	Greenbelt Development	During ooperation stage.	Plantation will be done along the boundary and specified sites shown in master plan.
5.	Solid waste disposal	Operation phase of the project.	Solid waste to be segregated and disposal at TSDF- BEIL, Ankleshwar.
6.	Hazardous waste Disposal	Operation phase of the project.	Collection /storage /transportation /disposal at TSDF- BEIL, Ankleshwar.

6.4 ENVIRONMENTAL ASPECTS TO BE MONITORED

Several measures have been proposed for mitigation of adverse environmental impacts. These shall be implemented as per proposal and monitored regularly to ensure compliance to environmental regulation and also to maintain a healthy environmental conditions.

A major part of the sampling and measurement activity shall be concerned with long term monitoring aimed at providing an early warning of any undesirable changes or trends in the natural environment that could be associated with the plant activity. This is essential to determine whether the changes are in response to a cycle of climatic conditions or are due to impact of the plant activities. In particular, a monitoring strategy shall be ensured that all environmental resources, which may be subject to contamination, are kept under review and hence monitoring of the individual elements of the environment shall be done.

The environmental aspects to be monitored to ensure proper implementation and effectiveness of various mitigative measures envisaged / adopted during the design and commissioning stage of the project proponent are described hereunder. The frequency of monitoring schedule for different parameters as mentioned below may increase depending on the requirement.

6.4.1 DURING CONSTRUCTION STAGE

During construction stage, different issues / components involved in environmental monitoring programme will be looked upon by Project proponent.

Table 6.2: Environmental Monitoring Programme (During Construction Stage)

Component	Parameters	Location and Frequency of Monitoring
Air	PM ₁₀ , PM _{2.5} , SO ₂ , NO _x , HCl, & VOC	Plant site; One sample every month
Noise	Noise Levels Leq	Four locations every month; one at project site and three at 120 degrees in nearest habitation
Soil	As per standard practice	Once before starting construction activity

6.4.2 DURING OPERATION PHASE

The environmental monitoring programme for different environmental components / indicators which are to be monitored during the operation phase will be as given under different heads.

At the unit, an Environmental Management cell has been formed, which will review the effectiveness of environmental management plan of the project during operation phase. The data collected on various EMP measures would be reviewed by this cell and if needed, corrective action will be formulated for implementation.

It will form short term & long term plans for environmental issues, which are required for monitoring and effective implementation. The environmental quality-monitoring program will be carried out in the impact zone with suitable sampling stations.

6.4.2.1 AMBIENT AIRMONITORING WITHIN PLANT AREA

The ambient air quality with respect to PM₁₀, PM_{2.5}, SO₂, NO_x, HCl, & VOC has monitor at ETP area, process area, storage area and one location in downwind direction. The frequency of monitoring will be every three month by external approved monitoring agency.

The log book has maintained at environment cell for evaluation of impact and to decide required mitigatory measures.

6.4.2.2 EFFLUENT MONITORING

Daily analysis of effluent stream is recommended. Sampling and analysis of the raw effluent, and Final Collection tank after RO will be conducted regularly.

6.4.2.3 STACK MONITORING FOR EMISSIONS

All the flue gas stacks in the proposed project has monitored with respect to temperature, oxides of nitrogen (NO_x), Suspended Particulate Matter (SPM) and Sulphur dioxide (SO₂) level.

The process gas emissions emanated from reaction vessels will be passed through scrubber and then disposed off through stack. The process gas stack would be checked for HCl concentration once every quarter.

6.4.2.4 WORK ZONE NOISE LEVELS

The Industry will monitor the noise levels inside and around the plant on a quarterly basis.

Description	Nos. of Locations and frequency
Work zone /Noise	Cover all shift of operation once every quarter for all the selected locations.

6.4.2.5 AMBIENT NOISE

Monitoring of noise levels is essential to assess the effectiveness of Environmental Management Plan implemented to reduce noise levels. A good quality sound level meter and noise exposure meter may be procured for the same. Audiometric tests have conducted periodically for the employees working close to the high noise sources. The noise levels due to machines/equipments viz. compressor, motors, engines etc has monitored regularly.

6.4.2.6 SOLID / HAZARDOUS WASTE DISPOSAL

The hazardous wastes will be disposed as per applicable stipulations of statutory authorities. Periodic surveillance monitoring will be conducted to ensure that the wastes are disposed in the manner as specified.

6.4.2.7 GREEN BELT DEVELOPMENT

The following plan has been made for implementation of green belt at the project site.

- Regular periodic watering of the plants,
- Manuring,
- Weeding,
- Hoeing will be carried out for minimum 3 years after the plantation work.

6.4.2.8 HOUSE KEEPING

The Industry will maintain housekeeping activities as per standard practice meeting hygienic norms.

6.4.2.9 SOCIO-ECONOMIC DEVELOPMENT

Industry will contribute to improve the infra-structure & socio-economic conditions; thus, will enhance the overall development of the region. The communities, which are benefited by the plant, are thus one of the key stakeholders. It is suggested that the management under Corporate Social Responsibility (CSR) plan should have structured interactions with the community to disseminate the measures planned / taken by the industry and also to elicit suggestions from stake-holders for overall improvement for the development of the area.

6.5 MONITORING PLAN FOR VARIOUS ATTRIBUTES

Sr. No.	Description	Location	Parameter To Be Monitored	Frequency of Monitoring
1.	Flue gas emission monitoring	Existing Two Boiler stacks (Natural Gas)	PM, SO ₂ , NO _x	1) At Boiler (Natural Gas), 2) For SO ₂ & NO _x , Every month by external approved monitoring agency.
		One proposed Boiler stack(Natural Gas)	PM, SO ₂ , NO _x	
		Existing one Thermo Pack (Natural Gas)	PM, SO ₂ , NO _x	
		Proposed two Thermo Pack (Natural Gas)	PM, SO ₂ , NO _x	
		Proposed Hot Gas Fired Spray Dryer (Natural Gas/Bio Coal)	PM, SO ₂ , NO _x	
		Three existing D.G. stack (HSD)	PM, SO ₂ , NO _x	
		One proposed D.G. stacks (HSD)	PM, SO ₂ , NO _x	
2.	Process gas emission monitoring plan	Indolinone Reactor & quencher (3 nos. existing and 5 nos. Proposed)	HCl	Every month by external approved monitoring agency.
		CPDCA Reactor Vent (2 existing + 2 Proposed)	HCl	
3.	Ambient air monitoring plan	Four locations.	PM ₁₀ PM _{2.5} SO ₂ NO _x	Every month by external approved monitoring agency.

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Sr. No.	Description	Location	Parameter To Be Monitored	Frequency of Monitoring
4.	Noise monitoring	Nine location within company premises	---	Every month by external approved monitoring agency.
5.	Water quality monitoring for			
EFFLUENT TREATMENT PLANT				
5.1	Effluent quality before neutralisation	Collection tank	For TDS, pH, COD,TSS, Ammonical nitrogen, Chlorides, Sulfates	Every day by self analytical facility.
5.2	Effluent quality after R.O. treatment	R.O. permeate	For TDS, pH, Conductivity, COD	Every day by self-analytical facility. And every month by external third party
6.	Water Quantity Monitoring			
6.1	Inlet	ETP	Quantity in KL	Flow meter
6.2	Inlet	Boiler	Quantity in KL	Flow meter
6.3	Inlet	Cooling Tower	Quantity in KL	Flow meter
6.4	Inlet	Process	Quantity in KL	Flow meter
6.5	Recycled Water	RO permeate outlet	Quantity in KL	Flow meter
6.6	Inlet	MEE	Quantity in KL	Flow meter
7.	Hazardous waste monitoring	Sludge drying bed	pH, Chloride, Alkalinity, COD.	Comprehensive analysis every 3 months by external third party agency.
8.	Electricity consumption monitoring			
8.1	ETP Plant	ETP Plant	Electricity	Separate electricity meter and daily reading will be noted.
8.2	Air pollution control system	Scrubbers	Electricity	Separate electricity meter and daily reading will be noted.
9	Environment Audit			
9.1	Environment audit will be carried out once in year through GPCB recognized schedule-1 Environment Auditors. This is as per directive of Hon. Gujarat High Court.			

Monitoring reports of flue gas emission, process gas emission ambient air and noise from Regional Office of Gujarat Pollution Control Board is attached as Annexure – XIV- A, B, C, D, and E. CCTV Camera is already installed with connectivity to CPCB, Delhi & SPCB, Gandhinagar.

6.6 MONITORING EQUIPMENT AND CONSUMABLES

A well-equipped laboratory with consumable items will be provided for monitoring of important environmental parameter. Alternatively, monitoring can be outsourced from NABL / MoEF& CC recognized laboratory.

6.7 PROGRESS MONITORING AND REPORTING ARRANGEMENTS

The rational for a reporting system is based on accountability to ensure that the measures proposed as part of the Environmental Monitoring Plan gets implemented in the project. The monitoring and evaluation of the management measures are critical activities in implementation of the project. Monitoring involves periodic checking to ascertain whether activities are going according to the plans. It provides the necessary feedback for the project management to keep the programme on schedule.

6.8 BUDGETARY PROVISIONS FOR ENVIRONMENTAL PROTECTION MEASURES

For environment protection, management and pollution control and treatment and monitoring systems, appropriate budgetary provision would be made and provision for recurring expenditure for environment management of the project would be made. The details of budget allocation during construction phase and operation phase are given in Table 6.2 (a) & (b).

Table No.6.3 (a) Cost of Environmental Protection Measures (Construction Phase)

CONSTRUCTION PHASE		
Sr. No.	Pollution Control Measures	Operating cost (Rs. In Lakhs)
1.	Water sprinkling	10
Total		10

Table No.6.3 (b) Cost of Environmental Protection Measures (Operational Phase)

Sr. No	Pollution Control Measures	OPERATION PHASE	
		Approximate Capital Cost (Rs. In Lakhs)	Approximate Recurring Cost Per Annum (Rs. In Lakhs)
1.	Green Belt / Horticulture	3.0	2.0
2.	Effluent Treatment Plant	10.0	35.0
3.	Municipal Waste Management	2.0	0.5
4.	Noise Control Measures	1.0	0.5
5.	Environmental Monitoring	0.5	7.0
6.	Water Management	3.0	2.5
7.	Air Pollution Control	2.5	2.5
8.	Environmental Awareness and Training	2	1
9.	Occupational Health	1	1
	Total	25*	52

Total EMP cost (Construction + Operation phase): 81 Lakhs

*unit invested Rs. 3.5 Crore for Zero Liquid Discharge for waste water in year 2011 to 2014.

6.9 IMPLEMENTATION SCHEDULE

This is existing unit going to expansion. Thus, the procurement of different equipments for plant operation shall be planned to be procured in phase wise manner

6.10 UPDATING OF EMP

The directives from MoEF and the regulations in force at any time shall govern the periodicity of monitoring. However, it is suggested that the implementation of various measures recommended in the EMP be taken as EMPs in the system to effectively implement the measures for continual improvement in environmental performance.