



BAILADILA IRON ORE MINE, KIRANDUL COMPLEX
NMDC LIMITED
SAFETY MANAGEMENT PLAN

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SAFETY MANAGEMENT PLAN

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BAILADILA IRON ORE MINE, KIRANDUL COMPLEX

Doc No: NMDC-B.I.O.M, KC-SMP

Effective Date: From the date of approval by the Owner

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2.0 REVISION AND AMENDMENT RECORD SHEET

Revision No.	Revision Date	Brief Description of Change

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3.0 Copy Holder

Hard copies will be available with the following:

S. No.	Copy Holder
1	Head-Project/Agent
2	Chief ISO, Head Office
3	Mines Manager
4	Safety Officer
5	Head-Mining
6	Head-Mechanical (Services)
7	Head-Electrical (Services)
8	Head-OCSL Plant
9	Head-Mechanical(Plant)
10	Head-Electrical(Plant)
11	Head-Civil
12	Head-Geology & QC
13	Head-Material Management
14	Head- Finance
15	Head- Personnel
16	Head-Medical
17	Training Officer
18	Workmen Inspectors

Soft copy will be displayed in BLD-14 Intranet site for information of all employees.

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4.0 Introduction, Scope and Objective

4a. Brief description of mine:

Bailadila Iron Ore Mine, Kirandul Complex (here in further mentioned as B.I.O.M, Kirandul Complex) is a Unit of NMDC Limited. The Corporation (NMDC Ltd.) as a whole is mainly engaged in exploration and extraction of Iron Ore and is in the process of setting up a green field steel plant. B.I.O.M, Kirandul Complex is one of the four Iron ore mines of NMDC Ltd. and is located at Kirandul, District- Dantewada, State- Chhattisgarh. The other mines are Bailadila Iron Ore Mine, Bacheli Complex located at Bacheli, District- Dantewada, Chhattisgarh, Donimalai Iron Ore Mine and Kumarswamy Iron Ore Mine located in the Bellary District of Karnataka State.

Geology of the Area

Iron Ore deposits constituted predominantly of Hematite along the tops of the ridges and are closely associated and underlain by Banded Haematite-Quartzite (BHQ) and tuffaceous ferruginous shale. This is underlain by a sequence of elastic and fixed tuffaceous and elastic formation.

The Iron Ores of Bailadila range belong to the Bailadila series, which are associated with slightly metamorphosed Iron Ore bearing sedimentary rocks of Pre-cambrian age. Iron ore occurs as separate ore bodies on the crest of the two sub-parallel hills running N-S. The iron ore is formed due to the enrichment of Iron by leaching of Silica from B.H.Q. formation.

This mine comprise of 03 pits, namely Pit No. 14, Pit No.11C & Pit No. 11B.

Pit no.14/Dep-14 is located at southern extremity of the eastern ridge of Bailadila range trending NW-SE with a strike length of 2.1 Kms and average width of 200 mtrs. Pit no.14 is the last deposit at the southern end of the eastern ridge which is under exploitation by NMDC since 1968. Pit No.14 is divided into three longitudinal segments by two major shale bands parallel to the strike. The western segment occurring along the cliff is constituted entirely of massive ore, the intermediate segment constituted by mixed massive ore and blue dust, the eastern segment is predominantly powdery ore with some admixture of massive ore. In addition to the two major shale bands there are numerous small-intercalated shale bands within the pit.

Pit no.11C/Dep-11C is about 2 Kms. away in the northern direction of Pit no. 14 on the eastern limb of the folded mountain ranges of Bailadila Ore series and is marked by a series of iron ore capping

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between Kodanar valley and Jhuvam pass. Towards north, it is separated from pit no.11B and towards south from pit no.14. Towards east it slopes down steeply to the Kirandul plain and to west to Galli Nallah valley. Concentration of ore body is mostly towards east and north-east part of the Central Axial Line (CAL) and consists of outcrops of massive and hard laminated ore. Lower position of the ridge is dominated by hard goethitic and altered ore. The ore body is underlain by Flaky ore / Blue Dust at depth, which in turn is overlain by ferruginous shale and banded iron formation.

Construction of mining and processing unit of Deposit No.14 of B.I.O.M, Kirandul Complex started in the Year 1964 and commercial production from Deposit-14 started in 1968. Subsequently, Deposit-11C and Deposit -11B have been developed to meet the market demand. Commercial production from Deposit-11C was started in 1987. Initially Deposit-11C was started with single line crushing plant and the ore from Deposit-11C was being processed at the same screening plant which was processing ore from Deposit-14. Subsequently, second line in 11C Crushing plant was commissioned, new Screening Plant was constructed and Fine Ore Handling System was also commissioned. Pit No.11B/Deposit 11 B was commissioned in the month of March 2015. The pits and plants are located at Kirandul (in Dantewada District of Chhattisgarh State) (latitude 18°32'32", longitude 81°13'0"). The basic mineral of Iron Ore at Bailadila Iron Ore Mine, Kirandul Complex is Haematite and different products like lump ore, calibrated lump ore and fine ore are produced after processing of Run-Of-Mine Ore (ROM). The Unit is having the capacity to produce 19 MTPA of ROM and currently producing around 12 million tons of ROM per annum.

Iron ore from B.I.O.M, Kirandul Complex mine is mainly supplied to domestic customers like VSP, Arcelor Mittal-Nippon Steel, KIOCL etc. Calibrated lump ore in small quantities is being supplied by road to other Chhattisgarh parties. In addition, Iron ore from B.I.O.M, Kirandul Complex mine is exported mainly to Japan and China directly and through M/s Minerals and Metals Trading Corporation (MMTC).

The ore is transported by rail to Visakhapatnam Port (480 km) from where it is shipped to destination countries.

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B.I.O.M, Kirandul Complex has always strived to fully meet the quality requirements of its customers thereby ensuring customer satisfaction and simultaneously ensuring safe working conditions, protection of environment and taking care of employee welfare and adherence to the law of the land.

Scope

The Scope of this Safety Management Plan is:

“Mining, processing & despatch of Iron ore in areas within the mine boundary”

This Plan cover operations of B.I.O.M, Kirandul Complex involving activities of the following Departments:-

S.N.	NAME OF THE DEPARTMENT/SECTION
1	Mining
2	Mechanical Services
3	Electrical Services
4	OCSL Plant(Mechanical & Electrical)
5	Materials Management
6	Finance
7	Personnel
8	Hospital
9	Training ,Safety &Environment
10	Geology
11	Civil

Objectives

The objectives of the Safety Management Plan are:-

- Activity based hazard identification, risk assessment, risk ranking / risk prioritization, risk control mechanism identification and putting in place required risk control mechanism along with defined responsibilities.
- Continual improvement in Health & Safety standard through effective Implementation of Safety Management Plan.
- To provide a reference auditable document for the implementation of Safety Management Plan connected with activities related to mining, processing and dispatch of Iron Ore within the mine boundary.

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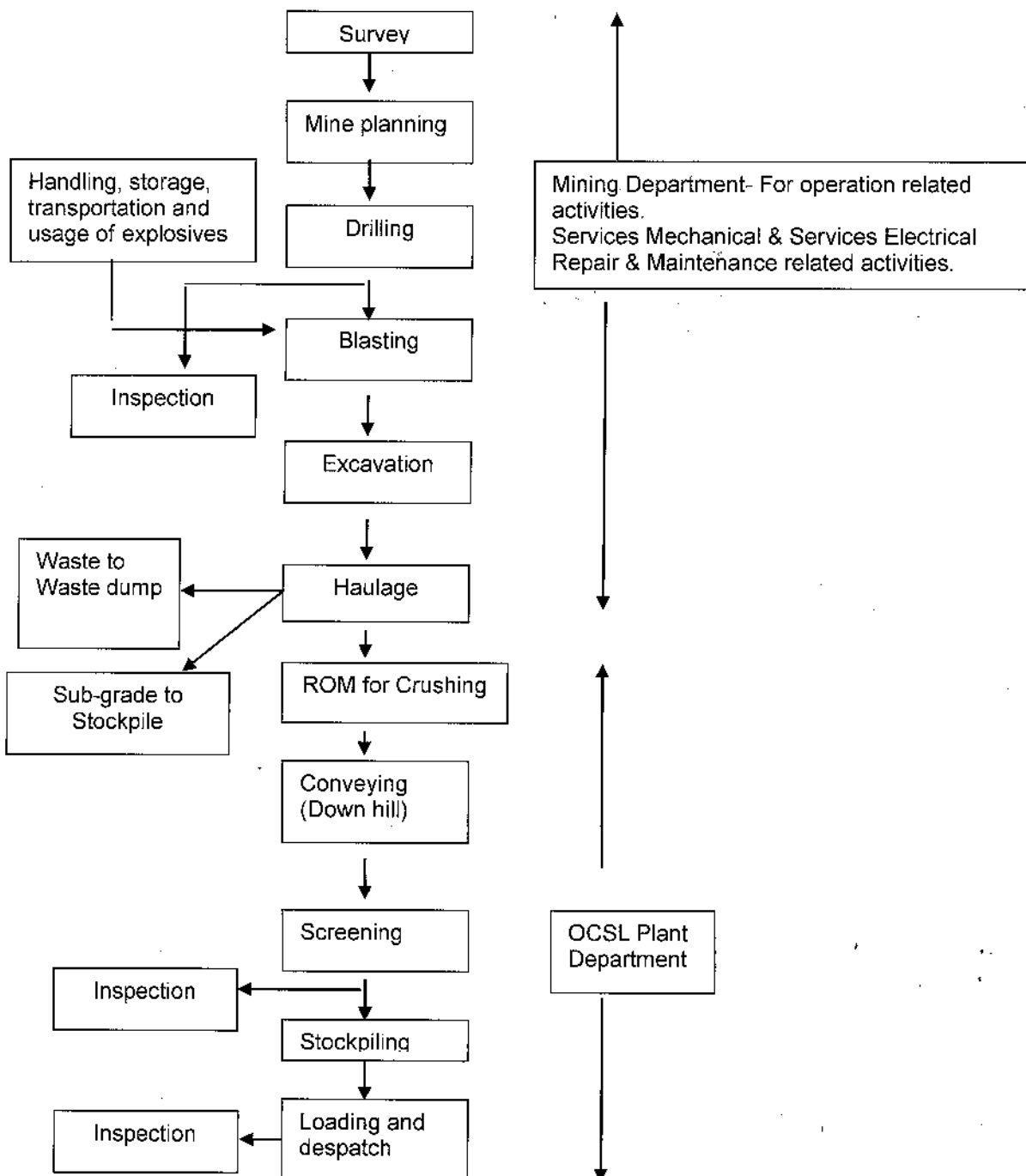
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4b. PROCESS FLOW SHEET

PROCESS FLOW DIAGRAM

Responsibility



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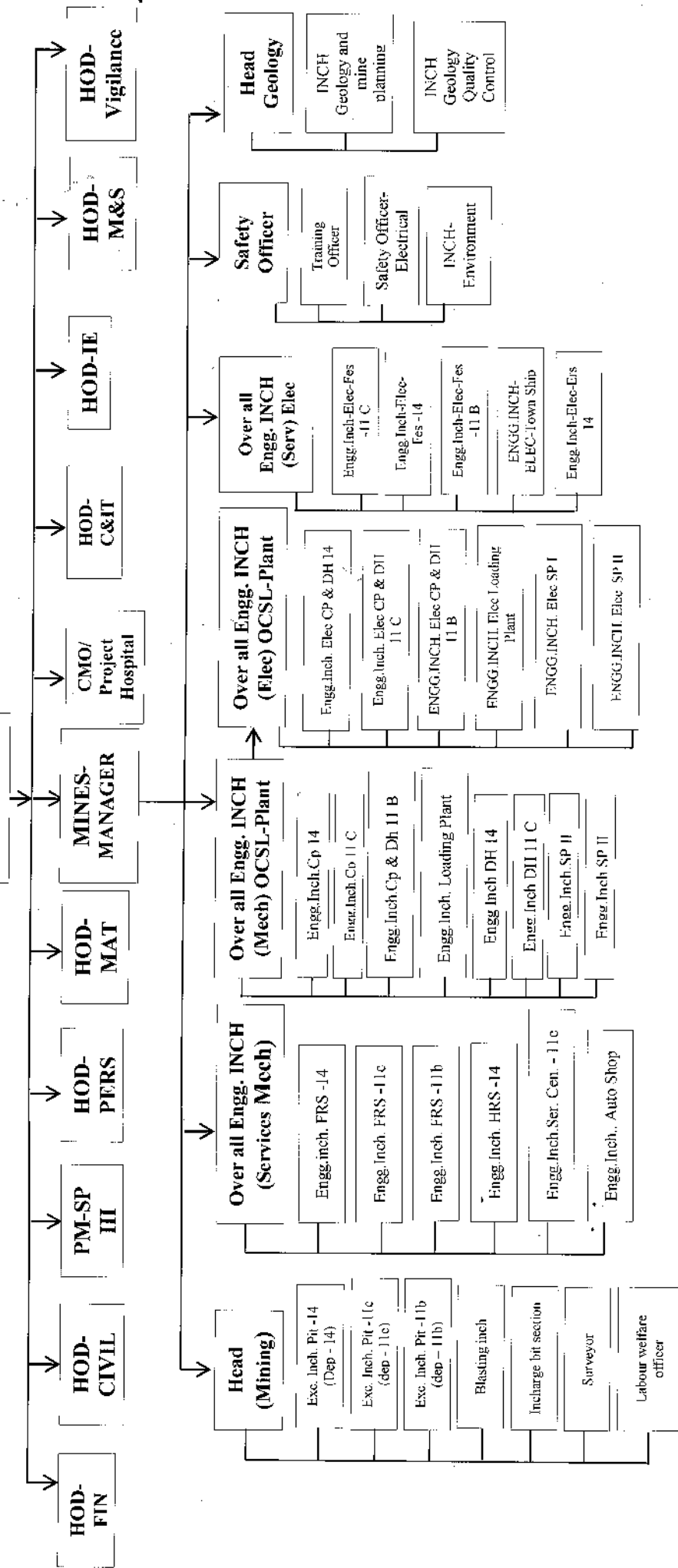
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4.c Organization Chart at Mine Level

AGENT



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4d. Commitment, Resources, Roles, Responsibility and Procedure.

PURPOSE

- To commit, define roles, responsibilities, accountability and authority for effective implementation of Safety Management Plan,
- To provide necessary resources for implementation of Safety Management Plan.

SCOPE

Applicable to all activities of B.I.O.M, Kirandul Complex which are within the purview of the Mines Act, 1952.

RESPONSIBILITY

Agent shall designate Mines Manager who shall be responsible for formulation and implementation of Safety Management Plan along with approving of roles and responsibility of different persons. Owner and agent shall be responsible for providing of necessary resources towards successful implementation of Safety Management Plan.

PROCEDURE

Top Management of B.I.O.M, Kirandul Complex is firmly committed for formulation and implementation of the Safety Management Plan. The following actions shall be taken in this regard.

- Formulation and implementation of Health & Safety Policy and its periodic review.
- Activity wise identification of hazards, risks, risk control measures and persons responsible for implementation of risk control measures.
- Establishing Objectives (Control Plans) at the Project level as well as at the relevant Department level for putting in place control measures for risk mitigation.
- Control Plan shall include Work plan which will indicate stages for implementation of control plan along with a time line and persons responsible for implementation.
- Periodic monitoring of Control Plans/Work Plans once in a month at Departmental Level and once in a Quarter at Project Level.
- Making available necessary resources required for successful implementation of Safety Management Plan.

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- Effective communication about the importance of statutory and regulatory requirements and various safety norms amongst all employees of the mine through written communications / circulars / training /notice boards / Intranet etc.
- Monthly meeting on all health and safety related issue of persons employed in the mine in Safety Committee which has been formed as per the Mines Rules'1955. This Committee also suggests necessary measures for improvement of safety standards in the mine.
- Statutory designation of persons including roles & responsibility related to implementation of Safety Management Plan shall be mentioned in the HIRA document.
- Name of Assistant Managers, Engineers and Supervisors responsible for implementation of risk control measures shall be as per the statutory appointment/authorization being in force under the applicable provisions of the MMR,1961 & the CEA Regulations,2010.
- Control Plans for implementation of risk control measures, which are required to be put in place, shall also be a part of HIRA Document.
- Other than mine officials, all competent persons like operators, mechanics, electricians, blasters, magazine in charge and rest of the persons employed in the mine are also responsible for implementation of risk control measures as mentioned in the HIRA Document.
- Date of implementation of Safety Management Plan shall be deemed to commence from the date of approval of this document by the Nominated Owner of the mine.
- After completion and implementation of all work plans, Safety Management Plan shall be audited to find out effectiveness of implementation.
- Audit findings shall be used for review and further improvement in Safety Management Plan.

GUIDING DOCUMENTS-

Safety Management Plan of B.I.O.M, Kirandul Complex is based on following DGMS Circulars:

- DGMS Technical Circular No. 13 of 2002
- DGMS(Tech) (S&T) Circular No. 05 of 2016
- DGMS Technical Circular No. 03 of 2019

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5. Safety Management Plan Overview

PURPOSE:

To frame a documented process, known as Safety Management Plan and to implement the same so as to either eliminate or control risks associated with all such activities at B.I.O.M, Kirandul Complex which come within the purview of the legal provisions applicable to the mine.

SCOPE:

Applicable to the all activities of B.I.O.M, Kirandul Complex within the scope of this Safety Management Plan.

RESPONSIBILITY:

As mentioned in the responsibility coloumn of Hazard Identification and Risk Assessment Document.

Overall Co-ordination: Mines Manager

PROCEDURE:

Mines Manger & concerned Head of the Department (HOD) shall ensure that the purpose of the Safety Management Plan is addressed by:

- Conducting Hazard Identification & Risk Assessment (HIRA) of different activities by:
 - Assembling a team of experienced persons comprising of officials/ supervisors (Assistant Managers, Engineers and Foreman) as well as workmen to identify all activities as well as hazards associated with these activities by analyzing past near miss cases, accidents and safety observations/ reports. Each activity and hazard is given a unique identification number.
 - Identifying risks (to men as well as machinery/installation) associated with hazards.
 - Ranking of risks by taking in to consideration number of persons exposed, exposure of persons at site for a particular activity, probability of accident and consequence of accident.

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- Identifying legal requirements related to health and safety.
- Control measures required to be in place to eliminate or minimize the risk.
- Procedures to be followed to put control measures in place.
- Identifying such control measures which are required to be in place, but presently not in place and to frame control plan for implementation of control measures.
- Each control plan is also given a unique identification number.
- Documented work plans for completion of control plans.
- Fixing responsibility for implementation of control measures.
- Fixing time line along with responsibility for different stages of implementation of such control measures which are required to be put in place
- Priority is given to control risks associated activities/sub-activities on the basis of risk scores.
- On completion of a implementation of a control measure (which is required to be put in place), same is to be approved by the Mines Manager and completion date is to be entered against the Control Plan in the HIRA Document.
- Details regarding this will be mentioned in the HIRA Document
- Safe Operating Procedures (SOPs) or Operational Control Procedures (OCPs) shall be prepared for different activities for ensuring safe operation. For new equipment/activity SOP shall be prepared by concerned Department to execute the work safely.
- Conducting Initial Medical Examination (IME) and Periodical Medical Examination (PME) of all employees as per applicable legal provisions. Health Examination records of Initial /Periodical Medical Examination of each employee shall be maintained in the required statutory format.
- To ensure safety, adequate number of supervisors, mine officials and other competent persons like operators, mechanics and electrician shall be deployed in each shift for effective supervision, operation, installation, and maintenance and repair activities in

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the mine.

- Required Safety and Skill Development trainings shall be imparted to persons employed in the mine, including persons employed on contract basis.
- Relevant Safety Circulars shall be issued from time to time for creating awareness amongst employees.
- Periodical air quality monitoring and noise level monitoring shall be carried out as per DGMS guidelines and action shall be taken to improve working condition.
- Periodical Internal Safety audit/ Inter-Project Safety Audit shall be conducted (One in 6 month) and action shall be taken to ensure continual improvement in Health & Safety standard.
- In case of any change in the process, necessary changes shall be made in the work process shall be recorded after conducting Hazard Identification and Risk Assessment. These shall be communicated to all concerned for taking necessary safety precautions to execute work safely. Changes shall be incorporated in SOPs/OCPs.
- Promoting Safety through Safety Week Celebration, display of Safety slogan Boards, Safety Sign Boards in the mine.

Role of Pit Safety Committee

- Periodic evaluation of the Safety Management Plan keeping in view near miss cases and accidents in the mine and to identify whether control measures mentioned in safety management plan are adequate or new control measures are to be framed to control risks.
- Whenever any new type of machinery or process is planned to be introduced in the mine, Safety Committee shall suggest control measures required to be framed and implemented before deployment of such machinery or starting of new process.
- To monitor effectiveness of implementation of Safety Management Plan

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6. HEALTH & SAFETY POLICY

PURPOSE:

To frame and implement Health & Safety Policy at the Mine Level.

SCOPE:

Applicable to all activities of B.I.O.M, Kirandul Complex coming within the purview of the Mines Act, 1952.

RESPONSIBILITY:

- Approving Health & Safety Policy - Agent
- Implementation of Health & Safety Policy - Mines Manager & HODs
- To follow Health & Safety Policy - All employees

PROCEDURE:

The top management shall establish a documented Health & Safety Policy. While establishing the policy, it shall be ensured that, the policy is appropriate to the nature, scale, impacts/ risks of activities (with regards to Occupational Health and Safety) related to all the activities of B.I.O.M, Kirandul Complex.

The Health & Safety Policy shall have following attributes:

- Includes commitment to continual improvement in Health & Safety standards.
- Includes commitment to comply with current applicable legal and other requirements set by law of the land.
- Documented, implemented and regularly monitored.
- Communicated to all related persons and stakeholders.
- Reviewed periodically to ensure its appropriateness.
- Available to public on demand.

Management shall takes suitable measures for communicating the Policy through display at relevant places, providing training to all concerned, who are working for and on behalf of the Unit as per the documented procedure to ensure that Safety Management Plan's requirements are complied with.

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The intention of the Management shall be communicated to the all concerned through the Policy as per the said documented procedure.

The implementation status & the feedback of the policy shall be reviewed by the Management in the Safety Management Plan monitoring meeting (Once in 6 months). In the Safety Management Plan monitoring meeting, need for any change in the Health & Safety Policy shall also be discussed and if required, revised policy shall be put up to the Agent for approval. Discussions held in Safety Management Plan monitoring meeting shall also help in ensuring continual improvement in the Safety Management Plan.

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HEALTH AND SAFETY POLICY

We, NMDC Limited, B.I.O.M, Kirandul Complex, are committed to develop safe and healthy place to work by adhering to applicable safety regulations by establishing systems and procedures and to implement and monitor those on a continual basis.

We are developing and maintaining conducive and safe working environment for personnel by:

- Providing a safe and healthy work place for persons by adopting safe, scientific and environment friendly methods of mining and allied activities and firmly committing ourselves for total compliance of applicable safety related legal provisions for the mine.
- Identifying hazards related with work and adopting necessary preventive methods to eliminate or minimize the workplace hazards.
- Providing periodical health and safety awareness training to persons working in the mine to work safely and to use the personal protective equipments.
- Maintaining machines in safe and proper working conditions to ensure minimum impact of their operation on safety of persons.
- Having emergency preparedness plan in place, remain prepared through regular mock rehearsal and practice and respond effectively for ensuring safety to all in emergency situations.
- Ensuring that the Pit Safety committee is always active.
- Ensuring that all the above points are being monitored properly.
- Promoting Safety awareness among personnel, local communities and interested parties through effective communication and training.
- Ensuring a team effort to sustain a safe and hygienic environment.

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7. PROCEDURES

7a. Hazard Identification and Risk Assessment (HIRA)

PURPOSE

To define the process for Hazard Identification and Risk Assessment

SCOPE

Applicable to all activities of B.I.O.M, Kirandul Complex within the purview of the Mines Act, 1952.

RESPONSIBILITY

Mines Manager, Safety Officer, Concerned Head of the Department (HOD) & Departmental Level team formed for Hazard Identification and Risk Assessment, Surveyor, Civil Engineers, OHS Physician and Workmen Inspectors/ Worker's Representatives

PROCEDURE

- Constitution of team from various Departments for Hazard Identification and Risk Assessment of all activities.
- The team members shall be trained in risk based thinking as a requirement of the Hazard Identification & Risk Assessment (HIRA) and team member of each Department shall do Risk Assessment based on all activities in their Department. The documented information on the same will be available in the respective Department's Hazard Identification & Risk Assessment Register (HIRA).
- Hazard identification and Risk Assessment shall be made based on relevant DGMS Guidelines.
- Hazard Identification and Risk Assessment review shall be carried out keeping in view the following points:-
 - It shall be done by a Department level team which shall take in to consideration aspects like :
 - All activities and number of persons exposed to these activities including contract workers
 - Each activity shall be given a unique identification number

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- Identification of hazard and associated risks and in this regard following documents shall be referred
 - Pit Safety Committee Minutes
 - Accident and near miss case history
 - DGMS Inspection reports and internal safety audit reports
- Mechanisms by which an accident can occur
- Exposure to hazard and associated risks, probability of occurrence of unwanted events and potential consequences resulting in injury to persons or damage of equipment.
- Control measures required to be in place.
- Gaps related to implementation of control measures.
- Review the necessary resources provided by the organization including persons responsible for implementation of control measures.
- Applicable legal obligations relating to implementation of necessary control measures.
- Framing of Control Plans for such control measures which are not in place, indicating different stages of implementation of control plan along with stage wise time line and responsibility.
- Each control plan shall be given a unique identification number.
- For each stage of control plan, there will be a work plan which is a documentary evidence of details related to completion of different stages.
- Departmental HIRA Documents shall be reviewed by Safety Officer and Mines Manager before finalization of these documents.

Definitions related to Hazard Identification & Risk Assessment (HIRA)

Hazard- It is a source of potential harm, injury or loss.

Risk- It is a combination of likelihood of occurrence of a specific unwanted event and the potential consequence in the event of occurrence of unwanted event.

Risk Assessment- It is a process that involves measurement of risk for prioritization of risks.

Risk Rating- The category or level of risk assigned following Risk Assessment.

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Risk Control- Implementation of strategies to prevent or control risks

Hazard Identification and Risk Assessment format:

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- RSP- Relevant Statutory Provisions, DGC- DGMS Circular, MG-Management Guidelines

RISK ASSESMENT (AS PER DGMS CIRCULAR NO.Cir.Tech.13/2002 & DGMS (Tech.) (S&T) CIRCULAR No.05, DHANBAD, DATED 02.04.2016)

SCALE FOR PROBABILITY, EXPOSURE AND CONSEQUENCE AS PER DGMS CIRCULARS

Probability		Exposure		Consequence	
May well expected	10	Continuous	10	Several Dead	5
Quite possible	7	Frequently (Daily)	5	One dead	1
Unusual but possible	3	Seldom (Weekly)	3	Significant Chance of fatality	0.3
Only remotely possible	2	Unusual (Monthly)	2.5	One permanent disability	0.1
Conceivable but unlikely	1	Occasional (Year)	2	Many lost time injuries	0.01
Practically Impossible	0.5	Once in 05 years	1.5	One lost time injury	0.001
Virtually impossible	0.1	Once in 10 years	0.5	Small injury	0.0001
		Once in 100 years	0.02		
Maximum Risk Score =		10 X 10 X 5 = 500			
Minimum Risk Score =		0.1 X 0.02 X 0.0001 = 0.0000002			
Risk Scores having value of more than 200 need immediate attention and control measures.					

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RISK PRIORITIZATION

Risk category/ Risk Level	Risk Score
High risk- Unacceptable and need immediate control	$200 < RS \leq 500$
Medium risk, i.e. Risk Requiring Management Action (RRMA) Need implementation of extensive risk controls	$20 < RS \leq 200$
Low Risk	$RS \leq 20$

RISK EVALUATION CALCULATION

TOTAL SCORE = $P \times E \times C$, i.e. Probability multiplied by Exposure multiplied by Consequence

Hierarchy of Risk Control Measures and their effectiveness –

- ✓ Elimination- (100%)
- ✓ Substitution - (75%)
- ✓ Separation - (50%)
- ✓ Administration - (30%)
- ✓ Training - (20%)
- ✓ PPEs - (5%)

The significant Hazard Identification and Risk analysis, identified during evaluation stage considering the legal requirements, shall be prioritized for setting objectives and targets.

Possibility of elimination /substitution to control risk shall be considered at the first place.

Wherever elimination/ substitution is not possible, other control measures shall be initiated to reduce risk to an acceptable level. The organization shall considers technological advancement and modification for processes to in this direction.

Interpretation of different types of risks level based on the assigned total risk scores -

- **Low Risk-** All control measures required to be implemented to reduce risks to acceptable level are in place.
- **Medium Risk-** Some of the control measures required to be implemented to reduce risks to acceptable level are not in place.
- **High Risk-** Most of the control measures required to be implemented to reduce risks to acceptable level are not in place.

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Procedure for Hazard Identification & Risk Assessment for Non-Routine Activity:

In case of any Non-Routine activity, i.e. such activities which are not there in the existing scheduled/defined list of activities of any Department, concerned Head of the Department shall constitute a group for Hazard Identification & Risk Assessment of that Non-Routine activity.

Group members shall inspect the site for Hazard Identification & Risk Assessment. After completing the Hazard Identification & Risk Assessment, group shall prepare necessary Risk Control Plan with time line for each activity and also fix the ownership to concerned official for timely completion of the risk control plan, so as to mitigate the risks and bring it down to an acceptable level for executing the work safely. Risk Control Plan shall be informed to the Mines Manager. Work shall commence only after full implementation of Risk Control Plan.

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A summary of HIRA Document prepared is as follows:

Sl. No.	Section/ Department	No. of Work Areas/ Activities identified	No. of hazards identified related to Activities/ Work Area	No. of Hazards with Base Risk Score > 200 (High Risk)	No. of Hazards with Base Risk Score ≤ 200 but > 20 (Medium Risk)	No. of Control Plans
1	All	09	12	8	4	----
2	Mining	72	231	1	27	----
3	Services Mechanical	64	68	1	14	----
4	Services Electrical	23	53	0	41	4
5	OCSL Plant Mechanical	89	88	0	22	1
6	OCSL Plant Electrical	18	24	0	12	1

Identified Major Hazardous activities based on base risk scores are as under:-

Sl. No.	Unique Sl. no. of Activity/ Work Area	Activity/ Work area	Potential Hazard	Mechanism	% of Workers Exposed	Base Risk Score
1	COM-6	All	Use of mobile phone	Distraction because of use of mobile phone	100	500
2	COM-3	All	Not using PPE required for the job	Required PPE not provided	100	350
3	COM-04	All	Use of inappropriate tools for work	Not using appropriate tools and tackles for work	100	350
4	COM-04	All	Stray current or other dangerous site conditions	Site not inspected and made safe for work prior to commencement of work	100	350
5	COM-7	All	Fly Rock hitting persons	Presence of persons inside danger zone at the time of blasting	100	250

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Sl. No.	Unique Sl. no. of Activity/ Work Area	Activity/ Work area	Potential Hazard	Mechanism	% of Workers Exposed	Base Risk Score
MINING						
Activity-Dumper Operation						
6	MIN Dump.4-4.2	Dumper Movement in parking area	Collision with other vehicles or dumper running over persons	07 reasons of accident identified. Details on page no. 03 of Mining Department HIRA Document	<=6	175
7	MIN Dump.5	Dumper Movement in areas other than haul road	Collision with other vehicles	06 reasons of accident identified. Details on page no. 04 of Mining Department HIRA Document	<=6	175
Activity- Chain Dozer Operation						
8	MIN Doz.4-4.3	Dozing Operation	Collision with other equipment because of poor visibility	09 reasons identified. Details on page no. 45 & 46 Department HIRA Document	<=6	35
9	MIN Doz.4-4.1	Dozing Operation	Running over persons or Collision with other equipment at the time of dozing	04 reasons identified. Details on page no. 45 of Mining Department HIRA Document	<=6	21
Activity- Wheel Dozer Operation						
10	MIN WD.4-4.2	Moving from parking area	Collision with other vehicles at parking area	10 reasons identified. Details on page no. 53 & 54 of Mining Department HIRA Document	<=3	175
11	MIN WD.5-5.3	Dozer Operation	Collision with other HEEM/ hitting persons because of poor visibility	8 reasons identified. Details on page no. 55 & 56 of Mining Department HIRA Document	<=3	35

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Sl. No.	Unique Sl. no. of Activity/ Work Area	Activity/ Work area	Potential Hazard	Mechanism	% of Workers Exposed	Base Risk Score
12	MIN WD.6	Travelling on slope	Machine tipping over or tilting side wise	5 reasons identified. Details on page no. 56 & 57 of Mining Department HIRA Document	<=3	35
13	MIN WD.8-8.1 & 8.2	Parking of wheel dozer	Accidental movement of wheel dozer	7 reasons identified. Details on page no. 57 & 58 of Mining Department HIRA Document.	<=3	35
Activity- FEL Operation						
14	MIN FEL.4-4.2	Moving from parking area	Collision with other vehicles at parking area	10 reasons identified. Details on page no. 61 & 62 of Mining Department HIRA Document	<=6	175
15	MIN FEL.5-5.3	FEL Operation	Collision with other HEEM/ hitting persons because of poor visibility	9 reasons identified. Details on page no. 63 of Mining Department HIRA Document	<=6	35
16	MIN FEL.6	Travelling on slope	Machine roll over	6 reasons identified. Details on page no. 65 of Mining Department HIRA Document	<=6	35
17	MIN FEL.8-8.2 & 8.3	Parking of FEL	Accidental movement of FEL	07 reasons identified. Details on page no. 66 & 67 of Mining Department HIRA Document.	<=6	35
Activity- Charging and Blasting Operations						
18	MIN-BLAST 1-1.1	Transportation/ Handling of explosives	SOP for safe explosives handling not followed	Detonators and other explosives not transported separately	<=2	175

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Sl. No.	Unique Sl. no. of Activity/ Work Area	Activity/ Work area	Potential Hazard	Mechanism	% of Workers Exposed	Base Risk Score
19	MIN-BLAST 1-1.2	Transportation/ Handling of explosives	Use of electronic equipments at the time of handling of explosives	Proper checking mechanism not established/followed	<=2	175
20	MIN-BLAST 1-1.3	Transportation/ Handling of explosives	Spark in explosive van	Spark arrestor not provided/maintained	<=2	175
21	MIN BLAST 2-2.1	Charging operation	Use of electronic equipments at the time of charging	03 reasons identified. Details on page no. 53 of Mining Department HIRA Document	<=2	175
22	MIN BLAST 2-2.2	Charging operation	Induced/ Stray current resulting in accidental detonation	04 reasons identified. Details on page no. 53 of Mining Department HIRA Document	<=2	175
23	MIN BLAST 2-2.3	Charging operation	Use of Metal Tools for stemming	Stemming of charged holes with metal tools	<=2	175
24	BLAST 3-3.1	Blasting/Firing	Using insufficient length Safety Fuse for firing	Blaster not using adequate length safety fuse to give sufficient time for moving away to a safe place from blast site after lighting safety fuse	<=2	175
25	MIN BLAST 3-3.2	Blasting	Injury because of fly rock	Inadequate burden, Over Charging, Improper evacuation and guarding in Danger Zone	< = 2	250

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Sl. No.	Unique Sl. no. of Activity/ Work Area	Activity/ Work area	Potential Hazard	Mechanism	% of Workers Exposed	Base Risk Score
Services Mechanical (HEMM and other mobile machines Installation, Repair & Maintenance Related)						
26	HIRA-SM20	Maintenance & repair of equipments	Poor communication/co-ordination	04 reasons identified. Details on page no. 8 & 9 of Serv. Mech. HIRA Document	<=28	250
27	HIRA-SM17	Working in undercarriage of equipment	Falling of part of /whole undercarriage	Insufficient Support and items not properly secured/locked	<=28	175
28	HIRA-SM12	Crane Operation	Fall of object which is handled/toppling of crane	06 reasons identified. Details on page no. 4 & 5 of Serv. Mech. HIRA Document	<=5	100
29	HIRA-SM14	Mobile Crane Operation	Brake failure during starting or operation	06 reasons identified. Details on page no. 3 of Serv. Mech. HIRA Document	<=5	100
30	HIRA-SM62	Maintenance & routine checking	Releasing equipment for operation without all safety features of machines found OK.	Before releasing equipment, not ensuring equipment is mechanically safe for operation. OK & BD equipment not tagged properly for ease in identification by operator.	<=28	70
31	HIRA-SM63	Transportation of persons	Failure of safety features of vehicle	Safety features not properly checked and maintained on routine basis	100	70
Services Electrical (Electrically operated HEMM and other electrical Installations related)						
32	HIRA-SE13	Operation and maintenance of PSGs	Improper power isolation or improper earthing	03 reasons identified. Details on page no. 6 & 7 of Serv. Elect. HIRA Document	<12	175

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Sl. No.	Unique Sl. no. of Activity/ Work Area	Activity/ Work area	Potential Hazard	Mechanism	% of Workers Exposed	Base Risk Score
33	HIRA-SE15	PSG Extension/ relocation and laying of HT Cable	Presence of other persons, equipments, toppling of PSG , Electric Shock, Poor Communication	08 reasons identified. Details on page no. 7 & 8 of Serv. Elect. HIRA Document	< 7	175
34	HIRA-SE19	Installation, repair and maintenance of Electrical Installations in Substation	Coming in contact with live parts, incomplete power isolation, improper earthing & not using required PPEs	3 reasons identified. Details on page no. 11 & 12 of Serv. Elect. HIRA Document.	<12	175
35	HIRA-SE2	Shifting of lighting poles and towers	Material transported falling during shifting, coming in contact with Over Head live lines	03 reasons identified. Details on page no. 1 of Serv. Elect. HIRA Document.	<12	105
36	HIRA-SE23	Blasting Operation in mine	Presence of person within the danger zone	03 reasons identified. Details on page no. 15 &16 of Serv. Elect. HIRA Document	<7	105
37	HIRA-SE3	Installation, repair or maintenance of poles and towers	Accidental charging of feeder, coming in contact with charged lines	02 reasons identified. Details on page no. 1 of Serv. Elect. HIRA Document	<12	87.5
38	HIRA SE-6	Working on overhead lines	Electric shock because of improper shutdown	Persons coming in contact with live parts because of improper shutdown	≤12	87.5
OCSL Plant Mechanical						
39	HIRA-PLM-34	Conveyor system operation	Brake failure of Conveyors	Over speed, coupling failure, improper plugin, Brake not properly maintained.	≤40	175

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Sl. No.	Unique Sl. no. of Activity/ Work Area	Activity/ Work area	Potential Hazard	Mechanism	% of Workers Exposed	Base Risk Score
40	HIRA-PLM-39	All operations	Fire hazard	Unwanted friction between moving and nonmoving parts	<=20	105
41	HIRA-PLM-47	Conveyor system operation	Weak joint	Joints not properly made, Joints not regularly inspected and maintained, over load on belts, poor belt quality and joint quality	<=40	70
42	HIRA-PLM-48	Conveyor system operation	Pull Chord not provided	Pull chord not provided, pull chord provided, but, not properly checked and maintained	<=40	70
43	HIRA-PLM-70	All activities	Communication gap	Proper Communication method not framed and established	<=40	70
44	HIRA-PLM-20	All operations	Fall into depth	Area not properly fenced	<=20	50
45	HIRA-PLM-27	All maintenance and repair works	Handling & Storage of cylinders	Improper storage, shifting & use of cylinders	<=8	40
46	HIRA-PLM-32	All maintenance and repair works	Selection of wrong tools for a work	Inadequate knowledge about the work. Work by untrained persons.	<=20	35
47	HIRA-PLM-35	EOT Crane operation	Brake fail of EOT Cranes	Over load, brake shoes worn out & system not checked and maintained.	<=25	35
48	HIRA-PLM-44	All operation & checking related works	Improper Start & stop of system	Starting or stopping any system without proper clearance and warning.	<=8	35

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Sl. No.	Unique Sl. no. of Activity/ Work Area	Activity/ Work area	Potential Hazard	Mechanism	% of Workers Exposed	Base Risk Score
OCSL Plant (Electrical)						
49	HIRA- PLE 12	Installation, repair and maintenance of motors	Live parts, moving parts of machines and fall of material	Static current, failure of protective device, improper shut down, working on moving parts without adequate precaution and lifting loads without adequate precautions	<=10	35
50	HIRA- PLE 16	Operation and maintenance works of EOT Cranes	Electric shock, fall from height, failure of limit switches	Improper shutdown, oil and grease on walk way and ladder, hand rails not provided, limit switches not properly maintained	<=8	21
51	HIRA- PLE 02	Operation and maintenance works	Electric shock because of ungrounded equipment	Use of poor insulated tool, insulation mat not as per standard and improper earth resistance value	<=15	21
52	HIRA- PLE05	Working at height	Inadequate fencing, corroded structures, unsecured load & not using PPEs	Inadequate fencing around the work area, structure on which persons are standing is corroded, loads or tools used at height not properly secured, persons not using safety belt	<=12	21
53	HIRA- PLE06	Operation and maintenance of transformers	Electric Shock	Accidental charging because of not following shutdown procedure Work being carried out by incompetent persons	<=12	21

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Sl. No.	Unique Sl. no. of Activity/ Work Area	Activity/ Work area	Potential Hazard	Mechanism	% of Workers Exposed	Base Risk Score
				Electric shock from static charge		
54	HIRA- PLE111	Cable Laying	Electric Shock	Persons coming in contact with live parts. Accidental charging before completion of work	<=10	21

HIRA Documents are mentioned in details as enclosures to the Safety Management Plan Manual as mentioned at Page No. 03 of the SMP Manual.

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List of control Plans

Sl. No	Unique Sl.no. of Activity/Sub-activity	Hazard	Control Plan for	Unique sl. no. of control Plan	Target Date
1	HIRA-SE2, HIRA-SE15 HIRA-SE22	Poor illumination at work site	Improvement of illumination level in the mine to the required statutory level	CPSE-01	31.03.2021
2	HIRA-SE17	Fire hazard in transformers	Installation of fire suppression system in transformers having oil capacity of > 2000 Ltrs.	CPSE-02	31.12.2020
3	HIRA-SE15	Improper termination of cables in Junction Boxes	Procurement and installation of Junction boxes as per requirement to ensure termination of cables in Junction Boxes as per IS/ Statutory norms	CPSE-03	31.03.2021
4	HIRA-SE22	Electric shock because of leakage current	Providing Earth Leakage Relays in LT Control Switch Gears	CPSE-04	31.12.2020
6	HIRA-PLM-1-2(a)	Collapse of structures because of inadequate structural strength	Structural stability study of different structures in Plant & implementation of corrective measures	CP PLM-1	Structural Stability study to be completed by 31.03.2021
7	HIRA-PLE01	Leakage Current in equipment	Installation of earth leakage relay	CP Plant Elect-1	30.04.2021

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7b. Management Guidelines including Safe Operating Procedures (SOP) or Operational Control Procedures (OCPs)

PURPOSE

- It is a documented process for informing all concerned persons about the guidelines to be followed for safe execution of all activities. SOPs/OCPs are also a part of management guidelines related to safety and are based on the following:
 - Risks linked with activities and required control measures are identified, documented, communicated to concerned persons and works are executed as per the documented procedure.
 - It covers Departmental activities as well as contract/out sourced activities of the mine.
 - Fixing of responsibilities for each step mentioned in the SOP/OCP.

SCOPE:

Applicable to all activities of B.I.O.M, Kirandul Complex within the purview of the Mines Act,1952.

RESPONSIBILITY:

- HODs for formulating SOPs/OCPs and for submitting SOPs/OCPs for approval by Mines Manager
- Mines Manager for approval of SOPs/OCPs
- Safety officer for display of approved SOPs/OCPs at relevant work place in consultation with HODs
- All concerned persons are required to follow SOPs/OCPs

PROCEDURE:

Sr. No.	ACTIVITY	DOCUMENT REFERENCE	RESPONSIBILITY
1	To identify different activities/work areas and associated Hazards. Assessment and prioritization of Risks. Control measures required and responsibility to minimize risk at work place.	Hazrd Identification & Risk Assessment (HIRA)	HOD, Departmental HIRA Team Members
2	Critical equipment, machinery and other sources from point of Occupational Health & Safety risks shall be identified and their preventive maintenance schedule shall be laid down in order to reduce / control or prevent/ eliminate risk	HIRA	HODs

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Sr. No.	ACTIVITY	DOCUMENT REFERENCE	RESPONSIBILITY
3	Documented Safe Operating Procedures (SOP)/ Operational Control Procedures (OCP) shall be prepared to cover activities, operations and services of the respective departments.	SOPs & OCPs.	HOD, Departmental HIRA Team Members
4	Submission of SOPs & OCPs for approval	SOPs & OCPs	HOD
5	Approval of SOPs & OCPs	Approved SOPs & OCPs	Safety Officer- For any review before submission to Mines Manger & Mines Manger for final approval
6	SOPs/OCPs shall be made available at the place of work in printed or electronic form for awareness and compliance by all concerned employees.	Approved SOP & OCP	HODs Safety Officer
7	Relevant SOPs/OCPs, legal and other regulatory requirement shall be communicated to the suppliers and contractors for the control of identified aspect & impacts.	N.I.T Document	HODs
8	To implement SOPs/ OCPs framed at work to eliminate / minimize risks at work place	Approved SOP & OCP	HODs and all Executives/ Supervisors
9	Machine and equipment shall be operated and operation shall be monitored as per the SOP/OCP and laid down criteria and records is maintained.	Operation & Maintenance Records	HODs and all Competent Persons
10	Review of SOPs/OCPs as per requirements.	Near Miss & Accident Records. Introduction of new machineries or work process	HODs HODs & OEM / Contractor Representatives
11	Controls related to purchase of materials , equipment and services as per the guidelines issued by DGMS	N.I.T Document and other relevant Communication	Mines Manager, HOD of concerned Department, HOD (Finance) & HOD (Materials)

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Sr. No.	ACTIVITY	DOCUMENT REFERENCE	RESPONSIBILITY
12	Controls related to contractors for adherence to all safety precautions and applicable guidelines	N.I.T Document and other relevant Communication	HODs and Engineer In charges
13	Controls related to visitors for adherence to all safety precautions and applicable guidelines	Do's & Don'ts in the mine	Same shall be displayed at main entrance and Persons visiting the mine shall follow these guidelines

Management Guidelines, mainly Traffic Rules/Codes for the mine, Do's and Don'ts for persons employed in the mine and all persons entering the mine and Department Specific SOPs/OCPs are mentioned in detail as mentioned at Page No. 03 of the Safety Management Plan Manual.

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7c. Emergency Preparedness Action Plan and response

PURPOSE

- Identify potential emergency situations.
- Initiating actions in a systematic manner and without any loss of time to minimize & control impact of emergency situations.
- To establish a system of emergency responses and check its preparedness from time to time through mock drills.
- To review & revise Emergency Preparedness Procedures, if required, in the wake of an emergency.

SCOPE

Applicable to all the mining related activities of B.I.O.M, Kirandul Complex.

RESPONSIBILITY

- Mines Manager for preparing a documented Emergency Preparedness Action Plan.
- Training Officer for imparting necessary training to employees on Emergency Preparedness Action Plan
- HODs & Safety Officer for periodic mock drills at site and submission of observations of mock drills to the Agent through Mines Manager indicating shortcomings noticed or improvements required, if any.
- All employees for following their roles and responsibilities as mentioned in the Emergency Preparedness Action Plan

PROCEDURE

Emergency Preparedness Action Plan

- Identify potential emergency situations and areas of occurrence during identification of Hazard and risks.
- The potential emergencies and related areas are identified as follows:

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- Fire: Stores , POL area, Plant & Mines Equipment
- Explosion at POL/Magazine/ Mining Area
- Inundation in mines area.
- Failure of Benches in mine/Waste dump
- Accidents involving HEMMs, Electrical Apparatus and Cables and plant machineries

Detailed procedure, prevention, mitigation and corrective, preventive actions related to emergency situation has been documented in "IMS-NMDC (K)-EPAP"

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7d. Competence, Training and Awareness

PURPOSE

- To identify training need of each employee to achieve necessary competency to perform the jobs assigned.
- Impart training to new employees and to give periodic refresher training to existing employees for updating the skill.

SCOPE

Applicable for all persons deployed/ to be deployed in the activities of B.I.O.M, Kirandul Complex which are carried out inside the mine.

RESPONSIBILITY

HOD for identifying training needs of employees. Arrangement of necessary training shall be taken care of by Training Officer.

PROCEDURE

- The organization shall determine the necessary competency for key personnel's performing works, affecting employee's health and safety.
- The training needs shall be identified and required training shall be provided to achieve necessary competency level. List of employees working under contractor to be trained shall be finalized by Training officer in consultation with concerned HODs and as per applicable legal norms .
- Training requirements mandated as per legal requirements shall be imparted by the authorized training officer.
- Training shall generally comprise of the following areas:
 - General awareness and employees roles and responsibilities in achieving conformance with Safety Management Plan requirements, objective & targets as per relevant rules & regulations, including emergency preparedness and response requirements
 - New employees shall be given training / awareness on SMP requirements, emergency preparedness and other safety requirements.

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- Periodic training and awareness programmes shall be conducted for existing employees.
- The Pit Safety Committee members shall be trained periodically in order to be competent to assess and analyze safety aspects related to different activities and workplace and to suggest measures for improvement in the health and safety standards at the workplace.
- Feedback shall be collected from employees attending the training in order to know, whether these employees have become competent enough to perform the task in desirable manner.
- Training center shall organize structured behavioral based safety training programme / structured training programme for front line supervisors as per DGMS guidelines and approved training schedule.

Whenever trainings shall be provided with an aim of continual improvement, evaluation of the effectiveness of the training provided shall be carried out with specific reference to the performance effectiveness and improvement.

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7e. Incident Investigation

PURPOSE:

- To find out reasons behind the incident, fixing of responsibility for the incident and taking action to prevent recurrence of incidents.

SCOPE:

Applicable to all activities of B.I.O.M, Kirandul Complex within the purview of the Mines Act, 1952.

RESPONSIBILITY:

Mines Manager, Safety Officer and HODs

PROCEDURE

Immediate Action

- In case of any incident resulting in injury, first aid shall be given to the injured person by a first-aid trained person available at site. If person is required to be shifted to Project Hospital for treatment, then information shall be given to the Project Hospital by the concerned Shift In-charge. In addition, information shall be given to the Section In charge by the concerned Shift In-charge.
- Because of injury, if any person is required to be shifted to Project Hospital, then it shall be the responsibility of concerned Shift In charge to ensure that the injured person is immediately taken to the Project Hospital by Ambulance/available conveyance.
- Shift In-Charge /Section In-charge shall prepare Injury on Duty (IOD) report, which shall be sent to Project hospital. Particulars of injury received by the person shall be entered in the IOD report by the Doctor attending the injured person. After this entry, one copy of IOD report shall be sent to T,S&E Department and one copy to the Mines Manager by Project Hospital.
- Shift In-charge shall record such cases in Accident/Near Miss Report, either in Hard Copy form or in Electronic Form.

Incident reporting

- Every individual (Including contractors) who is witness to any unsafe condition/ near-miss incident/accident shall report the same to the concerned Site In charge/ Shift In-charge.

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- Shift In-Charge Shall report the same to Section In-Charge and who in turn shall report the same to the concerned HOD, Safety Officer and Mines Manager.
- Safety Officer shall also inform about the incident to the Mines Manager.
- Information about accidents to the Agent shall be given by the Mines Manager as well as Safety Officer.

Investigation

- The Safety Officer/Mines Manager of Mine shall inspect accident site immediately upon receiving the information. In case of incident resulting in fatality / serious injury, the place of incident shall not be disturbed unless such disturbance or alteration is necessary to prevent any further incident, to remove bodies of the deceased or to rescue any person from danger or discontinuance of work at the place of accident would seriously impede the working of the mine. Provided that where the Chief Inspector or the concerned DGMS official fails to inspect the place of incident within 72 hours of the time of accident, work may be resumed at the site of the accident.
- The Surveyor shall make a plan or photograph of incident site, if required. The details of the injured person shall be collected by the Safety Officer and shall be informed to the Mines Manager. The Manager in-turn will communicate to all the concerned authorities(DGMS) and also to ISO,HO(Internal Safety Organisation, Head Office)
- Safety Officer shall conduct detailed enquiry into the cause and circumstances leading to the incident and submit the Enquiry Report to the Mines Manager. Workmen's Inspectors shall be associated with during the enquiry process. Enquiry report shall be sent to statutory bodies as stipulated in notice of accident related legal provisions.

Near-Miss Investigation

- In this case, initial investigation / information gathering shall be done by Section In charge in association with workmen / representative of workmen and it will be documented in Near miss register. Inspection by Safety Officer or any other person will be done as per the requirement. Details about incident shall be submitted by the concerned Section In-charge/HOD to the Safety officer in the specified format. Near miss cases along with

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preventive measures shall be discussed in Pit Safety Committee Meeting and shall also be recorded in the minutes of the meeting.

Investigation of Incidents resulting in Injury

- Safety Officer shall commence investigation of incident with the statement of witnesses and prepare the enquiry report to identify the cause and circumstances leading to the incident. Workmen inspector (s) and other officials whose expertise is needed shall be associated in the enquiry process. The detailed enquiry report shall be submitted to the Mines Manager.
- Based on the recommendations, the Mines Manager shall identify officer(s) to implement the corrective and/or preventive action with a specified time schedule. The investigation and report submission should be completed at the earliest.
- Information about accidents shall be sent to the authorities/Government Agencies concerned and within the time frame stipulated in the applicable statutory provisions pertaining to mine.
- Mines Manager shall also send a report to corporate office about the occurrence of serious/fatal injury.
- On implementation of corrective and preventive action, the Mines Manager shall review its adequacy and effectiveness. The Safety Officer shall maintain all the records.

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8. Applicable Legal and Other requirements

PURPOSE

To have a system to

- Identify and assess applicable legal requirements.
- Communication of applicable legal requirements to all concerned.
- Timely update Legal Compliance Register/Register of Regulations (ROR).

SCOPE

Applicable to all activities of B.I.O.M, Kirandul Complex which are within the purview of the Mines Act, 1952.

RESPONSIBILITY

- Mines Manager for ensuring overall compliance.
- Safety Officer for updating and informing changes in existing legal requirement pertaining to Safety of persons employed in the mine.
- OHS Physician for updating and informing changes in existing legal requirement pertaining to health of persons employed in the mine.
- All persons employed in the mine, including visitors, shall comply with applicable legal requirements.

PROCEDURE

- Refer legislations published in Government websites which are applicable to B.I.O.M, Kirandul Complex and identify list of Rules & Regulations applicable to B.I.O.M, Kirandul Complex.
- Consolidate the list of applicable regulatory requirements in the form of a "**ROR-Register of Regulation**" as applicable to the operation at B.I.O.M, Kirandul Complex, NMDC Limited. It should be maintained as
 - Updated sheet
 - List of all applicable Legislation covering Occupational Health & Safety
 - List of obligations & responsibilities, comprising the following:
 - Prescribed standards, responsible person and compliance status

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- As and when the issue of amendments comes to the notice, the relevant document shall be procured, analyzed, needs shall be identified and action would be initiated. In case of any change / new legislation, ROR will be updated and actions needed shall be discussed with the top Management of the mine. Necessary communication shall be made to the all Department which need to comply with change(s).
- Applicable Main Legal Documents:-
 1. The Mines Act,1952
 2. The Metalliferous Mines Regulation,1961
 3. The Mines Rules,1955
 4. The Mines Vocational Training Rules,1966
 5. The CEA(Measures relating to safety & electric supply)Regulation 2010
 6. DGMS Circulars
 7. Recommendations of National Conference on Safety in Mines.

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9. Objective, Targets and Programmes

PURPOSE

To formulate Objective and targets based on the identified control plans of Departmental Hazard Identification and Risk Assessment Document.

SCOPE

Applicable to all activities of B.I.O.M, Kirandul Complex which are within the purview of the Mines Act, 1952 .

RESPONSIBILITY

Objectives of Departments are framed by concerned HODs as per the control plan.

PROCEDURE

- Based on the identified Control Plans, objectives and targets in the form of Work Plans shall be prepared and shall be given a unique identification number.
- All the objectives and their status are to be monitored on monthly basis at Departmental level and on quarterly basis at the mine level.
- Work plans can be both generic and Department specific. They are time bound and achievable.
- Possibility of elimination and / or reduction of risk shall be considered at the first place. Wherever eliminating / reduction is not possible, steps shall be initiated to control risks to an acceptable level, i.e Low Risk Scores (Risk Score value less than or equal to 20).
- The organization considers technological advancement and modification for processes to necessitate the above goal.
- Each work plan shall be a documented record, which shall indicate responsibility along with a defined time line for completion of tasks mentioned in the work plan.
- Actual date of completion of tasks mentioned in the work plan along with reasons for deviation from the planned time line shall also be a part of work plan.
- On completion of a Work plan, it shall be submitted for approval by the Mines Manager, who may accept the work completion or suggest for further necessary changes.

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- On approval of the work plan completion, completion date is to be recorded in the HIRA document.
- New Hazard analysis shall be incorporated as and when required depending on change in process or introduction of new machinery.

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10. Performance monitoring & measurement/ Analysis of data

PURPOSE

- Monitor all activities that can have significant safety risks
- Monitor Departmental objectives and targets, which includes Operational Control Procedures and Work Plans.
- Periodic evaluation of activity wise risk control measures in place and compliance of the same and to take appropriate remedial actions as per requirement.

SCOPE

Applicable to all activities of B.I.O.M, Kirandul Complex which are within the purview of the Mines Act, 1952.

RESPONSIBILITY

Mines Manager, HODs, Pit In charges, Engineer In-Charges, Assistant Managers, Engineers & Supervisors.

PROCEDURE

Continual and periodic monitoring of required control measures as mentioned in HIRA Document shall be carried out as mentioned below:-

- For an activity, any deviation noticed in control measures shall be immediately communicated to the responsible persons so as to follow the control measures.
- Analysis of near miss cases and accidents keeping in view the mechanism and control measures mentioned in the HIRA Document and to identify any revision/changes required to be made in the HIRA Document. Identified changes required to be made shall be informed to the Mines Manager and changes shall be made upon receipt of approval from Mines Manager.
- Whenever any safety related non-compliance/ violation is pointed out by Statutory Bodies or during the safety audit, identified hazards, mechanism and control measures mentioned in the HIRA Document shall be reviewed to identify if any revision/changes required to be made in the HIRA Document. Identified changes safety be incorporated in HIRA Document with the approval of the Mines Manager.

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- To establish and maintain procedures for periodic monitoring of Control Plans to assess actual progress made vis-à-vis the time line set in the control plan.
- Different monitoring mechanisms are as follows:
 - Pit Safety Meeting.
 - Inspection carried out and recorded by supervising officials
 - Workmen Inspector's Inspection Report
 - Medical Examination report of employees
 - DGMS Inspection Report
 - Internal Safety Audit Reports
- Performance measurement:
 - Safety indices calculated as per DGMS guidelines
 - Near miss and Accident Cases
 - DGMS Violation reports
 - Safety Audit Reports
 - Control measures noncompliance records
 - Progress of Control Plans
 - Medical Examination reports.
 - Dust, Noise and Vibration Monitoring Reports

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11. Safety Management Plan Audit

PURPOSE:

To measure the effectiveness of implementation of Safety Management Plan. Audit shall be done by persons/ agency not associated with framing and implementation of Safety Management Plan in the mine.

SCOPE:

Formulation and implementation of Safety Management Plan including control plan and all other supporting Documents

RESPONSIBILITY: H.O. ISO

PROCEDURE:

- Audit shall be conducted after all control measures mentioned in the approved SMP Document are implemented as per the Control Plan and associated Work Plan.
- Information about the above shall be given to the H.O. ISO by the Safety Officer.
- H.O. ISO shall constitute an appropriate team for this purpose. If required, help of external agencies can also be taken.

During audit, amongst other things Auditors shall:-

- Check the Safety Management plan and see if all hazards and associated risks are properly addressed.
- Implementation of all required control measures
- Control Plans and Work Plans prepared related to implementation of control measures
- Check efficiency of control measures.
- Check awareness about the Safety Management Plan.
- Observations, if any, raised by the audit team are to be justifiably addressed by the Mine Management within a stipulated time frame and then re-audit shall be done.

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Reviewed by	Name- Vinay Kumar	Designation- GM (Prodn.)/Mines Manager



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- If on completion of the re-audit, the audit team is satisfied that all observations have been adequately addressed, then one cycle of audit shall be deemed to be completed. The same shall be certified in writing by the audit team affixing signature with date.
- All audited document will be carefully preserved for future reference.
- After completion of first cycle, risks because of hazards identified during first cycle should be effectively controlled.

OUT COME OF AUDIT-

- Actual time taken for implementation of control measures vis-à-vis the time mentioned in the approved control plan.
- Shortcomings in identification of hazards, risk and risk control measures
- Responsibilities for implementation of control measures are properly addressed or not
- Effectiveness of implementation of control measures
- Impact of Safety Management Plan on improvement of Safety Standards
- Generate inputs for review of Safety Management Plan after completion of audit

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Reviewed by	Name- Vinay Kumar	Designation- GM (Prodn.)/Mines Manager

12. Safety Management Plan Review

PURPOSE:

Improvement in existing Safety Management Plan based on the findings of previous audit cycle of Safety Management Plan and identifications of new activities or new hazards for already identified activities which can lead to accidents and injuries at work place, assessment of risks and framing of control measures.

SCOPE:

Continual improvement in Safety Management Plan to eliminate and/or control risks associated with mining activities at B.I.O.M, Kirandul Complex

RESPONSIBILITY:

Agent, Mines Manager and HODs

PROCEDURE

Planning

- Safety Management Plan review meeting shall be conducted after completion of each stage of Safety Management Plan Audit.
- Mines Manager prepares the agenda for Safety management review meeting and the following inputs shall be provided by various functions as indicated below.

Review Inputs	Input by
Observations made by Audit Team during the audit process	Safety Officer, Mines Manager
Introduction of any new machinery or work process	Concerned HODs
New Activities or Hazards identified, which are not mentioned in the existing HIRA Document	Concerned HODs
Required Control Measures and resources required, if any	Concerned HODs
Any specific points related to medical examination reports of persons employed in the mine	OHS Physician
Status of Preventive & Corrective Actions	All HODS

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Review Inputs	Input by
Changes that could affect the Health & Safety performance	Safety Officer, All HODs & Mines manager
Recommendations for Improvement	All HODS
Legal compliance	Safety officer, ALL HODs & Mines manager
Hazards & risk assessment	All HODs
Training Aneed identification & effectiveness review	Training Officer

Review Output

- The output of Safety Management review meetings is in the form of minutes prepared and maintained by Mines Manager and circulated to all relevant Departments and functions. The output focuses on decisions and actions related to:
 - Last audit findings of the Safety Management Plan
 - Any new machinery or process introduced, if any and required control measures including review and revision of HIRA.
 - Safety indicators and continual improvement of the effectiveness of the Health & Safety performance.
 - Any changes in legal requirements related to health and safety of persons employed in the mine

Mines Manager shall ensure that the Safety Management Review meeting is conducted as per the procedure prescribed in Procedure for Management review.

Prepared by	Name- Satyabrat Rath	Designation- AGM(Min.)
Checked by	Name- B. Venkateswarlu	Designation- GM (Min.)/Safety Officer
Reviewed by	Name- Vinay Kumar	Designation- GM (Prodn.)/Mines Manager