



Environment Management Plan for Pesticide Industries

Shubham Singh¹, Priyanka Mehta²

Student¹, Assistant Professor²

Parul University, Vadodara, India

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ABSTRACT:

Assessment of environmental and social impacts arising due to implementation of the project activities of process. An equally essential element of this process is to develop measures to eliminate, offset or reduce impacts to acceptable levels during implementation and operation of projects. The integration of such measures into project implementation and operation is supported by clearly defining the environmental requirements within an Environment Management Plan (EMP). The EMP has been formulated considering all necessary mitigation measures to prevent/minimize/eliminate environmental impacts associated with the proposed activities. To develop an Environment Management Cell to keep a close watch on the performance of the pollution control equipment, emissions from the sources and the quality of surrounding environment in accordance with the monitoring program.

I. Introduction

EMP (Environment Management Plan) includes the protection & mitigation measures to be implemented to reduce the adverse impact on the environment. In order to guarantee sustainable growth in the region surrounding the planned project, an environment management plan (EMP) is necessary. Therefore, it must be a comprehensive strategy for which the local population, the government, the industry, and regulatory bodies like the Pollution Control Board operating in the area must extend their cooperation. Protect the surrounding environment; mitigation strategies at the source level and an overall management plan at the site level are elicited. The mitigation measures are advised in order to coordinate the economic growth with environmental preservation. The Environment Management Plan (EMP) places a strong emphasis on reducing those effects.

In India industrialization expansion at full tilt. Worldwide India has known as biggest exporter of agricultural products such as Fruits, Vegetables and other food staples. For this well and good agricultural products many people's are using pesticides such as Metribuzin technical (Herbicide), Bispyribac, Tricyclozole (Fungicide), Thiamethoxam, Tebuconazole,

etc. sort under Pesticides. Process of manufacturing of these Pesticides numerous chemical reactions like Hydrolysis, Chloro-Bromination, Distillation, Chlorination etc. is done. During process many hazardous chemicals are used such as Bromine, 2-4-D Acid, CSCI₄, EDC, 2-Chloro-4(4-Chlorophenoxy) Benzyl chloride as an input at different stages of reaction. Manufacturing of this products have major ramification in Environment as well as on human beings. Pollutants extracted during the process in the form of air, water, noise, soil having a toxic effect on living system and ecosystem. In this the Environment management plan to turn down the pollutants in effective way by different techniques and technology. Reaction of chemicals releases toxic vapors and mist during process can be passed through Scrubber system before releasing into open atmosphere. Effluent generated which cannot be directly discharged into river or ponds as per Central Pollution Control Board (CPCB) Norms. So for this all possible treatment are done to achieve the Zero Liquid Discharge (ZLD) plant. All the possible measures will be taken to for the proper and effective environment management plan can over the risk and pollution on environment.



II. Methodology

A. *Environment Management Plan during Construction Phase.*

Construction phase results in temporary environmental pollution except for the permanent change in local land use pattern & aesthetics in certain cases. Such pollution is mainly due to site preparation, civil works, transportation, storage & handling of construction materials, construction worker's sanitation etc. These are usually short-term impacts.

B. *Air and Noise Environment.*

During construction work at site, air pollution is expected in the form of increased suspended particulate matter concentration. Installation work will generate noise and dust, but it will be within working areas. To mitigate the adverse environment impact due to the construction phase, following measures will be taken: Regular sprinkling of the water will be carried out at least twice a day along with the construction activities to reduce dust emissions, Regular preventing maintenance of machinery and transportation vehicles will be carried out to reduce vehicular emissions and noise pollution, Provision of silencer to modulate the noise generated by the machine, if required, and Provision of personal protective equipment such as earmuffs/earplugs to workers working in noisy area.

C. *Water Environment.*

During construction phase, water supply from tankers and portable sanitation facilities will be utilized by construction workers, casual workers, and truck drivers. Domestic wastewater will be discharged into soak pit.

D. *Socio Economic Environment.*

The proposed manpower requirement during construction will be 20-30 and will give preference to local people through both direct and indirect employment.

E. *Health & Safety.*

Adequate rest area will be provided to the construction workers and casual workers including truck drivers during operation phase. Unit will also supply potable water for the construction workers. The safety department will supervise the safe working of the contractor and their employees. Work spots will be maintained clean, provided with optimum lighting and enough ventilation.

F. *Environmental Management during the Operational Phase.*

EMP proposed for implementation is detailed under the following heads: Air Pollution Management, Wastewater Management, Solid/Hazardous Waste Management, Noise Management, Greenbelt Development, Occupational Safety and Health, Implementation of EMP and monitoring programme.

G. *Air Pollution Management.*

Sources of Air Pollution and Control Flue gas emission will be from stack attached with boiler where coal is used as fuel; and D.G. Set, in which Diesel will be used as fuel. Cyclone and bag filter systems will be installed as APCM for stack attached to boiler. Process emission will be from the vents attached to Process Reactors. Process Reactor of Acids will be installed with venturi water scrubber followed by alkali scrubber to control pollutants HCl and SO. Adequate stack height will be provided to control & disperse the air pollutants within the satisfactory levels and facility for sampling such as ladder and sampling point will be provided. The fugitive pollutants of PM, VOCs & Acid mist are likely to emit from process area. Industry will adopt following measures: Adequate scrubbing system to absorb the process gas, Entire process will be carried out in closed reactors, Pneumatically transfer of liquid raw material in reactor, Raw material will be stored in the covered structure, Regular maintenance of valves, pipes etc, PPEs will be provided to the workers, Frequent work area monitoring will be done ensure fugitive emissions level, Greenbelt will be developed around the plant to arrest the fugitive emission.

H. *Measures for Solvent Recovery.*

Most of the solvent can recovered from the Process reactors. By providing the condenser unit to each reactor at top. Cooling of condenser provided based on the boiling point of the solvent. Condensed solvent then collected in tank for further use.

I. *Odour Control System.*

The charging of Raw material into reactors will be direct by applying a slight negative pressure. For liquid charging direct line will be provided and for solid material or powder, powder transfer system shall also be used if applicable to prevent loss of powder into atmosphere. Liquid material shall be cooled down during summer time to minimize its vapour pressure and control of odour. Proper PPE's (Personal Protective



Equipments) will be provided to workers who are involved in handling of such materials.

J. *Water Environment.*

Fresh water required for the process which will be supplied from the pipelines or tankers. Total water utilization in Pesticide industry will be (Process + Domestic + Greenbelt). The main source of waste water generation is from process, utility, washing. For this treatment unit consist of ETP (Effluent Treatment Plant), MEE Plant (Multiple Effect Evaporator) and RO (Reverse Osmosis) Plant will be installed. The

generated effluent will be send to Treatment unit for treatment. Further treated water will be reuse or recycle in house only. This will achieve Zero Liquid Discharge.

K. *Hazardous / Solid waste management.*

The main source of hazardous waste will be generated after the treatment of waste water. Generating of ETP sludge, MEE salt, Process residue, discarded containers, liners, used lubricating oil. These all hazardous waste will be generated and handled as per the norms (Hazardous waste management Rule 2016).

Table 1 Hazardous / Solid waste Disposal methods

Type of Hazardous waste	Category	Disposal Type
ETP Sludge/ MEE Salt	35.3	Landfill at TSDF site
Process Residue	36.1	Co-Processing/ Preprocessing
Discarded Drums & Liners	33.1	Recycle
Used Oil	5.1	Disposed by registered recyclers

L. *Storage and Transportation of Solid/Hazardous Waste.*

Proper Hazardous waste storage area with impervious flooring and covered shed is provided for storage of solid/hazardous waste. Entire quantity of the hazardous waste is stored in the isolated hazardous waste storage area within premises having leachate collection system and roof cover. The storage yard shall be properly labeled for identification of wastes. Hazardous waste shall not be stored for a period more than 90 days. Records of the same shall be maintained and make them available for inspection. Properly packed & labeled waste shall be transported through dedicated vehicle to authorized TSDF facility.

M. *Noise Control.*

Protective measures will be provided for the machinery and proper maintenance will be done. Oiling and lubrication will be carried out for machines and equipments. For workers who are working in highly noise area will be provided PPE's such as Ear plug & Ear muffs. Transport noise will be reduced by informing the drivers to avoid speeding of vehicles into premises. Highly noise area will have display caution board. Periodic monitoring of noise level as per post-project plan shall be done on regular basis.

N. *Green Belt Development.*

Tree plantation is one of the effective remedial measures to control the air pollution & noise pollution

as well. 33% of project land is required for development of green belt as per Act. Selection of plants as per the area will be done. Some floral species for greenbelt area are: Azadirachta indica (Neem), Albizia lebeck (Siris), Ficus religiosa (Peepal) trees are suitable for evergreen tree in the area.

O. *Occupational Health & Safety.*

Employee or workers health check-up programs will be carried out on annually basis and all records & documents related will be maintained. Necessary PPEs, safety equipments/materials to ensure healthy & safe work conditions will be provided to employees. All employees will be provided with required set of PPEs like ear plug, ear muff etc. where noise levels in excess of 80 dB(A) are regularly generated. Pre-employment health check-up programs shall be carried out for every new employee and all records & documents related will be maintained. Safety documents, procedures, guidelines along with MSDS shall be provided to the associated/concerned personnel engaged in respective operational activities. Training programs & safety audit shall be done on regular basis to prevent impacts of the operational activities on occupational health as well as to improve workplace condition & safe work system. The proponent shall ensure implementation of emergency management plan with provision of fire-fighting equipment/facilities, first aid & medical facilities, evacuation procedures etc. Proponent shall



also ensure proper implementation & functioning as well as assess effectiveness of this safety & emergency system on regular basis throughout the project operation phase.

P. Environment Management Budget Allocation.

Company will release some amount to the Environment department to execute the future plan accordingly. The amount will be divided for Air pollution control, Water pollution control, Noise pollution control, Occupational health, Green belt development, Rain water harvesting.

Q. Post Project Environment Monitoring.

After the Operational phase facilities will be provided to maintain the environmental monitoring equipment in healthy condition. Regular monitoring of pollution monitoring equipment according to the analysis result. Records of air emission, water consumption in the industry on daily basis. Performance of effluent treatment unit will be evaluated on results. Plantation program on green belt area on regular basis. Rain water harvesting for minimize the consumption of fresh water within the industry.

Table 2 Environment Monitoring Plan

Sr. No.	Nature of analysis	Frequency of Analysis	Parameter
1.	Waste water analysis	Monthly by External Agency	pH, COD, BOD, TDS, SS, Oil & Grease etc.
2.	Stack monitoring	Monthly by External Agency	PM, SO ₂ , NO _x , HCl
3.	Ambient air quality	Monthly by External Agency	PM ₁₀ , PM _{2.5} , SO ₂ , NO _x , HCl
4.	Noise level	Monthly by External Agency	Utility, Boiler, Warehouse, Admin Office areas
5.	Health Checkup	As per statutory guidelines	All workers

R. Resource conservation and cleaner production.

For resource conservation and cleaner production rain water harvesting system to be developed to reduce the consumption of fresh water. All the process system should be closed to avoid and leakage. Increasing the efficiency of system to avoid any deviation. Maintaining regular good housekeeping. Segregation of material accordingly to maintain the 5S and good housekeeping in the area.

S Socio- Economic activities.

Industry will do the CSR (Corporate Social Responsibility) in the local villages nearby by providing the some facilities such as Drinking water and Sanitation, Educational activities, Miscellaneous demands of nearby village's etc. providing some general health camp for all villagers, contribution of fund for the development of village.

T. Energy conservation programme.

Energy conservation measures the consumption of the resources which is generally done by external agency. This will reduce the negative impacts on environment. In this selection of machinery and equipments according the actual need. Providing the maximum natural light in the area to reduce the electrical power and also by applying low energy consumption lights such as LED's or CFL's in the premises. Monitoring of energy consumption data.

U. Environment management cell.

Industry will set the environment management cell to implement the environmental management plan, ensuring the constant O&M of pollution control equipments, to minimize the negative impacts on environment. Maintain documentation according the norms. Maintaining of legal document related records. Good environmental practices will be followed and environmental laws.

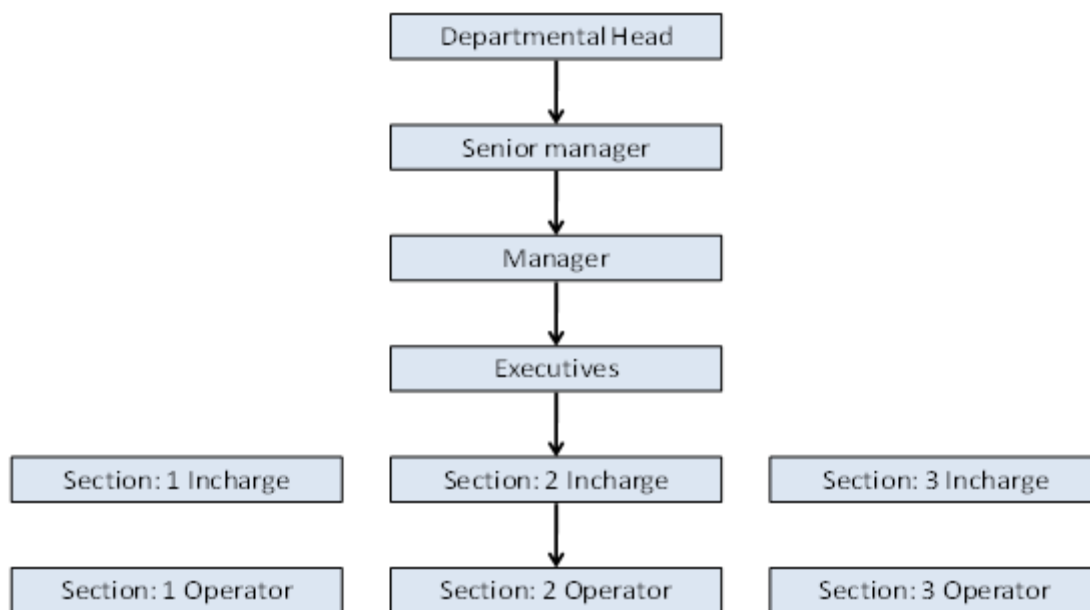


Fig. 1 Hierarchical structure of environment management cell

V. *Reporting system of Non-Compliance/ Violations of Environmental norms.*

The important management tool is to keep the records for smooth operation of industry. Identifying the non compliance or violation with respect to

environmental norms and preparing the reports for response within the time limit. Communication with the other department if required and taking necessary action accordingly.

W. *Framework for continual improvement of Environmental performance of Organization.*



Fig. 2 PDCA (Plan Do Check Act) cycle



III. Conclusion

Pesticides industry grows rapidly these days which directly or indirectly increases the pollution load in the environment. Emission into air, waste water discharge into rivers or oceans cause harmful impact on human and marine bodies. So, to reduce the negative impacts proper environment management plan need to prepare to better sustainability. So, by proper implementation of environment management it is suggested to reduce the negative environmental impact and better sustainability.

References

- [1] Ashok Kumar (2014). *Environmental management plan for chemical industries especially resin manufacturing unit. Journal of Octa journal of Environmental research. Oct.Jour Env. Res. Vol.2(3): 262-273.*
- [2] Kashmira B Patil, Dr. V.D. Salkar (2017). *Environmental management planning for a textile dying industry: A case study. Journal of International journal of engineering in mechanical & civil engineering. Vol.2 Issu4. ISSN (Online): 2456-1290.*