CHAPTER -X

Environmental Management Plan

10.0 INTRODUCTION

An EMP is prepared including all the administrative aspects of ensuring that mitigation measures are effectively monitored, after approval of the EIA. The final EIA/EMP of the proposed project will be submitted to SEAC, Uttar Pradesh, for obtaining environmental clearance for the project, in accordance with Environment Impact Assessment (EIA) Notification No. 1533 dt.14.09.2006. The approved Environment Management Plan will be implemented throughout the life of the project and half-yearly monitoring report showing the compliance status of conditions stipulated in Environmental Clearance letter will be submitted to MoEF & CC in every six months.

An Environmental monitoring programme has been prepared for the proposed project for periodical assessment of effectiveness of implementation of Environment Management Plan and to take corrective measures in case of any degradation in the surrounding environment.

To mitigate the adverse impacts which are likely to be caused due to the mining operation and overall scientific development of local habitat, environmental management plan (EMP) has been formulated and integrated with the mine planning. The details of the anticipated impacts and mitigative measures have been discussed in Section IV of this report, based on the results of present environmental conditions and environmental impact assessment. The EMP has therefore been made considering implementation and monitoring of environmental protection measures during and after mining operations.

The mitigation measures which reduce the impact have already been identified earlier in Section IV. To minimize the adverse impact, certain additional measures are enumerated below for implementation.

10.1 ENVIRONMENTAL MANAGEMENT PLAN (EMP)

S. No.	Particular	Management Plan
1.	Land Environment	➢ Soil quality will be monitored from strategic locations and analysis will be done once in every two years. ➢ To prevent erosion, moving the road or footpath will be kept away from the river's edge. ➢ Care will be taken to ensure that ponding is not formed in the river bed.
2.	Water Environment	Based on baseline data, corrective measures will be taken. ➢ Measurement of water level fluctuations to assess impact of mining activity on the water table depletion in close proximity of dug wells and bore wells. ➢ Regular monitoring and analysis of water samples at strategic locations will be carried out to monitor the water quality of the area.
3.	Air Environment	**Unpaved Roads** ➢ Water sprinkling will be done for dust suppression. ➢ Leveling of roads will be done to maintain the uniform speed of the trucks/ tippers. **Paved Roads** ➢ The roads will be maintained.

		➢ Regular cleaning will be done to reduce the chances of road dust to become airborne. ➢ Water sprinkling will be done on a fixed stretch of paved road passing through the villages. ➢ Adequate transportation routes will be decided to transport the mineral and will be maintained properly. ➢ Speed breakers will be constructed to restrict the speed of transporting vehicles. However, limiting of vehicular speed will be adopted. **Transportation** ➢ The vehicles will be maintained to control the air emissions. ➢ The speed of the vehicles will be maintained uniform. ➢ PUC certified vehicles will be used. ➢ The loaded vehicles will be covered with tarpaulin. ➢ Over loading will be avoided. **Other Measures** ➢ Personal Protective Equipments like dust mask, ear plugs, ear muffs etc. will be provided to the persons/ workers. ➢ Regular monitoring and analysis will be carried out through collection of air samples from strategic monitoring sites. If the parameters go beyond the permissible tolerance limits, corrective regulation measure will be taken.
4.	Noise Environment	➢ Noisy activities will be scheduled at normal working hours (daytime hours) to the extent possible when the environment is least sensitive to noise impact. ➢ Regular inspection and maintenance of vehicles and equipment will be performed to ensure efficiency and worn parts will be replaced. ➢ Limited numbers of equipments will be used on-site. ➢ The vehicles will be maintained in good condition and overloading will be avoided. ➢ Speed limits will be enforced in relation to road conditions and on-route communities. ➢ Road surfaces will be maintained in good condition to reduce tyre noise and to assure continuous traffic flow to avoid prolonged idling. ➢ Noise monitoring will be conducted on a regular basis to determine compliance with noise criteria. ➢ Personal protective devices i.e., earmuffs and earplugs will be provided to workers, working in high noise areas. ➢ Periodical medical checkup will be organized for all workers to check any noise related health problems.
5.	Occupational Health and Safety	**Heat & Light** ➢ The mine site will have adequate drinking water supply so that workers do not get dehydrated. ➢ Lightweight and loose fitting clothes having light colors will be preferred to wear. ➢ Rigorous exercise and more physical activities will be avoided in hot weather. **Noise** ➢ Noise exposure measurements will be taken to determine the need for noise control strategies. ➢ The personal protective equipment will be provided for mine workers. ➢ Supervisor will be instructed for reporting any problems with

		hearing protectors or noise control equipment. ➢ At noisy working activity, exposure time will be minimized. ➢ Machineries will be labeled with noise levels. **Dust Control** ➢ Dust generating sources will be identified and proper control measure will be adopted. ➢ Face mask will be provided during mining activity. ➢ Periodic medical examinations will be provided for all workers. ➢ Awareness program will be organized for workers.
6.	Biological Environment	➢ Mining activities will not cause any harm to riparian vegetation cover as the working will not extend beyond the offset left against the banks. The green belt development will be carried out by Project Proponent.
7.	Socio-Economic Aspect	➢ Direct employment to the local people which help to sustain their livelihood. ➢ During the operational phase by the implementation of certain CER activities indirect employment will also generate. ➢ Improved livelihood. ➢ Training will be provided to the local persons ➢ Awareness programme will be organized.

Proper environmental management plan is proposed for "Sand/morrum" mining project to mitigate the impact during the mining operations.

a. Care will be taken that no labour camps will be allowed on river bed.

b. Care will be taken that no cooking, or burning of woods will be allowed in the adjoining area.

c. Prior to mining, short awareness program will be conducted for labours to make them aware to way of working.

d. If some causality or injury to animal occurs, it will be informed to forest department and proper treatment will be given.

e. No tree cutting, chopping, lumbering, uprooting of shrubs and herbs will be allowed.

f. Maintenance of roads will be done from time to time.

g. Corridor movement of wild mammals (If exists) will be avoided.

h. Care will be taken that noise produced during vehicles movement for carrying sand/morrum is within the permissible noise level.

i. No pilling of RBM material will be in adjoining area.

j. If wild animals are noticed crossing the river bed, they will not be disturbed or chased away, instead the labours will move away from their path.

k. The persons whose standing crops get destroyed/damaged by the wild animals can approach the DFO, who on investigation can allow a suitable compensation to be paid.

10.2 ENVIRONMENTAL MANAGEMENT PLAN IMPLEMENTATION

Environmental Management Plan serves no purpose if it is not implemented with true spirit. Some loopholes in the EMP can also be detected afterwards when it is implemented and monitored. Thus, an implementation and monitoring programme has to be prepared.

The major attributes of environment are not confined to the mining site alone. Implementation of proposed control measures and monitoring programme has an implication on the surrounding area as well as for the region. Therefore, mine management should strengthen the existing control measures as elaborated earlier in this report and monitor the efficacy of the control measures implemented within the mining area relating to the following specific areas for eco-friendly mining plan:

a. Collection of air and water samples at strategic locations with frequency suggested and by analyzing thereof. If the parameters exceed the permissible tolerance limits, corrective regulation measure will be taken.

b. Collection of soil samples at strategic locations once in every two years and analysis thereof with regard to deleterious constituents, if any.

c. Measurement of water level fluctuations in the nearby ponds, dug wells and bore wells.

d. Regular visual examination will be carried out to look for erosion of river banks. Any abnormal condition, if observed will be taken care of.

e. Measurement of noise levels at mine site, stationary and mobile sources, and adjacent villages will be done in every six months for the first two years and thereafter once a year.

f. Plantation/afforestation as should be done as per program i.e along the road sides and near civic amenities, which will be allotted by Government bodies as it is not feasible to plant trees near the mine lease area. Post plantation, the area will be regularly monitored in every two years for evaluation of success rate. For selection of plant species local people should also be involved.

Mine management will be in regular touch with local surrounding villages to update the various developmental schemes made by them. They will also consider any immediate requirement, which could be taken care of in near future.

An Environmental Management Cell (EMC) is envisaged which will be responsible for monitoring EMP and its implementation. EMC members should meet periodically to assess the progress and analyze the data collected during the month. The EMC will function as per Fig. 6.1(Section VI).

EMC will be in regular touch with State Pollution Control Board and Indian Bureau of Mines and send them annual progress report. Any new regulations considered by State/Central Pollution Control Board for the industry will be taken care of by it.

10.3 PROPOSED SET UP

Keeping the utility of monitoring results in the implementation of the environmental management program in view, an organizational chart has been proposed, headed by General Manager as shown in Fig. 6.1(Section VI).

The said team will be responsible for:

a. Collecting water and air samples from surrounding area and work zone monitoring for pollutants.

b. Analyzing the water and air samples.
c. Implementing the control and protective measures.
d. Co-coordinating the environment related activities within the project as well as with outside agencies.
e. Collecting statistics of health of workers and population of surrounding villages.
f. Monitoring the progress of implementation of environmental management program.
g. The laboratory will be suitably equipped for sampling/testing for various environmental pollutants.

10.4 MITIGATION MEASURES FOR HYDROLOGICAL CHANGES OF RIVER

Extraction of bed material in excess of natural replenishment by upstream transport:

The unsustainable extraction of river bed material may cause degradation of river bed, which leads to increased turbidity during monsoon season. Increase of turbidity in the river water can affect the river water quality.

Bed degradation changes the morphology of the channel:

Unsustainable extraction of river bed material can cause change of river course. Even if the bed material extraction activity is conducted away from the active river channel during low water periods, substrate stability, Channel morphology and channel pattern outside the excavated area's perimeter could be affected during subsequent high water events. As active channels naturally meander, the channel may migrate into the excavated area.

Mitigation Measures:

- ✓ Buffer strips must be used to control stream flow away from the site.
- ✓ Extraction of riverbed material should be prohibited at meandering portion of the river.
- ✓ The removal rate should be as per natural replenishment rate of the river

10.4.1 RIVER BANK PROTECTION MEASURES

The river bank may be damaged due to access ramps to river bed, causing eyesore, damage to the vegetation, soil erosion, and possible inducement of changed river course.

Mitigation Measures:

- Minimum numbers of access roads to river bed for which cutting river banks should be avoided and ramps are to be maintained. Access points to the river bed are to be decided based on least steepness of river bank, less riparian vegetation and least human activity. Where Steepness cannot be avoided, access ramps should be constructed.
- Haulage roads parallel to the river bank and roads connecting access (ramps) to the river bed shall be away from bank.
- No sand shall be collected within 7.50 m from bank, especially from outer bank of the meandering river.
- Safe clearance should be determined by the height of the river bank and thickness of sand to be extracted from the close vicinity of that bank.
- Excessive plantation on river bank and haulage route.

10.5 STATUTARY REQUIREMENT AND METHODOLOGY DURING MINING

- ✓ No drilling and blasting.
- ✓ Mining in most accumulated sites/area (sand dunes).
- ✓ Mining in day hours and manual (shovels, spade, sieve etc.)
- ✓ No dredging in stream
- ✓ Mining parallel to the stream.
- ✓ No change in stream channel.
- ✓ The depth of mining will be restricted to the proposed depth of 3.00 m bgl.
- ✓ Only 1 or 2 ramp will be prepared for transportation of Sand.
- ✓ No pilling of minor mineral in core zone.
- ✓ Mining quantity will be as per granted Letter of Intent & approved mining plan.
- ✓ Mining activity will be done by maintaining safe distance from water intake points, bridges and / or embankments to maintain their structural safety.
- ✓ Safe distance will be maintained from Water Reservoir, and Monuments of archeological importance from ML area if applicable.
- ✓ Sand will be mined at a distance of 7.50 m of width of river, from the river bank.
- ✓ No in-stream sand mining will be done to maintain undisturbed flow of river water.
- ✓ There is no demarcated breeding ground of aquatic animal like hill stream fishes, turtles, gastropods; bivalves etc. are present in the vicinity of ML area. However if such breeding ground recorded during mining operation, it will be protected as per the Forest Department Guideline.

10.6 BUDGET ALLOCATION FOR EMP IMPLEMENTATION

Annual budget for EMP is very essential for successful implementation of EMP. As there are no pollution control systems, no capital cost of Pollution Control systems are envisaged. Costs will be annual operating costs as given below. The fund allocated will not be diverted for any other purposes and the top management will be responsible for this. The total EMP cost is approx Rs. 5,14,000.00/annum.

10.7 MONITORING SCHEDULE AND ACTIVITIES

To evaluate the effectiveness of environmental management program regular monitoring of the important environmental activities to be monitored are shown in Table. 6.1. (Section VI).

10.8 Environmental Monitoring Schedule

Monitoring of the post project environment is of importance and legal requirements. Regular monitoring of the environment helps in assessing the benefits of implementation of environment management plan. Proposed project will adopt an effective monitoring plan with proper schedule as a step forward to ensure better environment management practice.

This would be attained by collection of samples of water, stack emission, ambient air and work zone environment and analyzing the samples by various methods. Noise level would be

monitored by at sensitive points of manufacturing areas, where the fugitive emission would be visibly more.

The ambient air quality may be monitoring at four location, with one at the proposed project as the centre points and the remaining three at 120^0 to each other in down wind direction.

The location would change with the season and the wind pattern.

The environmental monitoring must be done as per the schedule summarized in table below.

Figure 10.2 Environment Monitoring Schedule

Environmental Component	**Frequently of monitoring / Sampling**	**Parameter to be covered**
Ambient Air Quality monitoring	Six monthly as per requirements	PM_{10}, $PM_{2.5}$, SO_2, NO_2 and CO
Ambient Noise Level monitoring	Six monthly as per requirements	Day time & Night time noise level in dB(A)
Ground water/ Drinking water quality	Six monthly as per requirements	pH, Turbidity, Total, Dissolve Solids, Total hardness, calcium, Magnesium, Iron, Total residual free chlorine, Alkalinity, Coliform (MPN Value) & E. Coli.
Surface Water Quality	Six monthly as per requirements	pH, Turbidity, Total, Dissolve Solids, Total hardness, calcium, Magnesium, Iron, Total residual free chlorine, Alkalinity, Coliform (MPN Value) & E. Coli.
Soil Quality	Six monthly as per requirements	Soil texture, alkalinity, pH porosity,

Table 10.3 Environmental Budget

S. No.	**Particulars**	**Details**	**Total Cost (Rs.)**	
			Capital (Rs)	Recurring/Ys (Rs)
1.	Afforestation Nos of trees (@5 plants/ha) Plantation on Haulage Road –120 Compensatory plantation – 20 Total = 140	Rs 1000/Sap (including tree guard and maintenance etc.)	1,40,000	60,000
2	Water Demand for plantation (@ 1 lit/plant)	0.140 KL		10,000
3.	Dust Suppression on haulage road	3.60KL		1,80,000

	(0.90 km) @ 1.0 lit in 1 sqm. (2 time a day)			
5.	Portable toilets			60,000
6.	Color coded Dust Bins as per MSW rule 2016		10000	4,000
7.	Six monthly monitoring and compliance			50,000
Total			**1,50,000**	**3,64,000**

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