RISK ASSESSMENT & DISASTER MANAGEMENT PLAN

1.1 RISK ASSESSMENT:

Risk assessment is all about prevention of accidents and there is a need to be aware that there is a risk of an accident before steps can be taken to prevent its happening. This is the reason, why risk assessments will be carried out. The proposed mining activity will be opencast semi-mechanized mining project. The anticipated risks are mentioned below:

1.1.1 INUNDATION:

Mining operations will not intercept the ground water table. Therefore, disturbance to ground water quality or depletion are not envisaged. In order to control the in-rush of water from the surface or through seepage from the strata during monsoon, sufficient garland drains will be constructed around the opencast excavation as proposed. The rain water falling directly into the open excavation will automatically drain out and there is no need to install pumps except to pump out the rain water collected in the pit during monsoons from bottom most benches to facilitate mining.

1.1.2. FAILURE OF PIT SLOPE:

Slope failures in mines are mostly associated with circular failure, which is controlled by the rock mechanics properties such as cohesion, angle of internal friction, joint/shear planes, ground water flow conditions, rock density and the heights to be maintained. To control the above factors the pits are designed to be developed with benches, with an overall slope angle of 300. Further the top benches of the will be afforested to provide long term stability. Thus the chances of slope failures for the pits are remote. All necessary precautions will be taken.

1.1.3. FAILURE OF WASTE DUMPS:

Sliding of waste dump will be a severe risk compared with quarry slope failure. Hence, it is imperative that the degree of hazard against potential failure of waste dump slope should be identified and that precautionary measures will be adopted, if required. The height of outside dumps will be restricted to 10m. The waste dumps will be designed with intermittent berms with an overall slope of 300. A strong retaining wall will be constructed at the bottom of the dump to

give toe support and for proper drainage from the waste dump. Garland drains will be provided to collect the drainage flow. Since the waste dumps will be proposed to be constructed over a hard rock surface, chances of foundation failures will be remote. As

controlled blasting techniques will be implemented with small size Jackhammer blast holes with limited explosive charge, there are no chances ground vibrations to reach the dump area and creating problems of liquefaction. Further the slopes of waste dumps will be afforested to provide long term stability. Thus the chances of slope failures for the dumps are remote.

1.1.4. SURFACE FIRE:

Sufficient fire extinguishers will be installed at selected locations on surface like office, workshop, Garage, Stores etc. for fire protection.

1.1.5. DUST FROM THE DRILLING OPERATION:

The hazard is the inhalation of dust which is created during the drilling operation. While it is not presently possible to totally remove the hazard, properly applied control measures can substantially reduce the risk. Control measures vary from using water during the drilling operation to the provision of local exhaust ventilation which removes the dust from the head of the hole to a

dust collection unit to the provision of a ventilated cabin provided for the operator. The most effective of these precautions will be the provision of a control cabin on the drilling rig provided with a suitable ventilation system fitted with a dust filter to remove harmful dust and maintain the dust level within the cabin to below acceptable control levels. Any ventilation equipment should periodically be examined to ensure that it is maintained to its designed standard.

1.1.6. NOISE:

Drilling, wire saw cutting & movement of vehicles will be give rise to high levels of noise. Both drilling the hole and the operation of the drill rig itself creates noise. It is impractical to remove the hazard at the hole but new generations of drill rig should be quieter by virtue of its design. The noise created is harmful to anyone who is within a zone around the operation of the machine at which the noise level will be above that considered to be safe for persons to work without having to use control measures. The noise levels around drilling & wire saw cutting equipments should be

measured and the risk assessed. Unless control measures are in place no-one, except those necessary for the work in hand, should be allowed inside the designated noisy area. Other control measures will include providing enclosure, development of green belts in the surrounding areas, training the operators and providing them with ear protection,

although the latter should only be seen as an interim precaution until a permanent solution can be found. The risk is very high when no control measures are provided. However if all the mitigation measures are provided the risk will be very low.

1.1.7. LOADING:

The main hazard associated with loading is toppling over due to uneven ground, failure of hydraulic systems, fires and falls while gaining access to operating cabins.

1.1.8. TRANSPORT VEHICLES:

The main hazards arising from the use transport vehicles will be incompetent drivers, brake failure, lack of all around visibility from the drivers position, access to the cab, vehicle movements particularly reversing, roll over, vibration, noise, dust and maintenance. The possible risks include the driver and pedestrians likely to be struck by the vehicle, and drivers of smaller vehicles, which cannot be seen from the cabs of large vehicles. Visibility defects can be eliminated by the use of visibility aids such rear view mirrors. Good maintenance and regular testing are necessary to reduce the possibility of brake failure. An area should be earmarked as a testing area where daily tests are carried out on the effectiveness of a vehicles braking system. Careful attention must be paid to guarding dangerous parts of the equipment and handling heavy components during maintenance work. Those most at risk will be the users of the system although casual pedestrians and vehicle operators may also be at risk.

1.2. RISK CONTROL MEASURES:

1.2.1 HOUSE KEEPING:

The provision and maintenance of a safe and healthy workplace will be the most basic principle of health and safety. Dirty and untidy workplaces or walkways contribute to a very large proportion of toppling and fall accidents. In the context of surface mining the provision of well defined roadways and walkways clear of obstruction, and regular cleaning up of spillage will greatly reduce the potential for this type of accident. Lack of maintenance may lead to roadways and walkways being unsuitable for their use.

1.2.2 THE WORK:

The application of risk assessment depends upon a full understanding of all aspects of the job being undertaken. In carrying out a risk assessment in relation to a particular task the

evaluation must include a review of the knowledge, experience and training of those persons carrying out the work.

1.2.3 PERSONAL COMPETENCE

If follows that the knowledge, experience and training of personnel involved in work is critical to the result of any risk assessment. A knowledgeable, experienced well-trained and competently supervised workforce will be at a lower risk of accidents occurring than a poorly trained and badly supervised workforce.

1.2.4 CO-ORDINATION:

A qualified & trained person should be given the responsibility for overseeing and coordinating work. It is essential that the coordinator ensures that everyone engaged in the work is capable and understands the role of others and their responsibility for each other. This is particularly important when contract workers undertake part or all of the work to be carried out.

1.2.5 WORKPLACES:

Access to both above and below ground workplaces should be by well constructed and maintained permanent fixed means. When practical stairways and shallow inclined walkways are preferred to vertical ladders, which in some circumstances can be the cause of very high risk. The sides of all workplaces from which persons may fall should always be protected.

1.2.6 HEALTH HAZARDS:

For the purposes of this document health hazards should be interpreted as being harmful dust, which will be emitted during surface mining operations, as well as the handling of heavy loads. While elimination and often complete suppression at source is not practicable, the norms for control of health hazards shall be made applicable.

1.2.7 PERSONAL PROTECTIVE EQUIPMENT (PPE):

The PPE should meet ISI standard, suitable for the hazard e.g. a dust respirator fitted with the correct filter to capture the particular hazardous dust, and maintained to recommended standards.

As personal protective equipment only affords limited protection it should only be used as a last resort and then as an interim arrangement until other steps are taken to reduce the risk of personal injury to an acceptable level.

1.2.8 TRAFFIC MOVEMENT:

The traffic movement should only take place within designated areas and over suitable roadways.

Adopting one way traffic movement systems are preferred to two directional traffic systems. The risk of accidents due to traffic movement is much less with a one. Whenever mineral will be mined, the first step in winning the product is the preparation of the site. The four main stages in the site preparation are:

1. Planning
2. Surveying
3. Laying out

Planning:

The risk of injuries can be significantly reduced if sufficient regard will be given to health and safety at the planning stage of a new mine. Using trained drivers can largely eliminate the danger of being struck by large moving vehicles and providing the vehicles with suitable appliances, such as aids to ensure the driver has all round visibility. Designing and implementing one-way traffic systems and

ensuring that open edges of roadways are suitably protected to prevent accidental driving off the edge can further reduce the danger. Additionally, ensuring that the vehicles are properly maintained in good working condition, particularly the braking system, will go a long way to help the driver control the vehicle. Well-designed access and working platforms will also reduce the

possibility of a fall.

Surveying:

Surveying has its hazards, for example surveyors are likely to be seriously

injured if they fall from heights or are thrown out of overturning vehicles. Since the hazards are created by ground formation it is unlikely that they can be removed. Those normally at risk would be the surveying team of the surveyor and assistants. Individuals working at the edge of vertical faces or on very steep undulating ground will be at greater risk than those working on level ground.

Driving over steep rough terrain is more dangerous than driving over gentle slopes. It is necessary to give clear positive instruction and ensure vehicles used to gain access to the areas to be surveyed are well maintained and suitable for the terrain over which access is to be gained.

Lay Out:

There are many different ways of opening of mines, but careful planning particularly concerning the mine layout will reduce hazards. Good well maintained equipment is essential to reduce the risk of injuries. If suitable equipment will not be used, for example if poor and badly constructed scaffolding is used there will be a much higher probability of persons falling from heights or the scaffolding collapsing than if good properly constructed scaffolding will be used. To reduce the risk of injuries, the vehicle drivers and those giving signals should be well trained. The lack of training and competence in the use of such equipment is the biggest cause of accidents.

1.3. DISASTER MANAGEMENT PLAN:

The complete mining operation will be carried out under the management control and direction of a qualified mine manager. The DGMS have been issuing a number of standing orders, model standing orders and circulars to be followed by the mine management in case of disaster, if any. Moreover, mining staff is being sent to refresher courses from time to time to keep them alert. Natural calamities such as earthquakes, landslides, floods etc., can also contribute to disaster. However, following natural/industrial hazards may occur during normal operation.

- Inundation of mine pit due to flood/excessive rains.
- Accident due to transport & others.
  In order to take care of above hazard/disasters the following control measures have been adopted.
- Regular inspection of the mine for the observance of any visible cracks.
- Checking and regular maintenance of garland drains and earthen bunds to avoid any inflow of surface water in the mine pit during rainy season.
- Provision of high capacity pumps for pumping out water from the mining pit.
- All safety precautions and provisions of metalliferous mine regulation 1961 is strictly followed during all mining operations.
- Entry of unauthorized persons is prohibited.

- Fire fighting and first-aid provisions in the mines office complex and mining area. Provisions of all the safety appliances such as safety boot, helmets, goggles etc. are made available to the employees and regular
  check for their use.
- Cleaning of mine faces is regularly done.
  Regular maintenance and testing of all mining equipment as per manufacture's guidelines.
- Suppression of dust on the haulage roads.
- Increasing the awareness of safety and disaster through competitions,
  posters and other similar drives.

The management is able to deal with the situation efficiently to reduce confusion keeping in view of the likely sources of danger in the mine.

1.3.1. STRUCTURE OF THE DISASTER MANAGEMENT PLAN OUTLINE OF DISASTER MANAGEMENT PLAN:

The purpose of disaster management plan is to restore the normalcy for early resumption of mining operation due to an unexpected, sudden occurrence resulting to abnormalities in the course of mining activity leading to a serious danger to workers or any machinery or the environment.

1.3.2 SYSTEM OF COMMUNICATION:

Having an internal direct communication system for the department head and to their line of command. Having the telephone nos. and addresses of adjoining mines, rescue station, police station, Fire service station, local hospital, electricity supply agency and standing consultative committee members.

1.3.3 FACILITIES & ACCOMMODATION:

Accommodation and facilities for medical centre, rescue room and for various working groups will be provided.

1.3.4 FIRST AID & MEDICAL FACILITIES:

The mine management will provided first aid / medical centre for use in emergency situation. All casualties would be registered and will be given first aid. It will have proper telephone / wireless set for quick communication with hospitals where the complicated cases are to be sent.

1.3.5 DISASTER MANAGEMENT TEAM:

In order to handle disaster/emergency situations, an organization chart entrusting responsibility to various project personnel has been prepared with their specific roles during emergency The composition of the management team:

1. Agent (Mines)
2. Mines Manager

1.3.6 INFRASTRUCTURE:

Following infrastructure and operational system shall be provided to meet any emergencies.

Emergency control room:

This is situated in an area away from the places of fire and has been provided with the following
facilities:

a. Master plan of the mines.
b. First aid boxes.
c. Telephone line
d. Emergency lighting system.
e. Transport facility.

Emergency control room will function as control base.

Transport Services:

Transportation will be provided to deal with the situation.

Functions Of Public Relations Group:

To make a cordial relation with government officials and other social service organization and working groups. To liaise with representatives of the mine to ameliorate the situation of panic, tension, sentiments, grievances and misgivings created by any disaster. To ameliorate the injured, survivors and family members of affected persons by providing material, finance, moral support and establishing contact with relatives of victims