SECTION-6

ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

6.0 GENERAL

This section provides brief description of environmental issues, mitigation measures to eliminate and/ or reduce environmental and social impacts to an acceptable level, institutional arrangement for the implementation of the mitigation measures and also carrying out environmental monitoring for air quality, water quality, and noise pollution related parameters. A budgetary plan is also to be developed indicating estimated costs to be incurred to mitigate potential negative impacts of the proposed Project.

6.1 OBJECTIVES OF THE ENVIRONMENTAL MANAGEMENT PLAN

The Environmental Management Plan (EMP) will help CCBPL to address the future likely negative impacts of the proposed Project, enhance the Project's overall benefits and introduce standards of good environmental practice. The primary objectives of the EMP are:

- Define the responsibilities of the Project Proponent and other role players during the design, construction and the operational phases;
- Facilitate the implementation of the mitigation measures by providing technical details of each Project impact, and proposing an implementation schedule of the proposed mitigation measures;
- Develop a monitoring mechanism and identify monitoring parameters to ensure that all the proposed mitigation measures are completely and effectively implemented;
- Identify training requirements at various levels and provide a plan for the implementation of training sessions;
- Identify the resources required to implement the EMP and outline corresponding financing arrangements; and
- Providing a cost estimate for all the proposed EMP actions.

Role of Contractor in EMP

The Contractor will be responsible for the implementation of the proposed Project under the supervision of the CCBPL. The Contractor will be bound to follow the provisions of the contract documents especially about environmental protection and apply good construction techniques and methodology without damaging the environment. Obligation of the contractor, to safeguard, mitigate adverse impacts and

rehabilitate the environment should be addressed through environmental provisions in the contract document and through adequate implementation at site.

6.2 STAFF AND TRAINING

6.2.1 Environmental Committee and its Responsibilities

CCBPL will form up an Environmental Committee (EC), which will be responsible for the environmental management and supervisory affairs during the construction phase of the proposed Project.

The responsibilities of the Environmental Committee (EC) are as follows:

- To ensure implementation of all the proposed mitigation measures during and after the proposed Project;
- To organize routine monitoring of motor vehicle emissions, air quality, traffic, noise and vibration; etc. In case, the noise and emission levels exceed the acceptable levels; a penalty or ban must be enforced;
- To develop operational guidelines and implementation schedule;
- Receiving complaints from residents and institutions and assisting the local environmental authority including liaison with EPA, KPK;
- To ensure that the proposed Project is implemented in an environmentally friendly manner, causing least harm to the existing environment including flora and fauna, sites of religious and cultural significance etc.

6.2.2 Technical Training Programs

In order to raise the level of professional and managerial staff, they need to upgrade their knowledge in the related areas. The Environmental Committee should play a key role in this respect and arrange the trainings.

Contractor's environmental awareness and appropriate knowledge of environmental protection is critical to the successful implementation of the EMP because without appropriate environmental awareness, knowledge and skills required for the implementation of the mitigation measures, it would be difficult for the Contractor(s) workforce to implement effective environmental protection measures. A domestic training program is proposed to train the Contractor(s) staff who will be involved in the construction phase and the professional staff from the CCBPL involved at the operational stage of the plant.

6.3 KEY ENVIRONMENTAL ISSUES

Following are the key issues, which are envisaged for the proposed Project at the design, construction and operational stages:

- Inadequate design of the proposed Project;
- Air pollution;
- Noise pollution;
- Disposal of solid waste;
- Disposal of wastewater;
- Health and safety of workers; and

6.3.1 Role of Functionaries of CCBPL

a) Plant Manager

Plant Manager will be overall responsible for the EMP obligations during the operational phase.

b) Project Manager

Project Manager will be responsible for handling the CCBPL's obligations with respect to the EMP during the design and construction phases. He will be responsible for ensuring that the provisions of the EMP are implemented at the design and construction phases. In addition, he will also coordinate with the EPD, KPK.

c) Plant Engineer

Plant Engineer will oversee the working of Site Environmental Officer (SEO) and report to Project Manager/ Factory Manager.

d) Site Environmental Officer

The Site Environmental Officer (SEO) will be responsible for:

- Supervising the Project's Contractor(s) for environmental and social compliance;
- Ensuring that day-to-day construction activities are carried out in an environmentally sound and sustainable manner;
- Organizing periodic environmental training programmes for the Contractors' staff in consultation with Project Manager;
- Developing "good practices" construction guidelines to assist the Contractor(s) and Plant Staff in implementing the EMP; and
- Assisting Project Manager in coordinating with EPD KPK.

6.4 SPECIFIC IMPLEMENTATION RESPONSIBILITIES

This section describes the responsibilities of different functionaries during the design, construction and operational phases of the proposed Project.

6.4.1 Design Phase/ Pre-Construction Phase

Project Manager and his staff are responsible for ensuring that the proposed Project design and specifications adequately reflect the EMP. The responsibilities of Project Manager and his support staff would be as follows:

- To get EIA approved by EPD KPK;
- Setting up systems for environmental management; and
- Incorporating environmental mitigation measures in the design/ tender document.

6.4.2 Construction Phase

The Contractor(s) will be responsible for compliance of environmental mitigation measures for the proposed Project, while SEO will monitor the compliance.

6.4.3 Operational Phase

Factory Manager, in coordination with SEO and respective departmental heads, will be responsible for the following:

- Coordinating with the operations staff working to monitor environmental compliance during the Plant's operation;
- Reporting on the progress of environmental compliance to EPD KPK;
- Assessing the long-term environmental impacts of the Plant's operation; and
- Report to Managing Director about the progress of work.

6.5 ENVIRONMENTAL MANAGEMENT PLAN

The Environmental Management Plan (EMP) is developed to eliminate and/ or mitigate the impacts envisaged at the design, construction and the operational stages and provide specific guidelines for long-term monitoring by identifying the roles and responsibilities of the Proponent, Design Consultant, and Contractor(s). Tables 6.1, 6.2 and 6.3 present the environmental aspects, issues, mitigation measures, implementation responsibility and the costs incurred at all the stages.

Table 6.1: Environmental Management Plan (Design Phase)

Aspect	Impacts	Mitigation Measures	Responsibility	
			Implementation	Supervision
Waste Water/Effluent Discharge	During the production process effluents will be produced from the proposed Plant.	▪ CCBPL will have its own combined effluent treatment plant (CETP) and sludge thickener to treat the projected flows within the NEQS.	DC	CCBPL Management
Seismic Hazard	Damage to the plant building	▪ The proposed structure of the CCBPL Plant will be designed and constructed to withstand moderate to large earthquakes; ▪ For seismic hazard analysis, updated structural and seismic evaluations will be consulted.	DC	CCBPL Management
Groundwater Consumption	Heavy load on the groundwater. Prolonged and high water consumption (during different operations) may lower the underground water table in the long run.	▪ The Proponent will ensure effective project management, efficient use of resources and incorporation of design and infrastructure measures for water conservation and designing of wastewater treatment plant keeping in view the reuse of treated water.	DC	CCBPL Management
Emergency Response	Disasters such as Ammonia leakage, earthquakes, flooding and other manmade disasters such as fires may occur	▪ Maintenance of Refrigeration system will be carried out after specified duration to avoid worse situations. Proper training will be given to the staff to cope up with emergency situation. ▪ The Building Regulations of Peshawar Development authority (PDA) and Hatar Industrial Estate (if any) will be strictly adhered to; ▪ Complete equipment control system, fire escape stairs and secured access system supplemented with close circuit surveillance equipment/alarms will be included in the design of the plant; ▪ Adequate internal and external water distribution system will be designed, with standby system for sufficient water from tube well, which could also	DC	CCBPL Management

		supply adequate quantity for firefighting during emergency.		
Fire Fighting System & Storage	Inefficient firefighting system and insufficient storage of fire water may cause severe damage to the plant's building.	▪ Storage for firefighting will be provided in water storage reservoir ▪ The firefighting pump will maintain constant pressure in the system; ▪ Fire hose cabinets will also be provided at different locations inside the plant; and ▪ A separate fire alarm system will also be installed in the shape of smoke detectors/ionization detectors at CCBPL Plant.	DC	CCBPL Management
Flora	No tree will be uprooted. The land is agriculture and used for growing crops and vegetable	▪ Proper landscaping and plantation will be done. This plantation will improve the aesthetic value and ecological habitat of the project area. About 800 trees will be planted along the boundary of the proposed project. ▪ Disallow introduction of exotic species with known environmental setbacks (Eucalyptus, etc.); ▪ A landscape will be properly designed with provision of new trees/ plantations around the plant boundary, roadside, office buildings and stretches of open land. The vegetation for the attenuation of air pollution would be most needed in the areas where ground level concentrations of the pollutants may rise. Tree Plantation plan is annexed as **(Annexure-XIII).**	DC, CCBPL Management	CCBPL Management

Table 6.2: Environmental Management Plan (Construction Phase)

Aspect	Impacts	Mitigation Measure	Responsibility	
			Implementation	Supervision
Soil	Due to the construction activities, soil erosion and contamination may occur	▪ All spoils will be disposed off as desired and the site will be restored back to its original conditions before handing over; ▪ Non-bituminous wastes from construction activities will be dumped in approved sites, in line with the legal prescriptions for dumpsites, and covered.	CC	EC
Air Pollution	Health impacts (dryness, roughness of throat, coughing etc.) on the workers associated with fugitive and point emissions as a result of different activities such as excavation operation,	▪ Water sprinkling; ▪ Provision of dust masks to workers; ▪ Use of well-maintained machinery and equipment; ▪ Vehicles carrying construction materials and the construction material storage areas will be covered with tarpaulin	CC	EC
Noise Pollution	Health impacts (increase in blood pressure, hypertension etc.) due to the operation of construction machinery and equipment	▪ Providing ear plugs/ear muffs to workers; and ▪ Use of well-maintained machinery and equipment with reduced noise levels ensured by suitable in-built muffling devices. ▪ No use of heavy noisy equipment during prayer timings	CC	EC
Solid Waste	Health impacts on the workers due to different construction activities	▪ Reuse of solid waste (surplus excavated material, construction and demolition material) in construction work where possible or dispose of to officially designate dumping site ▪ Provision of Bins and containers at the camp site and active construction sites ▪ Daily collection of solid waste by the contractor	CC	EC
Health and Safety of Workers	Minor and severe injuries due to the operation of construction machinery and equipment	▪ Implementation of HSE plan for construction purpose already developed ▪ Use of well-maintained machinery and equipment;	CC	EC

		▪ Training of workers in the construction safety; ▪ A contingency plan in case of major accidents will also be elaborated; and ▪ Provision of protective clothing for laborers handling hazardous materials, e.g. safety helmet, adequate footwear, protective goggles, gloves etc.		
Sewage and Construction Waste	Unhygienic conditions may prevail if the untreated sewage is disposed of. In addition, solid waste/construction waste generated will deteriorate the aesthetic value and may contaminate the soil.	▪ Wastewater will be treated to comply with NEQS before final disposal; ▪ Training of work force in the storage and handling of materials and chemicals that can potentially cause soil contamination; and ▪ Solid waste generated during construction will be safely disposed of.	CC	EC
Groundwater	Groundwater may get contaminated due to the disposal of construction waste generated during the project activity. Also the water for construction and consumption may come in conflict with local water demand.	▪ The solid waste will be disposed of in designated landfill sites (if any) to sustain the water quality for domestic requirements; ▪ Water required for construction may be obtained in such a way that the water availability and supply to nearby communities remain unaffected; and ▪ Protection of groundwater reserves from any source of contamination such as the construction and oily waste that will degrade its potable quality.	CC	EC
Traffic Management	This may result in traffic jams and cause inconvenience to the people travelling on KKH due to movement of vehicles carrying construction materials.	▪ Movement of vehicles carrying construction materials should be restricted during the daytime to reduce traffic load and inconvenience to the local residents; ▪ Liaison between the Traffic Police, Executing Agency and the Contractor to facilitate traffic movement during construction stage.	CC, Traffic Police	Traffic Police
Flora	Construction of the proposed Project does not involve cutting of trees.	▪ After construction instead of introducing new ornamental plants, local tree and plants species will be planted for landscaping. In addition to providing a better view to the area, the proposed vegetation's will help minimize the excess noise, vehicular emissions and dust pollution.	CCBPL Management	EC, CCBPL Management

Fauna	Due to the construction activities of the proposed Project, the free movement of fauna would be disturbed. Another impact on the fauna of the Project Area will be the probable dislocation of the birds/animals (rodents) from their nests and burrows.	▪ Plantation of large number of trees in the Project Area to regain the ecological habitat; ▪ New and good condition machinery with minimum noise will be used in construction; ▪ Contractor will ensure that the no hunting, trapping of animal will be carried out during construction; ▪ The camps will be properly fenced and gated to check the entry of wild animals in search of eatable goods. Similarly waste of the camps will be properly disposed off to prevent the chances of eating by wild animals, which may prove hazardous to them. ▪ Special measures will be adopted to minimize impacts on wild birds such as avoiding noise generating activities during the critical period of breeding.	CC	EC, CCBPL Management
Impacts of Heavy Vehicles on the Existing Road Network	The plying of heavy vehicles on the existing road network (Hattar Industrial Road) may result in air pollution (if unpaved roads), noise pollution due to tire-road friction especially near sensitive receptors (residential areas, school, mosque, health facility etc.), and damage to roads and traffic congestion.	▪ Any vehicle with an open load carrying area used for transport of potentially dust producing materials shall have properly fitted side and tailboards. Materials having potential to produce dust shall not be loaded to a level higher than the side and tail boards and shall be covered with clean tarpaulin in good condition; ▪ The Contractor shall not use any vehicles either on or off road with grossly excessive noise pollution. In case of built-up areas, noise mufflers shall be installed and maintained in good condition on all motorized equipment under the control of the Contractor; ▪ The traffic on the existing road shall be managed cooperation with the local traffic police department in order to avoid traffic accidents and congestions causing unnecessary delays;	CC, Traffic Police	CCBPL Management
Social/Cultural Disturbances	Problems for the residents of the area due to increased construction activity. Also social conflicts of the laborers with the locals.	▪ Adequate training of the work force of the plant (involved both in the construction process and in the commissioning) to regard the rituals of the area so that the locals do not feel insecure and local people will be involved by employing them during construction process. ▪ Maintaining a complaint register for grievance and	CC	EC

		developing grievance redress mechanism (GRM)		

Table 6.3: Environmental Management Plan (Operational Phase)

Aspect	Impacts	Mitigation Measures	Responsibility	
			Implementation	Supervision
Water Pollution	Wastewater discharged from the proposed plant's operations will include waste water from operation and wash rooms.	▪ A wastewater treatment plant will be installed by CCBPL for the treatment of wastewater from all these sources; ▪ Treated wastewater from WWTP will also be analyzed to check its suitability for irrigation purpose	CCBPL Management	EC
Noise Pollution	Health impacts (physical fatigue etc.) for the workers working near noisy equipment such as roller machine, operations in Standardization etc.	▪ Use of conventional methods such as enclosures, noise absorbing materials or silencers; and ▪ Use of personal protection equipment ▪ Provision of noise barriers towards Dinge School ▪ Furthermore, the generators will be enclosed in canopy to mitigate the impact of noise pollutions. ▪ Trees will be planted along the boundary of Plant to further mitigate the impact of pollution. Approximately 4,000 saplings will be planted in the premises of plant area or the community land. Following species of flora will be planted – Phulahi (Acacia modesta) and Kikar (Acacia nilotica). Approximate cost will be 0.5 million Rupees for Tree Plantation. Tree Plantation Plan along the boundary of Proposed Plant is annexed as **"Annexure-XIII"**	CCBPL Management	EC
Air Pollution	The quantity of air pollutants may increase due to the operation of power plant.	▪ Setting up of a system to monitor air quality of the plant in accordance with the applicable standards/limits; ▪ An air quality monitoring and improvement plan will be developed to keep the air pollution levels to minimum; ▪ Indoor air quality will be monitored on regular basis for	CCBPL Management	EC

		parameters like CO, CO_2, NO_2, VOC's, etc. and appropriate mitigation measures will be implemented; ▪ Fresh air will be regulated to maintain the acceptable indoor CO_2 level in the space and achieve saving in energy on partial occupancy; ▪ Vehicles with excessive smoke emissions will not be allowed to enter the proposed Plant; ▪ Plantation of trees inside and outside the boundary of the plant to minimize the effect of air pollution; ▪ Use of low sulfur fuel in the generators; and ▪ Use of scrubbers or other modern equipment's to minimize the emissions from the stacks.		
Solid Waste/ hazardous waste	Solid waste if not properly handled, may cause contamination/ pollution, nuisance to the plant workers, deteriorate the aesthetics of the plant.	▪ Used or discarded bags, paper bags, chemical cans & empty drums will be stored in scrap yard of the plant; ▪ Proper waste storage bins will be provided inside the plant. Adequate measures to reduce the waste and recycle paper waste will be adopted; and ▪ Solid waste management plant will be followed during operation to sort out the waste like municipal solid waste, paper and plastic waste and hazardous waste. ▪ Hazardous waste will be marked according Hazardous substance rule 2003 with bone and skull mark on the bin and place of handling	CCBPL Management	EC
Occupational Health and Safety Issues	Impacts on health of the workers associated with human errors, operational faults of machinery and unforeseen incidences	▪ Efficient management, staff training, maintenance of machinery and equipment; ▪ Instructing the workforce on storage and handling of materials and chemicals; ▪ Keeping the machinery and equipment in good operating condition with in-built muffling devices; ▪ Providing PPEs such as ear plugs/ear muffs to workers; ▪ Provide basic medical training to the specified work staff; ▪ Obligatory insurance of work laborers against	CCBPL Management	EC

		accidents; ▪ Provision of safety measures within the plant such as emergency sirens, firefighting equipment, safe storage of chemicals, first aid, and contingency measures in case of accidents. ▪ Proper signage of safety measures for each operation with safety hazards and provision of eye wash, emergency shower and PPEs.		
Emergency Response	Disasters such as earthquakes and fires may occur	▪ An Emergency Response Plan for earthquakes and manmade disasters will be developed by the CCBPL Management; ▪ Maintenance of Refrigeration system will be carried out after specified duration to avoid worse situations. Proper training will be given to the staff to cope up with emergency situation. ▪ Emergency Response Plan will be implemented in close consultation with the Fire Fighting Department, bomb disposal squad and paramedics. In addition, training of the staff/employees regarding the emergency procedures/plans will be regularly conducted.	CCBPL Management	EC
Local Socio-economic Conditions	Impact on the local communities due to extraction of water from groundwater aquifer in large quantity for operational purposes	▪ Initiate efficient use of water by focusing on re-use of water for irrigation in the plant as well as to farmers having land in the surrounding of plant. ▪ If additional manpower is required in future, local residents should be preferred; and ▪ Improving educational and health facilities.	CCBPL Management	EC

DC – Design Consultant

CC – Construction Contractor

EC – Environmental Committee

6.6 ENVIRONMENTAL MONITORING

This section provides environmental monitoring plan that identifies the roles and responsibilities of project staff involved in environmental monitoring and list the parameters that will be used in the monitoring process.

6.6.1 Objectives

The main objectives of the pre-construction and construction phase monitoring plans will be to:

- Monitor the actual impact of the works on the project site physical, biological and socio-economic receptors. This will indicate the adequacy of the EIA;
- Recommend mitigation measures for any unexpected impact or where the impact level exceeds the anticipated impact;
- Ensure compliance with legal obligations including safety on construction site; and
- Ensure the safe disposal of excess construction materials.

The main objectives of monitoring during the operational phase will be to:

- Appraise the adequacy of the EIA with respect to the project's predicted long-term impacts of operation of the Plant on physical, biological and socio-economic environment;
- Evaluate the effectiveness of the mitigation measures proposed in the EMP and recommend improvements, if and when necessary; and
- Compile periodic Environmental Monitoring reports on the basis of recommendations in EMP.

Table 6.4: Environmental Monitoring Plan at the Construction and the Operational Stages

Components	Parameters	Location	No. of Samples	Frequency	Responsibility	Duration	Budget (Rs)
Construction Phase (18 Months)							
Air Quality	CO, NO_x, SO_x, PM_{10}	Inside the Plant Boundary	1	Monthly	CC	24 hours	540,000
Noise Level	-	Inside the Plant Boundary	1	Monthly	CC	24 hours	72,000
Water Quality	For parameters given in NEQs	Tube well / hand pump	1	Monthly	CC		360,000
Operation Phase (Yearly)							
Air Quality	CO, NO_x, SO_x, PM_{10}	Stack Emissions from Generators	1	Bi-annually	EC	24 hours	60,000
Indoor Air Quality	CO, CO_2, NO_x, Relative Humidity, Temperature	Inside Office Building	20	Annually	EC	Morning/Evening	20,000
Ground Water Quality	Total Coliforms, Fecal E. Coli, Total Colonial Count, Fecal Enterococci/ Streptococci, Conductivity, Carbonates, Bicarbonates, Arsenic, Chloride, Fluoride, Manganese, Iron, Nitrates, Nitrites, pH, TDS, Sulfate,	Tube well	3	Annually	EC	-	50,000

Components	Parameters	Location	No. of Samples	Frequency	Responsibility	Duration	Budget (Rs)
	Ammonia, Copper, Magnesium, Phenol, Zinc, DO						
Wastewater Quality	All Parameters in NEQS	Liquid Effluent	2	Bi-annually	EC	-	60,000
Noise Level	-	Inside plant	10	Bi-annually	EC	24 hours	80,000

6.7 REPORTING STRUCTURE AND OUTCOMES

Overall, progress reporting will be the responsibility of the SEO who will provide inputs to the Factory Engineer to be collected and submitted to the Factory and Project Manager. The SEO will be responsible for submitting a monthly environmental report for the project to Plant/ Project Manager after receiving inputs from respective departmental heads. In addition, he will prepare a monthly report encompassing environmental concerns, and following review by the Plant Manager, submit the report to the EPD KPK.

6.7.1 Environmental Technical Assistance and Training Plan

An environmental and social training and Technical Assistance (TA) program will be carried out to build the CCBPL capacity to effectively implement this EMP, as well as to facilitate the improved environmental management of future projects by increasing the environmental and social awareness of CCBPL staff in general. The CCBPL will engage Technical Assistance (TA) consultant to manage the environmental training program. The objective of the TA will be to help establish appropriate systems, and to train senior CCBPL staff responsible for managing environment, operations, and planning, who can then impart training at a broader level within and outside the CCBPL (i.e., the training of trainers). The TA consultant will organize training courses for CCBPL staff in specialized areas such as air and noise pollution monitoring; develop environment operation manuals in consultation with the CCBPL Environmental wing. The details of this training program are presented in **Table 6.5**

Table 6.5: Personnel Training Program/ TA Services

Provided by	Contents	Trainees/Events	Duration
TA consultants/ organizations specializing in environmental management and monitoring	Short seminars and courses on: Environmental laws and regulations daily monitoring and supervision	Three seminars for CCBPL Project staff	2 days
TA consultants/ organizations specializing in social management and monitoring	Short seminars and courses on: Social awareness	Three seminars for project staff dealing in Social matters	3 days
TA consultants/	Short lectures relating	Two seminars for	2 days

organizations specializing in Occupational, health and safety issues	to Occupational Safety and Health	contractor's staff and factory workers	

6.8 ENVIRONMENTAL MONITORING, MITIGATION AND TRAINING COSTS

For an effective implementation of environmental mitigation measures, it is very important to provide sufficient funds for implementation of environmental mitigation measures, monitoring and training. The total cost of these items has been worked out and provided as below during construction:

Monitoring Cost (Laboratory +Transportation):		Rs 1,500,000	
Training Cost	:	Rs 300,000	Lump Sum
Tree Plantation Cost	:	Rs 500,000	Lump Sum
Total	**:**	**Rs 2,300,000**	
		Rs. 2.3 Million	