Resources Safety & Health
Queensland

Consultation draft

Recognised Standard 02

Control of risk management practices

Version 2.0

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Resources Safety & Health Queensland

Coal Mining Safety and Health Act 1999

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Recognised standards

This document is issued in accordance with PART 5—RECOGNISED STANDARDS and Section 37(3) of the *Coal Mining Safety and Health Act 1999*.

PART 5 - RECOGNISED STANDARDS

71 Purpose of recognised standards

A standard may be made for safety and health (a "recognised standard") stating ways to achieve an acceptable level of risk to persons arising out of coal mining operations.

72 Recognised standards

(1) The Minister may make recognised standards.

(2) The Minister must notify the making of a recognised standard by gazette notice.

(3) The CEO must publish on a Queensland government website each recognised standard and any document applied, adopted or incorporated by the standard.

(4) In this section—

Queensland government website means a website with a URL that contains 'qld.gov.au', other than the website of a local government

73 Use of recognised standards in proceedings

A recognised standard is admissible in evidence in a proceeding if—

(a) the proceeding relates to a contravention of a safety and health obligation imposed on a person under part 3; and

(b) it is claimed that the person contravened the obligation by failing to achieve an acceptable level of risk; and

(c) the recognised standard is about achieving an acceptable level of risk.

PART 3 - SAFETY AND HEALTH OBLIGATIONS

37 How obligation can be discharged if regulation or recognised standard made

(3) …. if a recognised standard states a way or ways of achieving an acceptable level of risk, a person discharges the person's safety and health obligation in relation to the risk only by—

(a) adopting and following a stated way; or

(b) adopting and following another way that achieves a level of risk that is equal to or better than the acceptable level.

Where a part of a recognised standard or other normative document referred to therein conflicts with the *Coal Mining Safety and Health Act 1999* or the Coal Mining Safety and Health Regulation 2017, the Act or Regulation takes precedence.

This recognised standard is issued under the authority of the Minister for Resources.

[Gazetted dd month year]

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1. Purpose

This recognised standard states a way for a Site Senior Executive, (SSE) to develop and maintain a risk management system in accordance with the *Coal Mining Safety and Health Act 1999* (CMSHA) to ensure the risk from coal mining operations is at an acceptable level.

2. Scope

This recognised standard applies to risk management activities conducted as part of the development, implementation, application and review of the mine Safety and Health Management System (SHMS) required under CMSHA.

3. Application

This recognised standard applies to risk management systems used to manage hazards present at coal mines as defined under CMSHA that require the use of risk management activities to take place for the ongoing safe operation of a coal mine.

4. Risk management system

A coal mine's SHMS must provide for hazard analysis, risk identification, and risk assessment to develop effective risk controls. [1]

Each coal mine must develop a system that supports the integration of risk management into all relevant activities and functions that may impact the safety and health of persons.

The system should be customised to the coal mine and recognise that leadership and commitment are integral to the effectiveness of risk management.

The system must enable the appropriate risk management process to be integrated into the planning of work activities.

The risk management process is to describe how risk management activities will occur to support decision making, recognising there are different layers of risk management and different risk assessment tools and techniques required at a coal mine to support a comprehensive approach:

- **Layer 1 – Mine baseline / broad brush** – to understand the hazards that could impact the coal mine, identify the unwanted events. For example: Workplace Risk Assessment and Control (WRAC).
- **Layer 2 – Event / issue based** – to determine controls for unwanted events that underpin the SHMS. For example WRAC; Failure modes, effects, and criticality analysis (FMECA); Hazard and Operability Analysis (HAZOP); Bowtie.
- **Layer 3 – Task / process based** – to determine controls for routine / non routine tasks. For example, Job Safety Analysis (JSA), Job Risk Assessment (JRA).

[1] CMSH Regulation section 6 Basic elements

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- **Layer 4 – Conditions based** – for individuals to assess immediate work environment hazards and determine additional controls required or escalate as required. For example: Stop Look Assess and Manage (SLAM), Take 5.

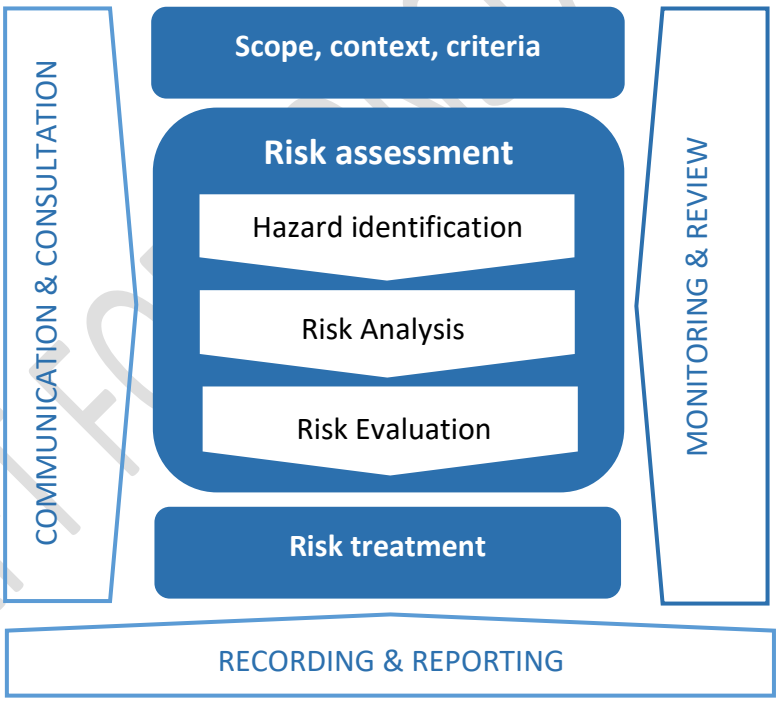
The risk management process must identify hazards that may affect the safety and health of persons from coal mining operations. This also requires the development of a management structure to control the principal and fatal hazards under the SHMS.

5. Risk management process

The risk management process developed for the coal mine should consider the model outlined in AS / ISO 31000:2018 (Refer Figure 1) or other industry-recognised process such as the risk management process model contained within *Risk Management, Leading Practice Sustainable Development Program for the Mining Industry.*

*Note: the model below identifies hazard identification in the place of risk identification to comply with CMSHA definitions for risk and hazard.

Figure 1 Risk management process



The risk management process should also consider critical control management as a way of providing additional governance over prioritised risks. Consideration should be given to the International Council on Mining and Metals' *Health and Safety Critical Control Management – Good Practice Guide* as an example.

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5.1. Scope, context, criteria

The risk management process must include context and scoping requirements including[2]:

- the objective of the risk assessment and what it is aiming to deliver or achieve
- identification of appropriate resources
- context of the coal mine site and mining activities
- identifying and understanding the potential hazards
- identifying specific inclusions and exclusions
- selecting the appropriate risk assessment tools / techniques considering how the risks will be analysed and assessed, the level of risk and risk treatment techniques including how reducing risk to within acceptable limits, and as low as reasonably achievable will be demonstrated.
- consideration of any external influences and impacts; and
- identification of any assumptions.

5.2. Risk assessment

The risk assessment component of the risk management process includes identification, analysis and evaluation as described in Figure 1: Risk management process.

The purpose of risk assessment is to understand the level of risk, to achieve this you need to:

- **identify the hazard:** identify and understand the hazards and identify the unwanted events.
- **analyse the risk:** analyse the nature and magnitude of consequences of the unwanted events and then the likelihood to determine the level of the risk.
- **evaluate the risk:** evaluate risk by comparing risk level to acceptance criteria to determine risk treatment method to use.
- **treat the risk:** determine the actions required to eliminate the risk or controls required to prevent or mitigate the unwanted event.
- **assess controls:** analyse the effectiveness of the controls against within acceptable limits, and as low as reasonably achievable[3].
- **select an appropriate and competent facilitator** (refer 6.2.1) along with appropriate participants (refer 6.2.2) and where relevant, subject matter expert/s (refer 6.2.3).

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[2] AS/NZS ISO 31000 Risk management- Principles and guidelines

[3] CMSHA section 29 What is an acceptable level of risk

5.2.1. Hazard identification

A key finding in the review of risk assessments has been the failure to effectively identify hazards in matters that are being analysed. The interchanging of *Hazard* and *Risk* is a common failing in most processes which is identifiable in the risk management process outlined in *AS / ISO 31000:2018* (Refer Figure 1) where the first step in the risk assessment process is identified as *Risk identification,* not Hazard identification.

Distinguishing between hazard and risk is identified as an issue in the *Handbook – Managing health-and safety-related risk SA/SNZ HB 205:2017.* This is clarified in section 3.1.2:

The word 'hazard' is commonly used in discussing safety-related risk. It can be interpreted narrowly as something which has the intrinsic potential to be harmful, often a source of hazardous energy, or it can be given a broader interpretation to include hazardous situations and activities.

Although the word hazard is often used with various meanings, the terms hazard and risk are not interchangeable. A hazard is something that exists. The associated risk is the uncertain effect on objectives that might arise because of the presence of a hazard.

The terms hazard and risk mean different things:

- A hazard is a thing or a situation with the potential to cause injury or illness to a person.
- Risk means the risk of injury or illness to a person arising out of a hazard. Risk is measured in terms of consequences and likelihood.

For clarity the identification of all reasonably foreseeable hazards must be effective to ensure that the analysis of hazardous situations and activities ensure that the risk within acceptable limits and is as low as reasonably achievable.

Identify the source of hazard or unwanted event. This step is to identify potential sources of energy and unwanted events that may lead to a high potential incident or accident.

There is tendency to move directly to risk identification after establishing context and scope.

Identify the hazards and the unwanted events. Hazard identification should include a range of techniques to identify actual and potential unwanted events that may include, but are not limited to:

- A review of historical events, including:
    - site, neighbouring sites, district, organisational and industry past accidents, and incidents.
    - accident and hazard databases.
    - historical reports including - safety notices, and audit findings.

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    - Other reports of past accidents, incidents, inquiries and other research and investigation findings etc.
- Data analysis of performance and trends relating to hazards and risks.
- Brainstorming with stakeholders or competent persons (consultation).
- Inspection and audit findings.
- Outcomes of assurance-related activities.
- Insurance assessment information.
- Breaking the activity into individual steps or process mapping the activity.
- Energy analysis (identification of the different types and magnitude of energies that are present for the hazard to be managed or task to be carried out).
- Hazard materials analysis (identification of the different types and hazardous properties of materials held on site).
- External threat analysis incorporating physical security, cyber security, supply chain quality and disruption, natural hazard, biological hazards, and other relevant external threats.

5.2.2. Risk analysis

Analyse the magnitude of consequences and likelihood of the unwanted events to determine the level of the risk.

Risk analysis should involve detailed consideration of risk sources, consequences, and likelihood of unwanted events. Any unwanted event has a range of potential consequences. The risk management approach should identify the highest-level consequences, irrespective of likelihood, which allows for prioritisation. Risk analysis methods may be qualitative, quantitative or a combination of these depending on the risk assessment objective[4].

5.2.3. Risk evaluation

Evaluate risk by comparing risk level to acceptance criteria to determine risk treatment method to use.

Risk evaluation must include a process to allow for analysed risks to be ordered based on the risk criteria. The risk evaluation must provide for the highest risks to be identified and prioritised for risk treatment.

Risks must be able to be prioritised based on consequence as well as the overall risk. The purpose of this evaluation is to ensure that the highest consequence risks are identified and prioritised (i.e. principal hazards).

Risk evaluation must include a process to support and document any decisions about the acceptability of the risk against the acceptance criteria (within acceptable limits, and as low as reasonably achievable) to determine where additional actions are required. Decisions because of risk evaluation are to be documented and may include:

[4] CMSHA section 30 How is an acceptable level of risk achieved

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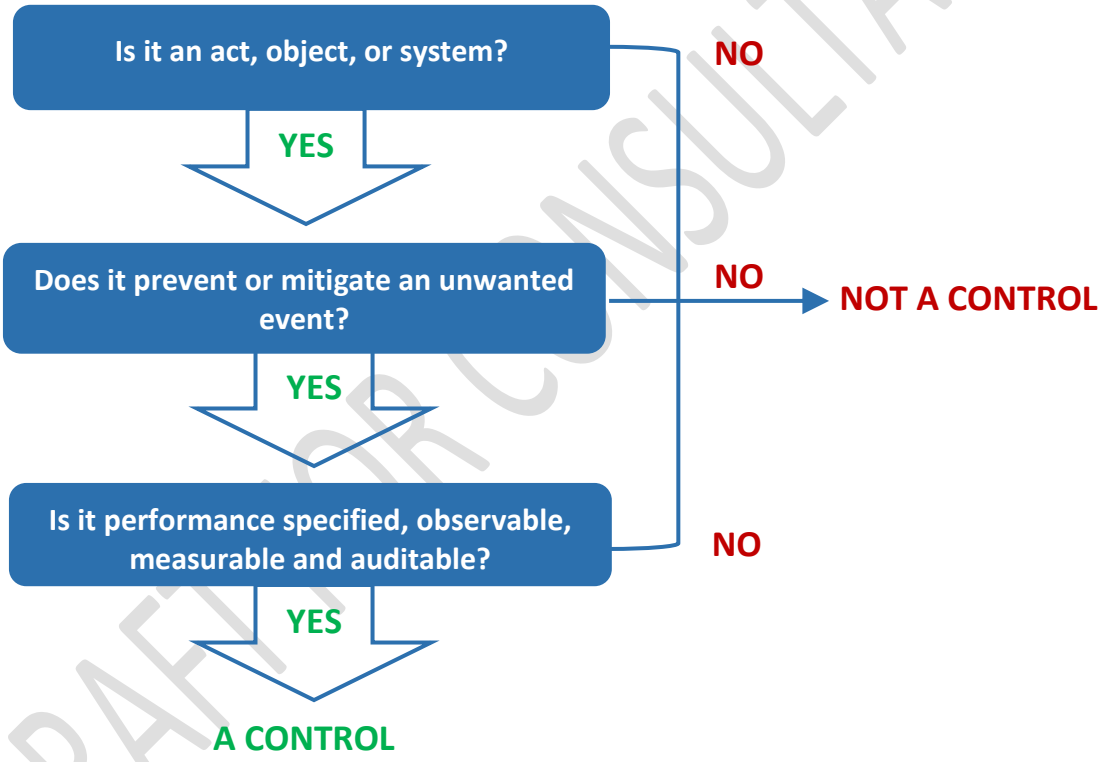
- No further analysis required – risk is acceptable – risk and associated controls to be monitored and reviewed.
- Risk treatment analysis to determine Implement additional full set of controls needed to achieve a level of risk within acceptable limits, and as low as reasonably achievable.
- Undertake further analysis to better understand the hazards and the risk[5].

5.2.3.1. Controls

Controls:

- are an act, object (engineered) or system (combination of act and object).
- that either prevent or mitigate the unwanted event.
- must be clearly defined with measurable performance criteria.

Figure 2 Control decision tree



The adequacy of preventative and mitigative controls should be assessed against the hierarchy of control measures with control preference given to higher level control measures that control hazards at the source and do not rely on human behaviour or supervision.

[5] CMSHA section 30 How is an acceptable level of risk achieved

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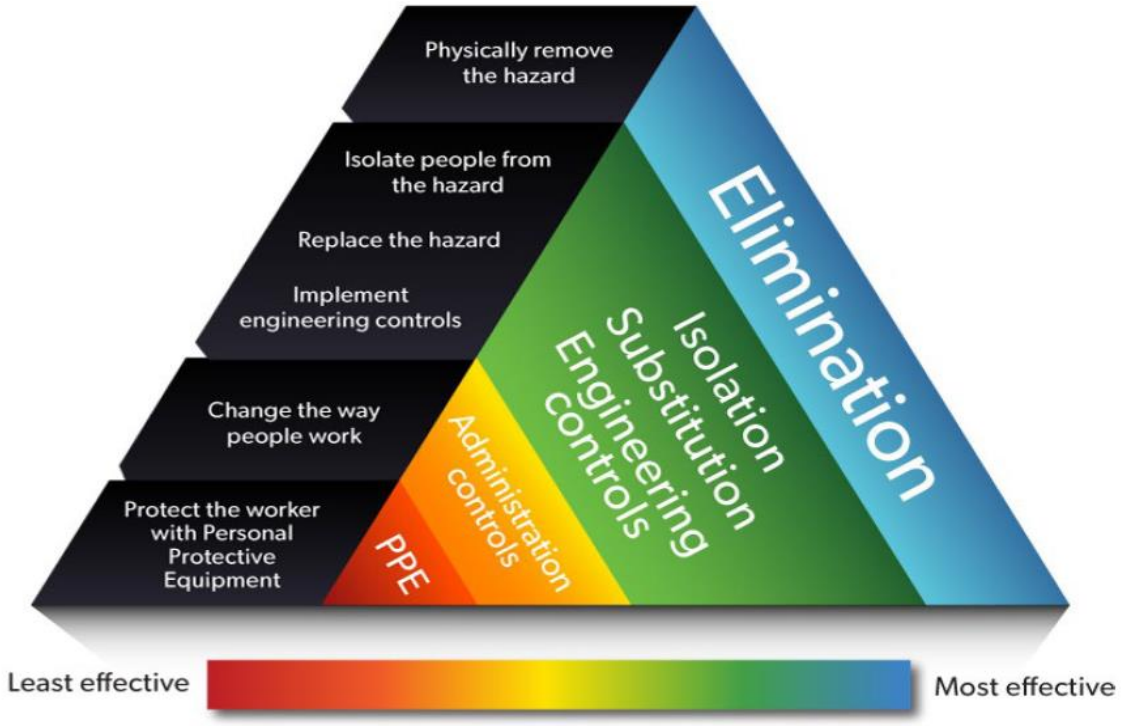
Figure 3 Hierarchy of control measures



Additional lower order controls such as administrative or personal protective equipment (PPE) controls should not have significant impact in lowering the level of risk.

5.2.3.2. Critical controls

Each coal mine should determine a criterion to define the threshold a risk must exceed before critical controls are required to be identified. Generally, these risks should be identified, and the criteria applied at the Layer 1 – Mine Baseline / Broad Brush risk assessment.

A decision tree is recognised as an appropriate way to identify critical controls.

In addition, a process for identifying the critical controls and methods for monitoring critical control implementation and effectiveness should be established by the SSE.

Critical controls must be supported by performance requirements that detail:

- the objective of the critical control, which defines what it is meant to do
- how the critical control is going to act to achieve the objective
- what needs to be verified and checked to confirm the critical control is working
- The performance threshold that triggers immediate action to shut down or change operation or improve control performance.

Appropriate persons must be assigned accountability which would typically include:

- Critical control owner – the person responsible for monitoring the health of the critical control
- Critical control verifier – the person responsible for completing the verification activity and reporting of the outcome.

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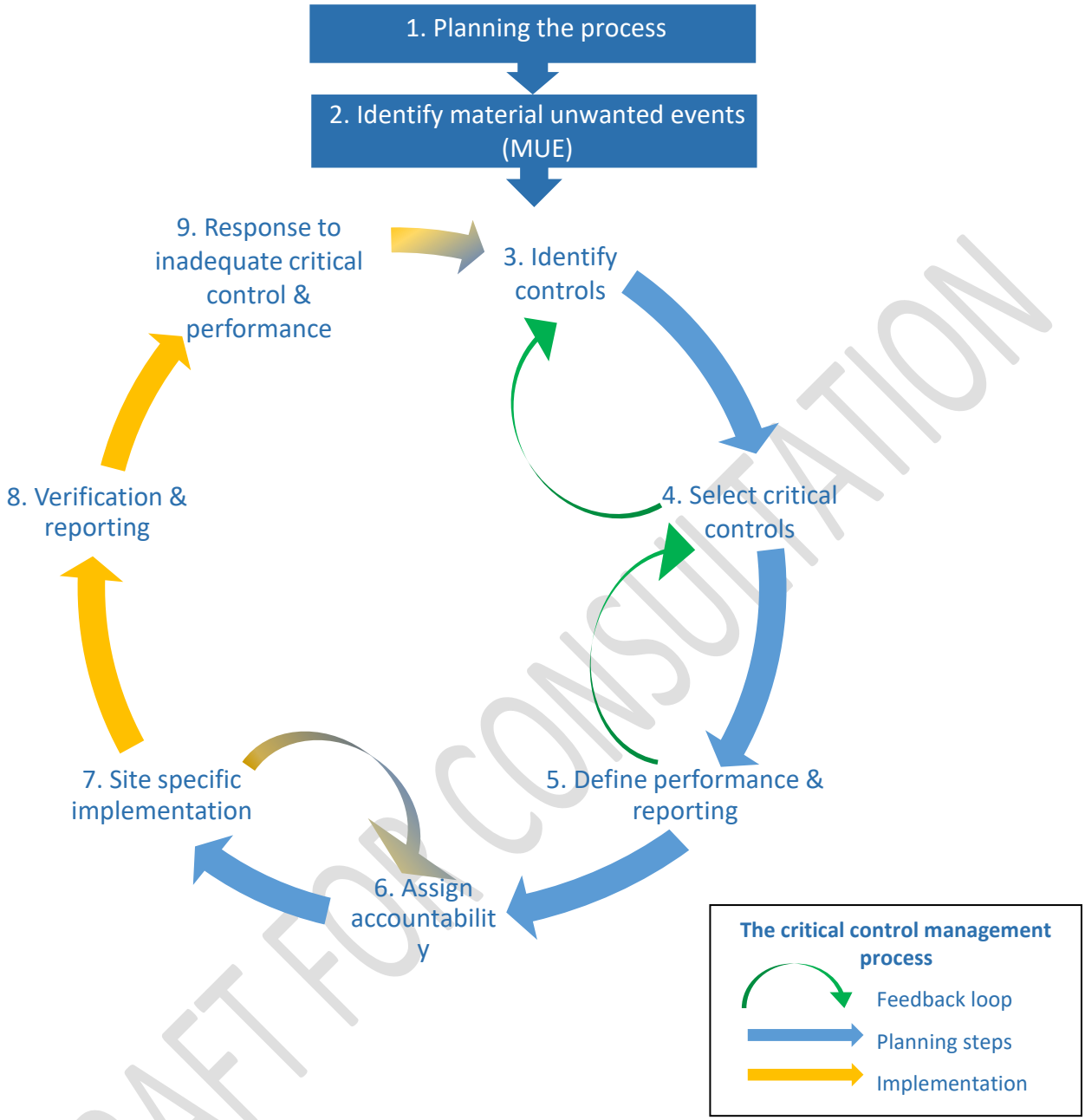
Figure 4 ICMM The critical control management process



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5.2.4. Risk treatment

Options for treatment of risk are to be described within the mine's risk management process and may include the following:

- Avoid the risk – do not start or continue the activity that gives rise to the risk.
- Remove or reduce the risk source.
- Change the likelihood or consequence (through implementation of effective controls).
- Retain the risk by informed decision.

Risk treatment can also introduce new risks that need to be managed and these should be considered when determining overall risk treatment.

The overall risk treatment selected should be subjected to risk evaluation to check that is within acceptable limits, and as low as reasonably achievable criteria has been met.

The risk and selected risk treatment options should be subject to monitoring, review, and where appropriate, updated as work methods, processes and technologies evolve.

5.3. Non-consensus matters

If the SSE, following section 10(1)(d)(ii)(a) of *the Regulation*, is required to obtain further information or advice from a person having the necessary qualifications and experience to give the advice or from a recognised text on the matter, the person or author of the recognised text must have the appropriate qualifications that are directly relevant to the subject matter.[6]

6. Roles and responsibilities

6.1. Risk owner

A risk owner is the person responsible for reviewing available information, identifying risk, managing, monitoring, and mitigating each risk in their area of responsibility.

6.2. Risk assessment team

6.2.1. Facilitator

The facilitator must hold the appropriate competency relevant to the level of risk assessment (refer section 10. Competency and Training).

The facilitator is to lead the discussion to identify the types of hazards, their nature and magnitude. The facilitator is to ensure:

- A clear and accurate scope is developed in advance of the risk assessment.
- Risk assessment boundaries are to be developed in preparation for the review.
- Appropriate resources are available (Subjects matter experts, reference material, time frame).
- The team is briefed and provided with relevant information to allow adequate consideration of the reference material to enable active participation in the risk assessment.
- Sound risk management principles are followed including:
    - guidance on risk assessment methodology
    - that all risk assessment team members understand the risk analysis method being applied
    - monitors for bias, over-confidence or inaccuracy in the application of the risk analysis.

[6] CMSH Regulation Section 10 Developing standard operating procedures

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The facilitator must ensure that all unwanted events have been assigned a level of risk by the risk assessment team, and Non consensus matters are recorded and escalated as required.

The facilitator does not provide technical input on the hazard being assessed or influence the outcome of the risk ranking; this is the role of the team.

6.2.2. Participants

Relevant to the type of risk assessment, an appropriate and competent team is to be selected. Each participant must hold appropriate skills and experience that are current and relevant to the risk being assessed. The names of the participants, organisational role and relevant experience must be recorded with signature and date on the risk assessment's attendance register.

The participant must come prepared to the risk assessment, and:

- actively participate with a risk assessment team
- have knowledge of the hazard/s being assessed and an understanding of their potential consequence
- understand current controls and their effectiveness
- understand the risk analysis method and apply this method to each unwanted event
- advise on any additional actions or controls required
- raise any concerns or non-consensus matters.

6.2.3. Subject matter expert

Appropriate subject matter experts should form part of the team. A subject matter expert must have appropriate skills, competency and experience or qualifications directly relevant to the subject matter.

A subject matter expert is to:

- actively participate
- have technical knowledge of the hazard/s being assessed and an understanding of their potential consequence
- understand current controls and their effectiveness
- advise on any additional actions or controls required
- raise any concerns or non-consensus matters.

7. Communication and consultation

The risk management process developed for the coal mine must include communication and consultation requirements for persons who be affected (internal and external stakeholders) relevant to risk management. Communication promotes awareness and understanding of the risk/s, whereas consultation is undertaken to obtain feedback and information to support decision making.

The Site Senior Executive must communicate and consult with relevant internal and, as required, external stakeholders so that risks are understood and stakeholders are aware of hazards, risks, control implementation and other risk management action requirements.

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The Site Senior Executive must establish a process to ensure there is consultation with a relevant affected cross-section of the mine's coal mine workers involved with carrying out a task or those affected by any change to identify the hazards and appropriate controls[7].

8. Recording and reporting

The Site Senior Executive must ensure a copy of each risk assessment for the mine, and information and data on which the assessment was based, is kept at the mine until:

- The assessment is superseded; or
- The hazard to which the assessment relates is no longer at the mine[8].

Risk treatment measures and actions, including timeframe and persons responsible must be recorded in the final document.

9. Monitoring and review

Each SSE must develop an assurance process, or similar, to monitor and review the risk management processes and risk controls to ensure that risks are kept at an acceptable level.

The monitoring process should measure effectiveness of controls to identify and mitigate potential erosion of control measures[9].

The process must consider monitoring and review of:

- The mine's risk management system and process.
- The ongoing effectiveness of controls (including critical controls); and
- Risk assessment outcomes and applicable risk treatment.

Review triggers should include:

- Periodic review e.g., 3-5 years.
- Change, modification, or introduction of new processes, plant, and substances.
- Identification of inadequacies within the risk management processes within the SHMS.
- Reporting should be provided to relevant internal and external stakeholders as determined by the mine.
- Recommendations from relevant incidents, safety alerts, updated guidance material, regulatory notices etc.

9.1.1. Document control

A document control system must be established to ensure the appropriate control of risk management documents and the information contained within. The system should also incorporate the SHMS documents that result from outcomes of the risk management processes such as Principal Hazard management Plans (PHMPs), procedures, and Trigger Action Response plans (TARPs). An appropriate document control system will ensure

[7] CMSH Regulation Section 10 Developing standard operating procedures

[8] CMSH Regulation section 7 Keeping information and data on which risk assessment is based

[9] CMSH Act section 30 How is an acceptable level of risk achieved

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that the contents reflect the outcomes of risk assessments, facilitate internal & external audits, and ensure compliance with the review process.

The SSE must authorise the change to the SHMS.

Where a risk management process is utilised to develop or review a Standard operating Procedure (SOP) (i.e WRAC), the following details must be recorded on the risk assessment document and the SOP that is kept at the mine:

- Document ID – unique number or code identifier for the document
- Version number – numbered in chronological order of review or change.
- Original document issue date – the date the original document was finalised and incorporation into the SHMS.
- Date of issue – the date the document was finalised.
- Document owner – responsible person or risk owner.
- Reason for review – description of reason for review or change.

10. Competency and training

Each mine is to establish minimum competencies for persons with responsibilities for risk management (reference RS22 and AQF).

Activity	**Summary**	**Relevant unit of competency**
Establish and Maintain the Risk Management process	Senior Positions	RIIRIS601 Establish and maintain the risk management system (or equivalent)
Implement the Risk Management Process	Superintendent Position	RIIRIS601 Establish and maintain the risk management system (or equivalent), *Or* RIIRIS501 Implement and maintain management systems to control risk
Carry out the risk management process	Statutory Supervisor/ Facilitator	RIIRIS402 Carry out the risk management process
Apply and Monitor the Risk Management Process	Supervisory Position	RIIRIS301 Apply Risk Management Processes
Conduct Risk Management activities	Coal Mine Worker	RIIWHS201 Conduct local risk control

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11. Definitions

Act	In relation to a control, an action carried out by a person, a person doing something. (ICMM Health and Safety Critical Control Management Good Practice Guide)
Critical control	A control that is critical to preventing the event or mitigating the consequences of the event. The absence or failure of a critical control would significantly increase the risk despite the existence of the other controls. In addition, a control that prevents more than one unwanted event or mitigates more than one consequence is normally classified as critical. (ICMM Health and Safety Critical Control Management Good Practice Guide)
Hazard	A hazard is a thing or a situation with the potential to cause injury or illness to a person
Critical control management	A process of managing the risk of material unwanted events that involves a systemic approach to ensure critical controls are in place and effective. (ICMM Health and Safety Critical Control Management Good Practice Guide)
Material unwanted event	An unwanted event where the potential or real consequence exceeds a threshold defined by the company as warranting the highest level of attention (e.g., a high-level health or safety impact). (ICMM Health and Safety Critical Control Management Good Practice Guide)
Object	In relation to a control, is a material thing that can be seen and touched. It is a thing used to control or divert hazardous energy and/or materials. (ICMM Health and Safety Critical Control Management Good Practice Guide)
Risk	Risk means the risk of injury or illness to a person arising out of a hazard. Risk is measured in terms of consequences and likelihood. (Coal Mining Safety and Health Act 1999, S18)
System	In relation to a control, is a combination of Acts and Objects implemented to control or reduce risk. (ICMM Health and Safety Critical Control Management Good Practice Guide)
Standard operating procedure (SOP)	A standard operating procedure at a coal mine is a documented way of working, or an arrangement of facilities, at the coal mine to achieve an acceptable level of risk, developed after consultation with coal mine workers. It includes SHMS documents such as principal hazard management plans, procedures, TARPs etc.

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Unwanted event	A description of a situation where the hazard has or could possibly be released in an unplanned way
Workplace Risk Assessment and Control (WRAC)	An analytical method of risk assessment to prioritise risks based on the likelihood and consequence. This may take into account the controls and control effectiveness.

12. References

The following documents are referred to, directly or indirectly, in this standard:

Publication/document name	Authoring organisation
AS / ISO 31000: 2018 Risk Management – Guidelines	Standards Australia
AS/NZS ISO 45001:2018 Occupational health and safety management systems – Requirements with guidance for use	Standards Australia
SA/SNZ HB 205:2017 Managing health and safety related risk	Standards Australia
Health and Safety Critical Control Management – Good Practice Guide	International Council on Mining and Metals
Risk Management, Leading Practice Sustainable Development Program for the Mining Industry	Australian Government
Coal Mine Safety Regime ACARP Project 15011, Report – Stage 1 (2007)	
Selection and Optimisation of Risk Controls ACARP Project C23007 (2015)	
Coal Mining Safety and Health Act 1999	Queensland State Government
Coal Mining Safety and Health Regulation 2017	Queensland State Government

13. For more information

Recognised standards may be updated from time to time. To ensure you have the latest version, check the Business Queensland website, or contact your local Inspector of Mines.

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