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BMC-HSE-SAF-SOP-0007 MANAGEMENT OF CHANGE

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❖ Change History

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❖ Definitions and Abbreviations

Word / Phrase / Abbreviation	Definition
PEME	PEME is an acronym used in Black Mountain Mining and has the following meaning: - People, - Equipment, - Materials, - Environment, The use of this in written documentation helps to comply with Resources Clause 7 – ISO 9001, ISO 14001 and ISO 45001. It is advisable to include in all written documentation.
Shall	Indicates a requirement (s) and is **compulsory** to comply with
BMM	Black Mountain Mine
HSE	Health, Safety and Environment
Change	Refers to changes to the organization, operations, activities, equipment, and the sustainability management or materials which could induce sustainability risk
Change Request	A request to initiate change
Management of Change (MOC)	The term "management of change" refers to the process of managing changes to existing facility design, operations, or activities in a way that will not introduce new hazards or increase the risk of existing hazards.
HOD	Head of Department
Stakeholders	Internal departments/sections/business partners/contractors/sub-contractors
RA	Risk assessment
Hazard Identification and Risk Assessment (HIRA)	A risk assessment conducted using the HIRA method
Workplace Risk Assessment and Control (WRAC)	A risk assessment conducted using the WRAC method
HIRA Team	A group of persons with sufficient knowledge regarding the process or activity as proposed in the MOC to assess hazards and risks
Implementation Team	A task team appointed by management for the implementation of change.

Word / Phrase / Abbreviation	Definition
HAZOP	Hazard & Operability study
P&ID	Piping and instrumentation diagram
PSSR	Pre-Start-up Safety Review
OEM Manual	Respective manuals of each original equipment manufacturer as applicable to their components
VSF MS 07	Vedanta Sustainability Framework Management Standard 07

1. Purpose

To introduce a Standard Operating Procedure (SOP) to guide how changes within BMM are managed. This is to ensure that HSE and sustainability performance is not impacted while effectively managing risks associated with temporary, kaizen, and permanent changes. More specifically, the MOC SOP shall ensure the below steps are considered before any change or proposed change:

- Impact of change on HSE.
- Documenting of all changes, communication, and training to all affected stakeholders.
- Authorization requirements for proposed change.
- Necessary time for change.

2. Scope

This SOP summarizes how the BMM site complies with the MOC requirements for changes as outlined in VSF MS.07. Complying with this SOP is mandatory, and applicable to all BMM business units, contractor business partners, sub-contracted business partners working at BMM.

3. SOP Flow Summary

The following flowchart displays an overview of this SOP coupled with a brief description for each section.

Figure 1: SOP Overview

3.1 Roles, Responsibilities & Authorities

Compliance with this SOP is ensured by assigning roles and responsibilities thereby empowering assignees to execute the role activities as discussed in Section 4 with the appropriate authority to enforce accountability.

3.2 Management of Change Process

Applying a risk-based approach, Section 5 describes the procedure wherein responsible assignees shall in a controlled manner, fulfill the requirements of the MOC process.

3.3 Hazard Identification

Given the emphasis on a risk-based approach, Section 6 highlights the importance of identifying & mitigating risks associated with proposed changes.

3.4 Documentation & Document Control

Section 7 emphasizes the importance of accompanying documentation to fulfill MOC requirements.

3.5 Status Reporting

Drawing attention to the importance of monitoring any changes and the consequent impacts thereof Section 8, places focus on improvements and risks associated with changes.

4. Roles, Responsibilities & Authorities

The below list of employees has been empowered with specific roles to execute the role activities in accordance with the MOC requirements. Consequently, these assignees shall enforce a structured approach to navigating transitions effectively thereby ensuring successful adoption and integration within the section where changes take place.

4.1 Change Initiator

The change initiator recognizes the need for change and initiates the Kaizen or MOC process. He/she prepares the change proposal, adds the change plans, implementation plans, and other required details to the level as required by this procedure for review, evaluation, and approval. Additionally, the change initiator shall comply with the following.

- Ensure relevant documentation is completed with appropriate approval, this shall include and not be limited to the description of the change, the reason for the change, benefits from the change, required changes to existing documentation, etc.
- Ensure change risk assessment is conducted for an approved MOC proposal before implementation and incorporate the recommendations in the final change.
- Circulate the proposed change request to the change management administrator and HOD of affected departments for review and comments.

4.2 Change Management Administrator (CM Admin)

A CM Admin will be identified by each Departmental Head to execute the below role activities.

- Initiate the MOC process and maintain the central docket system.
- Provide MOC & Kaizen reference numbers to change initiators.
- Ensure compliance with the change management requirements of BU’s.
- Train their departmental team about the requirements of this procedure.
- Maintain a list of approved MOCs per department.
- Validate action completion status before closure of change project.
- Maintain a risk register applicable to all approved MOC’s.

- Produce a written proposal for initial approval.
- Ensure that the key people are involved at the right times.
- He /she will function as an overall custodian of the PSSR documentation.

4.3 Change Owner

Typically, this employee is the change approver for the proposed change unless otherwise delegated. The below activities fall within the scope of the change owner.

- Accountable for leading the change project (change proposal) after approval until it is implemented and closed.
- Coordinate with relevant departments for execution of the change proposal.
- Monitor the implementation of the change.
- Ensure operating discipline during change project execution.
- Ensure training and communication to affected personnel through existing communication channels such as meetings, emails, toolbox talks, and training.
- Raise awareness of change which directly impacts affected personnel.
- Consult with the training department to ensure that skills gaps regarding the proposed change are identified and remedied before finalizing the change.
- Ensure absent employees are inducted and trained on all changes upon their return to work.
- Ensure a change management handover is provided to affected personnel.
- Ensure that the change was implemented according to the implementation plan, and subsequently, verify that it is functioning as intended.
- Ensure PSSR is conducted before start-up.
- Assign action owners for actions generated as part of the implementation and PSSR of the change proposal.
- Ensure and verify closure of all recommendations.
- Obtain start-up authorization.
- Responsible for closing out the change proposal after implementation.
- Communication to affected business partners shall include HSE specifications applicable to change, equipment handover, required training, OEM, other operational documents and manuals, clarification of roles and responsibilities, business partner engagement during start-up and/or handover, and hazards.

4.4 Change Approver

An authority matrix namely the Delegation of Authority (DOA) matrix coupled with the 5X5 risk matrix in Appendix C should be used as a tool to identify the employees who will be assigned as the change approver for both Kaizens & MOCs to:

- Assess and approve/reject the proposed change request, and forward it to the CM admin.
- Assign change owners to change projects.
- Ensure all personnel involved in the MOC process are trained and competent to conduct applicable risk assessments.

Table 1: Delegation of Authority MATRIX

Change Management Delegation of Authority		IMPACT RATING				
		Very Low	Low	Medium	High	Extreme
IMPACT SCOPE	Team	CU Supervisor	CU Supervisor	DL Supervisor	DU Manager	Head of Department
	Section	DL Supervisor	DL Supervisor	DU Manager	Head of Department	Head of Department
	Department	DU Manager	DU Manager	Head of Department	Head of Department	Change Management Review Team
	Business Unit	Head of Department	Head of Department	Head of Department	Change Management Review Team	Change Management Review Team

Table 1 above provides an impact/risk rating which will indicate the authorization level required for the change before implementation.

4.5 Change Management Review Team

The objective of a change management review team is to assess and approve/reject the effects and impacts associated with the proposed change, when such a change:

- Impacts the business.
- Poses high to extreme risk.

Determined on a case-by-case basis & constituted by the CM Admin, the management review team will have as members:

- Senior Managers, Head of Department where the change is implemented, who will also chair the team.
- Personnel from operational departments including, but not limited to sustainability/HSE, maintenance/engineering, facilities, etc.
- One additional Head of Department not directly involved in the change requested.
- Technical Experts as requested by the chair.

5. Management of Change Process

Identified or proposed changes coupled with their impact need to be evaluated, using a risk-based approach thereby ensuring changes are planned and implemented in a controlled manner. Identified changes are classified as either a MOC requiring full compliance with the MOC process described in this SOP or a Kaizen change discussed in Section 5.4. Compliance with this section should be adhered to in combination with the process flow in Appendix A.

5.1 Change Triggers

Constant throughout the lifetime of the BMM site, triggers are known to affect change. Reasons for change are termed triggers. Once these triggers for change are identified, the MOC process should be initiated. As a minimum, the following triggers will initiate the MOC process.

Table 2: Trigger Examples

Trigger	Example
Personnel, including Business Partners	Changes to organizational structures and staffing, including the hiring of Business Partners and staff handover. Changes in working conditions.
Operational activities/processes and equipment	Any modification, adjustment, or alteration to operational equipment and processes. Changes in workplace locations and surroundings. System software, network, or database changes e.g., SCADA, PLC, etc. Procurement of new equipment (different) Capital Projects (upgrades). Process parameters and interlocks. Changes to services and processes. Changes to plant and equipment. Developments in knowledge and technology. Changes in knowledge or information about known hazards and associated risks. Vehicles, TMM etc
Established processes, procedures, relevant documentation, and management systems	Any modification, adjustment, or alteration to management systems. Changes to legal requirements and other requirements. Changes to the system of working including COPs/SOPs/WI where there are significant HSE risks involved.
Products and materials	Procurement of any new materials, equipment, or products that is not standard on the mine. Changes relating to new products, materials, changes to existing products.

5.2 Exclusions From MOC Process

Several triggers for change do not warrant compliance with the entire MOC procedure and may be excluded. Changes that may be excluded from the site MOC procedure are:

- Kaizen changes (see Section 5.4 for description).
- Replacement of an identical item, usually during routine maintenance. It is a direct like-for-like replacement.
- Short-term, temporary bypass/suppression of interlocks, alarms, or other safety systems and devices (such as fire protection facilities, fire & gas detection systems, life-safety systems, etc., only for maintenance or troubleshooting purposes. Such changes shall be managed by a separate system of administrative controls, either by permit or procedure.
- Minor software changes, the change of which does not cause the process to operate outside of the defined SOC & SOP. These minor software changes include but are not limited to tuning changes of process controllers, the addition of reports or logs, the addition of trends and/or tags for storing historical data, the addition or modification of calculations (informational data), addition of maintenance points, timer changes, a step in the evolutionary development design, a modified work method to achieve the design intent, a variation to a contract to complete work that is within the scope of the project, a change to a procedure to accommodate circumstances that are isolated or happen rarely, any other activity/change which is either a part of established operating procedures or governed by a different procedure. However, these minor changes are required to be tagged and communicated to operations personnel. In the event wherein a change creates a hazard and associated risk, these shall be indicated in a risk assessment.
- Larger projects or modifications, usually where designated and executed by a project function.

5.3 Change Duration Classification

Once triggered, the MOC process should apply equally to both emergency, temporary, and permanent changes. This classification should be displayed on the change request and proposal document.

5.3.1 Emergency Changes

An emergency MOC is a change that must be immediately performed due to unforeseen circumstances arising that have a negative impact on imminent health, safety, or environment. Moreover, these changes are required to correct a hazardous condition that is considered an immediate threat to the safety, environment, and health of stakeholders. Consequently, the section manager/engineer shall immediately:

- Conduct a basic risk evaluation, completed in full and signed off.
- Complete a change request form and conduct an impact assessment.
- Implement measures to monitor changes until complete MOC can formally be addressed.

5.3.2 Temporary Changes

In the event of temporary changes, the process must ensure that a clear time limit for the validity of the change is defined. After this time, the change should be carefully reviewed and either granted an extension, managed as a permanent change, or reverted to its original condition.

5.3.3 Permanent Changes

A change that continues with the lifetime of the facility and upon close out becomes part of the existing facility.

5.4 Change Type Classification

Changes are classified as either a Kaizen change or one wherein the MOC process is triggered, the latter of which will be discussed further in Section 5.6.

A Kaizen change is defined as, any minor change that has minimal impact on other departments and does not cause the process to operate outside of the defined Standard Operating Conditions (SOCs) or Standard Operating Procedures (SOPs). Moreover, the impact of Kaizen changes should prompt only minor health risks, minimal environmental harm, no disruptions of operations, and no breaches of law whilst not encouraging public concern. Shown in Appendix C, the 5X5 Risk Matrix should be used as a pre-requisite to identify Kaizen changes, applicable to only low-impact ratings.

This is not a trigger to initiate an MOC process, however, the 5X5 Risk Matrix and a risk assessment should accompany a Kaizen application given in Appendix B.

5.5 Personnel & Business Partner Changes

Section 5.1 lists personnel changes as a change trigger since the associated risks due to the absence of certain personnel should be managed. Consequently, a critical skills list should be generated using the 5X5 Risk Matrix to identify which positions have a significant impact on HSE. Thereafter, changes to these identified critical positions shall trigger the MOC process. The below incomplete list will be considered for personnel MOC's.

- New appointments & transfer of personnel, business partners & contractors.
- Requirement for an increase in personnel KCA (Knowledge Capability Application).
- Requirement for substitution/enhancement of a business partner/supplier with an impact on HSE.
- Risks associated with ergonomics such as physical effort, posture, and load handling. This might include an Occupational Risk Exposure Profile (OREP).
- Impact on the use of PPE.

Furthermore, all personnel & business partner changes shall be referred to senior management and Human Resources to implement the change process.

5.6 Components of MOC Process

An overview of the five major components which make up the MOC process is shown and described below. Each component shall be complied with once an MOC process is triggered.

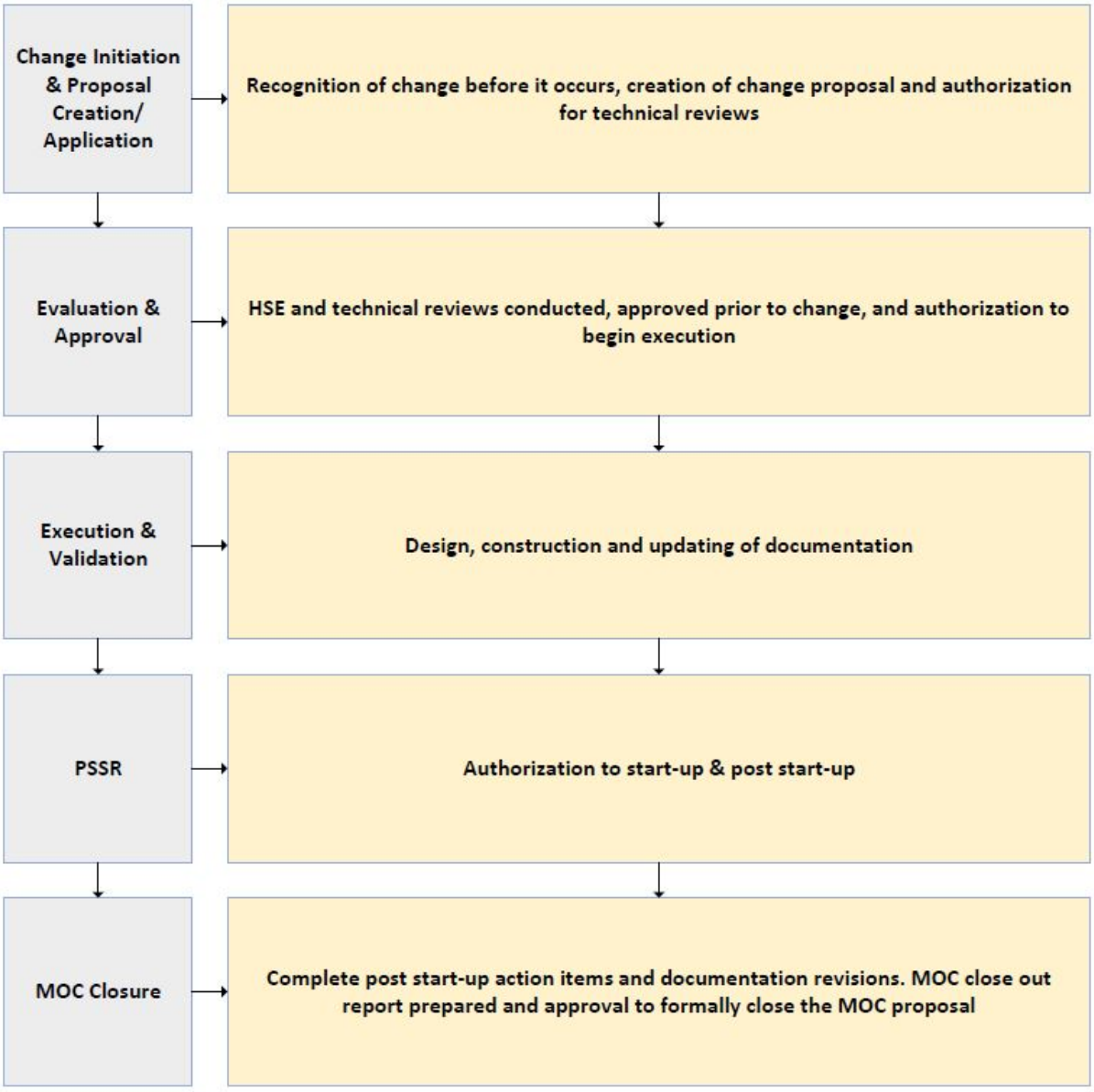


Figure 2: Components of the MOC process

5.6.1 Change Initiation & Proposal Creation/Application

This step defines the initial stages of the MOC process up to and including authorization that the change has been accepted to be processed. When the proposal is made and before submitting, a risk assessment and supporting documents as needed shall accompany the change request & proposal document. The change initiator will complete the change request & impact assessment documents BMC-HSE-SAF-FRM-0031a Process Change Evaluation Form, BMC-HSE-SAF-FRM-0031b Process Change Application

Form and BMC-HSE-SAF-FRM-0118 Change Impact Assessment Form respectively and submit them to the CM admin who shall assign a unique MOC number to it.

5.6.2 Evaluation & Approval

Once assigning a unique MOC no to the change request, the CM admin will log the change into an MOC register, to track changes, progress, and approvals to provide a historical record. Thereafter, the change request coupled with supporting documentation (examples of supporting documentation can be found in Section 7.2) shall be reviewed in a change review meeting hosting all applicable departments including HSE personnel prior to implementation. Thereafter, the approver and applicable departments as indicated in the change review meeting will consolidate their comments and provide feedback to both the CM admin and change initiator. Should a change be declined, the CM admin shall record the change as declined in the MOC register. Alternatively, upon approval of the change request, the change approver will assign a change owner to the change proposal.

5.6.3 Execution & Validation

Post approval, the change request is redesignated as a Change Project. Once authorized for implementation, the change owner shall follow established site procedures/practices to execute the change project while maintaining a change of scope/design protocols during the execution phase. This includes but is not limited to:

5.6.3.1 Execution

- Routing the final change proposal to relevant departments (Engineering, Procurement, Construction, etc.), as applicable.
- Develop a finalised project plan, resource plan, and final cost estimates.
- Obtaining the necessary approvals including final project team and project budget, as required.
- Manage project execution against a plan by tracking and following up with the action owners to complete the requirements of the change project, including closure of balance recommendations from the change project review.
- Maintain adequate supervision and over-inspection to ensure safe and efficient execution of the change project.

5.6.3.2 Validation

- Re-evaluating risk assessment against intended changes.
- Re-evaluating project execution plan, resource plan, and project budget.
- Re-evaluation of project financials.

- Maintain proper records with regards to the change projects, including any updates on any drawings, specification sheets, etc. as required for the change project.
- Provide regular feedback to the change approver with regard to progress made against the project execution plan and project budget.
- Expenditures above 10% of the approved project budget must be submitted for approval to the change approver.

5.6.4 Pre-start-up Safety Review (PSSR)

Start-up is defined as turn-over to operations for normal operation of the equipment or process. No hazardous materials or conditions shall be introduced before start-up. The purpose of PSSR is to ensure that all relevant risk elements have been appropriately addressed during the execution of the change. Consequently, the project, changed process, and equipment shall be established to be safe before commissioning. Fulfilling the requirements of the PSSR are included but not limited to that listed below.

- A PSSR shall be conducted before the start-up of the change project.
- The change owner shall be responsible for ensuring that PSSR is conducted for the change project before start-up.
- The requirement for field inspection may be waived off by the site PSSR leader/ administrator for those changes where there are no physical changes such as introducing new feedstock changes, changes in operating procedure, software changes, etc.
- The PSSR team shall verify that all the pre-start-up requirements identified in the change proposal are completed to the satisfaction of the PSSR team.
- All the pre-start recommendations of PSSR must be completed by action owners before start-up.
- Change owner shall track and follow up for compliance with pre-start recommendations.
- Only once the PSSR team is satisfied that all safety requirements have been met, an authorization may be granted for a start-up.

Moreover, the PSSR will as a minimum include the following where applicable: P&ID checking, creating a punch list which shall be cleared before the request to start-up authorization is made, mechanical completion, pre-commissioning, cold commissioning, hot commissioning which may require initial operation to adjust, tweak and/or optimize. On completion of the PSSR, a formal handover from the project team to the change owner with all relevant documentation shall be conducted.

5.6.4.1 Start-up authorization

- After completion of all pre-start-up requirements (including PSSR if applicable), the change owner shall request authorization from the change approver prior to commissioning/starting up the change request/proposal.
- Some changes are large or complex enough to require a staged start-up (some equipment is pieced into operation, while the remaining equipment is still being installed).
- Partial start-up authorization will be requested and authorized in the same way. It will be documented that this is a partial start-up.
- For such changes, the change owner may request a PSSR for part of an authorized change project with proper justifications.
- The PSSR leader/administrator should critically review such requests to ensure that the facilities proposed for PSSR are completed in all aspects and all relevant change management elements have been appropriately addressed.
- The process is repeated until the complete change project is in operation.
- After the change project start-up (complete/partial), the change owner shall communicate the same to the CM admin to record the start-up date in the MOC register.
- All new or modified equipment, plant, and buildings shall be inspected pre-commissioning, pre-acceptance, and pre-use. These inspections shall be conducted by the HSE department and operational control users.

5.6.4.2 Post-Start-up change project closure

- The post-start-up recommendations shall be monitored for closure.
- The change owner is responsible for verifying that post-start-up recommendations are closed effectively before the closure of the change project.
- The record of approved change(s), if any, is maintained.

5.6.5 MOC Closure

All change projects require closure. After the implementation of the change, it is the responsibility of the change owner to track and follow up with action owners to ensure all the following items (as applicable) are completed, verified for compliance, and documented in the change project file and ISOMETRIX before a change project can be closed:

- Each item on the change proposal/request checked/recorded as being required must be verified as being complete/in place.

- All relevant documents such as as-built drawings, process overviews/process electrical classifications drawings, etc. have been updated as part of the official records to reflect the changes.
- All relevant standard practices and operating/maintenance procedures requirements are updated/completed.
- All training and communications requirements are completed.
- Existing mechanical integrity and/or quality assurance programs, computerized maintenance management systems (such as SAP, ISOMETRIX), lubrication or vibration management programs, equipment files, spare parts lists, inspection programs, or fixed asset accounts, etc., were updated/modified because of the change.
- Equipment tagged properly.
- After implementation of the change and post-stabilization of the unit (if applicable), sufficient data may be collected to estimate the change and study the impact of the change on plant, personnel, and the environment.
- After the implementation of the change, review of the risk assessment conducted for change request/proposal control measures for its adequacy. If required, repeat risk assessment may be called for before closing out of the change. Action items arising out of repeat risk assessment must be closed before the closure of the change project.
- The change owner shall prepare the close-out report based on these data and observations.
- The change owner shall complete the change project closure report and submit it to the change approver for authorization. The complete change project documentation (Original Hard Copy) should also be handed over to the CM admin along with the change project closure request.
- The CM admin shall review the change project closure request and conduct validations, as required or deemed to be necessary to ensure completion of the change project closure action item.
- After ensuring that all the requirements for the change have been satisfied, the CM admin will endorse the change project closing request.
- Upon endorsement, the change approver may authorize the closure of the change project. The CM admin to update the MOC register to mark the completion of the change proposal while the change owner closes the MOC request on ISOMETRIX.
- The Engineering department shall ensure that maintenance plans are being compiled to accommodate changes.

6. Hazard Identification

As previously noted, every identified change and its impact shall be evaluated using a risk-based approach since the MOC process has been developed to prioritize the HSE needs of the end user. It should be noted that the risk assessment component is central to the entire MOC process thereby ensuring that all consequences associated with changes are fully understood, with all risks appropriately managed. Since changes can result in added risks and opportunities to compound existing risks, the below shall be complied with.

- Changes in knowledge or information about hazards and OH&S risks shall be identified, communicated, and concluded with an updated baseline risk assessment.
- BMM shall review the consequences of unintended changes, taking action to mitigate any adverse effects, as necessary.
- Hazard identification and risk assessment shall be performed for each change request.
- All changes shall be assessed to include risk control measures suitable for the proposed/authorized change.

6.1 Hazard Identification & Risk Assessment (HIRA) Team

The Department Manager/Senior Manager/Change Approver will assign a team to conduct a HIRA for changes. Therefore, the team will be responsible to:

- Ensure that all relevant HIRAs are carried out prior to final approval of the change request. The BMM risk methodology shall be followed.
- The HIRA Team shall ensure that HSE document control receives all final HIRA documentation after implementation.
- All primary hazards and associated risks shall be identified before the change.
- Contractors and or business partners shall follow a similar process and avail BMM of their HIRA methodology and associated documentation.
- In the absence of a HIRA Methodology, all stakeholders shall be required to follow the BMM HIRA methodology.
- The review process shall include a higher level of risk assessments or studies (HAZOP, FMEA, ESIA, etc), as required, to understand the impacts associated with the change and relevant controls.

6.2 Types of Change Risk Assessments

The type of risk assessment process to be used for a change under consideration should be identified before evaluating risks. It is common to identify various levels or types of risk assessment to be used in the MOC process, appropriate to the size and/or significance of the proposed change. An incomplete list of risk assessments can be found in Table 3.

Table 3: Change Risk Assessments

Hazard & Operability (HAZOP) study	Design and construction-related requirements
Safety risk assessment	Management or organizational requirements
Environment risk assessment	Recordkeeping and documentation management requirements
Occupational health and ergonomics risk assessment	Training and communication requirements for affected personnel
Competency/skills risk assessment	Business partner requirements
Carbon emissions impact	Changes in roles, responsibilities, and accountability
Change the risk management plan.	Special analysis required, maintenance and inspection requirements
Statutory clearances required	

7. Documentation & Document Control

Once a change project is commissioned, all documentation associated with the change should be uploaded to ISOMETRIX and signed off. This is considered a formal handover to the affected team. ISOMETRIX should be used to register, track, and manage all changes that trigger the MOC or Kaizen process. Moreover, no unauthorized changes can be made to any approved document and only valid versions shall be used. Upon close out of a change, authorisers shall ensure that the below list is complied with.

- Initial change request is available at document control on ISOMETRIX and the safety department.
- Authorized change requests with original signatures are available on ISOMETRIX and at the safety department.
- Final documentation relating to the change request is available on ISOMETRIX and at the safety department including completed HIRA documentation, proof of communication regarding the implemented change, etc.
- All relevant codes of practices/SOP etc shall be updated to the next version.
- SOPs shall be drawn up for all new plant, equipment, and or products.
- Document controller(s) to keep old documents and records on record for 3 years.

7.1 Distribution & Access

- Distribution will be electronic by means of accessing the relevant procedures folder on the shared drive coupled with uploading all MOC documents into ISOMETRIX.
- All printed copies will be considered uncontrolled documents.
- All employees will have read access.

7.2 Supporting Documents

The required supporting documents as needed by the change request, include as applicable but not limited to the following.

- Drawings, as applicable, such as sketches, mark-up diagrams, Piping & Instrumentation Diagrams, Process Flow Diagrams, etc.
- Risk assessments.
- Construction of new plant/facilities shall require as-build-drawings, approved, and signed off.
- OEM Manuals.
- Critical Equipment Inventory sheets.
- Material Safety Data Sheets (MSDS)
- Control Logic Diagrams
- Revised operating or maintenance procedures etc.
- List of requirements or tasks required to implement the change proposal successfully and completely.
- Change request and impact assessment.
- Proposal documentation.
- PSSR.
- Legal appointments, signed handover takeover records, joining announcements, curriculum vitae for personnel changes. It should be noted, that given the sensitive nature of personnel change documentation, copies thereof will only be kept on record by the human resources department.
- Evidence of communication and training.
- SOPs.

8. Status Reporting

The performance and health of the MOC system described in this SOP should be evaluated by subjecting the process to periodic audits. This will ensure that the system is used as intended. Meanwhile, any changes should be periodically monitored and assessed, assisted by Key Performance Indicators (KPIs) which describe any risks, improvements, and expectations and will provide the necessary data to determine whether a change was successful. The health of the system can be measured using the below indicators.

- Number of changes raised in the reviewed period.
- Number of emergency and temporary changes.
- Number of closed changes.

- Number of overdue actions.
- Number of incidents and near misses due to changes.
- Operational checklists.
- VFLs, PTOs, Complaints
- Health impact reporting.
- Incident investigations.

All incidents, including near misses involving risks related to any MOC or Kaizen process, shall be reported and investigated, the outcome of which shall be communicated to stakeholders. Moreover, each event relating to non-compliance and/or complications with the implemented change shall trigger a corrective action by the manager responsible for the area.

9. Validity and Document Management

9.1 Document Validity

This SOP is effective from 2019/10/08 and was last reviewed on 10-12-2024. This SOP will be reviewed every 2 Years.

9.2 Document Management

9.2.1 This SOP replaces any other SOP issued earlier by BMM to the extent specifically covered here. This SOP should be followed in letter and spirit.

9.2.2 BMM is committed to continuously reviewing and updating policies and procedures, based on the Entity's risk assessment and shall incorporate for any regulatory requirement which is required to do so.

9.2.3 Any amendment to this SOP or issue of any guidance or circular etc. under this procedure must be approved in writing by the approving authority as listed in this document.

9.2.4 BMM reserves the right to withdraw, modify or revise the SOP as a whole / partial without providing any justification for the same. On revision, it should be duly communicated to the personnel involved.

9.2.5 If compliance with this SOP ever conflicts with the applicable law, regulation, directives issued by the statutory and or regulatory authority, then compliance must be ensured with the law.

9.2.6 In order to ensure compliance or to address any known conflicts with the law or to address any specific local requirements, BMM may adopt local sub-procedures which shall be by way of addendum to this SOP and which shall be approved by the approver of this SOP. Proposing of such addendum shall be the responsibility of the respective Entity’s competent authority who is at an equivalent level with the SOP owner as set out in this document.

9.3 Violation of Sop

9.3.1 BMM follow a “Zero Tolerance Policy” with respect to non-compliance with this SOP and/or any other SOP / guidance issued by BMM and its constituent Entities.

9.3.2 Violation of this SOP is subject to appropriate disciplinary actions which may include but not limited to termination of employment. This determination will be based on the facts and circumstances of each situation. Any accused of violation of this SOP will be given an opportunity to present their case prior to any determination of appropriate disciplinary actions. Violation of this SOP may also be subject to substantial civil damages, criminal fines and prison terms.

9.3.3 Each employee is responsible for ensuring that their conduct and the conduct of anyone reporting to them shall fully comply with this SOP. Compliances, both personal and by subordinates, will be a factor in periodic performance appraisals.

9.4 Disclaimer

9.4.1 This SOP issued by BMM is for internal compliance and does not create, nor shall it be construed to create, directly or implicitly, any rights, duties or obligations of BMM to any person, body or legal Entity.

9.4.2 This document and its contents are the copyright property of BMM. The release of this document to any third party outside BMM is strictly prohibited without prior consent.

10. Review and Approval

Content Owner(s)
Daniel Seragie (Metallurgist | BMM) TimeStamp: 2024/12/23 2:44:08 PM ||

Content Reviewer(s)
Tshilidzi Nemakhavhani (Metallurgical Manager | BMM) TimeStamp: 2025/01/09 12:33:24 PM || Mapheu Mawasha (Mining Manager | BMM) TimeStamp: 2025/01/17 3:06:16 PM || Marinus Hanekom (Engineering Manager | BMM) TimeStamp: 2025/01/22 7:27:51 AM || Hein Pienaar (Principal: Asset Optimisation (Centre of Excellence) • Business Excellence) TimeStamp: 2025/01/23 12:04:16 PM || Catharina Kotze (Head of HSE | BMM) TimeStamp: 2025/01/23 12:20:54 PM ||

Content Approver(s)
Luctor Roode (General Manager | BMM) TimeStamp: 2025/02/17 10:48:05 AM ||

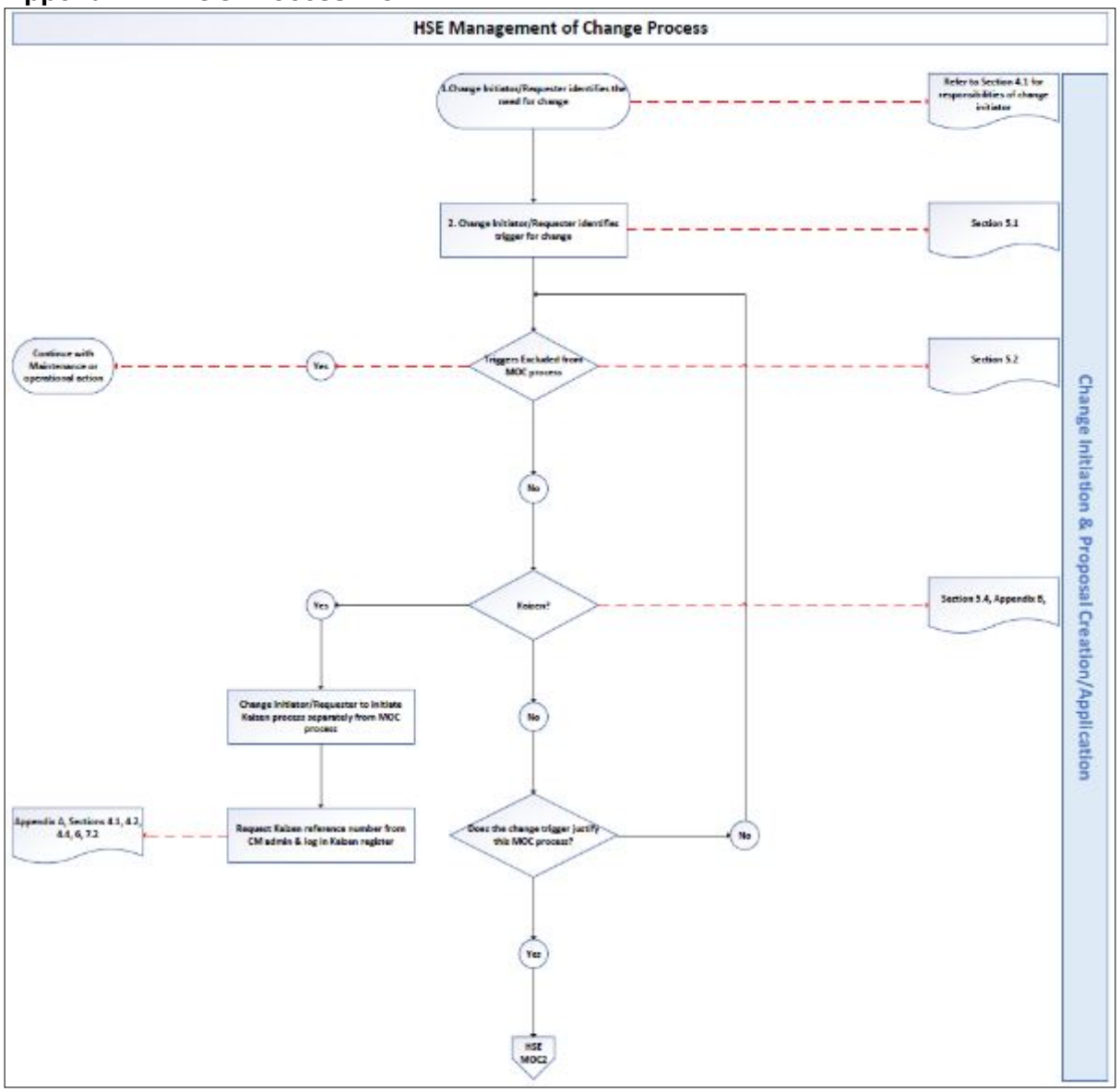
This document was approved (in sequence) by the individuals above using electronic approval in our Document Control System.

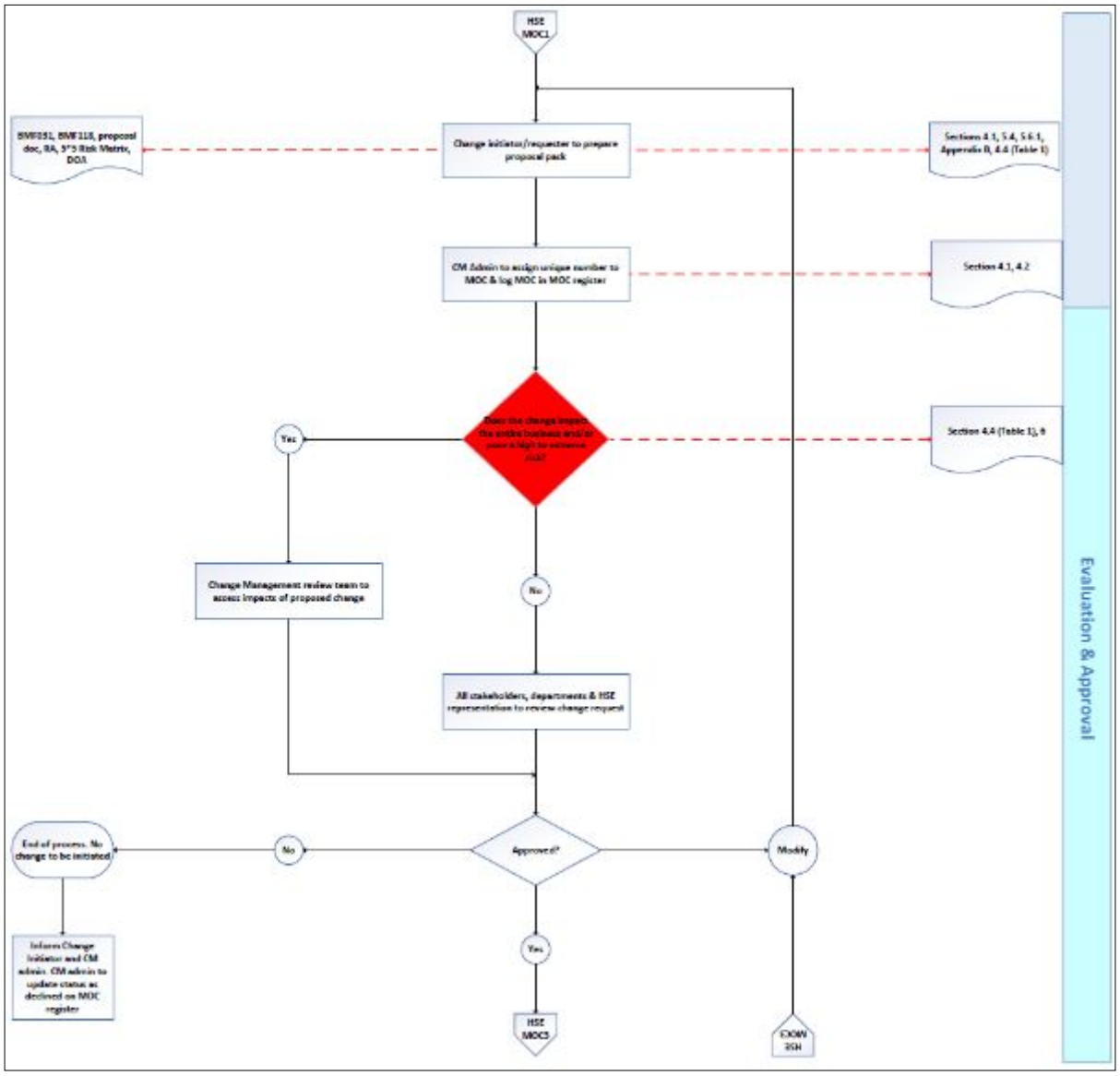
Final approval status: Approved

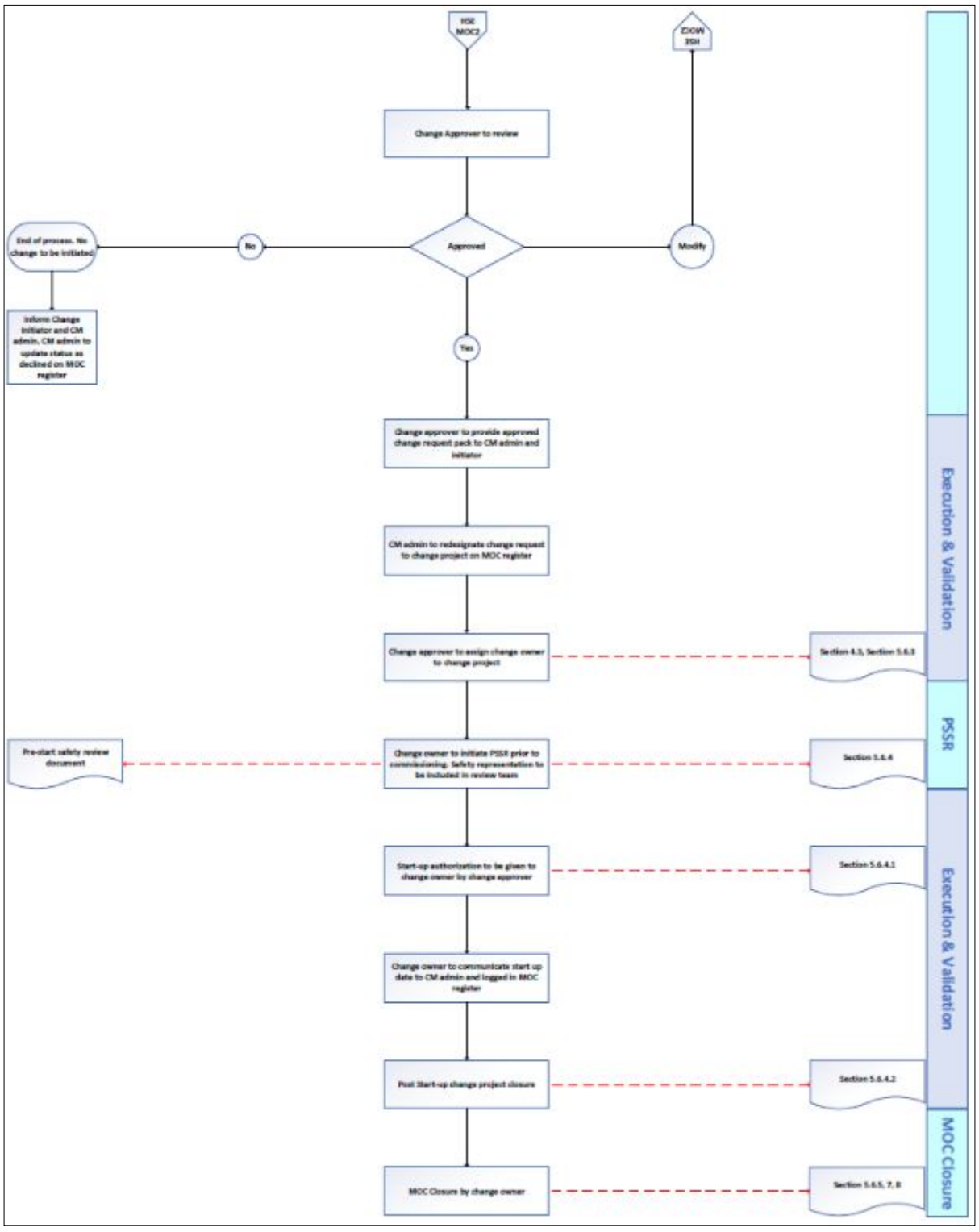
Approvals were done electronically.

❖ Annexures / Appendix

Appendix A: MOC Process Flow




HSE MOC1
BMF151, BMF118, proposal doc, RA, 5*5 Risk Matrix, DOA
Change initiator/requester to prepare proposal pack
Sections 4.1, 5.4, 5.6.1, Appendix B, 4.6 (Table 1)
CM Admin to assign unique number to MOC & log MOC in MOC register
Section 4.1, 4.2
Does the change impact the entire business and/ or pose a high to extreme risk?
Section 4.4 (Table 1), 9
Yes
No
Change Management review team to assess impacts of proposed change
All stakeholders, departments & HSE representation to review change request
Approved?
No
Modify
End of process. No change to be initiated
Inform Change Initiator and CM admin. CM admin to update status as declined on MOC register
Yes
HSE MOC3
EXCOM RSH
Evaluation & Approval


HSE MOC2
Change Approver to review
End of process. No change to be initiated
No
Approved
Modify
Inform Change Initiator and CM admin. CM admin to update status as declined on MOC register
Yes
Change approver to provide approved change request pack to CM admin and initiator
CM admin to redesignate change request to change project on MOC register
Change approver to assign change owner to change project
Section 4.3, Section 5.6.3
Pre-start safety review document
Change owner to initiate PSSR prior to commissioning. Safety representation to be included in review team
Section 5.6.4
Start-up authorization to be given to change owner by change approver
Section 5.6.4.1
Change owner to communicate start up date to CM admin and logged in MOC register
Post Start-up change project closure
Section 5.6.4.2
MOC Closure by change owner
Section 5.6.5, 7, 8
Execution & Validation
PSSR
Execution & Validation
MOC Closure

Appendix B: Kaizen Report

Reference #: Date:

Kaizen Report

Subject	Process / Project

Area / Location	Department / Division

Initial Condition (What was the problem?)	Solution Description (What was implemented, changed or improved?)

Before (Include pictures, diagrams, etc.)	After (Include pictures, diagrams, etc.)

Benefits Category				Benefits Description (e.g. results, cost benefit analysis, cost savings etc.)
	Quality		Safety / Health	
	Cost		Environment / Energy	
	Delivery		Customer responsiveness	
	Efficiency		Morale	
	Waste		Other	

Change Initiator	Contact Details	Approved By	Contact Details

Team Members (Who was involved?)

Implementation Date	Date of Completion	Remarks

Appendix C: 5X5 Risk Matrix

Blackmountain Mine and Gamsberg Operations Risk Matrix			Hazard Effect / Consequence (Where an event has more than one 'Loss Type', choose the 'Consequence' with the highest rating)				
Loss Type (Additional 'Loss Types' may exist for an event; identify & rate accordingly)			1 Insignificant	2 Minor	3 Moderate	4 Major	5 Catastrophic
(S/H) Harm to People (Safety / Health)			First aid case / Exposure to minor health risk	Medical treatment case / Exposure to major health risk	Lost time injury / Reversible impact on health	Single fatality or loss of quality of life / Irreversible impact on health	Multiple fatalities / Impact on health ultimately fatal
(E) Environmental Impact			Minimal environmental harm L1 Incident	Material environmental harm L2 Incident remediable short term	Serious environmental harm L2 Incident remediable within LOM	Major environmental harm L2 Incident remediable post LOM	Extreme environmental harm L3 Incident irreversible
(B/HD) Business Interruption / Material Damage & Other Consequential Losses			No disruption to operation US$20k to US$100k	Brief disruption to operation / US$100k to US$1.0M	Partial shutdown / US$1.0M to US$10.0M	Partial loss of operation /US$10M to US$75.0M	Substantial or total loss of operation >US$75.0M
(L&R) Legal & Regulatory			Low level legal issue	Minor legal issue; non compliance and breaches of the law	Serious breach of law; investigation/report to authority, prosecution and/or moderate penalty possible	Major breach of the law; considerable prosecution and penalties	Very considerable penalties & prosecutions. Multiple law suits & jail terms
(R/S/C) Impact on Reputation / Social / Community			Slight impact - public awareness may exist but no public concern	Limited impact - local public concern	Considerable impact - regional public concern	National impact - national public concern	International impact - international public attention
Likelihood		Examples (Consider near-hits as well as actual events)	Likelihood → Consequence ↓	Methodology note: Determine the Risk Rating (no multiplication required) Steps: 1) Determine Likelihood 2) Determine Consequence 3) Crossing point where they meet indicates the risk rating			
5	(Almost Certain)	The unwanted event has occurred frequently; occurs in order of one or more times per year & is likely to reoccur within 1 year	11 (M)	16 (H)	20 (H)	23 (Ex)	25 (Ex)
4	(Likely)	The unwanted event has occurred infrequently; occurs in order of less than once per year & is likely to reoccur within 5 years	7 (M)	12 (M)	17 (H)	21 (Ex)	24 (Ex)
3	(Possible)	The unwanted event has happened in the business at some time; or could happen within 10 years	4 (L)	8 (M)	13 (H)	18 (H)	22 (Ex)
2	(Unlikely)	The unwanted event has happened in the business at some time; or could happen within 20 years	2 (L)	5 (L)	9 (M)	14 (H)	19 (H)
1	(Rare)	The unwanted event has never been known to occur in the business; or it is highly unlikely that it will occur within 20 years	1 (L)	3 (L)	6 (M)	10 (M)	15 (H)
Risk Rating		Risk Level	Guidelines for Risk Rating interpretation to determine suitable risk treatment options				
21 to 25		(Ex) – Extreme	Avoid	Implement specific action plans/procedures to manage & monitor		Reference(s)	
12 to 20		(H) – High	Transfer / Share	Pro-actively manage		ISO 31000-2018	
6 to 12		(M) – Medium	Mitigate / Separate	Actively manage			
1 to 5		(L) – Low	Accept	Monitor & manage as appropriate			
NOTE:		More specific risk identification ,evaluation and risk control protocols might be applicable to Occupational Health and Hygiene, ensure to refer to the specific risk matrix for use					

Appendix D: BMC-HSE-SAF-FRM-0031a Process Change Evaluation Form

Black Mountain Mining (Pty) Ltd
PROCESS CHANGE EVALUATION FORM
BMC-HSE-HAF-FRM-0031a

Systematic Evaluation and Identification of Potential Areas Requiring Change Administration.

Change Title:

Department: **Section:**

Originator: (Surname & Initials) (Designation)

Evaluation Monitor For detail regarding Change Effect / Impact "GoTo" Below	Change will have an effect on Operations - YES:	
	Change will have an effect on Ops - UNKNOWN / UNCERTAIN:	
	Change will have an effect on Ops - NO:	15
	Total Areas Evaluated /15:	15
	All Areas are Covered (Evaluated) (OK / ERROR): All Areas must be evaluated to ensure a comprehensive assessment. "ERROR" indicates that all areas were not covered and must be rectified.	OK
	Should any Areas reflect a "Yes" or "Unknown", then the Process Change System must be implemented.	Not Required

GoTo Change Administration Definitions (For more detail regarding below)

	Area	Does the change: Use RH Column Y N U for Yes, No & Unknown / Uncertain respectively.	(Y N U)
1	Systems	Produce conflict with a regulation or current standard.	N
2		Add new Operational Maintenance Procedures or modification to existing Procedures.	N
3		Affect Alarms or Critical Control Systems.	N
4		Affect existing Inspections or Communications.	N
5		Impact on Critical Item Inventories because of High Risk Activities.	N
6		Modification to Emergency Plans.	N
7		Significantly alter Technical Plans and/or Specifications.	N
8	People	Affect risks relating to Ergonomics - Physical Effort, Posture, Load Handling.	N
9		Impact on the use of PPE.	N
10		Require an increase in Personnel KCA (Knowledge Capability Application).	N
11		Require Personnel increase / decrease / relocation.	N
12		Require substitution / enhancement of Contractor / Supplier with an impact on SHE.	N
13	Equip & Mat	Cause interferences or interphases with other Equipment or Operations.	N
14	Environ	Generate a variation in Waste Emission.	N
15		Involve a variation in the types or quantity of hazardous substances.	N
		Total:	15

Comments.

Signature Originator **Date**

BMC-HSE-SAF-FRM-0031a Process Change Evaluation Form Ref: 2024/12/05 09:51 Sensitivity: Internal (C3) 1 / 1

Appendix E: BMC-HSE-SAF-FRM-0031b Process Change Application Form

Black Mountain Mine (PTY) LTD
CHANGE ADMINISTRATION FORM

BMC-HSE-SAF-FRM-0031b

NB: All red check boxes must be completed. **All Check Boxes Completed.**

Change Title:

Department:

Section:

Originator: **Name** **Designation**

1. CHANGE DATA.

1.1 Description of Change.

1.2 Reasons for Change.

1.3 Origin of the Change.

Legals		Operational		Facilities	
SOP's / POL's		Projects		Organisation	
Other					

(Specify) Redundancy/replacement

1.4 Duration of the Change.

Permanent / Temporary | If Temporary - End Date:

1.5 Change Scope.

Company		Department/s		Section/s	
Site/s		People		Environment	
Other					

(Specify)

2. RISK EVALUATION RELATING TO THE CHANGE.

List and attach the applicable HIRA/SWP's and any other Risk Assessment Tools applied in the Process.

Black Mountain Mine (PTY) LTD
CHANGE ADMINISTRATION FORM

BMC-HSE-SAF-FRM-0031b

3. DOCUMENTATION RELATED TO CARRYING OUT THE WORK.
Specify the Risk Control Tools that must be emplaced before carrying out the work.

Legals (External Permits)		Pre- Use Checklists	
Work Permits		Hazardous Substance Control Sheet	
Safe Work Practice		Supplier User Manual	
Other (Specify)			

4. DOCUMENTATION ATTACHED re THE RISKS THAT THE CHANGE INCORPORATES.
Proof of Comprehensive Process Implementation and Closure.

HIRA / SWP		Budget Considerations	
SOP		Test Data	
Eng Plans / Specs		Training / Communication	

Other Relevant Documentation:
(Specify)

5. ROLE PLAYER INPUT.
Involvement and Consultative Process with all relevant Role Players / End Users closed off.

SPAGGED **(YES / NO)**

6. START UP.
Verification of Fulfillment of Activities

6.1	Approval Levels - Initiation of Change	
6.2	AEP's in Place (Approvals Exemptions Permissions	
6.3	Control Measures (Safety Occupational Health Environment)	
6.4	End-User Involvement (SPAGGED)	
6.5	Training / Fulfillment	
6.6	Documentation Emplaced	

6.7 Comments:

7. PROPOSAL, APPROVAL AND SANCTION.
Originator - Custodian - Approval HOD - Sanction General Manager

Name	Designation	Signature	Date

8. COMMENTS.

Finis

BMC-HSE-SAF-FRM-0031b Process Change Application Form Ref: 2024/12/05 09:55
Sensitivity: Internal (C3)

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Appendix F: BMC-HSE-SAF-FRM-0118 Change Impact Assessment Form

Black Mountain Mining (Pty) Ltd
CHANGE IMPACT ASSESSMENT FORM

BMC-HSE-SAF-FRM-0118

NB: Change Impact Calulation: Use this document either manually or electronically to calculate the Change Request Impact Rating.

Issue	Rating		Rating Guide	Raw Score	Weight	Adjusted Score
1. Legal Implications	Treat all issues with legal implications as "Major" Change Requests (CR's).			An Automatic Major CR		
	Raw Scores					
	L	1	< R 20 000			
2. Cost Implications	M	5	< R 50 000		20%	
	H	10	> R 50 000			
	L	1	Limiting some operational functionality < 12 hrs.			
3. Production Impact	M	5	Significantly limit some operational effectiveness for 12 - 24 hrs.		30%	
	H	10	Result in no production of ≥ 24 hrs.			
4.	L	1	Minimal environmental harm - L1 incident.			
Environment Issue	M	5	Serious environmental harm - L2 incident remedial within LOM.		10%	
	H	10	Extreme environmental harm - L3 irriversible incident.			
	L	1	First Aid Case / Exposure to Minor Health Risk.			
5. Safety Issue	M	5	Lost Time Injury / Reversible Impact on Health.		30%	
	H	10	Multiple Fatalities / Impact on Health ultimately fatal.			
	L	1	First Aid Case / Exposure to Minor Health Risk.			
6. Health Issue	M	5	Lost Time Injury / Reversible Impact on Health.		10%	
	H	10	Multiple Fatalities / Impact on Health ultimately fatal.			

TOTAL SCORE (Rounded Up): ☐

Total Rating is < 5 (less): (Minor Change) Only the Section Head Authorisation Required.
Total Rating is > 5 (= or more): (MAJOR CHANGE) Department Head Authorisation Required.

CR Impact Assessment Ref: _____

Attach the completed Assessment Sheet to the BMF 031 Process Change Management Form

Fin

BMC-HSE-SAF-FRM-0118 Change Impact Assessment Form

Doc ID: 2024/12/05 10:00
Sensitivity: Internal (C3)

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Appendix G: BMC-HSE-SAF-FRM-0001 Pre-Startup Safety Review Checklist

BMC-HSE-SAF-CHL-0001
Pre-Startup Safety Review Checklist

BMM PSSR Report

INSPECTION DATE	
DEPARTMENT/ AREA	
PROJECT TITLE	
PROCESS/ EQUIPMENT	

APPROVAL BY PSSR TEAM

The PSSR team concludes that the equipment / processes are safe to start-up after completion of recommendations/ actions required before start-up.

PSSR Team Member Name	Department	Signature

ACTION-ITEMS TO BE COMPLETED BEFORE START-UP:

S.N.	Action	Responsible	Target Date / Signature of responsible person

Sensitivity: Internal (C3)

BMC-HSE-SAF-CHL-0001

Pre-Startup Safety Review Checklist

(Add more rows as required)

START UP AUTHORISED BY:

(Operations Head / Engg. Head Name):	Signature / Date

NOT TO BE SIGNED UNTIL THE ABOVE ACTION ITEMS ARE COMPLETED

ACTION-ITEMS THAT CAN BE COMPLETED AFTER START-UP:

Ref. No (Ref. clause from PSSR checklist)	Actions	Responsible	Target Date/ Signature of responsible person

BMM Check list for Pre-Startup Safety Review

This checklist is presented in the form of questions. It is required to check [√] the appropriate box while answering these questions. Any checks in boxes with an asterisk (*) should be addressed through appropriate recommendations.

It is emphasized that this is not an all-inclusive listing but should serve to stimulate additional questions and actions.

A. SAFETY & HEALTH

	1.1 General Safety	NO	YES	N/A	Remarks (If 'No' is ticked [√])
1.1.1	Have ALL personnel, (Operations, Maintenance, Technical, and Supervision), received adequate and appropriate training on the process /equipment?				
1.1.2	Has adequate and appropriate PPE (Personal Protective Equipment) been specified and provided?				
1.1.3	Have measures been taken adequately to guard dangerous part of the equipment? (360 deg. Machine Guarding)				
1.1.4	Has sufficient provision been made for the electrical and/or mechanical isolation of the equipment? (LOTO)				
1.1.5	Are points of isolation clearly marked/labeled and readily accessible?				
1.1.6	Have bump/trip hazards been identified and all sharp edges removed?				
1.1.7	Has proper guarding, handrails/barriers, been provided to prevent falls?				

BMC-HSE-SAF-CHL-0001

Pre-Startup Safety Review Checklist

1.1.8	Have all hot/cold surfaces been adequately guarded to prevent burns?				
1.1.9	Are Safety Showers and Eye Wash facilities provided and adequate?				
1.1.10	Has Lighting / Lux Survey has been carried out? Has sufficient lighting been provided as per survey recommendations so that operation, servicing, maintenance, and repair of the facility can be carried out safely?				
1.1.11	Are display systems for providing operational instructions, safety warnings and emergency information provided and positioned so that they are clearly visible and easily read?				
1.1.12	Are all required statutory licenses, consents, and approvals in place?				
1.1.13	Is housekeeping as per acceptable standard?				
	1.2 Machinery Safety	**NO**	**YES**	**N/A**	**Remarks (If 'No' is ti √]**
1.2.1	Has the machinery been installed so that it will be stable andsecure during operation?				
1.2.2	Has all access to dangerous moving parts, (or danger zones created by moving equipment) been prevented by the provision of the correct guards, interlocks and/or fencing?				
1.2.3	Have the correct safety measures been taken to prevent any risk from hot/cold surfaces, ejection of material, failure of parts and their ejection, overheating/fire?				
1.2.4	Has safe access been provided to those parts of the machinery that require operator access for operation, adjustment, service, maintenance, or repair, i.e., elimination of slip, trip, trap, crush, entanglement, fall, bump and cut hazards?				
1.2.5	Is the machinery provided with the properly identified START/STOP and EMERGENCY controls that are positioned for safe operation without hesitation, or loss of time, and without ambiguity?				
1.2.6	Is the machinery provided with a clearly identified means tosecurely isolate it from ALL energy sources?				
	1.3 Ergonomics	**NO**	**YES**	**N/A**	**Remarks (If 'No' is ti √]**
1.3.1	Has the workstation, workplace, or equipment, been constructed so that the need for stooping, bending, stretching, over-reacting, and working over-head during operation has been eliminated, or reduced, to the minimum?				
1.3.2	Has the need to lift, carry, push, or pull, heavy loads, or parts,been eliminated as far as possible?				
1.3.3	Are all display screens, dials, START/STOP/EMERGENCY buttons positioned so that they are easily seen and accessible by those who will operate the equipment, or machine?				
1.3.4	Have Visual Display Screens been positioned so that interference from glare is reduced to the minimum?				
1.3.5	Has the workstation been designed and equipped so that a comfortable position can be adopted by the operator? i.e., able to stand, or change position and sit upright, angle at elbows and knees 90 deg., feet on floor.				

Sensitivity: Internal (C3)

BMC-HSE-SAF-CHL-0001
Pre-Startup Safety Review Checklist

1.3.6	Does the operation of the equipment does not increase the risk of UpperLimb Disorder, e.g., repetitive tasks, handling of loads,machine paced work, and prolonged operation?				
	1.4 Occupational Health	**NO**	**YES**	**N/A**	**Remarks (If 'No' is ticked [√])**
1.4.1	Have all health risks due to liquids, dusts, mists vapors or gases, used by, contained in, or emitted by the process/ equipment been assessed, and where necessary, eliminated or adequately controlled?				
1.4.2	Has adequate Personal Protective Equipment (PPE) and/or Respiratory Protective Equipment (RPE) been specified in the Operating Procedures?				
1.4.3	Has the need for an Occupational Health Monitoring Program been assessed?				
1.4.4	Have Operating Procedures been reviewed to take into account any additional "hazards to health" which may arise from operation or maintenance of this equipment?				
1.4.5	Has adequate Local Exhaust Ventilation (LEV) been installed, tested, balanced, and entered on an Inspection (PM) Schedule?				
1.4.6	Have adequate inspection/cleaning ports been provided onall ductworks?				
1.4.7	Are relief facilities directed to a safe place away from the workplace?				
1.4.8	Has a Noise Survey been considered, and a Noise Compliance Plan prepared, if required?				
1.4.9	Has all pipe work, tanks, etc., containing hazardous materialsbeen adequately labeled?				
1.4.10	Are medical facilities available with competent medical personnel and are adequately stocked?				

B. PROCESS SAFETY MANAGEMENT

	2.1 Process Technology (PT)	**NO**	**YES**	**N/A**	**Remarks (If 'No' is ticked [√])**
2.1.1	Are up to date material safety data sheets available?				
2.1.2	Have the hazardous effects of inadvertent mixing of different materials including waste streams been considered (i.e., hasa chemical interaction matrix been prepared/updated)?				
2.1.3	Has the process design basis (e.g., Standard OperatingConditions) been documented /updated?				
2.1.4	Has the equipment design basis (e.g., Design specification/P&ID) been documented /updated?				
	2.2 Process Hazards Analysis (PHA)	**NO**	**YES**	**N/A**	**Remarks (If 'No' is ticked [√])**
2.2.1	Have project PHAs been approved, and a final project safetyreport been prepared?				
2.2.2	Are all action items, deemed necessary by the PHA team forstart-up, complete?				
2.2.3	Has the facility been approved as "Safe to Operate" by thePHA team?				
	2.3 Management of Change – Technology / Facilities	**NO**	**YES**	**N/A**	**Remarks (If 'No' is ticked [√])**

Sensitivity: Internal (C3)

BMC-HSE-SAF-CHL-0001

Pre-Startup Safety Review Checklist

2.3.1	Has a management of change (MOC) – technology/facilitiessite procedure been approved?				
2.3.2	Are all action items, arising from the MOC, that were deemednecessary for start-up, complete?				
2.3.3	Have all changes made during construction/modificationbeen recorded and authorized?				
	2.4 Quality Assurance (consult with personnel who havequalification responsibilities)	**NO**	**YES**	**N/A**	**Remarks (If 'No' is ticked [√])**
2.4.1	Have checks and inspections been made to ensure that critical equipment is installed properly and is consistent withdesign specifications and vendor's recommendations?				
2.4.2	Have quality assurance inspection reports, covering fabrication, assembly, and installation, been completed as per theproject's qualification plan and reports filed with the equipment design basis documentation?				
2.4.3	The PSSR team should agree on, and field check specificitems: (a) Does the construction meet the design specifications? (b) Does the construction match the drawings?				
	2.5 Mechanical Integrity	**NO**	**YES**	**N/A**	**Remarks (If 'No' is ticked [√])**
2.5.1	Have maintenance procedures been approved and issued?				
2.5.2	Have maintenance personnel been trained?				
2.5.3	Have inspections and tests (including regulatory requirements) for the following equipment been included in preventive maintenance schedule (i.e., added to the SAP System)?				
	• Pressure vessels and storage tanks				
	• Pressure relief systems, vent systems, and devices				
	• Critical controls, interlocks, alarms, and instruments				
	• Emergency devices, including shutdown systems andisolation systems				
	• Fire protection equipment				
	• Piping systems in critical service				
	• Electrical grounding and bonding				
	• Emergency alarm and communication system				
	• Monitoring devices and sensors				
	• Pumps				
	• Lifting equipment				
	• Other identified PSM critical equipment (if any)				
2.5.4	Is the equipment inspected by an internal/external agencyand certificates are available? (E.g., lifting equipment test certificates, pressure systems regulations, etc.).				
2.5.5	Have all commissioning tests or inspections been identified?(e.g., pressure or leak tests)				
	2.6 Operating Procedures & Safe Work Practices	**NO**	**YES**	**N/A**	**Remarks (If 'No' is ticked [√])**
2.6.1	Have operating procedures been prepared/updated and approved?				

Sensitivity: Internal (C3)

BMC-HSE-SAF-CHL-0001

Pre-Startup Safety Review Checklist

2.6.2	Have site procedures for safe work practices (e.g., Permit towork, LOTO, Work at Height, Confined space entry etc.) been prepared/updated and approved?				
2.7 Training and Performance		**NO**	**YES**	**N/A**	**Remarks (If 'No' is ticked [√])**
2.7.1	Has specific process (or job task) training been given to allpersonnel?				
2.7.2	Have initial/refresher training records been updated?				
2.8 Contractor Safety		**NO**	**YES**	**N/A**	**Remarks (If 'No' is ticked [√])**
2.8.2	Have all contract personnel been adequately trained in appropriate maintenance and operating activities?				
2.9 Interlocks and Alarms		**NO**	**YES**	**N/A**	**Remarks (If 'No' is ticked [√])**
2.9.1	Has the alarm/interlock been classified into safety (or) process interlocks and appropriate integrity levels are determined?				
2.9.2	Is the SOP for interlock/critical alarm testing been written andimplemented prior to this PSSR?				
2.9.3	Have all interlocks been checked to ensure that those actions, under all conceivable failure conditions, to be fail-safe?				
2.9.4	For alarms/interlocks with more than one software or hardware circuit, have all possible interlock routes beentested?				
2.9.5	Do you have an appropriate procedure to ensure that yoursoftware is protected? (E.g., routinely archived, key/password protected etc.).				
2.9.6	Has the software been properly documented and filed? (E.g.,logic drawings, schematics, sequence/batch descriptions).				
2.9.7	Has all software been properly validated and tested?				
2.9.8	Have you ensured that the equipment does not restart either on the resetting of a protective device such as an interlock or the re-establishment of power after an outage?				
2.9.9	Are all installation and / or any changes to the SCADA / DCS (Control Software) have been tested and verified by the operators as functional?				

C. ENVIRONMENT

3.0 ENVIRONMENT		**NO**	**YES**	**N/A**	**Remarks (If 'No' is ticked [√])**
3.1	Are all secondary containment/bundling facilities adequate?(Curb walls, Dykes etc.)				
3.2	Are all material storage facilities adequate and appropriatelylabeled?				
3.3	Have adequate arrangements been made, prior to start-up,for the identification, classification and safe disposal of all waste materials?				
3.4	Do Area Spill Procedures need to be developed / updated?				
3.5	Are relief vents/ facilities adequate and directed to an environmentally safe location?				
3.6	Have the Corporate Resource Conservation Guideline beenfollowed during the design stage of this project?				

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3.7	Have all waste streams been identified, quantified, analyzedand minimized?				
3.8	Is there a procedure for disposal of solid/liquid waste?				

D. EMERGENCY RESPONSE PLANNING

4.0 EMERGENCY RESPONSE PLANNING		NO	YES	N/A	Remarks (If 'No' is ticked [√])
4.1	Are all necessary Emergency warning signs, lights or otherdevices installed where necessary?				
4.2	Have all necessary precautions been taken to ensure that theequipment inspected is not a source of ignition to any flammable materials, irrespective of their source?				
4.3	Are fire protection facilities adequate, e.g., fire extinguishers, fire walls, sprinkler systems, Alarm Boxes, foam system etc., and have they been included on an Inspection Schedule?				
4.4	Are Emergency Escape Routes, including ladders, adequateand properly signposted?				
4.5	Is Emergency Lighting adequate & tested?				
4.6	Is sufficient Respiratory Protective Equipment, such as Escape Sets or Self-Contained Breathing Apparatus (SCBA)available?				
4.7	Have Emergency Procedures been prepared, and relevantpersonnel trained?				
4.8	Are assembly points / muster points clearly marked and appropriately selected?				

E. ELECTRICAL SAFETY

5.0 ELECTRICAL SAFETY		NO	YES	N/A	Remarks (If 'No' is ticked [√])
5.1	Have operations/areas been electrically classified?				
5.2	Has the equipment been properly installed and constructedto the company standards and local legislation and does it meet any special installation requirements noted on the manufacturer's certificate?				
5.3	Are all live parts adequately enclosed to prevent access?				
5.4	Do earthing/ grounding / bonding comply with local standards/legislation?				
5.5	Are MCCs and electrical isolation devices appropriately labeled?				
5.6	Have fuses or circuit breakers been provided which willautomatically disconnect the supply?				
5.7	Are first aid stations, single line drawings and PPE requirements available in MCC/PCC/Main Load Tension Panel (MLTP)/Sub stations as appropriate?				
5.8	Have all relevant documentation and drawings (e.g., P&IDs,SLD's, Schematics, equipment arrangement, I/O, logic, electrical classification and Panel Schedule drawings) beenupdated to reflect the current installation?				
5.9	Have all new Substation Breakers, MCC isolators, starters orother appropriate equipment been added on to the site inspection schedule?				
5.10	Have any electrical circuits, made redundant by thisinstallation, been properly removed?				

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5.11	Whether Lightening arrester circuit / connectivity is there or not.				

F. FIRE PROTECTION

6.0 FIRE PROTECTION		NO	YES	N/A	Remarks (If 'No' is ticked [√])
6.1	Does the site have a written emergency control plan that includes a list of the major workplace fire hazards, proper handling and storage procedures, potential ignition sources(such as welding, smoking and others), and the type of fire protection equipment or systems that can control a fire involving them?				
6.2	Are fire separations/ Fire walls identified and maintained properly to prevent fire spread including separations betweenoperations and storage areas?				
6.3	Does the site fire water supply have sufficient capacity to supply the design demand for the specified duration (one tofour hours – depending on the severity of the hazard)?				
6.4	Can the fire pumps deliver 100% of the maximum fire water demand at the required pressure for the largest credible fire expected to occur on the site?				
6.5	Have new sprinkler/foam systems been tested to ensure theymeet the Acceptance Requirements of NFPA 13/NFPA 16 and will all sprinkler systems be maintained in accordancewith NFPA 25?				
6.6	Are all the facilities that handle flammable liquids fully protected with water spray, foam, or other automatic suppression system that complies with a nationally recognized code or standard?				
6.7	Is Nomex or garments made from other flame-resistant fibersworn by personnel who work with flammable liquids?				
6.8	Is all portable fire extinguishing equipment located in properlocations along normal paths of travel, including exits from areas, and will this equipment be properly maintained per NFPA 10?				
6.9	Is there a site fire alarm system and are alarms perceivableand above ambient noise or light levels?				
6.10	Has the site established a site ERT and are all ERT members trained to a level of competency commensuratewith the duties members are expected to perform?				

G. OTHERS (For any additional requirement specific to Equipment)

7.0 OTHERS		NO	YES	N/A	Remarks (If 'No' is ticked [√])

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