	<b>Environmental Impact Assessment for Netrabandha Pahar Iron Ore Block for Total Excavation of 2.680 MTPA (2.0 MTPA (ROM)+ OB 0.680) along with 2x100 TPH Mobile Crusher in mine lease area of 139.223 ha located at Baladihi villages, Koira Tehsil, Sundargarh District, Odisha</b>
	<b>Risk Assessment</b>

## 1.1 Risk Assessment

Hazard analysis involves the identification and quantification of the various hazards (unsafe conditions) that exist in the iron ore mines. On the other hand, risk analysis deals with the identification and quantification of risks, the mining equipment and personnel are exposed to, due to accidents resulting from the hazards present in the mine.

Risk analysis follows an extensive hazard identification. It involves the identification and assessment of risks on the neighboring population exposed as a result of hazards present. This requires a thorough knowledge of failure probability, credible accident scenario, vulnerability of population etc.

In the sections below, the identification of various hazards, probable risks in the Netrabandha mine, maximum credible accident analysis, consequence analysis are addressed which gives a broad identification of risks involved in the mine. Based on the mining method and the iron ore handling, the Disaster Management Plan (DMP) has been prepared.

### 1.1.1 Preliminary Risk Assessment


The Netrabandha mines is adopting opencast method of mining. The lease area is an undulating terrain. It has water channels, villages and other infrastructures like roads, power lines etc.

The complete mining operation will be carried out under the management control and direction of a qualified mine manager holding a First Class Manager's Certificate of competency to manage a metalliferous mine granted by the DGMS, Dhanbad. The DGMS have been regularly issuing standing orders, model standing orders and circulars to be followed by the mine management in case of disaster, if any. Moreover, mining staff has to be sent to refresher courses from time to time to keep them alert. However, following natural/industrial hazards may occur during normal operation.

- Accident due to explosives;
- Accident due to heavy mining equipment; and
- Sabotage in case of magazine.

In order to take care of above hazard/disasters, the following control measures are being adopted:

- All safety precautions and provisions of Mine Act, 1952, Metalliferous Mines Regulation, 1961 and Mines Rules, 1955 will be strictly followed during all mining operations. However, blasting will be carried by external agency;
- Entry of unauthorized persons will be prohibited;
- Fire fighting and first-aid provisions in the mine office complex and mining area;
- Provisions of all the safety appliances such as safety boot, helmets, goggles etc will be made available to the employees and regular check for their use;

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	<b>Risk Assessment</b>

- Training and refresher courses for all the employees working in hazardous premises; Under mines vocational training rules all employees of mines shall have to undergo the training at a regular interval;
- Working of mine, as per approved plans and regularly updating the mine plans;
- Cleaning of mine faces shall be regularly done in order to avoid any overhang or undercut;
- Handling of explosives, charging and firing shall be carried out by competent persons only under the supervision of an Assistant Mine Manager;
- Provision of magazine at a safe place with fencing and earthen mound and necessary round the clock security arrangement;
- Regular maintenance and testing of all mining equipment as per manufacturer's guidelines;
- Suppression of dust on the haulage roads by regular deployment of water sprinklers;
- Adequate safety equipment will be provided at explosive magazine; and
- Increasing the awareness of safety and disaster through competitions, posters and other similar drives.

For any type of above disaster, a rescue team is placed. Details of key persons are given in **Table-1**.

#### 1.1.2 Identification of Hazard and Precautionary Measures


Identification of hazards in a mining unit is of primary significance in the analysis, quantification and effective control of accidents. A hazard is characteristic of a system/process that presents potential for an accident. All the components of a system/process need to be thoroughly examined to assess their potential for initiating an accident. Safety is relative and implies freedom from danger or injury. It calls for identification of hazards, risk and further suggestion on hazard mitigation measures.

Hazard analysis involves the identification and quantification of various hazards, unsafe conditions practices that exist in the mine. On the other hand, risk analysis deals with the identification and quantification of risks, the mining equipment and personnel are exposed due to accidents resulting from the hazards present in the mine.

**TABLE-1**  
**DETAILS OF KEY PERSONS**

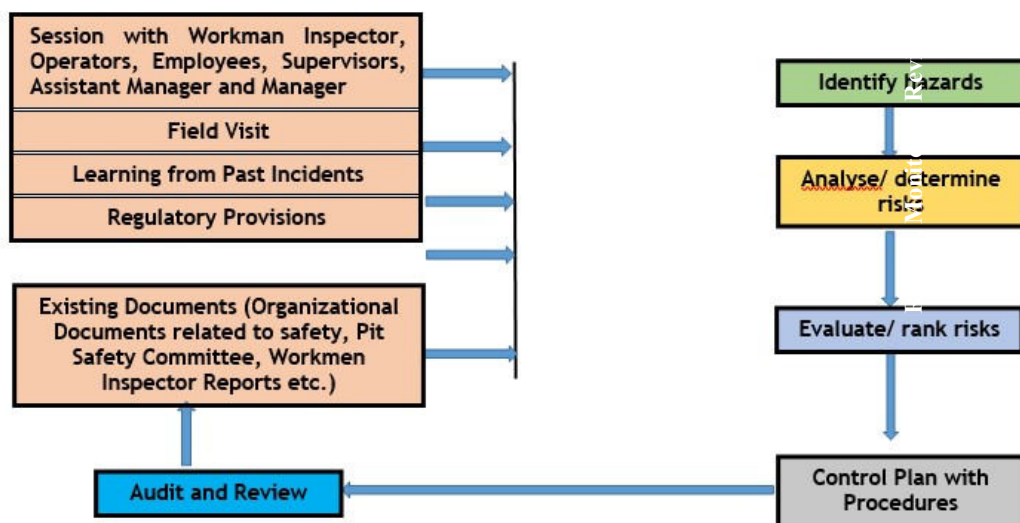
Sr No.	Designation	Name and Designation
1	Chief Controller	Mines Manager
2	Site Controller	Safety Officer
3	Communication Officer	Shift In-Charge-Mine
4	Medical Officer	Doctor-Medical Services
5	Security Officer	Officer-Security
6	Electrical Engineer	Engineer- Electrical
7	Transport Officer	Officer-Admin
8	Maintenance Engineer	Engineer-Mechanical

Source: BPSL DMP

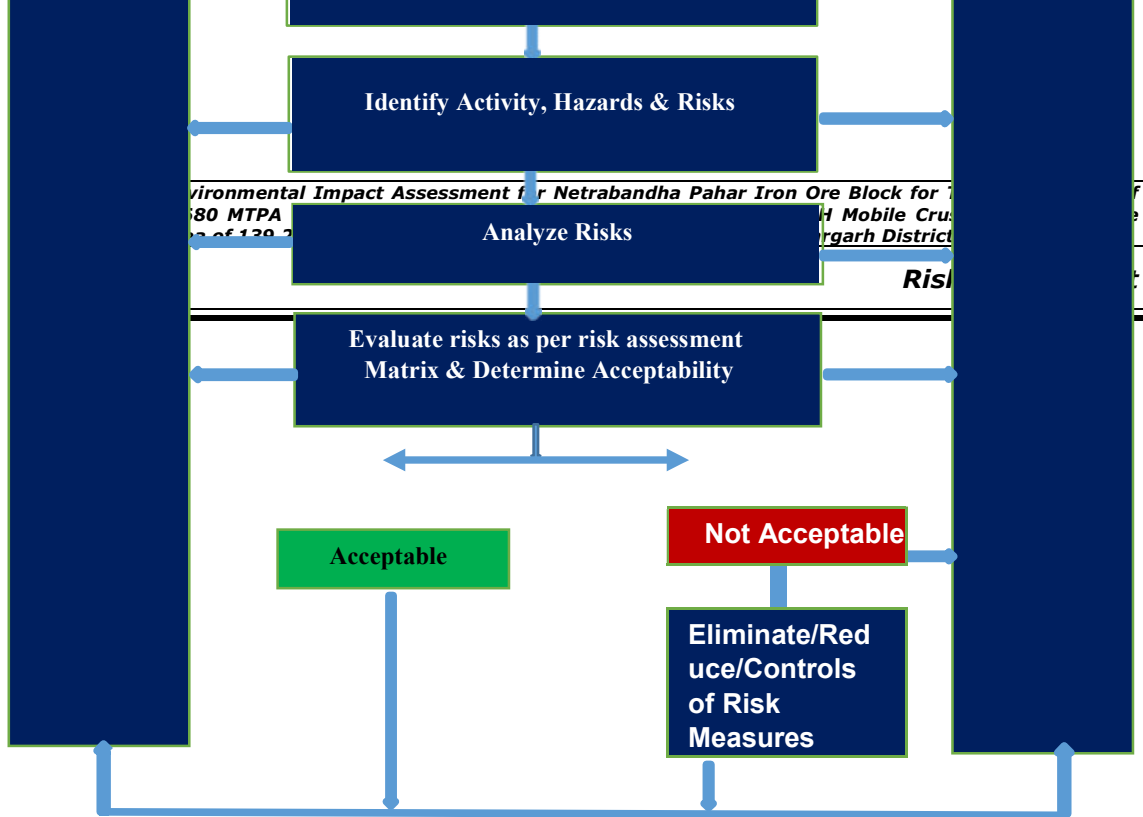
	<b>Environmental Impact Assessment for Netrabandha Pahar Iron Ore Block for Total Excavation of 2.680 MTPA (2.0 MTPA (ROM)+ OB 0.680) along with 2x100 TPH Mobile Crusher in mine lease area of 139.223 ha located at Baladihi villages, Koira Tehsil, Sundargarh District, Odisha</b>
	<b>Risk Assessment</b>

#### Methodology Adopted:


Mining team shall develop, implement and maintain appropriate risk evaluation and management programs/procedures for all activities, products and services and develop measures to reduce these risks. Risk management program /procedures shall systematically identify hazards, assess their risk and adopt control strategies to reduce risk to as low as reasonably practicable (ALARP) level. The typical risk management process is given in **Figure-1.1 & Figure-1.2** Threats/Hazard.



**FIGURE-1.1**  
**RISK MANAGEMENT PROCESS**




**FIGURE-1.2**  
**RISK MANAGEMENT METHODOLOGIES**

	<b>Environmental Impact Assessment for Netrabandha Pahar Iron Ore Block for Total Excavation of 2.680 MTPA (2.0 MTPA (ROM)+ OB 0.680) along with 2x100 TPH Mobile Crusher in mine lease area of 139.223 ha located at Baladihi villages, Koira Tehsil, Sundargarh District, Odisha</b>
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**FIGURE-1.3**  
**HIERARCHIES RISK CONTROL MEASURES**

The emergency situations defined in the existing document can be summarized as follows keeping the major activities in considerations;

	<b>Environmental Impact Assessment for Netrabandha Pahar Iron Ore Block for Total Excavation of 2.680 MTPA (2.0 MTPA (ROM)+ OB 0.680) along with 2x100 TPH Mobile Crusher in mine lease area of 139.223 ha located at Baladihi villages, Koira Tehsil, Sundargarh District, Odisha</b>
	<b>Risk Assessment</b>

#### Mining:

- I. Explosion in diesel dispensing
- II. Explosion of explosive during transport & storage;
- III. Theft of explosive during storage; and
- IV. Fire in HEMM.
- Equipment:
  - I. Explosion of gas cylinder (Oxygen, Nitrogen & DA);
  - II. Bursting of batteries;
  - III. Explosion of pressurized vessels.
- Plant:
  - I. Gas cylinder explosion;
  - II. Fire in equipment/ conveyors;
  - III. Electrocution during maintenance; and
  - IV. Trap with moving parts of equipment.
- Planning/ NRD:
  - I. Fire in office building due to electrical short circuit;
  - II. Failure of fire tender; and
  - III. Fall from height.
- Engineering Services:
  - I. Electric shock;
  - II. Fire;
  - III. Drowning risk;
  - IV. Fall from height;
  - V. Flow of chemicals in water body/ natural steam; and
  - VI. Sabotage at vital installations (Drinking water treatment plant. Pump houses, Hospital, Power Sub Stations etc.)


#### 1.1.3 Possible Hazards in Open Cast Mine

There are various factors, which can cause disaster in the mine. These hazards are as follows:

- Blasting;
- Waste rock dumps;
- Heavy machinery; and
- Explosives storage.

The mining activity has several disaster prone areas. The identification of various hazards in open cast mining is shown in **Figure-1.4**. List of activities and hazards are given in **Table-1.2**.

##### 1.1.3.1 Blasting

	<b>Environmental Impact Assessment for Netrabandha Pahar Iron Ore Block for Total Excavation of 2.680 MTPA (2.0 MTPA (ROM)+ OB 0.680) along with 2x100 TPH Mobile Crusher in mine lease area of 139.223 ha located at Baladihi villages, Koira Tehsil, Sundargarh District, Odisha</b>
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Most of the accidents from blasting occur due to the projectiles, as they may some times go even beyond the stipulated danger zone of 500 m, mainly due to overcharging of the shot holes as a result of certain special features of the local ground. Flying rocks are encountered during initial and final blasting operations in a particular bench. Vibrations also lead to displacement of adjoining areas. Dust and noise are also problems commonly encountered during blasting operations. The detailed blasting study was carried out and recommendation were followed strictly.

#### *1.1.3.2 Waste Rock Dumps*

The waste rock dumps may cause landslides. High rock dumps created at the quarry edge may cause sliding of the dump or may cause failure of the pit slope due to excessive loading, thereby causing loss of life and property. Siltation of surface water may also cause run-off from waste rock dumps.

#### *1.1.3.3 Heavy Machinery*


Most of the accidents during transport of dumpers, trucks, excavators, ripper dozers and other heavy vehicles are often attributable to mechanical failures and human errors.

#### *1.1.3.4 Storage of Explosives*

In Netrabandha mine, the blasting operations are carried out every day as per requirement in daytime only. The main hazard associated with the storage, transport and handling of explosives is fire and explosion. The rules as per the Indian Explosive Act and Rules 1883 shall be followed strictly for handling of explosives.

The storage, transportation and use of explosives shall be carried out with complete safety, in accordance with rules and regulations. The magazine is kept guarded round the clock by security personnel. The entire magazine area is fenced by high chain link with barbed wire at top. Security watchtower and morchas are provided for surveillance of the area around magazines. The storage and maintaining of stock records of magazine is done by an authorized magazine in-charge under the guidance of mining engineer. The magazines are kept under lock and key and are guarded by security personnel.

Suitable explosive vans duly licensed by the controller of explosives are utilized for daily transportation of explosives between magazine and blasting site both for bringing and returning the explosives. Necessary fool proof arrangements are made for transportation/bringing of detonators in separate vehicles to the blasting site. It is ensured that explosives and detonators/detonating fuse are not transported in the same compartment of explosive van in order to avoid any possible accidents.

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During monsoon season and cloudy weather, no charging of explosives in the field are carried out. Necessary precautions such as keeping the detonating fuse properly covered with drill cuttings/stemming material are taken during onset of rains/stormy weather in order to prevent any possible premature firing due to lighting.

- **Type of Explosives**


Types of explosives proposed at Netrabandha Iron Ore mine are given below:

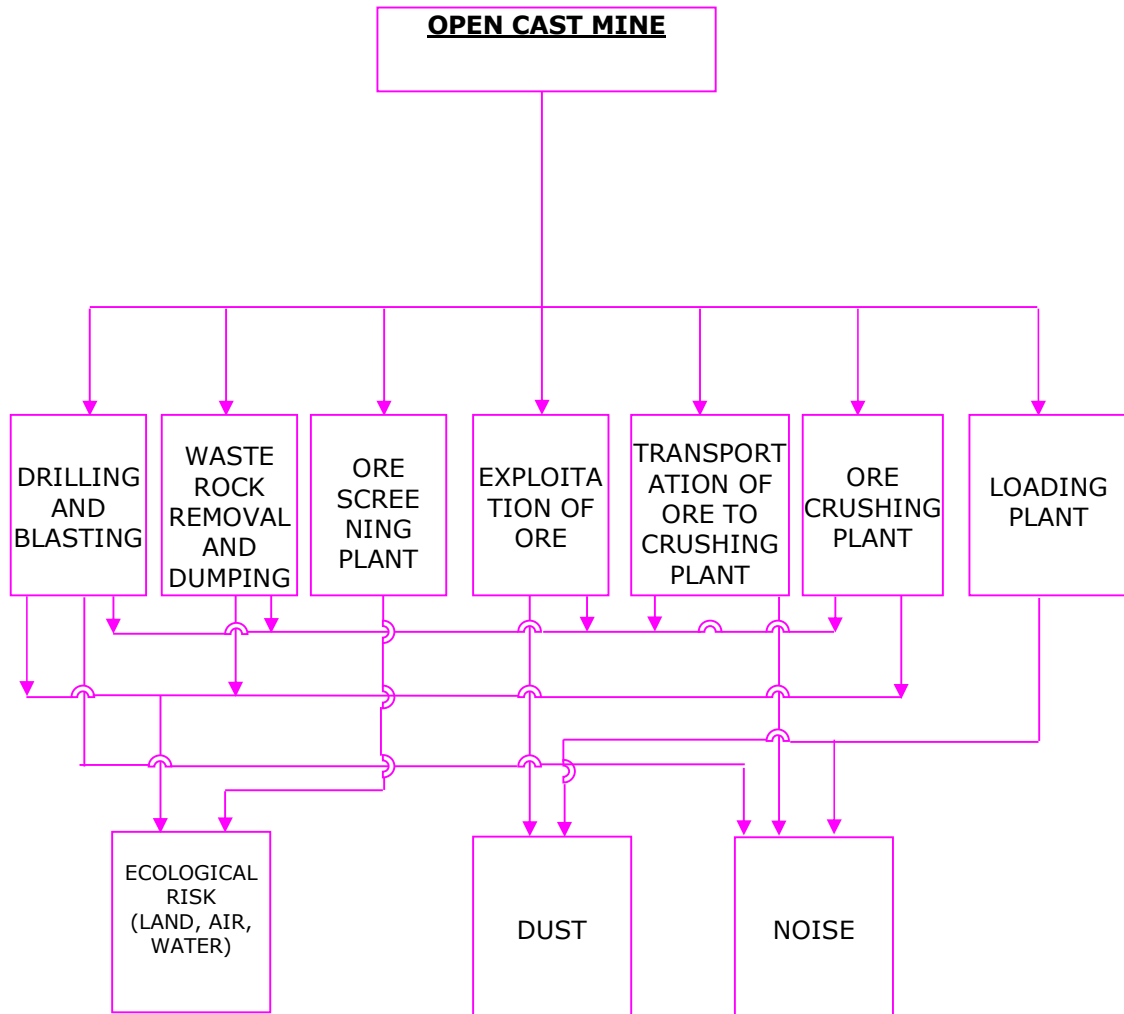
Ammonium Nitrate Fuel Oil (ANFO) is the most popular and economical blasting technique. It is cost effective, safe to store & handle and non-cap sensitive. It is used as a column charge and other explosives are used as booster to initiate the blast. Free flowing prilled-granulated ammonium nitrate is mixed intimately with 6% by weight of diesel oil. The mixture so prepared in the field is then used as explosive agent with 20% to 30% of a booster charge at the bottom. ANFO however is hygroscopic and therefore cannot be loaded directly into wet/watery holes but can be loaded packed in plastic tube bags.

- **Storage of Explosives:**


About 66 no's of holes are to be charged and blasted per day to match the proposed excavation by drilling and blasting. Hence, proposed explosive consumption per day will be ammonium nitrate prilled 1365 Kg, Booster cartridge 66 no's or 183 Kg and diesel of 87 liters. The blasting will be carried out by authorized explosive agent hence, no magazine is required for storage of explosives.



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**FIGURE-1.4**

	<b>Environmental Impact Assessment for Netrabandha Pahar Iron Ore Block for Total Excavation of 2.680 MTPA (2.0 MTPA (ROM)+ OB 0.680) along with 2x100 TPH Mobile Crusher in mine lease area of 139.223 ha located at Baladihi villages, Koira Tehsil, Sundargarh District, Odisha</b>
	<b>Risk Assessment</b>


## **IDENTIFICATION OF HAZARDS IN OPEN CAST MINE**

### Preventive Measures:

- Surveillance: Proper surveillance with recording system round the clock. Records of all visits in the magazine should be maintained.
- Magazine location: Location will be such that any accidental explosion should not damage other building or nearby persons. The distance will be as per the maximum explosive kept anytime in the magazine.
- Environmental consideration: If any magazine is situated within 30 m of a body of water, an environmental assessment of the site is required. Therefore, the Inspector of Explosives needs to be contacted for further details.
- Initiating system mechanism: Detonating Cord and Boosters: Detonating cord and boosters contain PETN, TNT, or similar high explosives should be kept in a magazine (never with detonators) in closed cases.

Fuse Lighters, Ignite Cord, and Connectors: Fuse lighters, ignite cord, and ignite cord connectors are explosives, but present more of a fire hazard than an explosion risk. So these items should be kept in a separate, dry, secure location. When initiation systems are kept in a magazine, no other blasting explosive should be kept in the magazine.

- Protection from lightning: Locating a magazine at the base of a high bank will reduce the possibility of it being struck by lightning. Grounding of the magazine areas done to severe electrical storms.
- Proximity to Electrical Transmission Lines: All overhead cables line has been terminated 15 m away from the magazine.
- Wireless Communication Devices: Wireless communication devices such as cellular phones, Mobile radios, Pagers, GPS unit, etc. are not being brought inside an initiating system magazine.
- Protection against External Fires: Fire is a hazard that must always be borne in mind when considering explosives storage. To guard against it, the grounds surrounding a magazine must be maintained free from bush, weeds, dry grass and other combustible material for a distance of at least 8 m. A magazine built of concrete blocks or clad in fire- resistant material affords added fire protection.

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**TABLE-1.2**  
**LIST OF ACTIVITY AND HAZARDS**

List of Activity and Hazards							
Sr No	Description of Hazards/Activity	Percentage of Workers Exposed	Consequences	Probability	Exposure	Total	Risk level
1	Dumper Operation	20-40	5	7	10	350	High
2	Loader Operation	5-10	5	7	10	350	High
3	Light vehicle	< 5	5	7	10	350	High
4	Excavator	< 5	5	7	10	350	High
5	Truck Transport	5-10	5	7	10	350	High
6	Crusher & Screening plant	< 5	5	3	10	150	Medium
7	strata control	< 5	5	3	10	150	Medium
8	Workshop (Maint. & Service)	< 5	5	3	10	150	Medium
9	Blasting	< 5	5	7	3	105	Medium
10	Electrical	< 5	5	2	10	100	Medium
11	Crane	< 5	5	3	3	45	Medium
12	General	5-10	1	7	5	35	Medium
13	Sampling	< 5	1	3	10	30	Medium
14	IT Operation	< 5	1	2	10	20	Low
15	Afforestation, Dump management & Survey	< 5	1	2	5	10	Low
16	Drilling	< 5	1	2	5	10	Low

#### 1.1.3.5 Water Logging

Water logging in the mine site can be avoided by adopting following measures:

- Position of water body should be correctly known;
- Water from the surface water bodies should not be allowed to enter in the mine;
- Surface water bodies should be correctly marked together with their highest flood level on the mine.


#### 1.2.4 Safety Measures

BPSL ensures implementation of all the possible safety measures in the course of its endeavour to mine iron ore from the Netrabandha mine. This is in line with the company's policy that all the efforts made towards enhancement of safety pays rich dividends in terms of higher productivity and reduction of losses.

A brief description of the measures taken-up by BPSL during the process of mining are mentioned below:

##### 1.2.4.1 Mine Layout

The mine is non-operating proposed iron ore mine. To overcome the problem due to complex geological structure of the deposit and to ensure safe and stable working benches, following measures will be taken:


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	<b>Risk Assessment</b>

- The deposit will be opened up from the top of the hill, to enable slicing method of open cast working pattern to be followed. This ensures that there will be no left over benches above the working benches, which can cause unstable workings;
- The benches will be kept sufficiently wide for greater stability as well as for easy movement of the heavy earth moving machinery; and
- The height of the benches will be kept commensurate with the digging height of the excavators. This facilitates easier operation of the loading machines at the face and the benches remain stable as well.

#### 1.2.4.2 Measures Adopted to Avoid Accidents due to Blasting

To ensure safe blasting, the following measure will be adopted:

- The use of non-electric system of initiation of the blast holes by using excel detonators and connectors. It ensures bottom hole initiation of the explosive charge, thereby reducing the ground vibration and fly rock problem;
- Use of ground vibration and air blast monitoring instruments to monitor the blasts. The instrument reveals efficiency of the blasting activity;
- Complete evacuation of the area falling within 300 m of the blast site by sounding siren and by deployment of guards to avoid any exposure of the human beings and other animals to the danger associated with blasting;
- All the blasts are carefully planned and executed by experienced blasters under proper supervision of qualified and experienced mining engineers to ensure effective utilization of the explosive material towards breaking of the rock;
- The explosive material is stored properly in an approved magazine, which is guarded by security personnel round the clock;
- Secondary Blasting: Slurry cartridge is used in 83 mm/32 mm diameter hole drilled by 150 mm drill. The holes are connected by cordex /nonel and fired using an electric detonator activated by an exploder;
- The blasting operation is strictly conducted as per the guideline given in metalliferous mines regulation, 1961;
- All employee and equipment are cleared from the blast area and removed to a safe location prior to any scheduled blasting;
- To prevent unauthorized entry, guards are posted at all access points leading to the blast area; and
- Audible signals such as sirens, whistles, etc. are being used to warn employees, visitors and neighbours about the scheduled blasting event.

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#### 1.2.4.3 Ripping and Dozing

The proposed dozers will be utilized, especially to excavate mineral from the areas having close proximity to structures, likely to be affected by blasting. This machine completely minimizes the blasting activity, thereby ensuring safety at the critical locations.


#### 1.2.4.4 Transport of Mineral

To ensure safe working of the rear dump trucks, which transport the mineral from the mine pit to the hopper, following measures will be taken-up:

- The haul roads will be kept sufficiently wide to ensure free and easy movement;
- The curves on the roads will give proper super elevation;
- Drains along the roads will be designed to carry away rainwater without causing damage to the road;
- The valley side of the road is clearly demarcated either by erecting stone walls or by fixation of drums;
- Proper illumination of the roads will be done to facilitate work in the night hours;
- All transportation within the working area will be carried out under the direct supervision and control of competent person;
- The vehicles must be maintained in good repairs and checked thoroughly at least once a week by a competent person authorized for this purpose by the management;
- Broad signs will be provided at each and every turning point specially for the guidance of the drivers at night; and
- To avoid dangers while reversing the trackless vehicles, especially at the embankment and tripping points, all areas for reversing of lorries should, as far as possible, be made man free, and there should be a light and sound device to indicate reversing of trucks.

#### 1.2.4.5 Other Features

Automatic fire fighting systems will be provided for the critical equipment like excavators, loaders etc. All the heavy earth moving equipments are maintained in the efficient working order by a team of well experienced and qualified personnel at the mine site. Personal checking of the following features will be carried out on daily basis.

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	<b>Risk Assessment</b>

- Brakes;
- Horns and auto reverse horns; and
- Lights.

All the staff will be provided with essential personal protective equipment like safety shoes, helmets, hand gloves, goggles, apron, guards, ear muffs etc. Regular training will be imparted to the related staff of the mines for safe and proper operation and maintenance of the machines.

#### 1.2.4.6 Measures to Prevent the Danger of Overburden


To prevent the failure of overburden slopes, especially during the rainy season, the following precautions will be taken:

- Provision of garland drains to divert all surface water from OB dumping area.
- Wherever possible, providing bottom layer of hard rock OB to permit drainage of water.
- Levelling out hollows, low areas and humps and creating a natural slope for rainwater to flow down to the sump rather than accumulate and get absorbed by the dump.
- Keeping the sump adequately advanced and maintains proper slop for self-drainage of faces/OB dumps.
- Characteristics of material i.e. its size, hardness, density, composition, nature etc. influences the dump stability so these factors are also includes while designing dump.
- Height of OB dumps. The height should be designed for the particular mine considering physical and mechanical properties of the material, method of dumping or casting and topography of the OB dump area. As height increases, slope is to be flattened.
- Sequence in which the material is deposited in the dump. If the materials of different characteristics are dumped in the same dump, it will not consolidate and settled uniformly. The most unavoidable condition is created when alluvial or other soft material or clayey materials is dump at the bottom of dump yard. Such material has a property to hold water for substantial period, which causes unstable condition for the dump.

#### Containment and Post Event Management:

In the event of any signage of slope failure, all the machines and men must be evacuated so as to contain any further damage. Since this is a catastrophic situation, hence it must be dealt with a lot more patience and sincerity. The following things must be done aftermath the slope failure:

- Inform the concerned authorities so as to have quick and necessary solution.
- The area must be cordoned off so as to prohibit the entry and exit of men and machine.
- All the machinery deployed close to the affected area must be evacuated so as to prevent any further damage to property or danger to life.
- Proper enquiry must be conducted so as to prevent the recurrence of such incidents in near future.
- Operation must be started once only after the approval of concerned regulatory authorities.

	<b>Environmental Impact Assessment for Netrabandha Pahar Iron Ore Block for Total Excavation of 2.680 MTPA (2.0 MTPA (ROM)+ OB 0.680) along with 2x100 TPH Mobile Crusher in mine lease area of 139.223 ha located at Baladihi villages, Koira Tehsil, Sundargarh District, Odisha</b>  <b>Risk Assessment</b>
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- Continuous monitoring must be done in order to avert any further collapse.

#### Slope/ Strata Failure:

##### 1.2.4.7 Preventive Measure for Slope Failure


- Drainage System
  - I. A surface drain system that is capable to discharge all the storm water within the rain water catchment area in a designated period of time (say, 200 mm rainfall/hour). A surface drain system usually consists of:
    1. Surface Channel;
    2. Stepped or trapezoidal channel; and
    3. Catch pit or sand trap.
  - II. A sub-soil drain system that is laid below surface for the discharging of ground water and to maintain the water pressure be kept in a safe level (a) filter layer behind the slope leading water to outlets (b) Weep holes - cut-off drain (c) subsoil drain pipe
- Protection and treatment to Rock Slope
  - I. Scaling – loose blocks or boulders to be removed from exposed rock surfaces, this is usually done by manual method.
  - II. Construct buttress support – this is concrete or masonry gravity structure use to retain the unstable rock mass.
  - III. Rock bolt/nail – this is tensioned bar inserted into rock forming a short anchorage zone in rock so that an unstable slope area being reinforced by tension. Typical rock bolts are 25mm to 40mm in dia. 3m to 6m long, and have a tensile working load around 100 kN.

Protect a slope by the use of retaining wall: Retaining walls are structures usually provided at the toe of a slope to stabilize it from slide, overturn or collapse. A slope will be relatively stable when its profile (section angle) is kept below its angle of repose. Angle of repose is an angle that maintains naturally to a safe equilibrium by the composing material of a slope. This angle deviates from differing materials depending on their compaction, particle size and the nature of the material itself. (E.g. cohesiveness and shear strength).

- Monitoring of Slope Failure

A common technique to determine slope stability is to monitor the small precursory movements, which occur prior to collapse. Slopes rarely fail without precursor movements.

Currently available slope monitoring techniques include –

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- I. Laser EDM with reflectors: Laser EDM from reflectors has greater range but is limited by the availability of reflectors on the slope.
- II. Reflector less laser scanners: Reflector less laser scanners are the most similar to the SSR, but their displacement measurements are less precise (by at least an order of magnitude), they have a shorter range and require more stable footing.
- III. Wire extensometers: Wire extensometers can have similar accuracy, but produce only a limited number of point measurements and are subject to a high incidence of false alarms.
- IV. Visual spotting of the face and visual crack monitoring: Visual spotting has the drawback of only being useful with adequate lighting. The spotter can also be easily misled by unrelated localised drilling and gives only a short warning time before failure.

Monitoring of pit slope is being done as per prescribed guideline. If the movement of strata is found to be more than 5 mm/meter, the movement is treated as excess. In such eventualities, repeated measurements shall be taken. On getting repeatedly similar excess readings, the area is to be declared unsafe and the men & machinery shall be removed from that area till the readings stabilize.

The major hazard scenarios associated with slope failure along with possible causes, consequence and preventive measures are given below:

#### Containment and Post Event Management:


In the event of any signage of slope failure, all the machines and men must be evacuated so as to contain any further damage. Since this is a catastrophic situation, it must be dealt with a lot more patience and sincerity. The following things must be done aftermath the slope failure:

- Inform the concerned authorities so as to have quick and necessary solution.
- The area must be cordoned off so as to prohibit the entry and exit of men and machine.
- All the machinery deployed close to the affected area must be evacuated so as to prevent any further damage to property or danger to life.
- Proper enquiry must be conducted so as to prevent the recurrence of such incidents in near future.
- Operation must be started once only after the approval of concerned regulatory authorities.
- Continuous monitoring must be done in order to avert any further collapse.

#### *1.2.4.8 Hazard Identification*

- **Classification of Major Hazardous Substance**



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Hazardous substances may be classified into three main classes: flammable substances, unstable substances and toxic substances. The ratings for a large number of chemicals based on flammability, reactivity and toxicity have been given in NFPA Codes 49 and 345 M. The details of the fuel storages in the mine are given in **Table-1.3**.

**TABLE-1.3**  
**CATEGORYWISE SCHEDULE OF PROPOSED STORAGE TANK**

Sr. No	Product	No. of Tanks	Classification	Design Capacity (KL)
1	HSD	2	B	20

A: Dangerous Petroleum  
Source: IBM Approved Mine Plan

B: Non- Dangerous Petroleum C: Heavy Petroleum

### 1.3 Disaster Management Plan

The terminologies of disaster and emergency are used synonymously by many countries. There is no separate definition of these terms in Indian statutory rules and regulations.


MSIHC Rules 1989 of Environment (Protection) Act 1986, Govt. of India, as amended in 2000, defines Major Accident as "an accident involving loss of life inside or outside the installation, or ten or more injuries inside and/or one or more injuries outside or release of toxic chemicals or explosion or fire or spillage of hazardous chemicals resulting in on-site or off-site emergencies or damage to equipment leading to stoppage of process or adverse effects to the environment".

In the present context, it has been followed that a disastrous situation is nothing but a major emergency in an industrial plant. As defined by ILO, a major emergency is "one which has the potential to cause serious injuries or loss of life both inside and outside the plant, or huge economic loss. It would normally require the assistance of outside emergency services to handle it effectively. Though this type of emergency may be caused by a number of different factors, viz., accidental release of huge amount of hazardous chemicals/containment failure, human error, natural disasters (say earthquake, cyclone etc.), sabotage, etc., it will normally manifest itself in three basic forms: fire, explosion or toxic release".

Assuming that accidents in a mine are possible irrespective of required/ adequate preventive measures, industries are preparing disaster management plans for combating major emergencies. A Disaster Management Plan (DMP) comprises the identification of hazards and analysis of the consequences and frequencies of occurrence of such accidents followed by the setting of priorities for emergency preparedness, mitigation, response, etc. for both on- and off- site.

#### 1.3.1 Objectives of Disaster Management Plan

The DMP has been prepared on the basis of identification of major hazards and hazardous locations leading to maximum credible loss scenarios (MCLSs) and associated consequences. Since the MCLSs are associated with worst-case release

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scenarios, therefore, it has been prepared primarily on the results of such scenarios.

### ➤ **Emergency Preparedness**

Approach Roads: - The approach road to the sites is well connected to main roads of the mine. Vehicle of any kind including fire tender and ambulance can approach to the site in case of emergency.

There shall be sufficient space left on the road for plying HEMM equipments and vehicles to facilitate movement of fire tenders, ambulance and other emergency vehicles in case of any emergency.

*First- Aid Box* – Total 9 Nos. of first aid boxes are available in the mine area. The location of these boxes are

- a) Mines Manager Office
- b) Time Office at mine
- c) Horizon plant area at Netrabandha
- d) Workshop
- e) Crushing & Plant area
- f) Screen plant area
- g) Quarry Rest Shelter
- h) Store
- i) Laboratory

Apart from the above locations, first aiders also carry their own first aid kit with them.

#### *First-Aid Station*

One first-aid station with requisite medical aids and accessories are provided near mine area to respond the first-aid cases at site by trained first-aid personnel.


Location: Netrabandha Mines office

#### *Medical Centre*

A medical center equipped with modern equipments and accessories has been established Near Baladihi to render medical facility to employees and the community.

#### *Ambulance*

One ambulance (general) have been deployed for meeting medical emergency of employees working round the clock and shifting to nearby hospitals for treatment as per the advice of doctor.

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#### *Preventive Measures –*

- a. The area is identified as “NO SMOKING ZONE”.
1. Oil, lubricants and gas cylinders are segregated and stored in a specified place, which are free from combustible materials.
- b. FIRE EXTINGUISHERS and SAND BUCKETS are placed at site.
- c. AFDSS are provided in vital HEMMs
- d. Quarterly maintenance of fire extinguishers done by outsourced vendor
- e. Persons are being trained in Fire Fighting.
- f. Proper SOP is formulated and implemented for all activities in mines.

#### *Information Displayed –*

The following information are displayed at site –

- a. Emergency telephone numbers
- b. Emergency communication flow chart
- c. Emergency Action plan
- d. Traffic Rules
- e. Details and locations of Fire Extinguishers
- f. Location of First Aid boxes
- g. NO ENTRY.
- h. Sign boards at strategic places in mine area.

#### *Emergency Equipments/Accessories*

The following are emergency equipment facility available in mines.

1. Siren 2. Fire extinguisher 3. Fire bucket filled with sand & water 4. Ambulance
5. Emergency Contact 6. First-aid box 7. Fire PPEs etc.

All emergency equipments are properly maintained. Equipments are regularly checked for proper performance.


#### *Assembly Point:*

Assembly Points have been identified across the site. These areas have been selected as they are safe and large enough to hold the evacuated population. The individual Assembly Points are listed below.

- a) Mines Manager Office
- b) Time Office at Mine Quarry
- c) Workshop
- d) Crushing and Screening Plant area

Location of the assembly points are marked on Emergency Plan which is displayed at different strategic locations within the lease area.

#### **1.3.2 Disaster Management Committee**

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The Disaster Management (DM) committee is headed by the mines manager or principal officer the area. He will be the in-charge of all the disaster management activities in the area. The current opencast operational management plan is discussed below.

Due to mining, processing of ore and dispatches of final products and the associated activities the following two types of emergency situations may occur:

1. On-site Emergency- The incident which has potential to cause impacts within the plant/ mines boundaries.
2. Off-site Emergency-The incident which has potential to cause impacts beyond the plant/ mines boundaries.

On the basis of the nature of process involved and number of employees working in key facilities of mine lease area, the various emergency response teams have been functional. Also to tackle an emergency situation effectively, their roles and the responsibilities are defined clearly.

TYPE OF EMERGENCY SITUATION – Emergency can take place in any hour of the day. It is therefore important that coordinated efforts at all the levels as well as timely decision on vital matters is taken in an integrated manner to control the incident.

EMERGENCY CONTROL ROOM – Mine manager office will be the control room for any emergency.

FIRE CONTROL ROOM- Security office at Entry Gate will be fire control room for any type of fire emergency situation.

MANNING –

a) In the event of emergency on the directive of Chief Controller or his authorized representative control room will start functioning round the clock till the normalcy is restored.


b) Communication Officer (Mining Shift in-charge) and representative of site controller, representative of personal & IR will man the control room.

Emergency Mock Drill:

Mock drill will be planned and conducted for security, contractor and departmental employees in monthly basis on possible emergency situations of outbreak of fire and serious accident. Evacuation mock drill will be conducted to check effective evacuation time in case of emergency. All key personnel will take part in emergency mock drill.

Functioning of Control Room:

Site controller will monitor the functioning of the Control Room.  
The control room will interact with the following –

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- a) Fire Brigade
- b) Hospital
- c) Security
- d) Police
- e) District Administration
- f) Safety & Training department
- g) Also the control room shall keep information of affected person and update information with the family.

#### *Education & Training*

Training on fire emergency and firefighting shall be conducted once in every quarter in mines. The training shall include demonstration of fire extinguishers and its specific uses for different class of fire. Maintenance of fire extinguishers has been scheduled quarterly by a competent agency.

#### Action Plan For Meeting The Emergency Arising Out The Fire

The following action plan will be followed in the event of emergency arising out of Fire. In case of fire the persons working in the area shall try combat fire initially by using the closest fire extinguisher of suitable type. In case it goes beyond the control, they shall immediately adhere the following -

- a. The electricity shall be cut off to the site of incident;
- b. Inform the Fire Control Office;
- c. Inform the Mine Manager Office; and
- d. In case of any casualty inform mine control room / safety office / hospital for Ambulance.


The information boards showing above emergency telephone numbers are displayed at different strategic locations.

#### *Action By Fire Brigade -*

- a) Reach the site with firefighting equipment and crew and start the fire fighting
- b) Help in rescue operations.

#### *Action By Security Department -*

- a) Immediately dispatch the patrolling vehicle to the site with fire extinguisher and fire crew to extinguish the fire;
- b) Fire extinguishers shall be used only as per their class mentioned in the equipment;
- c) Control of the area and barricade if necessary;
- d) Control of traffic to reach the emergency vehicles and equipment's at site;
- e) Arrange to keep the approaching road clear from spectators; and
- f) Helping the fire and rescue operation.

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*Action By Medical Officer–*

- Reach the site of incidence with the ambulance and other medical equipments and staffs.
- Provide first aid to all those injured and escort serious cases to hospital.

*Action By Transport Officer –*

- Providing vehicle and ambulance as per the demand of chief controller / site controller / shift in charge.

*Action By Hr/IR Department –*

- Reach the site and collect the details of persons present at the site at the time of emergency and those who are affected;
- Ensure the victim, receive adequate help and care;
- Ensure the needful medical care of the victims and financial expenditure;
- Inform relatives of the victims and extend help them;
- Inform police/local authority as required; and
- To arrange for refreshment and catering facilities during rescue and recovery.

### 1.3.3 Emergency Preparedness and Response Planning

The basic function of the emergency organization is to save lives and this should be the main concern of one and all. Emergency is declared by the following members based the order.

**Who Declares Emergency**

**Emergency of first order:**


When the situation is such that the facility and equipment available at mine site / level is adequate enough to handle the emergency situation, then the emergency situation should be handled by Manager of the mine.

**Emergency of second order: -**

When the situation is such that the facility and equipment at mine site / level is inadequate to handle the emergency situation and help from higher authority is needed, then the emergency should be declared by agent of the mine, and manager should assist the agent in handling the situation.

**Emergency of third order:-**

When the situation arising out of the accident / incident are such that the internal resources of the industry / company and the facility and equipment at mine level and the area level are not adequate enough to handle the situation, emergency is

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to be declared, and help from nearby mines, other agencies, and the government machinery may be sought.

Emergency of third order ought to be declared by executive head of the organization, and the Emergency Preparedness Plan is put in operation, and the agent and manager of the mine shall assist him in handling the situation.

This committee will be responsible for overall direction of all the operations connected with the rescue/recovery work and will function in close contact with DMC.

In each shift, electrical supervisor, electrical fitters, pump house in-charge, and other maintenance staff would be drafted for emergency operations. In the event of power or communication system failure, some of staff members in the mine/plant offices would be drafted and their services would be utilized as messengers for quick passing of communications. All these personnel would be declared as essential personnel.

#### 1.3.4 Emergency Facilities

##### 1.3.4.1 *Control Rooms and Associated Facilities*


In case of emergency of third order – when emergency has been declared by executive head

- Control room under the charge of a competent official shall be set up forthwith.
- The control room shall preferably be on the surface.
- The control room shall be as near to the site of accident / incident as possible.
- The control room shall act as a facilitator in all the operations being conducted.
- The control room shall be manned by competent officials round the clock, in shifts, in a relieving system. Besides the Control room in charge shall be assisted by adequate number of officials to handle the volume of workload including communications, material and persons.
- The control room shall be equipped with one or more clear two way communication system(s) which shall assist the control room in charge to communicate with the mine and the outside agencies also.
- Control room in charge shall record all communication in the register with date and time of communication in chronological manner.
- Control room in charge shall also record the visits, orders of visiting officials, and any other matter of relevance which takes place during his duty.

##### 1.3.4.2 *Fire Hose Reels and Extinguishers*

Basic requirements are:

- 1 Portable fire extinguishers and blankets shall be provided and mounted;
- Fire hose reels installed; and
- All firefighting equipment checked up to 6 monthly.

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Fire extinguishers and hose reels are the first line of defense in the event of a fire and prompt use of the correct fire extinguisher can prevent serious injury or damage. However, there is no single type of fire extinguisher that is effective for all fires. The following types of extinguishers may be available at the workplace.

- **Water Extinguisher - Colour Code Red**

Usable Only for use on fires involving wood, paper, plastic and other solid combustible material. Stream should be directed at the base of the fire. Not to be used on electrical or solvent fires.

- **Foam Extinguisher - Colour Code Blue**

Used predominantly on flammable liquid fuel type fires (i.e. petrol, oils, thinners and solvents). Not to be used on electrical fires.

- **Dry Chemical Powder (DCP) - Colour Code Red with a Horizontal White Band**

Can be used on all fires but especially for flammable liquid fires and fires involving live electrical equipment. Use with a sweeping motion across the flames. This is a non-conductive extinguishing agent.

- **Carbon Dioxide (CO<sub>2</sub>) - Colour Code Red with a Horizontal Black Band**

Can be used on all fires but is not particularly effective, especially outdoors. They are most effective for electrical fires, especially for portable electrical equipment (e.g. computers) as there is no residue.

#### 1.3.4.3 First Aid

- **First Aid Kits**

First aid kits provided for all workplaces under company control. First aid trained persons shall be in each shift.

First aid kits shall contain all the items listed in the First Aid Kit Checklist. Regular checks is carried out to ensure the availability of required medicines in first aid kits.


Netrabandha mine have a number of trained First-Aiders certified from St. John Ambulance Association. Each first aid kit will be in the care of a trained first aider. The first aid kit is to be located so it is easily accessible to all employees with its location signed so that it is clearly visible.

- **Appointment of Trained First Aiders**

A first aider is a trained person no matter how many employees there are, At least one first aid person should be deployed for each work group (e.g. each shift).

- **Maintenance of First Aid Equipment**



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The person in charge of first aid equipment and provisions is being checked up at should check it at regular intervals to ensure the contents meet legislative requirements.

Any other first aid equipment (e.g. stretcher) should be checked regularly to ensure it is well maintained and is in a state of readiness.

### 1.3.5 On-site Emergency Plan

#### **Introduction:**

The on-site emergency plan is an integral part of any major hazard control system. There are accidents defined, which could affect people and the environment outside the works. Thus, the on-site plan follows logically from the analysis to provide the basis for the off-site plan and the two plans should therefore complement to each other. The key feature of a good on-site emergency plan is flexibility in its application to emergencies other than those specifically included in the formation of the plan. The roles of the various parties that may be involved in the implementation of an on-site plan are described below. The responsibility for the on-site plan is likely to rest either with the works management or with the local authority.

Some of the aspects to be included in off-site emergency plan are as follows:

#### **Brief of Handling the Situation**


On declaration of emergency, immediate action shall be initiated by the agent (in his absence the next senior most officer) to

- Set up the control room, with directions to the persons responsible to handle it.
- Arrange for intimation to be sent to govt. agencies including DGMS.
- Arrange for directions to various departmental heads listed below to man their positions.
- The Departmental heads shall communicate their position and keep in constant / touch with control room for information, direction and liaison.

#### **Duties of various Heads on Declaration of Emergency**

The executive head shall define in writing the following officials who shall work in close liaison with the control room and the technical head to fulfill the duties defined against each officer. The sectional head so defined shall be a responsible person who holds position of responsibility and authority. An alternative to the sectional head shall also be included in the order, to cope up with absenteeism.

**Technical**– The technical head shall take-up:

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- All matters related to technical operations;
- Decide what is to be done;
- This shall be in communication with control room in charge;
- Assisted by officials of other technical wings e.g. Electrical, Mechanical and other heads, and also by the officials whose duties have been defined below.

### **Corporate Communication**

- Keep liaison with media;
- This shall be in coordination with control room in charge;
- Information to be given to media shall only be through the corporate communication department; and
- Other officials may prefer to avoid speaking to media and direct the media if any to the corporate communication department.

### **Medical Officer** – The Medical officer shall:

- Arrange the emergency medical services requirement;
- Take decisions in respect to the medical aid requirement;
- Co-operation with control room arrange for shifting of persons needing medical attention to the required hospitals;
- During shifting of injured persons arrangements shall also be made to ensure a person of the organization to accompany the injured;
- Inform the major developments to the control room; and
- Intimate the higher official time to time about the situation.

### **Stores and Purchase** – The Stores and Purchase head shall:

- Arrange the emergency requirement including purchases;
- He shall keep in constant touch with Control room in-charge and the technical head; and
- Arrange for urgent purchases as required by the Technical head.


**Financial** – The Financial head shall be responsible for arranging for the finances required during the emergency and the rescue and recovery operations. This shall be in coordination with control room in charge.

### **Personal** – The Personal Head

- Responsible for contacting and for keeping liaison with the bereaved families, if any;
- He shall ensure that the issues related to the compensation and other related matters are settled at the earliest; and
- The progress in the matter shall be constantly be informed to control room in-charge.

### **Protocol**– A protocol officer shall be designated

- Assist and accompany the political or other VIPs, visiting the site; and
- He shall keep in constant liaison with the control room in-charge, and shall act accordingly.

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**Welfare**– The welfare officer

- Entrusted with the work of making arrangements for food, water, lodging, for the rescue and recovery operations and for all other operations required to deal with the emergency;
- Attend to and assist Personal officer in contacting and for keeping liaison with the bereaved families; and
- Liaison with the control room.

**Security** – The Head of security shall be entrusted with the task of protecting the property and the officers and the rescue workers.

**Liaison**–The liaison officer so designated shall keep a close liaison with state and Central Govt.

**Adjoining mines** – the various machines including pumping capacities of each and the broad machines used by them, shall be an added advantage.

#### 1.3.6 Off-Site Emergency Preparedness Plan

- **Specialized Knowledge**

Details of specialist bodies, firms and people upon whom it may be necessary to call e.g. those with specialized knowledge of fire control;

- **Voluntary Organizations**

Details of organizers, telephone numbers, resources etc.

- **Meteorological Information**

Arrangements for obtaining details of whether conditions prevailing at the time and whether forecasts.

- **Humanitarian Arrangements**

Transport, evacuation centers, emergency feeding treatment of injured, first aid, ambulances and temporary mortuaries.

- **Public Information**


Arrangements for dealing with the media press office and informing relatives, etc.

- **Assessment**

Arrangements for:

- (a) Collecting information on the causes of the emergency; and
- (b) Reviewing the efficiency and effectiveness of all aspects of the emergency plan.

- **Role of the Emergency Coordinating Officer**

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The various emergency services should be coordinated by an emergency coordinating officer (ECO), who will be designated by the district collector. The ECO should liaise closely with the site main controller. The ECO should inform the DGMS authorities in case of accidents as per the statutory requirement. Again depending on local arrangements, for very severe incidents/accidents with major or prolonged off-site consequences, the external control should be passed to a senior local authority administrator or even an administrator appointed by the central or state government.

- **Role of Police**

Formal duties of the police during an emergency include protecting life and property and controlling traffic movements. Their functions should include controlling bystanders evacuating the public, identifying the dead and dealing with casualties, and informing relatives of death or injury.

- **Role of Fire Authorities**

The control of a fire should be normally the responsibility of the senior fire brigade officer who would take over the handling of the fire from the site incident controller on arrival at the site. The senior fire brigade officer should also have a similar responsibility for other events, such as explosions. Fire authorities in the region should be apprised about the location of all stores of flammable materials, water supply points and fire-fighting equipment. They should be involved in on-site emergency rehearsals both as participants and, on occasion, as observers of exercises involving only site personnel.

- **Role of Health Authorities**


Health authorities, role doctors, surgeons, hospitals, ambulances, and so on, have a vital to play following a major accident, and they should form an integral part of the emergency plan.

For major fires, injuries may cause as a result of the effects of thermal radiation to a varying degree, and the knowledge and experience to handle this in all but extreme cases may be generally available in most hospitals.

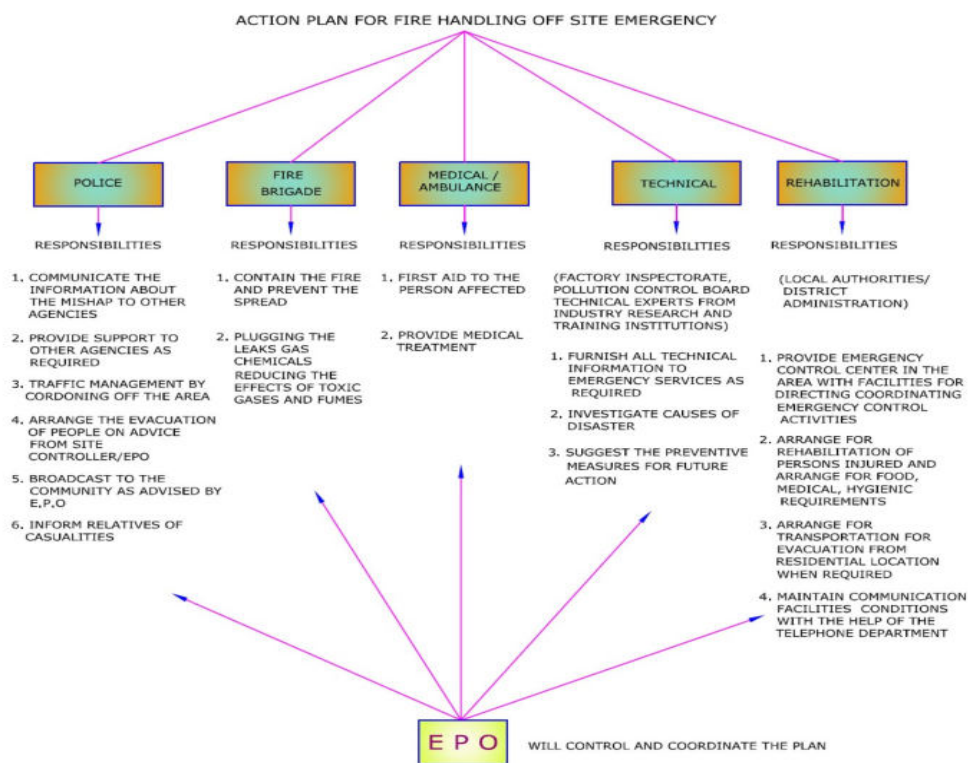
Major off-site incidents are likely to require medical equipment and facilities addition to those available locally, and a medical "mutual aid "scheme should in the event of an emergency.


- **Role of Government Safety Authority**

DGMS and their officials are likely to want organization producing the off-site plan has made adequate arrangements for handling emergencies of all types including major emergencies. They may wish to see well documented procedures and evidence of exercise undertaken to test the plan.

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The off-site emergency organization chart for major disaster is shown in **Figure-1.5**.



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**FIGURE-1.5**  
**OFF-SITE EMERGENCY CHART**

#### **1.4 Occupational Health and Safety**

In mining, where multifarious activities are involved during mine development and operational phase, like loading and transportation; the men, materials and machines are the basic inputs which brings several problems like occupational health and safety.

The mine planner, therefore, has to properly plan and take steps to minimize the impacts of mining and to ensure implementation of occupational health and safety including fire plan. All these activities again may be classified under mine development and mine operational phase.

##### **1.4.1 Occupational Health**

Occupational health needs attention both during mine development and operational phase. However, the problem varies both in magnitude and variety in the above phases.


- **Construction and Erection**

The occupational health problems envisaged at this stage can mainly be due to dust, noise, & accident. To overcome these hazards, in addition to arrangements to reduce it within TLV's, necessary protective equipments is being supplied to workers.

- **Operation and Maintenance**

The problem of occupational health, in the mine development and operational phase is primarily due to noise, dust etc. The necessary PPE's will be given to all the workers. The working personnel will be given the following appropriate personnel protective equipments:

- Industrial safety helmet;
- Crash helmets;
- Face shield with replacement acrylic vision;
- Zero power goggles with cut type filters on both sides and blue color glasses;
- Welders equipment for eye and face protection;

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- Cylindrical type earplug;
- Ear muffs;
- Canister gas mask;
- Self-contained breathing apparatus;
- Safety belt/line man's safety belt;
- Leather hand gloves;
- Acid/alkali proof rubberized hand gloves;
- Canvas cum leather hand gloves with leather palm;
- Electrically tested electrical resistance hand gloves; and
- Industrial safety shoes with steel toe.

All working personnel will be medically examined as per provisions of the Mines Act. This will be in addition to the pre-employment medical examination.

**Notified Diseases u/s 25 of Mines Act-** There is no case of pneumoconiosis reported. Having said that, BPSL is committed to provide all the health & medical facilities to all the employees.

#### **Screening of Diseases:**


- Initial medical examination (IME): at the time of joining.
- Periodical medical examination (PME): once in every five years below 45 yrs. of age and once in every three years above 45 yrs. of age of all employees.
- Extension medical board: at the time of 60 yrs. of age.
- Officer's medical check-up: every year
- All employees' medical examination under wellness @ workplace: every year

BPSL will start Initial medical examination before starting the mining operations at Netrabandha. The occupational health and safety facilities are given below.

#### **1.4.2 Occupation Health and safety Facilities**

1. For providing medical facilities to its workers, company is proposing a well-equipped dispensary with full time doctor.
2. First-Aid training has been provided to employees to handle emergency situations.
3. IME and PME are being carried out at regular intervals
4. Ear plug/muff has been provided to the workers, engaged in noise prone zone.
5. Mobile safety van is being utilized to create awareness about latest safety measures.
6. An ambulance is available to the workers for carrying the patients to nearby health center or hospitals.

#### **1.4.3 Safety Plan**

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Safety of both men and materials during mine development and operational phase is of concern. Safety management plan is prepared and implemented in the mine. The preparedness of mine for the occurrence of possible disasters is known as Disaster Management Plan. The disaster in the mine is possible due to land slide, collapse of structures, flood, vehicular accidents and fire/explosion etc.

The innovative concepts and extensive use of new age technology right from the design stage has helped the mine to achieve high standard of safety in mining. The mining activities are carried out in a highly controlled and scientific manner to achieve the safety performance within the statutory and regulation framework. The company's commitment in the area of Health and Safety is well supported by implementation of Occupational health and safety management system (OHSAS 18001:2007) and Integrated management system (IMS). At BPSL, Occupational Health & Safety (OH&S) values take precedence over other considerations. The organization is conscious about its responsibility towards cultivating & maintaining safe work environment at mine site. The goal of organization's corporate OH & S Policy is "Zero Harm" and to meet the same, a number of management systems/approaches have been adopted/initiated and implemented with special focus on Behavioral Safety.

Keeping in view the safety requirement during construction, operation and maintenance phases, mine formulates safety policy with the following regulations:

- To allocate sufficient resources to maintain safe and healthy conditions of work;
- To take steps to ensure that all known safety factors are taken into account in the design, construction, operation and maintenance of mine, machinery and equipment;
- To ensure that adequate safety instructions are given to all employees;
- To provide wherever necessary PPE's, safety appliances, clothing and to ensure their proper use;
- To inform all employees about materials, equipment or processes used in their work which are known to be potentially hazardous to health or safety;
- To keep all operations and methods of work under regular review for making necessary changes from the safety point of view in the light of experience and up to date knowledge;
- To provide appropriate facilities for first aid and prompt treatment of injuries and illness at work;
- To provide appropriate instruction, training, repeat training and supervision to employees in health and safety, first aid and to ensure that adequate publicity is given to these matters;
- To ensure proper implementation of fire prevention methods and an appropriate fire fighting service together with training facilities for personnel involved in this service;



	<b>Environmental Impact Assessment for Netrabandha Pahar Iron Ore Block for Total Excavation of 2.680 MTPA (2.0 MTPA (ROM)+ OB 0.680) along with 2x100 TPH Mobile Crusher in mine lease area of 139.223 ha located at Baladihi villages, Koira Tehsil, Sundargarh District, Odisha</b>
	<b>Risk Assessment</b>

- To organize collection, analysis and presentation of data on accident, sickness and incident involving people injury or injury to health with a view to taking corrective, remedial and preventive action;
- To promote through the established machinery, joint consultation in health and safety matters to ensure effective participation by all employees;
- To publish/notify regulations, instructions and notices in the common language of employees;
- To prepare separate safety rules for each type of occupation/processes involved in a mine; and
- To ensure regular safety inspection by competent persons at suitable intervals of all buildings, equipments, work places and operations.

#### **IDENTIFIED STRATEGIES FOR IMPLEMENTATION OF POLICY:**

BPSL Steel assigns highest priority and importance to safety and health of its employees, partners and communities around areas of its operation. We shall strive to become a role model in implementation of safe practices to ensure zero injury and attempt to go beyond statutory compliance by committing to: -

- Establishing systems and processes to create Safe Work environment;
- Proactive approach in assessment & mitigation of risks related to Safety and Health of all stakeholders;
- Prevention of injuries and occupational illness by implementing best practices and by creating awareness and providing training to the workforce including Associates, Contractors, Apprentices, Transport workers and Suppliers; and
- Selection of Plant, Equipment, Machinery and Material considering their long term impact on health and safety of our stakeholders.