7.2 Risk Assessment & Disaster Management Plan

Introduction

Human health and Environmental risk from developmental activities is mainly due to occurrence of some accident consisting of an event or sequence of events like explosion, fire and toxic hazards. Risk analysis provides a numerical measure of the risk that a particular facility poses to the public. It begins with the identification of probable hazardous events at an operational area and categorization as per the predetermined criteria. The consequences of major events or accidents are calculated for different combinations of weather conditions to stimulate worst possible scenario.

All types of mining face certain types of hazards which can disrupt normal activities abruptly and to disaster like fires, inundation, failure of machinery, explosion, to name a few. Similarly Mining of minor mineral also have impending dangers or risk which need be addressed for which a disaster management plan has been formulated with an aim of taking precautionary steps to avert disasters and also to take such action after the disaster which limits the damage to the minimum.

As per proposal made under the mining plan, during proposed working the area will be developed by means of manuals opencast mining method. Exploitation and transportation of minerals are to be carried out by manual means. W ater table will not be touched during processed working. No high-risk accidents like landslides, subsidence flood etc. have been apprehended.

No explosives will be stored at site as Blasting will be conducted on contract basis by an expertise person from certified blasting agency.

But possibility of accidental disaster is also not ruled out. Therefore, all the statutory precautions should be taken for quick evacuation as per the Mines Act 1952, the Mines Rules 1955 MMR-1961 and MCDR-1988.

7.2.1 Risk Assessment & Disaster Management Plan

Mining and allied activities are associated with several potential hazards to both, the employees and the public at large. A worker in a mine should be able to work under condition, which are adequately safe and healthy. At the same time the environment should be such as not to impair his working efficiency. This is possible only when there is adequate safety in mines. Safety of the mine and the employees is taken care of by the mining rules & regulations, which are well defined with laid down procedure for safety, which when scrupulously followed safety is ensured not only to manpower but also to machines & working environment.

A major emergency in a mine is one that may cause injury or loss to the workers engaged in the mining and allied operations. Therefore, the first action under the disaster management is the identification of risks involved and their priorities. From this risk assessment the identified risks are as below:

a) Use of explosives and the blasting operations, inducing vibrations due to blasting.
b) Fly rocks & vibrations from Blasting.
c) Slope Failures in open pit.
d) Solid waste generation, their disposal and rehabilitation.
e) Improper use of equipment and machinery.
f) Dust exposure.

Each parameter is discussed below:

7.2.2 Use of Explosive and the Blasting Operation:

Blasting will be done on t he contract basis and it will be conducted by Blasting expert. No Magazine will be there as no explosives will be stored at the Mine premise. The explosives will be bought by contractor for blasting and after the completion of work it will be taken back by himself.

7.2.3 Mitigation measures to avoid impacts due to Blasting

1. Muffled Blasting with controlled Blasting will be employed to arrest the Flying rocks.
2. Prior Information and investigation of area will be done before blasting at Site.
3. Timings will be fixed for Blasting and it w ill be conveyed to all the workers and Employees engaged in Mining operation.
4. Dummy Holes, Trenches etc. would be implemented to dampen the vibrations.
5. Regular Health check-up of the workers will be carried out.

7.2.4 Slope Failures

The mining is proposed from top level and gradually advance towards lower levels. Height of benches will be kept 6.0 m and Slope will be kept at 45^{o} or as per the guidelines. In that case, chances of slope failure will be negligible.

7.2.5 Solid Waste Generation, Their Disposal and Rehabilitation

Soil shall be generated during course of mining will be used for greenbelt development. Overburden will be used for road maintenance.

7.2.6 Proper Training on the Use of Equipment

Machineries will be employed in the mine. Vocational training program will be organized to train the workers about mine workings & operating the machines.

7.2.7 Exposure to dust emissions

1. Proper PPE's i.e. Helmet, Nose mask, Safety Shoes, Ear Plugs, Safety googles etc. will be provided to workers engaged in working at Mining operations.
2. Water Spraying on haul roads.
3. The green belt development program will be implemented which will help in prevention of dust (leaves acting as a sink) and screening noise. It will also proves to be helpful in maintaining ecological balance.

7.3 Disaster & its Management

Mining will be done by Open Cast Semi-mechanized method to produce stone. There are various factors, which can create unsafe working conditions/ hazards in mining of minerals. The following types of hazards are identified during the proposed mining operations: -

- Mining Machinery and Loading operation.
- Vehicular movement and Transportation of Mineral
- Fall of workers from high benches

7.3.1 Mitigation Measures

- Unorganized Vehicular movement in the ML area will also contribute in accident occurrence. Following practice will be adopted:
- To avoid danger while reversing the trackless vehicles especially at the embankment and tipping points, all areas for reversing of Lorries should be made man free as far as possible.
- The vehicles must be maintained, repaired and checked thoroughly at least once in a week.
- Overloading should not be permitted, and the maximum permissible speed limit should be ensured.
- The dumper/Tractor drivers should have proper driving license.
- A statutory provision of the fences, constant education, training etc. will go a long way in reducing the incidents of such accidents.
- The top of every opencast working shall be kept securely fenced.
- The opencast mine has been planned for working with shovel dumper system which requires proper benching not only for slope stability but also for movement of dumpers and other heavy machinery.

7.4 Emergency Management Plan for Proposed Mines On-Site and Off-Site Emergency Preparedness Plan

The emergency plan delineates the Organizational procedures for dealing with accidents or unexpected events and natural calamities arising from operation of the company. An experience of any accidents that have occurred in other manufacturing/mining projects is considered to prepare this plan. This Emergency plan should be periodically reviewed and modified. It should also be changed based on the observations of emergency mock drills and experience of handling actual emergencies. Major objectives of this onsite – offsite emergency plan is:

- To take necessary proactive and preventive actions to avoid the emergency. The main aim of any emergency plan should be to prevent emergency situations.
- To train the manpower to handle the emergencies of the following nature:
  - Onsite (Within ML boundary)
  - Offsite (Outside ML boundary)

7.4.1 Onsite & offsite Emergency Plan

- Fire
- Explosion
- Major accidents involving man-made collapse of the mining edges.

7.4.2 Disaster Due to Natural Calamities Like

- Flood/ heavy rains which can involve natural landslides.
- Earthquake
- Cyclone
- Lightening

General Guidelines:

- The mining operations should be immediately stopped in case of any emergency. A siren can be sounded if available.
- An emergency assembly point should be created, and all Employees should guide visitors or contractors to approach assembly point.
- The site office can serve as emergency control room (Centre) in case of emergency.
- Emergency vehicle should be available near security main gate and rush to the emergency control center at the blowing of emergency siren. The driver of emergency vehicle will follow the instructions of Incident Controller / Site Main Controller.
- People should be trained for the precautions to be taken during natural disasters line heavy rain, floods, earthquake and cyclone.

7.4.3 Emergency Control

- Shut down of mining operations: Raising the alarm or siren followed by immediate safe shut down of the power supply, and isolation of affected areas.
- Treatment of injured: First aid and hospitalization of injured persons

- Protection of environment and property: During mitigation, efforts should be made to prevent impacts on environment and property to the extent possible.
- Preserving all evidences and records: This should be done to enable a thorough investigation of the true causes of the emergency.
- Ensuring safety of personnel prior to restarting of operations: Efforts required to be made to ensure that work environment is safe prior to restarting the work.

7.5 Emergency Evacuation of Employees

7.5.1 Emergency Training

One day of the week-long pre-production start-up program will be devoted to fresher training in emergency procedures, fire-fighting and related programs. An emergency evacuation drill will be held at least once during the production season.

7.5.2 Training for Evacuation

In the event of an emergency requiring employee evacuation:

1. Notify the plant office.
2. The office will sound the alarm and notify all employees to evacuate.
3. All employees will come to the plant office by company vehicle obeying posted speed limits.
4. Park in the parking lot and assemble in front of the office or inside if the weather is bad.

7.5.3 Training for Incident and Injury

1. First aid kits should be located at the Site office and in each company vehicle.
2. For minor injuries (scrapes, shallow cuts, etc.) all employees are authorized to use materials in any first aid kit but must make a note of the injury and materials used in the kit's logbook.
3. For any injury more serious than the above, call the office for assistance. Current-trained first aiders. They will determine whether an injury can be treated on site, treated in hospital or requires an ambulance.
4. It is company policy that no e mployee shall walk on, c limb or otherwise become personally involved with stockpiled material so runs of material should not be a safety issue.

7.5.4 Training for Security Procedures

1. Only the main gate near the weigh scale will be opened for vehicle access. All other gates at entries to the property will be closed and locked at all times. Report any damage to gates or perimeter fences
2. Incoming customer trucks for pickup must stop at the office. Drivers should not allowed to leave the cabs of their vehicles at any time while on property.
3. All other visitors are required to park near the office for check-in and check-out when leaving.

4. No explosives are stored on the company property. Blasting contractors bring only the required quantity of explosives for the job at hand and are responsible for explosives security.

7.6 Occupational Hazard / Health & Safety Control Measures

This mining project does not contain any toxic elements. Further this being a manual/semi mechanized mine, stone production is by manual/mechanised means and waste material handling partly by manual and partly by mechanized way, there shall be marginal impact on air and noise qualities. Therefore; the possibilities of any health hazards are minimal. The most significant occupation healthy treats are Noise Induced Hearing Loss (NIHL) and Occupational Lung Disease (OLD) due to inhalation of dust. However, the management of the Basupali Stone Quarry has been taking enough care in minimizing the impacts due to these activities.

- Employees are adequately trained and educated for involvement and commitment into the implementation of health and safety guidelines.
- Monitoring the effects of mining activities on safety and health and conducting regular performance reviews through periodical health check-up.
- Provision of all necessary resources for safety and health of employees and contractors engaged in mining.
- Setting of safety and health objectives based on comprehensive strategic plans and measure performance against these plans.
- Implementing safety and health management system and assessing the effectiveness through periodic audits.

Occupational safety and health are very closely related to productivity and good employer-employee relationship. The factors of occupational health in Proposed Mining project are mainly dust and land degradation. Safety of employees during operation and maintenance etc. shall be as per Mines rules and regulations.

Table 7-1 Anticipated Occupational Hazards & Safety

Anticipated Occupational Health and Safety Impacts	**Proposed Mitigation Measures**
Lung disease and respiratory disorder due to dust exposure	There will be regular health checkups for all the workers. Lung function tests, chest X-rays etc. shall be carried out and any health disorders will be evaluated. Dust mask will be provided to the workers. Precautions will be adopted to prevent dust generation at site and dispersing in the environment. Air emission control system such as water sprinkling, green belt development.
	Budget of pollution control i.e. dust suppression by water sprinkling, Green belt development etc. is proposed in EMP.

Anticipated Occupational Health and Safety Impacts	**Proposed Mitigation Measures**
Noise	Earmuff will be provided Good Maintenance of vehicles. PUC certified vehicles will be engaged for transportation and other Mining activities.
Accident at site	PPEs will be provided to the workers likely hand gloves, safety shoes etc.
Others	Awareness program/training program will be organized for workers for occupational safety. Smoking and tobacco will be banned at site. Provisions of rest shelter for mine workers with facility of drinking water. First Aid facility and training to workers.