

CHAPTER – 5

ENVIRONMENTAL MANAGEMENT PLAN

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5.1 INTRODUCTION

Industrial development is associated with few positive impacts and few negative impacts on the environment. The negative impacts should not hinder industrial development but they should be properly mitigated.

An environmental management plan (EMP) has been prepared for the proposed Cement plant of M/s. Rudradev Cement Pvt. Ltd. to minimize negative impacts and is formed on the basis of prevailing environmental conditions and likely impacts of this project on various environmental parameters. This plan will also facilitate monitoring of environmental parameters.

EMP includes scheme for proper and scientific treatment and disposal mechanism for air, liquid and solid hazardous pollutants. Apart from this, green belt development, safety aspect of the workers, noise control, fire protection etc. are also included in it.

5.2 PURPOSE OF ENVIRONMENTAL MANAGEMENT PLAN

Various purposes of the environmental management plan are:

- To treat and dispose off all the pollutants viz. liquid, gaseous and solid waste so as to meet statutory requirements (Relevant Pollution Control Acts) with appropriate technology.
- To support and implement development work to achieve environmental standards and to improve the methods of environmental management.
- To promote green-belt development.
- To encourage good working conditions for employees.
- To reduce fire and accident hazards.
- Budgeting and allocation of funds for environment management system.
- To adopt cleaner production technology and waste minimization program.

5.3 DETAILS OF ENVIRONMENTAL MANAGEMENT PLAN

5.3.1 CONSTRUCTION AND COMMISSIONING PHASE

5.3.1.1 AIR ENVIRONMENT

Construction phase will be for a short period and hence the impacts will also be for a short and temporary period. During construction activities, mainly emission of dust and gases from movement of vehicles and construction activity is expected. However, following measures will be taken to reduce / contain such emissions:

- Preparation of paved internal movement roads will be taken up at the initial stage of civil construction work.
- Water will be sprinkled on loose top soil to prevent re-suspension of dust into ambient air due to movement of vehicles etc.
- Separate civil construction material storage yard will be created within the site and it will be enclosed.
- Cement bags will be separately stored under cover in bales. Sand will be stacked under tarpaulin cover.
- Possibility of raising green belt alongwith construction activity will also be explored.
- Transport vehicles and construction equipments / machineries will be properly maintained to reduce air emissions.
- Vehicles and equipments will be periodically checked for pollutant emissions against stipulated norms.
- Idle running of vehicles will be minimized during material loading / unloading operations.
- Exhaust vent of DG set will be kept at proper height to ensure quick dispersal of gaseous emissions.
- All construction workers will be provided appropriate PPEs like dust mask, ear plug, helmet, safety belt etc. and made to wear them during working hours.

5.3.1.2 WATER ENVIRONMENT

Maximum water requirement for construction purpose is estimated to be approximately 10 cu. mt. per day and water requirement for domestic purpose of construction work force is estimated to be approximately 3 cu. mt. per day. Thus, total water requirement during construction period will be approximately 13 cu. mt. per day.

Water requirement during construction phase will be full filled by ground water using bore well located within premises. Water quantity being small, no major impact on existing water resources of the study area is envisaged. Further, there will be no housing facility at site for construction workers and hence a major source of impact on water environment will be avoided. Proper and sufficient sanitary facility will be provided to construction workers to maintain hygienic conditions at site. Storm water drain compatible with the local hydrological pattern of the area is provided to carry - off any run - off or storm water from the premises and this water will be harvested through ground water recharge or storage. Care will be taken during construction work not to create any obstruction / dips in the topography which can lead to accumulation of water within premises leading to undesirable consequences like health and hygiene problems etc.

5.3.1.3 SOLID WASTE

Main solid waste generation during construction phase will be construction debris like rubble, brick bats, debris, steel scrap, wooden scrap, sand, gravel etc. However, these materials are inert in nature and will not result into leaching of any substance or constituent.

These materials will be properly sorted and will be used within premises for filling of low lying areas. Wooden scrap, steel scrap will be given to scrap dealers.

On completion of civil work, all debris etc. will be completely removed from site to avoid any incompatibility with future use.

5.3.1.4 NOISE ENVIRONMENT

Following measures are proposed during construction period to mitigate adverse impacts:

- Construction machinery and vehicles will undergo periodic maintenance to keep them in good working condition.
- All machineries to be used for construction purpose will be of highest standard of reputed make and compliance of noise pollution control norms by these equipments will be emphasized by company.
- Acoustic laggings and silencers will be used in equipments wherever possible.
- Feasibility of putting up acoustic enclosure / temporary barrier around areas with high noise levels will also be explored.
- All construction workers working in high noise areas will be provided appropriate PPEs like ear muffs and made to wear them during working hours.
- Possibility of raising green belt alongwith construction activity will also be explored so as to serve as a noise barrier.

5.3.1.5 LAND ENVIRONMENT

Following steps are proposed to take care of impact of construction activity on project land area :

- On completion of civil work, all debris etc. will be completely removed from site to avoid any incompatibility with future use.
- Other material like paints, diesel etc. will be properly stored and handled to prevent any spillage on land.
- All the wastes will be stored at a designated site within the premises to prevent scattered discharge on land.

5.3.1.6 ECOLOGY

As the proposed expansion will be within premises no major tree cutting exercise will be there and no major impact on ecology is anticipated.

However, possibility of raising of green - belt along with construction activity will be explored so that greening of area can be started at the beginning of proposed expansion project.

5.3.1.7 SOCIO-ECONOMIC

As there will be no temporary housing colony for construction workers, no socio - economic impact due to the same is envisaged.

Over - all socio - economic effect of construction phase will be positive due to direct and indirect employment opportunity for the local population.

5.3.2 OPERATION PHASE

Operation phase of any industry being longer in duration and because of its' potential to create continuous impacts, is much more important from the environmental impact point of view and a comprehensive and effective EMP has to be prepared and implemented to safe-guard environmental concerns during operation phase of any unit.

5.3.2.1 AIR ENVIRONMENT

The incremental GLCs of pollutants i.e. PM due to the proposed project have been predicted to be within the CPCB norms.

Following measures are proposed to mitigate negative impact of operation phase of the project on the surrounding air environment:

- All transfer points will have bag filter attached to them to control and capture dust emission.
- Height of all the stacks will be as per statutory requirement. All the stacks will have stack monitoring facility (SMF) consisting of sampling port-hole, platform and access ladder.
- Adequate spares of critical components of dust collection systems will be kept to ensure trouble - free operations and continuous compliance to emission norms.
- A comprehensive plan for fugitive emission control based on CPCB guidelines is prepared and its details are given following section.
- All stacks will be provided with on-line CPM (continuous particulate measurement) analysers and interlocking system with production plant will be provided which will automatically shut - off production activities when the emission concentration exceeds the set limit.
- Possibility of use of vehicles using cleaner fuel like CNG will be explored and if found feasible will be implemented on a large scale.
- Transport vehicles will be properly maintained to reduce air emissions.
- Vehicles will be periodically checked for pollutant emissions against stipulated norms.
- Idle running of vehicles will be minimized during material loading / unloading operations.

Action plan to control secondary fugitive emissions as per CPCB guidelines:

(A) Unloading section :

- Enclosure (of flexible material) will be provided towards unloading side upto suitable height.
- Bag filter will be provided to effectively capture dust emission.

(B) Material Handling Section And Transfer Points

- All transfer point locations will be fully enclosed but will have access doors. Doors will be kept closed during operation.
- All transfer points will have bag filters.

(C) Storage Of Clinker, Gypsum And Fly Ash

- Gypsum storage will be done under covered shed and side walls will be provided on minimum two sides upto roof level.
- Clinker and fly – ash will be stored in concrete silos.
- Fly ash will be transported in closed trucks / tankers and will be mechanically transported into silos.
- All silo tops will be equipped with bag filters.

(D) Cement Packing Section

- Packing machines will be provided dust extraction system in the form of bag filters.
- Adequate ventilation will be provided in packing hall to provide dust free work environment.
- Spilled cement from the packing machine will be collected properly and sent for recycling. Arrangement for vacuum sweeping will also be provided.

(E) Roads

- All internal roads will be of concrete and will be well maintained. Repairing work required, if any, will be carried – out immediately.
- Speed limit inside the plant premises will be fixed to prevent dust emissions.

Other Measures:

- Company will also designate Environment Manager, who will look after fugitive dust emission control including emergency situations. He will be adequately trained to handle the responsibility of control of fugitive emissions.
- All personnel working on fugitive emission control systems will be given regular training on operation and maintenance of the system.
- A proper record and documentation of fugitive dust control system will be kept.
- All other guidelines of CPCB too will be complied.

5.3.2.2 WATER ENVIRONMENT

Total water requirement for operation phase will be 23 KLD and full filled by ground water using bore well located within premises. To compensate and mitigate impact on ground water availability in the area due to continuous withdrawal of ground water by the project to the tune, a comprehensive rain water recharge scheme will be developed.

Proper and sufficient sanitary facility will be provided to construction workers to maintain hygienic conditions at site. The sewage is treated in a common sewage treatment plant. While the purified water will be reused for the cement manufacturing process, the sewage sludge, which is an excellent fertilizer, shall be set out in the areas where reforestation is anticipated.

5.3.2.2.1 ACTION PLAN FOR RAINWATER HARVESTING

Rain Water Harvesting is a way to capture the rain water when it rains, store that water above ground or charge the underground and use it later.

Rainwater Harvesting System:

Rooftop rainwater harvesting: Rooftop rainwater from the admin area, store area and plant area is flown down to the ground and then taken to storm water drains. The storm water drains are intercepted at strategic locations and rainwater is diverted into recharge wells. The recharge wells are provided with recharge bores to facilitate the recharge. Layers of filtering material like boulders, pebbles and coarse sand inside the recharge well ensure efficient filtration.

5.3.2.3 SOLID WASTE

- All the solid wastes will be stored separately in a “Solid Waste Storage Area” within the factory premises. It will have non -percolating R.C.C. floor and covered roof. The storage area will have proper illumination and ventilation and equipped with fire extinguisher device wherever required. A sign - board will be put out-side the storage area marked “Solid Waste Storage Area” and “Danger”.
- Non - hazardous dried bio-sludge from septic tank will be rich in nutrients and hence will be used as fertilizer and nutrient within premises for gardening.
- Hazardous waste i.e. used lubricating oil will be given to CPCB registered recycler / re-processor of oil.

5.3.2.4 NOISE ENVIRONMENT

Following precautionary measures will be adopted to control the noise level :

- Roof of buildings will be constructed of reinforced concrete or of lightweight concrete
- Walls and ceilings of building will be lined with sound absorbing materials, wherever required
- Sheet metal casting and housing will be insulated with sound absorbing materials
- Noise generating sources and their platforms will be maintained properly to minimize noise vibrations generated by them
- Personnel working near the noisy machines in different plant locations, will be provided with well designed ear muffs / plugs (effective noise reduction 10-15 dBA)

- Cement mill premises will have proper ventilation.
- Green belt will be developed to act as a noise barrier.
- Noise barriers/ shields in the form of walls, beams will be provided around the units wherever found feasible
- Training to personnel will be imparted to generate awareness about effects of noise and importance of using PPEs .

5.3.2.5 LAND ENVIRONMENT

There will be no major generation of hazardous waste from the project.

A small quantity of used lubricating oil will be generated which will be properly stored and disposed off.

There will be no disposal of industrial effluent on land as small quantity of treated industrial effluent will be re-used. Only treated sewage will be used on land for gardening purpose.

Thus, no impact on land is envisaged due to discharge of gaseous emission, solid waste or liquid effluent from the proposed unit.

5.3.2.6 BIOLOGICAL ENVIRONMENT

5.3.2.6.1 GREEN BELT DEVELOPMENT

Tree plantation is one of the effective remedial measures to control the Air pollution and noise pollution. It also causes aesthetics and climatologically improvement of area as well as sustains and supports the biosphere. It is an established fact that trees and vegetation acts as a vast natural sink for the gaseous as well as particulate air pollutants due to enormous surface area of leaves. It also helps to attenuate the ambient noise level. Plantation around the pollution sources control the air pollution by filtering the air particulate and interacting with gaseous pollutant before it reaches to the ground. Tree plantation also acts as buffer and absorber against accidental release of pollutants.

In Green belt area about 1000 tree per acre of land shall be planted, the selection of tree species suitable for plantation at the industry shall be governed by guiding factors as stated below

- The trees should be tolerant to air pollutants present in the area
- The trees should be able to grow and thrive on soil of the area, be evergreen, inhabitant, having minimum of leaf fall.
- The trees should be tall in peripheral curtain plantation and with large and spreading canopy in primary and secondary attenuation zone.
- The trees should possess extensive foliar area to provide maximum impinging surface for continued efficient adsorption and absorption of pollutants.
- The trees should be fast growing and indigenous and should maintain ecological, land and hydrological balance of the region.
- It is also recommended to plant few trees, which are sensitive to air pollution, as air pollution indicator.
- It is also recommended to carry out extensive plantation within premises.
- Some portion of Rooftops/terraces area of the building will be covered with plantation.
- Keeping in view the climatic conditions, status of soils and vegetation types in and around the project area the species shall be selected for proposed green belt development.

5.3.2.7 SOCIO - ECONOMIC ENVIRONMENT

A comprehensive plan for socio - economic uplift of the area has been prepared by M/s. Purbanchal Cement Ltd. and presented in chapter-8.

5.3.2.8 HEALTH AND SAFETY

Following measures will be adopted in the plant:

- Regular inspection and maintenance of pollution control systems.
- All measures related to safety such as safety appliances, training, safety awards, posters, slogans will be undertaken.
- The workers exposed to noisy sources will be provided with ear muffs/plugs.

- Adequate facilities for drinking water and toilets will be provided to the employees.
- The fire and safety equipment will be properly utilized and maintained regularly.
- The health of the workers will be regularly checked by a well qualified doctor and proper records will be kept for each worker.

5.3.2.9 GENERAL CONSIDERATIONS

For good house keeping of the proposed project, following measures will be planned:

- Maintaining cleanliness of roads to prevent accumulation of dust and waste material.
- Inculcating positive attitude among employees for good house -keeping.
- Maintaining hygienic conditions in canteens, near drinking water source and toilets.

5.3.2.10 CONCEPT OF WASTE-MINIMISATION, RECYCLE/REUSE/RECOVER TECHNIQUES, ENERGY CONSERVATION, AND NATURAL RESOURCE CONSERVATION

Waste-minimisation: Process optimization by using latest technology equipment.

Recycle/reuse/recover: Close circuit process water cooling system for plant. Dust collected from air pollution control equipment will be 100% recycled in the in Cement manufacturing process. Other solid wastes i.e. used/spent oil shall be Reuse in plant for lubrication or sold to authorize recyclers. However no waste is generated by Plant Operation.

Energy Conservation Measures: Latest Technology has been selected for Grinding of Clinker and Slag. For grinding of Clinker and Slag, which have minimum specific power consumption. In order to conserve Energy, the following measures have been taken right at the time of selection of Equipments and Technology:

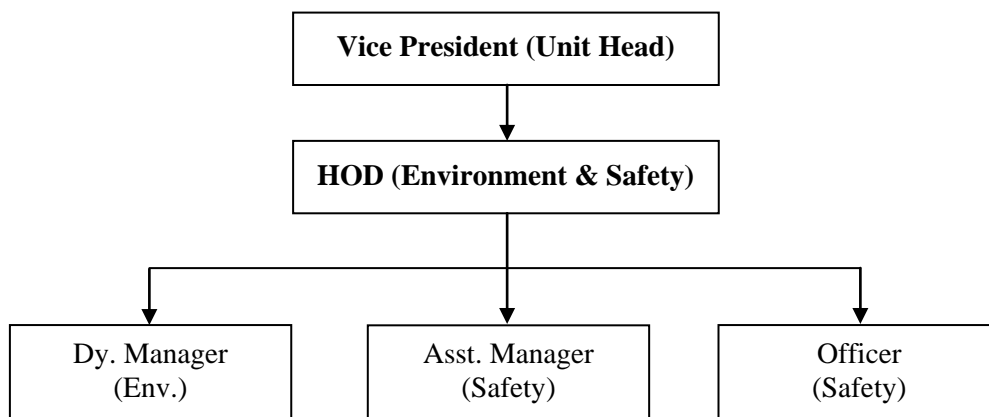
- Control of Fans with frequency converters instead of Dampers.
- To go for highly energy efficient Pulse Jet Bag Filters for the cement mill.
- To install highly efficient, high efficiency Air Separators in the mill.
- Minimize use of compressed Air, by use of proper compressed Air pipe line design in the plant.
- The lighting of the complete plant will be controlled with light intensity controllers.
- Air leakages will be to a bare minimum with proper design of Air ductings and casings for cement mill.
- False air leakages in the plant will be arrested by carrying out regular checks.

Natural Resource Conservation: By using Slag and Fly ash, natural resource such as limestone is conserved. To conserve ground water rain water harvesting will be carried out to store rain for future use and also to recharge ground water.

5.4 ENVIRONMENTAL MANAGEMENT CELL

In addition to preparing an EMP, it is also necessary to have a permanent organizational set up to ensure its effective implementation. Hence, M/s. Rudradev Cement Pvt. Ltd. will create a team consisting of officers from various departments to co-ordinate the activities concerned with management and implementation of the environmental control measures. This team will undertake the activity of monitoring the stack emissions, ambient air quality, noise level etc. either departmentally or by appointing external agencies wherever necessary. Regular monitoring of environmental parameters will be carried - out to find out any deterioration in environmental quality and also to take corrective steps, if required, through respective internal departments.

The Environmental Management Cell will also collect data about health of workers, green belt development etc. Organogram of the Environmental Management Cell is presented in figure-5.1.

FIGURE - 5.1 AN ORGANOGRAM OF ENVIRONMENT MANAGEMENT CELL

The cell will also be responsible for monitoring of the plant safety and safety related systems which include:

- Checking of safety related operating conditions.
- Visual inspection of safety equipments.
- Preparation of a maintenance plan and documentation of maintenance work specifying different maintenance intervals and the type of work to be performed.
- Other responsibilities of the cell will include :
- Conduct and submit annual Environmental Audit. A SPCB registered agency will be retained to generate the data in respect of air, water, noise, soil and meteorological data and prepare the Environmental Audit report. This report will be submitted to the SPCB every year before 30th September. Timely renewal of Consolidated Consents & Authorization (CC & A) will also be taken care of.
- Submitting environmental monitoring report to SPCB. Data monitored by the cell will be submitted to the Board regularly and as per the requirement of SPCB. The cell will also take mitigative or corrective measures as required or suggested by the Board.
- Keeping the management updated on regular basis about the conclusions / results of monitoring activities and proposes measures to improve environment preservation and protection.
- Conducting regular safety drills and training programs to educate employees on safety practices. A qualified and experienced safety officer will be responsible for the identification of the hazardous conditions and unsafe acts of workers and advise on corrective actions, organise training programs and provide professional expert advice on various issues related to occupational safety and health.
- Conducting safety and health audits to ensure that recommended safety and health measures are followed.

5.5 MONITORING OF ENVIRONMENT

A regular monitoring of environmental parameters like air, water, noise and soil as well as performance of pollution control facilities and safety measures in the plant are important for proper environmental management of any project. Therefore, the environment and safety cell will handle monitoring of air and water pollutants as well as the solid wastes generation as per the requirements of State Pollution Control Board and Central Pollution Control Board. Proposed monitoring schedule for environmental parameters is given in following table-5.1.

ADVANTAGES OF MONITORING:

Monitoring of various parameters will be carried out regularly to :

- find out pollution level inside the plant and in nearby area
- compile pollution related data for remedial measures
- find out efficiency level of pollution control measures adopted

TABLE - 5.1 MONITORING SCHEDULE FOR ENVIRONMENTAL PARAMETERS

SR. NO.	ATTRIBUTE	PARAMETERS	FREQUENCY OF MONITORING
1.	Stack Monitoring	SPM, SO ₂ , NO _x	Every Month or as specified by State pollution Control Board
2.	Ambient air quality within premises	PM, SO ₂ , NO _x , CO	Every Month or as specified by State pollution Control Board
3.	Ambient air quality outside premises	PM, SO ₂ , NO _x , CO	Once in a year or as specified by State pollution Control Board
4.	Water monitoring	Ph, Temp., TDS, TSS, Hardness, BOD, COD, heavy metals, etc.	Once in a year or as specified by State pollution Control Board
5.	Noise monitoring within premises	Noise levels	Every Month or as specified by State pollution Control Board
6.	Noise monitoring outside premises	Noise levels	Every Month or as specified by State pollution Control Board

Laboratory Facilities

Laboratory facilities to analyze above stated parameters will be provided to cater to the needs of all environmental control activities, all necessary equipments for the monitoring and analysis of environmental parameters shall be made available. List of laboratory equipments required for environmental monitoring is given in following table-5.2.

TABLE-5.2 LABORATORY EQUIPMENTS FOR ENVIRONMENTAL MONITORING

SR. NO.	NAME OF EQUIPMENTS	DESCRIPTION	MAKE	MODEL	QTY.
1.	High Volume Sampler(RDS)	For ambient air quality Monitoring	Envirotech	APM-460BL	3
2.	Stack Sampler	Stack monitoring	Vayubodhan Upkaran	VSS1	1
3.	Sound Level Meter	Sound Level Monitoring	Lutron	SL4010	1
4.	Digital Anemometer	Wind Speed Measurement	Lutron	AM4201	1
5.	Water Testing Kit	Water Quality Testing	Scientific	Portable	1
6.	Rain Gauge	Rain fall Measurement	Scientific	-	1
7.	TDS meter (Digital)	TDS test	ESICO	651E	1
8.	PH meter (Digital)	TDS test	ESICO	111E	1
9.	Hygrometer	Humidity Measurement	BARIGO	-	2
10.	Incubator for BOD test	BOD	Scientific	-	1
11.	Max.-Min Thermometer	Temperature measurement	G.H.Zeal Ltd.	-	1
12.	Mercury Thermometer	Temperature measurement	Labequip Inst.	-	1

5.6 PROPOSED BUDGETORY PROVISIONS FOR EMP

Adequate budgetary provisions have been made by management for execution of environmental management plans. The details of total capital and recurring (per annum) for environmental pollution control measures are given in following table-5.3.

TABLE - 5.3 TOTAL CAPITAL AND RECURRING COST FOR EPCM

SR. NO.	ITEM	RS. IN LAKHS
CAPITAL EXPENDITURE:		
1.	Air Pollution control equipment	320.00
2.	Water Treatment	10.00
3.	Emission Monitoring equipments	8.00
4.	Green belt development	10.00
	Total Capital Expenditure	348.00
RECURRING EXPENDITURE PER ANNUM:		
6.	Recurring expenditure on environmental management cell and on pollution control systems	120.00