RISK ASSESSMENT

1.0 RISK ANALYSIS AND DISASTER MANAGEMENT PLAN

Mining basically is a hazardous profession requiring stringent safety measures to avoid incidences involving life and damage to machineries. It may cause extensive damage to property and serious disruption in work inside and outside the premises. Such situations need positioning of emergency response plan which can be executed without the loss of time. Time factor is the essence in dealing emergencies to minimize the loss of human life and disruption of work.

Any accident may develop into a major emergency even with the best safety measures and programmes in mining. Hence, an emergency preparedness plan will be planned properly and documented for ease of implementation at the time of need without losing time and avoiding and delays.

1.1 OBJECTIVES OF DISASTER MANAGEMENT PLAN

The objectives of DMP is to describe the company's emergency preparedness, organization, the resource availability and response actions applicable to deal with various types of situations that can occur at mines in shortest possible time.

Thus, the overall objectives of the emergency plan are summarized as:-

- Rapid control and containment of Hazardous situation.
- Minimizing the risk and impact of event/ accident.
- Effective prevention of damage to property.

In order to achieve effectively the objectives of emergency planning, the critical elements that form the backbone of Disaster Management Plan (DMP) are:-

- Reliable and early detection of an emergency and immediate careful planning.
- The command, co-ordination and response organization structure along with availability of efficient trained personnel.
- The availability of resources for handling emergencies.
- Appropriate emergency response action.
- Effective notification and communication facilities.
- Regular review and updating DMP.
- Training of the concerned personnel.

Steps taken for minimizing the effects may include rescue operations, first aid, evacuation, rehabilitation and communicating promptly to people living nearby.

1.2 IDENTIFICATION OF HAZARDS AND MITIGATION MEASURES

The following types of hazards are identified and precautions to be taken against them are enumerated below:-

1.2.1 FALL OF SIDES & ROOF

- Flatter slope angles are adopted where occurrences of loose earth are encountered.
- Unmanageable heights are not created.
- Loose rocks are properly dressed.
- Nature and structure of the rocks are properly studied for their slips.
- Bench height will be kept with respect to the digging depth of excavating equipment. In case of manual open cast mine it will not be normally more than 3.0m. The width of the bench will not be less than the height.
- No overhang/ under cutting will be allowed to be created in benches.
- Overloading of dumpers will not be allowed. Large size of material will not be loaded at the top of the dumpers to prevent its falling and causing injury to persons.

1.2.2 STORAGE AND USE OF EXPLOSIVES

- Safe practices will be adopted while using explosives and it will be kept and stored in magazine, duly licensed.
- DGMS qualified blaster will be appointed for carrying out blasting operations
- All precautions will be taken before blasting like removal of persons, equipments from the place of blasting to the safe distance.
- Proper record of receipt, storage and use of explosives/ fuel will be kept and maintained by properly authorized persons.
- Explosives will be used as per the requirement. No overcharging/ undercharging of holes will be allowed.
- All entries to the blasting area will be blocked and guarded to prevent inadvertent entry of persons.
- Alert through hoisting red flag will be given for cautioning/ warning to persons nearby before blasting.
- No blasting/ charging will be carried out in case of thunderstorm/ lighting etc.
- Caution board will be placed in the roads/ passages leading to blasting zone.

1.2.3 STORAGE OF OIL AND FUEL

- Due care will be taken to avoid oil spillage.

- Oil collecting bins will be placed before taking out oil from drums/ barrels to prevent spillage on the ground. Storage will not be allowed beyond necessity.
- Sand will be spread on floor. It will be regularly scrapped and removed.
- Sand baskets will be provided within the easy reach of persons near the area of fuel/ lubricant storage.
- Sufficient no. of foam type fire extinguishers will be provided.
- All equipments deployed in the mine will be provided with fire extinguishers CO_2 type to deal with electrical fires.
- Fire hydrant will be provided with long hose pipe near the mine.

1.2.4 WATER

- Proper drainage will be maintained to eliminate inundation of working pits during rains from run-off water.
- Garland drains will be provided to prevent outside water entering the mine pit.
- Sumps with adequate capacity will be developed inside the mine.
- Adequate pumping capacity will be developed to deal with accumulated water.
- Dumping area will be benched and sloped at the top towards the low altitude side.
- Parapet wall of 1m x 1m will be provided on the low altitude side of the dumps.
- Siltation ponds (3m x 3m x 2m) will be provided to arrest silt coming with runoff water/ garland drains.

1.2.5 NATURAL HAZARDS/ DISASTERS AND MANAGEMENT PLAN

1.2.5.1 EARTHQUAKES

Study area falls in Seismic Zone – IV (High Damage Risk Zone (MSK VIII)) as per vulnerability atlas. Area witnessed some low to moderate intensity earthquakes in last five years. The details are as below:-

S. No.	Intensity (Richter Scale)	Date and Time	Centre
1	4.1	17.07.2016 & 09:24 AM	12 Km from Gariadhar, Gujarat
2	4.3	06.10.2015 & 05:58 AM	70 Km from Rāpar, Gujarat
3	7.7	24.09.2013 & 04:59 PM	113 Km from Bela, Balochistān, Pakistan
4	4.0	29.07.2013 & 06:37 PM	6 Km from Bhachāu, Gujarat
5	4.1	08.12.2012 & 12:36 PM	11 Km from Kāndla, Gujarat

Management Plan

Following safety measures will be adopted for management of earthquakes:-

- Workers will be informed to get away from the working faces/ loose surface and to reach on safe and open place.
- Unmanaged and high benching will be avoided.
- Preparedness training for working staff.

1.2.5.2 CYCLONE

Gulf of Kutch is at approximately 7.0 km distance from the mine lease. It is cyclone prone zone. Considering the scenario, a brief recent history has been studied and it is as below:-

S. No.	Cyclone Name	Lowest Pressure	Date
1	ARB 02	958	1998
2	ARB 01	932	May 24, 2001
3	Onil	990	Oct 2, 2004
4	Yemyin	986	2007
5	Nilofar	-	Oct 31, 2014

Management Plan

Following safety and precautionary measures will be adopted for management during (pre-post scenario) Cyclones:-

- Workings will be stopped with the alert of any cyclone till situation comes under control.
- Regular updates from the District/ State authorities about the situations and early warning systems.
- Preparedness training for working staff.

****