DOCUMENT OF RISK ASSESSMENT & MANAGEMENT

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1.1 RISK ASSESSMENT & MANAGEMENT

Risk is the chance of something happening that will have an impact on objectives. A risk may have a positive or negative impact. Risk is measured in terms of a combination of the consequences of an event and their likelihood and is often specified in terms of an event or circumstance and the consequences that may flow from it. Risk management process is the systematic application of management policies, procedures and practices to the tasks of communicating, establishing the context, identifying, analysing, evaluating, treating, monitoring and reviewing risk.

The main elements of the risk management process, as shown in **Figure 1** below, are the following:

a.) Establish the context - This step establishes the strategic, organisational and risk management context in which the rest of the process will take place. Criteria against which risk will be assessed are established and the structure of the analysis is defined.

b.) Identify risks - Identify what, why and how events can arise and could cause harm as the basis for further analysis

c.) Analyse risks - Determine the existing controls and analyse risks in terms of likelihood and consequence in the context of those controls.

The analysis should consider

i) how likely is an event to happen; and

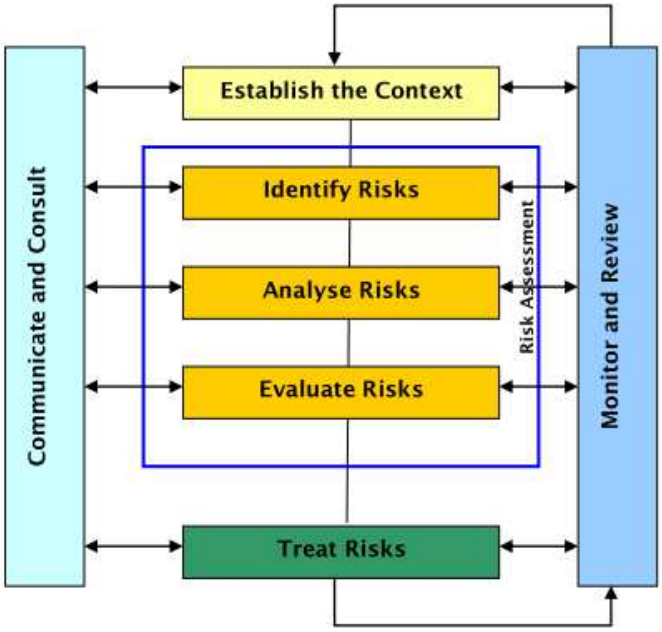
ii) What are the potential consequences and their magnitude? iii) Combine these elements to produce an estimated level of risk.

d.) Evaluate risks - Compare estimated levels of risk against the pre-established criteria. Risks are then ranked to identify priorities. If the levels of risk established are low, then risks may fall into an acceptable category and treatment may not be required.

e.) Treat risks - Develop and implement specific controls and management plans for identified priorities. Accept and monitor low-priority risks.

f.) Monitor and Review – All steps in the risk management process should be monitored and subject to review. For each stage adequate records should be kept to demonstrate how decisions were made and what was the outcome of the process.

Figure 1: Risk Assessment Process



Key questions associated with the seven phases of the risk management process:

Phase	Question
Establish the context	What are we looking at?
Risk Identification	What could go wrong?
Risk Analysis	What might that mean for the mine or process?
Risk Assessment	Which are the most important problems?
Risk Treatment	How can they be managed?
Monitoring and Review	How do we ensure they stay managed?
Communicate and Consult	Who do we need to ask and keep informed?

Mining and allied activities are associated with several potential hazards to both the employees and the public at large. A worker in a mine should be able to work under conditions which are adequately safe and healthy. At the same time, the environmental conditions should be such as not to impair his working efficiency. This is possible only when there is adequate safety in both opencast and underground mines.

Significance of Risk Management (Safety Management System)

Minimize adverse effects of the risk, to which the workers are exposed in execution of different activities. Risk management involves the entire staff in the realization of safety improvement programme with responsibility and accountability sharing proportionately with the decision making authority.

The Directorate General of Mines Safety issued following Technical Circular to implement SMS:

a) DGMS. Tech. Cir.13 of 2002 - Safety Management System -A guideline for Implementation.

b) DGMS. Tech. Cir.8 of 2009 - System Study and Safety Audit for the purpose of eliminating the Risk of Accidents & Dangerous Occurrences.

c) DGMS (Tech) (S&T) Circular 2 of 2011 -Provision for Audit and Review of SMS.

Safety Management System (SMS)

- Identify the hazard.
- Dissect each activity to as smallest node as possible,
- Assess risk by considering the exposure, probability and consequence
- Prioritise and implement control measures
- Find out the residual risk, if any and procedures for handling of situations
- Continual improvement by adopting new methods and procedures

Hence, **Safety Management System** is one of the most essential aspects to operate the mine in safe way.

Risk Assessment Process

Risk assessment is the overall process of risk identification, risk analysis and risk evaluation. Risk Assessment is to be performed on a regular basis.

Identifying the Hazards

Hazard is a source or situation with a potential for harm in terms of human injury or ill health, damage to property, damage to the environment, or a combination of these.

The process of identifying hazards is possibly the most important part of the whole risk assessment process.

The Kistaram opencast project is proposed to operate near Kistaram village in Sathupalli mandal where one mine Jalagam Vengala Rao (JVR) Opencast – I expansion mine is already in operation.

Hazard Identification can be done in many ways but the objective is to ensure that all of the possible Hazards are identified.

Kistaram opencast project is proposed with same method of mining/technology (i.e opencast with shovel dumper combination technology), the Hazards were identified basing on the previous experience of the JVR OC – I expansion mine with the following criteria

- Design parameters of the proposed mine
- Work process evaluation
- Accidents or occurrences
- Consultation with employees.
- Safety statistics
- Significant incident, near miss or accident reports
- Inspection in the mine

The following are the possible hazards identified for the proposed project basing on the Tasks/Activities/Work places involved.

1 Inundation

No major streams are flowing across the proposed project area; there will not be any danger due to sudden inrush of water from streams in to quarry. During heavy rains there is a possibility of inrush of rain water from catchment area of Kistaram tank.

2 Fires

Fire in coal stock yard may be expected due to spontaneous heating of coal. As the proposed project is mining of virgin coal seam there will not be any fire on coal bench.

3 Slope stability

i. In Pit Slope Stability (OB benches)

The ultimate working depth of the proposed quarry is between 22 m to 170 m. There may be chances for slope failure, where the depth is more.

ii. Overburden dump slope stability

Overburden dumps (both internal and external) were planned to a height of 120 m above ground level with 30 mtrs height decks. No dump sliding was noticed in JVR OC – I mine, where the dump height is 90m. There may be chances for slope failure, when the dump height is beyond 90m.

4 Sliding

Sliding of material may possible, whenever the height of OB or coal bench exceeds the digging height of the machine, while excavating Near Fault Plane, while handling fiery material etc.

5 HEMM Movement

Accidents may occur due to failure of vehicle stability, run over by vehicles/HEMM, sliding of dumpers/tippers/dozers at dump edge, simultaneous operations at loading and un loading points, Crossing 3 way/4 way junctions, un authorised riding on HEMM, spillage of boulders from loaded tippers/dumpers etc

6 Drilling

Accidents may occur due to toppling, while transporting the drill machine with mast in raised position, Mast contact with overhead power transmission line, while changing drill barrels/rods etc

7 Blasting Operation

While transporting, loading and blasting there are chances for premature blasting of explosive result into accidents.

8 Electricity

Accidents/Incidents may occur due to switching on power when persons are at work, dragging of cable by hoisted body of dumper/drill where the Transmission lines / cables cross the haul roads.

9 Lighting

There are chances for accidents due to insufficient lighting at work places.

10 Health Hazards

Health hazards due to inhalation of air borne dust, while working in dust atmosphere and noxious gases while working near fiery coal in coal yards. Noise levels can create stress, increase workplace accident rates.

11 Storage, Handling and Disposal of Hazardous Waste

Hazardous waste generated such as used oil, waste oil, empty oil drums, batteries, non-ferrous scrap etc due to mining activities. Explosives, HSD oil, Hydraulic oils shall be handle, storage, disposed, transport as per Hazardous Waste (Handling & Management) rules

The following table illustrates in detail about the control measures and action to be taken for each hazard for elimination or reduction of risk involved.

Identified Hazards	Mechanism	Control	Action
(1)	(2)	(3)	(4)
1. Inundation	Tank catchment area near Kistaram village along the edge of the quarry.	It is proposed to lay the bund with dimensions Bottom Width 6 mtrs X Top width 3 mtrs X Height 3 mtrs in between tank catchment area and quarry	Shift In charge to inspect the surface drainage system at weekly Periodicity to arrest any possibility of water entry to the quarry.
	Catchment Area water during Rains	All around the dumps drains are to be prepared to collect the rain water from the catchments of the dumps. In case of any siltation or damage, the drain may cause water entry into the quarry. De-siltation is being done every year before onset of monsoon and when ever required during monsoon. Sufficient height bund shall be maintained all along the edge of the quarry to prevent inadvertent entry of water A berm with dimensions of not less than two metres height and 2 metres width at the top shall be made in trapezium shape all along the edge of each deck to prevent erosion of dumps and gully formation. The terrace shall be kept free of obstructions (OB heaps), sloped in bye and maintained with uniform gradient for free flow of water in order to avoid accumulation of water leading to gully formation and dump slides. Plantation shall be done over and around OB dumps to ensure stability of slopes and prevention of dust generation by wind action.	Periodical inspection of the drains by competent person is arranged after every rain with a minimum interval of one week. Sufficient capacity pumps shall be maintained. Manager, Asst Manager, Under Manager should inspect the protective works

		Water danger plan should be prepared and maintained	
2. Fires	Spontaneous heating in coal stock yard	Water Pipeline with sufficient pressure should be laid all along the periphery of the coal stock yard to quench the fire. Coal will be lifted on first dumped first dispatched basis.	A suitable provision has to be made for this purpose and a separate Fire Fighting Organization with trained personnel shall be maintained for fighting these fires.
3. Slope Stability	Failure of Pit Slope when the depth is more	The overall pit slope varies from 36.00^0 (on the northern side) to 41.45^o (on the dip side of the property). This has been done to ensure safe pit slope for the prevalent strata conditions. This may, however, be confirmed through slope stability studies	The movement of the slope shall be observed by installing subsidence movement pillars. Surveyor should ensure frequently.
	Dump Slope Failure	The overall dump slope for spoil has been kept at 26.57^0. This is flatter than, what suggested in ToR (28^0). However, the dump slope stability be confirmed through studies. To leave safe margin between the dump and quarry. To protect the dump from getting water charged.	The movement of the slope shall be observed by installing subsidence movement pillars. A minimum width equal to the height of the dump shall be maintained between the toe of the dump and the line of the excavation. No water shall be allowed to accumulate / stock over any dump top particularly near the edge of the dumps Surveyor should ensure frequently
4. Slidings	Sliding of OB or coal due to more height of the bench than the digging height of the machine.	a) The height of the benches shall be planned in such a way that they match the digging height of the shovels. b) Not to deploy the shovels where the bench height is more than its digging height.	a) Drilling should be done in such a way that the bench height will not be more than the digging height of the shovel. b) The excess height of the blasted material should be reduced to match the digging height of the shovel Further where ever the soft layers at the

			bottom of the bench the same may be reduced by dozing to match the digging height of the shovel.
		c) No bench shall be allowed to merge with another bench, resulting in increase of bench height.	c) Progress of any bench towards a top bench should be stopped at a distance of equal to the height of bench.
		d) Overall pit slope shall not exceed 41.45^0	d) Surveyor should ensure frequently
	Sliding Of OB / Coal While Excavation Near Fault Plane.	a) No bench shall be worked parallel to fault planes.	a) i. A plan indicating all the faults position running over the different benches should be maintained and same may be indicated in the parting plan supplied to operation staff and the marking of the same in the field should be ensured always. ii. Benches shall be planned always at right angles or oblique to the fault plane but definitely not parallel to the fault plane.
		b) Cleaning of top and hade portions of the fault planes must be ensured, when ever the shovel works near fault plane.	b)While working near fault plane, see that, the reach of bucket is more than the height of fault plane
	Sliding of dump slopes/edges	a) Not to allow excess dump heights or merging of any two dump decks. The height of each deck is limited to 30m and overall dump height shall not exceed 120m for Kistaram OC Project, both internal and external	i) Top of the dumps up to the edges shall be thoroughly compacted to prevent any possible ingress of rain water and also to provide a gentle slope towards toe drains. ii) Individual dump deck height shall be maintained around 30 mtrs. Merging of any two dump decks in any case is not allowed.
		b) Not to allow any Dumpers /Tippers to	i) No movement of Dumpers /Tippers is

		move over the un consolidated the dump edge/slope	allowed over the edge of un consolidated dump/dump having excess height. ii) How ever HEMM can be allowed up to a distance of 3.00 mtrs. from the edge of consolidated dump with the provision of a berm at the edge of the dump as required by law.
	Fall of hot material or ash on men and machinery while excavating fiery material.	a) No hot/fiery material shall be handled with any machine as it is.	a) Thorough quenching of hot/fiery material shall be done before it is handled.
5. HEMM movement	i) Failure of vehicle stability resulting toppling.	i) Ensure placement and movement of HEMM only on the stable and level ground.	a) Level and compact the blasted material before allowing any HEMM to ply over it. b) Not to allow any HEMM movement with in a distance of 5 m from the edge of blasted/loose bench.
		ii) To provide IDEAL conditions at Loading, while Hauling and at unloading points for HEMM	a) Provide stable and level ground at loading point for placement of HEMM. b) Berms shall be provided on both sides of the elevated haul roads as required by law. c) Ensure super elevation at curves of haul roads. d) Arrange level and stable platforms with suitable size of berms as required by law at unloading point with the help of dozer. e) Always ensure a minimum height of 1 ½ feet safety girder at the crusher unloading point. f) Unloading of material shall be done over the stable dumps at a distance of minimum

			3.00 mtrs. from the edge. g) Ensure tyre height berm at the edge of the dump
		iii) Run the HEMM with in permissible speed limits.	a) Ensure by surprise checks it required that the HEMM is remains with in the speed limits as specified by the Manager. b) Arrange speed locking over HEMM where ever it is possible.
		iv) Using good quality tyres	a) Replace worn out tyres in time with good quality tyres. b) Not to use re treated tyres in front sides in any case.
	Run over by vehicles/HEMM	i) Persons/conveyance vehicles to maintain a safe distance on haul roads and 50 mtrs at loading and unloading points from working HEMM.	a) To develop awareness among employees to maintain a minimum distance of 30 mtrs. on haul roads and 50 mtrs. at loading and un loading points from moving and working HEMM.
		ii) Prevent unauthorised drivers.	a) Insist all Operators/drivers to wear identity cards while they are on duty. b) Verify the validity of driver's licensee of operators and drivers before authorisations and identity cards are issued. c) Verify the HEMM operations as per the allotment by surprise checks also check up the details of drivers/operators and confirm.
		iii) Persons to maintain a safe distance from moving vehicles.	a) To ensure no person shall be allowed to enter with in a distance of 30 mtrs of moving vehicles. b) To stop any

			vehicle/HEMM persons must use whistle/red flags/red light before going near to the machines for any reason.
		iv) Prevent boarding / alighting the moving vehicles.	a) Develop awareness among the employees not to board/light from the moving vehicles/HEMM.
		v) Persons shall not be allowed to take rest under/by the side of parked vehicles/HEMM. Prevent sleeping of persons in mine premises.	a) Develop awareness among all the employees not to take rest under/by the side of parked vehicles/HEMM. b) Educate all the operators/drivers to verify the surroundings including underneath the machine/vehicle for possible presence of any person before starting the same. c) Create awareness among all the employees not to sleep while on duty in mine premises
	Sliding of dumpers/tippers/dozers at dump edge.	1. Restrict the deck height to 30 mtrs. Only. 2. No HEMM shall be allowed to work over the edge of any unconsolidated dump.	a) To ensure deck height doesn't exceed 30 mtrs. under any circumstances a) Ensure sufficient size of berm at the edge of the dump always as required by law. b) Not to allow any HEMM over the edge of any unconsolidated dump. c) To deploy a spotter for guidance the tippers/dumpers at unloading point on elevated platform.
	Simultaneous operations at loading and un loading points. For this purpose the following are considered as (separate) individual	1. Not to allow more than one operations at the face at a time.	a) To maintain a minimum distance of 50 mtrs. between the places of i) Drilling and loading ii) Charging and loading.

	operations. i) Drilling ii) Charging and blasting iii) Dozing iv) Grading v) Loading vi) Un loading		b) To maintain a minimum distance of 15 mtrs between drilling and charging operations. c) Except as above no two operations shall be allowed to under go at a time at one place. d) To maintain a minimum distance of 15 mtrs. between loading tippers/ dumpers and dozer at unloading point.
	Crossing 3 way/4 way junctions.	1. Not to allow traffic in more than one direction at a time at junctions.	a) To engage a signal men at all the junctions. b) To ensure traffic controlling by surprise checks.
	Un authorised riding on HEMM	1. Not to allow un authorised persons to ride on HEMM 2. To provide sufficient no. of suitable and comfortable conveyance vehicles to all the workmen, available at their reach when ever they want to move.	a) Educate all the employees about the danger involved in riding HEMM b) Check the un authorised riding on HEMM by surprise inspections. c) Ensure even authorised person also travel by sitting in the cabin having pillion. a) Ensure sufficient no. of suitable and comfortable conveyance vehicle is available. b) Ensure their availability at the reach of the persons when ever they required to move.
	Spillage of boulders from loaded tippers/dumpers	1. Avoid over loading of tippers/dumpers. 2. To control speed of the vehicles.	a) Educate all the operators not to over load the dumpers/tippers. b) Ensure the loading is up to the brim level of

		3. To avoid sharp curves.	the tippers/dumpers. c) Ensure strict implementation of code of traffic rules. d) Haul roads shall be formed without sharp curves. Where ever mild curves are inevitable suitable super elevation shall be provided
	Stoppage of HEMM /vehicles on active haul roads due to break-down.	1. Break down equipment from active haul roads must be attended immediately and repair/remove at the earliest possible. 2. To provide protection against break down equipment an active haul roads.	a) To keep emergency steering mechanism in order. So that operator himself can remove the equipment. b) Immediate information to Engineers /Technicians about the break down machine on active haul roads. c) Engineers/Technicians must repair/remove the equipment at the earliest possible. d) Till the equipment is repaired or removed protection against hitting by running equipment shall be provided on both sides by dumping OB heaps. e) To arrange red flags and lights on both traffic sides of the breakdown equipment
6. Drilling	Toppling of drill machine. Mast contact with overhead power transmission line	While transporting drill machine, its mast must be lowered, even with in the drilling area on inclined plane (High gradients) to avoid toppling of drill machine and in contact with over head power transmission line. For positioning on inclined planes (High gradients), wedges must be used under jack pads for levelling of the drill machine.	Transportation of drill should be done under the supervision of competent person.
	While changing drill	Ensure proper holding of	Drill operator should

	barrels/rods	drill barrels, while loading / unloading (Attachment /Detaching) on the drill mast.	ensure.
	While drilling	Prior Marking of drill holes as per the designed pattern shall be taken up to ensure proper blasting All the holes drilled should be pegged to avoid leg in	Drill operator should ensure
7. Blasting	While transportation	Transport the explosives and accessories in vehicle approved under explosive rules. Standard operating procedure (SOP) should be followed	Transportation of explosive should be done under the supervision of competent person.
	While charging	1. Blasting design and initiation pattern such that the maximum charge per delay is within the stipulated range. 2. Wherever possible, the progress of detonating holes, through delay intervals, should progress away from the structures to be protected.	1. Blasting incharge should design the drilling pattern. 2. The blast parameters will be established during actual mining operations, after conducting field trial blasting considering the local geo-mining conditions
	While blasting	1. Avoid blasting during cloudy days and when the wind is blowing towards structures. 2. All loose debris will be cleared off from the blasting site 3. A free face will always be maintained. 4. In multi row blasting, greater relief will be provided between rows using suitable delay intervals. 5. Proper use of different type of relay / delay detonator for proper sequencing of the blast will be used. 6. If required, all the holes will be suitably muffled before blasting to control the fly rock. 7. Standard operating	

		procedure (SOP) should be followed	
8. Electricity	Switching on power when persons are at work Dragging of cable by hoisted body of dumper, where the Transmission lines / cables cross the haul roads.	Shut down procedure shall be strictly implemented. Identification of cables and switches shall be displayed. Transmission lines / cables shall only be laid on 12 Meter height towers, as required by Indian Electricity Rules 1956	Supervisors having valid electrical supervisory certificate only shall be deployed on the jobs. Planning shall be done in initial stages for laying of 12m height towers.
9. Lighting	Insufficient lighting at work places	Working places shall be illuminated as per the standards fixed by DGMS Circular No.1 of 1976 All persons shall wear radium jackets in during dark hours. All persons shall possess Cap Lamps in dark hours. All persons shall have whistles.	Engineer and electrical supervisor shall ensure the lighting as per the DGMS circular

10. Health Hazards

Occupational safety and health is very closely related to productivity and good employer – employee relationship. This subject is dealt with strictly as per circulars and orders of DGMS including the Mine Rules and Coal Mines Regulations, 1957. Some of the measures proposed for occupational safety and health have been listed below:

1 Effective dust removal system in the crusher house
2 Provision of wet drilling
3 Provision of rest shelters for mine workers with amenities like drinking water, fans, toilets etc.
4 Provision of personal protection devices to the workers.
5 Rotation of workers, if necessary, exposed to noise to reduce exposure time
6 Closed control room in crusher house with proper ventilation.
7 Dust suppression of haul road and dumps
8 First - Aid facilities in the mining area
9 Provision of communication network between pit working areas and manager.
10 Provision of alarm system at working areas
11 Training of personnel including contract workmen in Mines Vocational Training Centres to inculcate safety consciousness through modules, video clippings slogans and posters and introduction of safety awards
12 Safe design of height, width and slope of working benches of OB & coal, overall pit slope kept less than 41.45°.
13 Safe design for formation of OB dumps, over all dump slopes kept below 26^0 degrees.

14 Safe design of haul roads.
15 Provision of fire fighting equipment
16 Safe storage of explosives and other inflammable substances.
17 Regular / periodical monitoring of mine environment to ensure the efficacy of various protective measures.
18 Initial and Periodical medical examination for the employees.

11. Storage, Handling and Disposal of Hazardous Waste

Hazardous waste generated such as used oil, waste oil, empty oil drums, batteries, non-ferrous scrap etc. Explosives, HSD oil, Hydraulic oils shall be handle, storage, disposed, transport as per Hazardous Waste (Handling & Management) rules and CPCB guidelines.

1 The waste generated shall be disposed as per HWM rules within 90 days from date of generation to authorized recycler.

2 The handling, transport and storage of explosives shall be as per Indian Explosive Act.

3 Transportation and storage of explosive shall be as per the approved code of practice.

4 Flammable, ignitable, reactive and non-compatible wastes shall be stored separately and never stored in the same storage shed.

5 Adequate storage capacity (i.e. 50 % of the annual capacity of the hazardous waste incinerator) shall be provided in the premises.

6 Storage area shall be provided with the flameproof electrical fittings and strictly adhered to.

7 Adequate fire fighting systems shall be provided for the storage area, along with the areas in the facility.

8 There should be at least 15 meter distance between the storage sheds.

9 Loading and unloading of wastes in storage sheds shall only be done under the supervision of the well trained and experienced staff.

10 Fire break of at least 4 meter between two blocks of stacked drums shall be provided in the storage shed. One block of drum should not exceed 300 MT of waste.

11 Minimum of 1 meter clear space shall be left between two adjacent rows of pallets in pair for inspection.

12 The storage and handling shall have at least two routes to escape in the event of any fire in the area.

13 In order to have appropriate measures to prevent percolation of spills, leaks etc. to the soil and ground water, the storage area should be provided with concrete floor.

14 Measures shall be taken to prevent entry of runoff into the storage area. The Storage area shall be designed in such a way that the floor level is at least 150 mm above the maximum flood level.

15 The storage area floor should be provided with secondary containment such as proper slopes as well as collection pit so as to collect leakages/spills etc.

16 All the storage yards should be provided with proper peripheral drainage system connected with the sump so as to collect any accidental spills in roads or within the storage yards as well as accidental flow due to fire fighting.

17 The stacking of drums in the storage area should be restricted to three high on pallets (wooden frames). Necessary precautionary measures should be taken so as to avoid stack collapse. However, for waste having flash point less than 65.5 °C, the drums shall not be stacked more than one height.

18 Drums containing wastes stored in the storage area shall be labelled properly indicating mainly type, quantity, characteristics, source and date of storing etc.

19 The storage areas shall be inspected daily for detecting any signs of leaks or deterioration if any. Leaking or deteriorated containers should be removed and ensured that such contents are transferred to a sound container.

20 In case of spills / leaks/dry adsorbents/cotton should be used for cleaning instead of water.

21 Proper slope with collection pits be provided in the storage area so as to collect the spills/leakages.

22 Proper records with type of waste received, characteristics as well as the location of the wastes that have been stored in the facility need to be maintained.

The Risk Management Plan (RMP) prepared for the mine under the provisions of DGMS Circular and Recommendations of 9th National Safety Conference will be implemented to tackle risks associated with each and every operation (s).

The RMP will be modified periodically to the changed conditions/circumstances by the project authorities.

1.2 DISASTER MANAGEMENT PLAN

Disaster Management Plan(DMP), a general plan of action for use in the event of inundation, fire, high wall failure, dump failure or any other dangerous occurrence or in the time of emergency. The DMP will have three stages:-

1 Information Stage
2 Assessment Stage
3 Action Stage

1.2.1 Information Stage:

Any person employed in a mine observes / discovers any dangerous incident; he shall immediately inform to Man Way Clerk (Attendance Clerk) or the nearest official(s) available who shall inform to the man Way Clerk and Manager or senior most officials in his absence.

The Manway Clerk shall immediately inform the Manager or senior most mine official in his absence, inform the rescue station and collect information regarding place of accident/occurrence, number of persons involved and nature of help required. He should record the above information with name of the person who informed and the exact time and pass on the same to the manager. He should not leave the place for any purpose what so ever.

The Manager shall inform the Project Officer, General Manager and Nodal officer to initiate DMP and also rush to the spot / mine if he is at out of project premises. Personally assess the gravity of situation by contacting the frontline supervisors / witness available or through wireless set.

Nodal officer shall rush to the mine and inform: CGM (safety), All Directors, So to C&MD, DGMS authorities, District Magistrate and Collector, Supdt. of Police, Mine/Area level representative and recognized union delegates, local dispensary, Chief medical officer, all area departmental heads.

1.2.2 Assessment Stage:

The role and functions of following persons will be envisaged in the detailed DMP available during operation.

1 Role of Mining Sirdar, Overmen and Foremen
2 Role of Manager, Project Officer and Area General Manager
3 Role of in-charge at operations or at place accident.
4 Function of core committees
5 Function of support committees
6 Functions of surface control room

Supporting Committees:

The composition, functions, infrastructure required for core and supporting committees, etc. will be envisaged in the detailed DMP available during operation.

1 Public Relations committee
2 Catering committee
3 Medical committee
4 Men and material management committee
5 Transport committee
6 Survey committee
7 Casualty committee
8 Security committee
9 Cash committee
10 Accommodation committee.

Action Stage:

Action stage deals with the functions of Disaster Management Committee (DMC) and duties of following personnel.

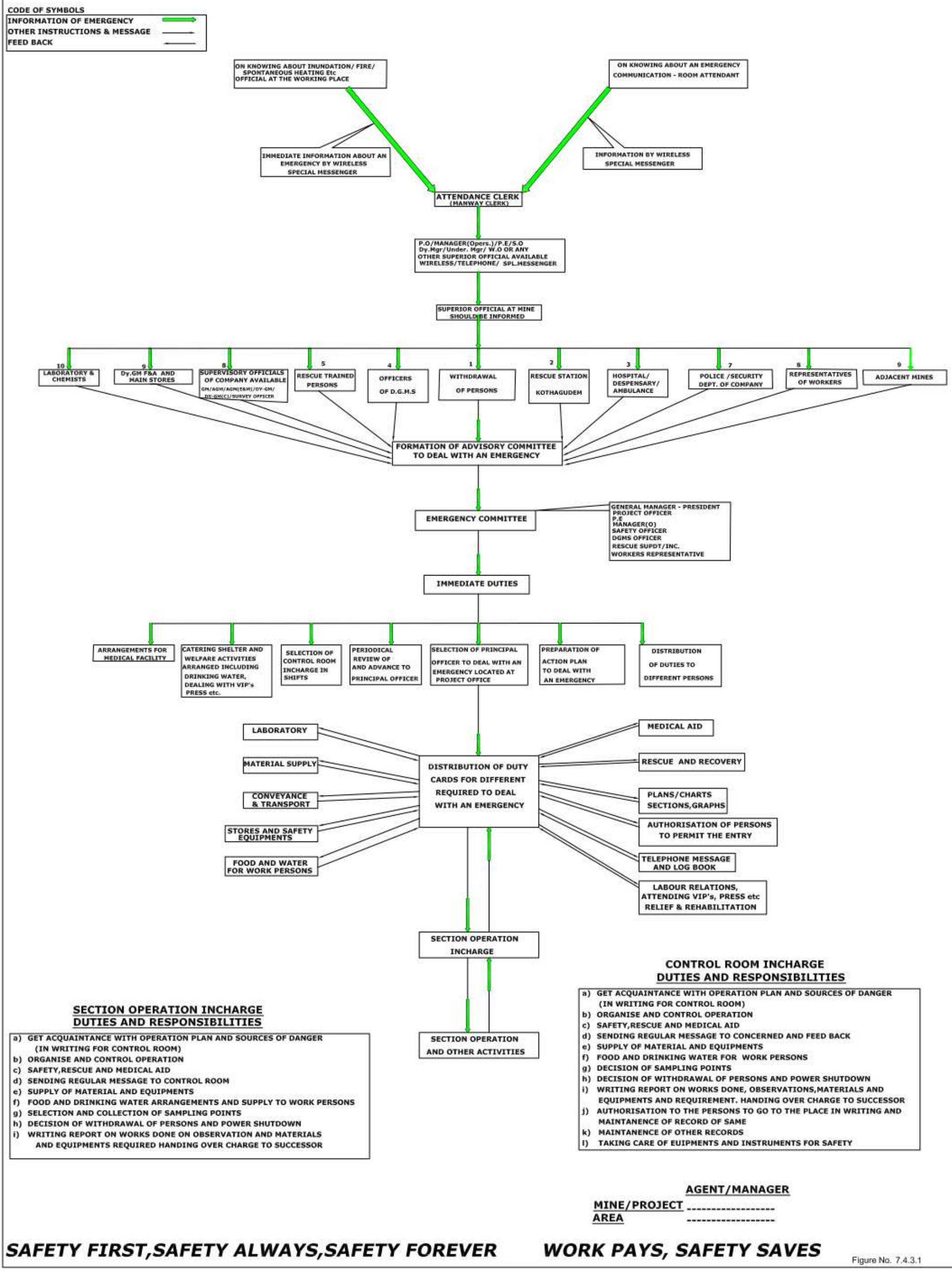
1 Director, DMP
2 Area General Manager
3 CGM (Safety)
4 GM (Electrical & Mechanical)
5 GM (Personnel)

The Disaster Management Plan for proposed Kistaram OCP is enclosed as **Figure No. 1.2.3.1**.

THE SINGARENI COLLIERIES COMPANY LIMITED

EMERGENCY ORGANISATION PLAN

KISTARAM OPENCAST PROJECT



SECTION OPERATION INCHARGE
DUTIES AND RESPONSIBILITIES

a) GET ACQUAINTANCE WITH OPERATION PLAN AND SOURCES OF DANGER (IN WRITING FOR CONTROL ROOM)
b) ORGANISE AND CONTROL OPERATION
c) SAFETY,RESCUE AND MEDICAL AID
d) SENDING REGULAR MESSAGE TO CONTROL ROOM
e) SUPPLY OF MATERIAL AND EQUIPMENTS
f) FOOD AND DRINKING WATER ARRANGEMENTS AND SUPPLY TO WORK PERSONS
g) SELECTION AND COLLECTION OF SAMPLING POINTS
h) DECISION OF WITHDRAWAL OF PERSONS AND POWER SHUTDOWN
i) WRITING REPORT ON WORKS DONE ON OBSERVATION AND MATERIALS AND EQUIPMENTS REQUIRED HANDING OVER CHARGE TO SUCCESSOR

CONTROL ROOM INCHARGE
DUTIES AND RESPONSIBILITIES

a) GET ACQUAINTANCE WITH OPERATION PLAN AND SOURCES OF DANGER (IN WRITING FOR CONTROL ROOM)
b) ORGANISE AND CONTROL OPERATION
c) SAFETY,RESCUE AND MEDICAL AID
d) SENDING REGULAR MESSAGE TO CONCERNED AND FEED BACK
e) SUPPLY OF MATERIAL AND EQUIPMENTS
f) FOOD AND DRINKING WATER FOR WORK PERSONS
g) DECISION OF SAMPLING POINTS
h) DECISION OF WITHDRAWAL OF PERSONS AND POWER SHUTDOWN
i) WRITING REPORT ON WORKS DONE, OBSERVATIONS,MATERIALS AND EQUIPMENTS AND REQUIREMENT. HANDING OVER CHARGE TO SUCCESSOR
j) AUTHORISATION TO THE PERSONS TO GO TO THE PLACE IN WRITING AND MAINTANENCE OF RECORD OF SAME
k) MAINTANENCE OF OTHER RECORDS
l) TAKING CARE OF EUIPMENTS AND INSTRUMENTS FOR SAFETY

AGENT/MANAGER

MINE/PROJECT ----------
AREA ----------

SAFETY FIRST,SAFETY ALWAYS,SAFETY FOREVER ***WORK PAYS, SAFETY SAVES***

Figure No. 7.4.3.1