RISK ASSESSMENT

GENERAL
Mining operations are associated with several potential hazards that affect adversely the human health and environment. It would normally require the assistance of emergency services to handle it effectively. The mining operation will be taken up under the supervision and control of qualified staff including Mine Manager. Nevertheless, the following natural/industrial problems may be encountered during the mining operation.

1. Inundation due to excessive rains.
2. Accidents by heavy machinery.
3. Slope failures at the mine faces etc.

HAZARD IDENTIFICATION AND RISK ASSESSMENT METHODOLOGY
All types of industries face certain types of hazards which can disrupt normal activities abruptly. Similar mining also have risks which need to be addressed for which a disaster management plan has been formulated with an aim of taking precautionary steps to avert disasters and also take such action after disaster which limits the damage to minimum. In the sections below, the identification of various hazards, probable risks during the operational phase of the mining, maximum credible accident analysis and consequences analysis are addressed either qualitatively or quantitatively. Risk assessments will help mine operators to identify high, medium and low risk levels. This is a requirement of the Occupational Health and Safety Act 2000. Risk assessments will help to priorities the risks and provide information on the need to safely control the risks. In this way, mine owners and operators will be able to implement safety improvements. The following natural/industrial problem may be encountered during the mining operation.

- Inundation: Filling of the mine pit due to excessive rains,
- Blasting- fly rocks and Boulders,
- Drilling- Noise and Vibration,
- Handling of overburden and heavy machinery,
- Storage of diesel,
- Slope failures at the mine faces or stacks.

As per proposal made under the mining plan the area will be developed by means of opencast mining method. Extraction of minerals is to be carried out by mechanized mining means. Water table will not be touched during the mining process. No high risk accidents like landslides, subsidence flood etc have been apprehended.

Risks due to Inundation
Mining will be done during the non-monsoon periods therefore problem of inundation is not likely to happen.

Risks due to Failure of Pit Slope
In order to allay dangers due to open cast slope failure, final pit, slope stability estimations will be made for the existing mines. Determining the factor of safety, the slopes should be monitored at regular intervals to check for any possible failure.

Risk due to Handling of Over burden and Heavy Machinery
During the mining, most of the activities are done by the vehicles and the heavy machinery for mining and handing of the mineral. There is no overburden or waste will be generated during the first five year of mining operation. Heavy machinery also cause for accidents due to mechanical failure.
<table>
<thead>
<tr>
<th>S. No.</th>
<th>Activity</th>
<th>Hazard Description (Risk)</th>
<th>Score</th>
<th>Risk Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Bench Formation</td>
<td>Rock falls or slide due to lack of bench face stability (bodily injuries)</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>6.</td>
<td>Crushing and sizing of ROM</td>
<td>Hit by Machineries – Electrical Equipment (bodily injuries)</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>7.</td>
<td>Transportation of minerals</td>
<td>Vehicle Accident (bodily injuries)</td>
<td>5</td>
<td>50</td>
</tr>
<tr>
<td>8.</td>
<td>Transportation of minerals</td>
<td>Accidental 1 fire in vehicle (bodily injuries, exposure to heat radiation)</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

By arranging the above hazards from highest to lowest, the hazards were re-arranged as per their risk levels. Ranking of hazards based on risk levels are provided below in the Table:

### Table Hazards ranked by Risk level

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Activity</th>
<th>Hazard Description (Risk)</th>
<th>Risk Score</th>
<th>Risk Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Site planning and layout</td>
<td>Travel in moving vehicle in uneven terrain</td>
<td>2</td>
<td>Level 3</td>
</tr>
<tr>
<td>2.</td>
<td>Storage of explosives</td>
<td>Unintended explosions (exposure to overpressure)</td>
<td>15</td>
<td>Level 1</td>
</tr>
<tr>
<td>3.</td>
<td>Charging of explosives</td>
<td>Unintended explosion or Exposure (exposure to overpressure)</td>
<td>1</td>
<td>Level 1</td>
</tr>
<tr>
<td>4.</td>
<td>Blasting</td>
<td>Hit by fly rock (bodily injuries)</td>
<td>2</td>
<td>Level 3</td>
</tr>
<tr>
<td>5.</td>
<td>Bench Formation</td>
<td>Rock falls or slide due to lack of bench face stability (bodily injuries)</td>
<td>15</td>
<td>Level 1</td>
</tr>
<tr>
<td>6.</td>
<td>Crushing and sizing of ROM</td>
<td>Hit by Machineries – Electrical Equipment (bodily injuries)</td>
<td>9</td>
<td>Level 2</td>
</tr>
<tr>
<td>7.</td>
<td>Transportation of minerals</td>
<td>Vehicle Accident (bodily injuries)</td>
<td>50</td>
<td>Level 1</td>
</tr>
<tr>
<td>8.</td>
<td>Transportation of minerals</td>
<td>Accidental 1 fire in vehicle (bodily injuries, exposure to heat radiation)</td>
<td>5</td>
<td>Level 3</td>
</tr>
</tbody>
</table>

### Hazard Analysis

Broadly, the hazards cover explosive material management, working at heights, slope and bench stability, mineral transport, mineral processing and force majeure conditions (rainfall and flooding). The mechanisms due to which hazards (coming under Risk Levels 1 and 2) may actually occur are covered in Table:

### Table Cause analysis for Level 1 and Level 2 hazards

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Hazard Description (Risk)</th>
<th>Risk Score</th>
<th>Risk Level</th>
<th>Cause Analysis</th>
</tr>
</thead>
</table>
| 1      | Travel in moving vehicle in uneven terrain | 2          | Level 3    | • Poor visibility
• Incompetent driver
• Poorly maintained vehicles |
| 2      | Unintended explosions (exposure to overpressure) | 15         | Level 1    | • Defective explosives
• Improper storage of explosives
• Force majeure conditions such as rainfall and flooding |
<table>
<thead>
<tr>
<th>Overpressure during storage of explosives in magazines</th>
<th>Outdated explosives</th>
<th>Improper storage of explosives</th>
<th>Force majeure conditions such as lightning strike</th>
<th>Fire (can be caused by unsafe practices)</th>
</tr>
</thead>
<tbody>
<tr>
<td>only from approved and licensed authority</td>
<td>If deteriorated or unserviceable explosive is found, seek advice of licensing authority</td>
<td>Records and accounts of explosive stock and issue is to be maintained. Stock should be drawn upon strict rotation. Well planning for requirement of explosives shall be exercised. Disposal of outdated explosives as the chief controller or controller of explosive may issue.</td>
<td>Detonator are to be stored separately. Explosives shall be stored in dry and well ventilated area. Protect explosives from extreme temperatures.</td>
<td>Empty packages shall be removed immediately and destroyed.</td>
</tr>
<tr>
<td>it is returned back to the original</td>
<td>supplier for disposal at their end as per Rule 16 of The Explosive Rules 1983.</td>
<td>Maintaining registers for Explosives receipt, issue and stock as per Reg. 154, 156 of MMR 1961.</td>
<td>Lightning arrestor are provided and maintained as per the requirement under Rule 116 the Explosive Rules 1983.</td>
<td>Follow the instructions Specified in Rule 154, 155and, 170 of MMR 1961.</td>
</tr>
<tr>
<td>explosives</td>
<td>Mines Manager</td>
<td>Mines Manager</td>
<td>Mines Manager</td>
<td>Mines Manager, Mines</td>
</tr>
<tr>
<td>Poor vehicle maintenance</td>
<td>Periodic servicing of vehicle Brakes and steering apparatus should be in good condition. Headlight and tail light of the vehicle should be in good condition.</td>
<td>MMR 1961</td>
<td>Procedure for Maintenance of Vehicles under Reg. 176 of MMR - 1961</td>
<td>Y</td>
</tr>
<tr>
<td>-------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------</td>
<td>---------------------------------------------------------------</td>
<td>-----</td>
</tr>
<tr>
<td>Unintended explosion or exposure to overpressure, charging blast holes</td>
<td>Well planning is required before and after charging of blast holes. Blast sites should be secured and warning signs posted before loading boreholes.</td>
<td>MMR 1961</td>
<td>Procedure for drilling, charging, stemming and firing of holes as per Reg. 162</td>
<td>Y</td>
</tr>
<tr>
<td>Incompetent blasting personnel</td>
<td>Shot firer should have shot firer's permit granted under explosive rules.</td>
<td>MMR 1961</td>
<td>Appointment of Shot firer as per Reg. 160 as per MMR 1961</td>
<td>Y</td>
</tr>
<tr>
<td>Poor blasting practices</td>
<td>Tamping rod of wood must be used, iron or steel rods should not be used. No smoking or any source of light or fire shall be allowed near explosives storage. Before loading the blast hole blaster should check the driller log. Blast sites should be secured and warning signs posted before loading boreholes.</td>
<td>MMR – 1961 -The Explosive Rules, 1983, Procedure for drilling, charging, stemming and Firing of holes as per Reg. 161, Rule 14 of ER ISO procedure QSP-760-06</td>
<td>Y</td>
<td>Certified laster</td>
</tr>
<tr>
<td>6</td>
<td>Hit by Machineries – Electrical Equipment (bodily injuries)</td>
<td>Periodic servicing of machineries Periodic Inspection /Audit of Machineries and Structures Non Compliance to SOP</td>
<td>MMR 1961</td>
<td>Procedure laid under Section 174 Chapter XVI – Machinery and Plant of MMR 1961</td>
</tr>
<tr>
<td></td>
<td>Poor machinery Maintenance</td>
<td>Periodic servicing of electrical instruments. Periodic Inspection / Audit of Electrical equipments – cables and accessories Non Compliance to SOP</td>
<td>Indian Electricity Rules 2003</td>
<td>Section VII – Works of Licensees of Indian Electricity Rules 2003</td>
</tr>
</tbody>
</table>

**DISASTERS MANAGEMENT PLAN**

The Disaster Management Plan (DMP) is a guide, giving general considerations, directions, and procedures for handling emergencies likely to arise from planned operations. The DMP has been prepared for the TCL on the basis of the Risk Assessment and related findings covered in the report.

**Disaster Management Plan: Structure**

The Disaster Management Plan (DMP) is supposed to be a dynamic, changing document focusing on continual advantage of doing this is to have a system that is in synchronicity with commonly used SHE systems such as ISO 14001 and OHSAS 18001.

**Policy**

The Safety Health and Environmental (SHE) policy is existing and accessible to all at site and to other stakeholders. The policy has been framed considering legislative compliance, stakeholder involvement, continual improvement, and management by objectives.

**Planning**

**Identification and Prevention of Possible Emergency Situations**

Possible emergency situations can broadly be classified into unintended explosions, vehicle collision, and inundation. Additional emergency situations can be developed on the basis of audit or other procedures prior to commencement of operations.

**Emergency Prevention**

Some of the ways of preventing emergencies are as follows:
Liaison with State Authorities
Government authorities, local hospital, police fire services, taluka mamlatdar, district collector will be kept informed about the occurrence and development of any incident by Commander and procure necessary help and guidance from these authorities.

Task Force of Essential Staff
A task force of essential trained staff is made available to get work done by the Commander. Task Force personnel shall be trained to perform tasks as mentioned above.

Emergency Control Center
Manager-Quarry Office will act as Emergency Control Center and provided with required communication facilities. The Control Center is situated in an area of minimum risk and close to the road to allow for ready access by a vehicle if other systems fail or extra communication facilities are needed to be set up. The Emergency control center should consist of following items:

- External telephones
- Internal telephones
- E-Mail facilities
- Emergency plan
- Stationeries
- Torches and emergency lights.

Fire Fighting
Person noticing the fire shall immediately raise alarm and ask the nearest person to inform Matron and Manager-Quarry.

- Portable Fire Extinguisher shall be used in an attempt to extinguish the fire, by the person at site.
- Matron shall assess the severity of fire and if likely to be severe shall take following steps -
  - Call fire tenders and mobile trailer pump from nearby fire department.
  - Call for assembly of all persons at assembly points
  - Arrange for turning "OFF" main switch of electricity supply.
  - Manager-Quarry shall review the steps taken by Matron in his capacity as COMMANDER and establish a "Control Room" in his office.

Immediate Step in Case of Explosion:
At first the concerned security guard should inform about it to the shift-in-charge and Mgr.-Quarry. They will take the precaution described in the Work Instruction.

Further Steps in Case of Fire Spreading
- Assembly of all persons at the assembly points.
- Arrival of fire tenders and / or Mobile Trailer Pump.
- Ensure evacuation in orderly fashion.
- Ensure that any vehicle parked near the Fire Site is taken away to safe area.
- Carry out responsibilities as detailed as above.

Emergency Preparedness for Electrical Shock / Accident
- Source of power should be put off immediately in case of any electrical shock.
- Injured person should be shifted to safe place.
- Persons engaged in rescuing operation should use all PPEs and take appropriate precaution while removing the injured persons.
- Trained persons are engaged to give first-aid treatment to injured persons.
UNDEARTAKING

I, hereby give undertaking that as per EIA notification dated 14.09.2006 & its subsequent notification till date the mining project is falls in category-B2, thus ToR is not mandatory for this project.