

# Towards Sustainable Mining

## Safety and Health Protocol



Towards Sustainable Mining  
Vers le développement minier durable



## **TSM ASSESSMENT PROTOCOL**

A Tool for Assessing Safety and Health Performance

### Purpose

The purpose of the assessment protocol is to provide guidance to facilities in completing their evaluation of safety and health performance against TSM indicators. The assessment protocol sets out the general expectations for safety and health as part of the TSM initiative. This protocol supports implementation of the TSM Safety and Health Framework.

As with any assessment of a management system, professional judgment is required in assessing the degree of implementation of a system indicator and the quality of management processes and intervention. Application of this protocol will, therefore, require a level of expertise in auditing and systems assessment and knowledge of and experience in the practice of safety and health. This assessment protocol provides an indicator of the level of implementation of proactive safety and health practices as part of the TSM initiative. It is not, of itself, a guarantee of the effectiveness of safety and health activities.

### Performance Indicators

**The Safety and Health Protocol contains four indicators:**

1. Commitments and Accountability
2. Planning and Implementation
3. Training, Behaviour and Culture
4. Monitoring and Reporting
5. Performance





## 1. COMMITMENTS AND ACCOUNTABILITY

### Purpose

To confirm that the facility has established clear accountability for safety and health management and performance, and that safety and health commitments have been established and clearly communicated to employees, contractors, and suppliers.

### Commitment and Accountability: Assessment Criteria

LEVEL	CRITERIA
<b>C</b>	<ul style="list-style-type: none"> <li>The facility does not meet all Level B criteria.</li> </ul>
<b>B</b>	<ol style="list-style-type: none"> <li>A demonstrated commitment to safety and health is evident, including commitments related to fatality prevention.</li> <li>A senior management representative is accountable for safety and health.</li> <li>The company has developed an action plan to meet all Level A requirements.</li> </ol>
<b>A</b>	<ol style="list-style-type: none"> <li>Commitments are defined and authorized by the company's senior management and are consistent with the intent of the MAC Safety and Health Framework.</li> <li>There is a process in place to ensure that employees, contractors, and suppliers who work at the facility are aware of the company's safety and health commitments.</li> <li>Accountabilities and responsibilities are understood at all levels.</li> </ol>
<b>AA</b>	<ol style="list-style-type: none"> <li>An internal audit has been conducted to determine: <ol style="list-style-type: none"> <li>The degree of consistency that the commitments are applied with respect to the intent of the MAC Safety and Health Framework</li> <li>Whether accountabilities and responsibilities are understood</li> <li>Whether the commitments to safety and health have been communicated to employees, contractors, and suppliers at the facility</li> <li>Whether processes are in place to ensure that employees, contractors, and suppliers who work at the facility are aware of the safety and health commitments</li> </ol> </li> <li>Employees at the facility demonstrate their commitment to safety and health.</li> </ol>
<b>AAA</b>	<ol style="list-style-type: none"> <li>An external audit has been conducted to determine: <ol style="list-style-type: none"> <li>The degree of consistency that the commitments are applied with respect to the intent of the MAC Safety and Health Framework</li> <li>Whether accountabilities and responsibilities are understood</li> <li>Whether the commitments to safety and health have been communicated to employees, contractors, and suppliers at the facility</li> <li>The effectiveness of the process in place to ensure that employees, contractors, and suppliers who work at the facility are aware of the commitments</li> </ol> </li> </ol>





Commitment and Accountability: Frequently Asked Questions

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2	How do you determine if safety and health commitments are consistent with the MAC Safety and Health Framework?	15
4	Can corporate documentation be used to demonstrate facility-level commitment?	15
5	What is meant by “contractors and suppliers at the facility”?	16
13	What is the expected focus of audit activities?	17
14	Can a company or facility achieve a Level AAA on satisfactory completion of an external audit, without having completed a Level AA internal audit?	17
15	For how long are internal and external audits valid?	17
16	How is “senior management” defined?	17
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23	What does “responsibility” mean?	18





## 2. PLANNING AND IMPLEMENTATION

### Purpose

To confirm that processes have been established to effectively plan for and manage safety and health controls to prevent the occurrence of incidents, acknowledging safety and health is a shared responsibility, and that hazard identification, risk assessment and the establishment of effective controls are integral to an effective management system.

### Planning and Implementation: Assessment Criteria

LEVEL	CRITERIA
<b>C</b>	<ul style="list-style-type: none"> <li>The facility does not meet all Level B criteria.</li> </ul>
<b>B</b>	<ol style="list-style-type: none"> <li>Some safety and health management systems elements are established, including a clear incident notification and investigation process.</li> <li>Risk control tools are identified and available.</li> <li>The facility has identified the most common tasks.</li> <li>Standard operating procedures and safe work practices are in place for the facility's most common tasks.</li> <li>The company has developed an action plan to meet all Level A requirements.</li> </ol>
<b>A</b>	<ol style="list-style-type: none"> <li>A documented safety and health management system is established, implemented, and maintained. At a minimum, it incorporates: <ol style="list-style-type: none"> <li>Objectives and targets, with supporting plans to achieve them</li> <li>A hazard identification, risk assessment (HIRA) and control processes</li> <li>Identification of high consequence hazards and related critical controls</li> <li>An industrial hygiene program</li> <li>Defined roles and responsibilities for safety and health management</li> <li>Workplace inspections</li> <li>Maintenance of safety and health records</li> </ol> </li> <li>Resources are assigned to establish, implement, maintain, and improve the safety and health management system and validate effectiveness of controls.</li> </ol>
<b>AA</b>	<ol style="list-style-type: none"> <li>An internal audit has been conducted to determine whether planning and implementation of the safety and health management system meets the requirements of Level A.</li> <li>Industrial hygiene risks and controls have been reviewed by a qualified hygienist.</li> <li>The facility has verified that critical controls are in place and functioning, and the definition of critical controls differentiates between critical controls, mitigating controls and underpinning controls.</li> </ol>





SAFETY AND HEALTH PROTOCOL

<b>AAA</b>	<ol style="list-style-type: none"><li>1. An external audit has been conducted to determine whether planning and implementation of the safety and health management system meets the requirements of Level A.</li><li>2. An industrial hygiene program is subject to the oversight of a qualified hygienist.</li><li>3. Facility-specific and especially hazardous tasks have been identified, and critical controls for those tasks have been identified through an established controls identification methodology (e.g., bowtie analysis).</li></ol>
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Planning and Implementation: Frequently Asked Questions

#	FAQ	PAGE
1	What is Hazard Identification and Risk Assessment (HIRA)?	15
4	Can corporate documentation be used to demonstrate facility-level commitment?	15
8	What is meant by “control”?	16
11	What could be included in an industrial hygiene program?	16
12	What is meant by a qualified hygienist?	17
13	What is the expected focus of audit activities?	17
14	Can a company or facility achieve a Level AAA on satisfactory completion of an external audit, without having completed a Level AA internal audit?	17
15	For how long are internal and external audits valid?	17
16	How can a facility set objectives and performance requirements for critical controls?	17
18	What is meant by “planning”?	18
21	What is a system?	18
22	What does “effective” mean?	18
25	What are “critical controls”, “mitigating controls” and “underpinning controls”?	19
26	What is a “bowtie analysis”?	19





### 3. TRAINING, BEHAVIOUR AND CULTURE

#### Purpose

To confirm that processes have been established to effectively train employees and contractors on safety and health to ensure they are competent in identifying hazards and preventing incidents and they understand that safety and health is a shared responsibility and that safety behaviour is integral to controlling risk.

#### Training, Behaviour and Culture: Assessment Criteria

LEVEL	CRITERIA
<b>C</b>	<ul style="list-style-type: none"> <li>• The facility does not meet all Level B criteria.</li> </ul>
<b>B</b>	<ol style="list-style-type: none"> <li>1. Basic training on safety and health hazards and risks, including high consequence tasks, has been provided at the facility and training records are maintained.</li> <li>2. The company has developed an action plan to meet all Level A requirements.</li> </ol>
<b>A</b>	<ol style="list-style-type: none"> <li>1. Planned, documented and functional safety and health training program is in place that includes:               <ol style="list-style-type: none"> <li>a. Training needs analysis for employees, including consideration of required skills and competencies, and orientation for employees, on-site contractors, and visitors.</li> <li>b. The training program is implemented and includes a mechanism for review.</li> <li>c. Training records are maintained.</li> <li>d. Resources are assigned to implement and maintain the training program.</li> <li>e. Trainees are assessed for competency where tasks have safety and health competency-based requirements.</li> <li>f. Trainers are qualified to deliver safety and health training programs.</li> <li>g. Training includes hazard identification and control with a focus on prevention and proactive measures.</li> <li>h. A task observation program supports and reinforces training to ensure routine safety checks and coaching are in place to encourage safe behaviour and work practices.</li> <li>i. The facility has mechanisms in place for the participation of workers in hazard identification, risk assessment and determination of controls and considering input from workers in setting OH&amp;S objectives.</li> </ol> </li> </ol>
<b>AA</b>	<ol style="list-style-type: none"> <li>1. The facility encourages organizational engagement in key requirements for health and safety by integrating safety and health criteria into core business processes and practices, including:               <ol style="list-style-type: none"> <li>a. The annual business plan</li> <li>b. Purchasing decisions</li> <li>c. Performance appraisal processes</li> </ol> </li> </ol>





SAFETY AND HEALTH PROTOCOL

	<p>d. The compensation system (i.e. compensation is affected by safety and health performance)</p> <p>2. The facility's programs promote and encourage health and wellness, including mental health, and a healthy lifestyle.</p>
<b>AAA</b>	<p>1. The commitment to safety and health is visibly embedded throughout the facility.</p> <p>2. Facility management visibly demonstrates commitment with one-on-one interactions with employees.</p> <p>3. Trainers are assessed for effectiveness.</p> <p>4. A program is developed to support worker mental health and provide assistance when required.</p>





Training, Behaviour and Culture: *Frequently Asked Questions*

#	FAQ	PAGE
3	What are “job observations”?	15
4	Can corporate documentation be used to demonstrate facility-level commitment?	15
5	What is meant by “contractors and suppliers at the facility”?	16
9	How can a company demonstrate that they have assessed the competency and effectiveness of its trainers?	16
19	What is “compensation”?	18
20	What is a system?	18
21	What does “effective” mean?	18





## 4. MONITORING AND REPORTING

### Purpose

To confirm that safety and health performance is regularly monitored and reported both internally and externally.

### Monitoring and Reporting: Assessment Criteria

LEVEL	CRITERIA
<b>C</b>	<ul style="list-style-type: none"> <li>The facility does not meet all Level B criteria.</li> </ul>
<b>B</b>	<ol style="list-style-type: none"> <li>Some basic training, safety and health metrics are monitored and reported to facility management on a regular basis, going beyond regulatory requirements.</li> <li>Key performance indicators are reported or posted within the facility.</li> <li>The company has developed an action plan to meet all Level A requirements.</li> </ol>
<b>A</b>	<ol style="list-style-type: none"> <li>Documented safety and health monitoring and reporting occurs. <ol style="list-style-type: none"> <li>Performance metrics are clearly defined, consistently applied, regularly assessed (including against broader industry performance) and internally reported.</li> <li>Performance metrics are used to analyze trends for informing decisions and guiding continuous improvement.</li> <li>A monitoring program includes tracking and internal reporting of leading and lagging indicators, safety and health and industrial hygiene inspection and monitoring, health surveillance, and incident investigation and follow-up.</li> <li>A safety and health audit program is in place and compliance audits and management system audits are conducted in accordance with the audit plan.</li> <li>The monitoring and audit programs include a focus on high consequence hazards.</li> <li>The facility assesses the adequacy and effectiveness of its safety and health management system annually and makes recommendations on how to make continual improvement</li> <li>Regular management review of safety and health performance takes place for the purpose of continual improvement and to inform decision-making.</li> <li>Results of workplace monitoring, inspection and follow-up action are recorded and communicated within the facility.</li> <li>Safety and health performance is communicated to the public at least once per year.</li> </ol> </li> </ol>
<b>AA</b>	<ol style="list-style-type: none"> <li>An internal audit has been conducted to determine whether the safety and health data and information collection, compilation and reporting meets the requirements of Level A.</li> </ol>





	<ol style="list-style-type: none"><li>2. Thresholds and triggers related to the performance of critical controls are in the process of being developed and implemented, with some thresholds and triggers already in place.</li><li>3. The monitoring and audit programs include a focus on critical controls.</li></ol>
<b>AAA</b>	<ol style="list-style-type: none"><li>1. An external audit is conducted to determine whether the safety and health data and information collection, compilation and reporting meet the requirements of Level A.</li><li>2. An internal evaluation of effectiveness is conducted, and a tracking process is in place for opportunities for improvement identified. This includes evaluation of the quality of investigations and the close-out of actions, contributing to a culture of continuous improvement.</li></ol>

### Monitoring and Reporting: Frequently Asked Questions

#	FAQ	PAGE
4	Can corporate documentation be used to demonstrate facility-level commitment?	15
10	What is meant by health surveillance?	16
13	What is the expected focus of audit activities?	17
14	Can a company or facility achieve a Level AAA on satisfactory completion of an external audit, without having completed a Level AA internal audit?	17
15	For how long are internal and external audits valid?	17
18	What is “workplace monitoring”?	18
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21	What does “effective” mean?	18
27	What are “thresholds” and “triggers”?	19





## 5. PERFORMANCE

### Purpose

Recognizing that zero harm is the ultimate goal for all facilities, the purpose of this indicator is to confirm that continual improvement targets have been established at each facility to move toward zero harm and that performance relative to targets is assessed. If a facility has had a fatality within the reporting year, it is not eligible for Level A or higher.

### Performance: Assessment Criteria

LEVEL	CRITERIA
<b>C</b>	<ul style="list-style-type: none"><li>The facility does not meet all Level B criteria.</li></ul>
<b>B</b>	<ol style="list-style-type: none"><li>Safety and health performance targets are set for employees of the facility.</li><li>Targets are communicated to employees.</li><li>The company has developed an action plan to meet all Level A requirements.</li></ol>
<b>A</b>	<ol style="list-style-type: none"><li>Performance targets include on-site contractors.</li><li>Facility management is involved in reviewing and improving performance relative to targets.</li><li>Performance results are communicated to employees and on-site contractors.</li><li>The facility has not had a fatality in the reporting year.</li></ol>
<b>AA</b>	<ol style="list-style-type: none"><li>Performance targets are set for both leading and lagging indicators.</li><li>Senior company management reviews performance against facility targets and associated improvement plans.</li><li>The facility (or company) benchmarks its safety and health performance against its peers.</li></ol>
<b>AAA</b>	<ol style="list-style-type: none"><li>The facility has consistently met its continual improvement performance targets (at least 3 of the last 4 years) and is fatality free over the entire four-year period.</li><li>The facility externally audits its safety and health performance to ensure accuracy and reliability.</li></ol>





Performance: *Frequently Asked Questions*

#	FAQ	PAGE
4	Can corporate documentation be used to demonstrate facility-level commitment?	15
5	What is meant by “contractors and suppliers at the facility”?	16
6	What level of benchmarking is adequate?	16
7	What would prevent a facility from achieving a level A for indicator 5?	16
8	What is the expected focus of audit activities?	16
14	Can a company or facility achieve a Level AAA on satisfactory completion of an external audit, without having completed a Level AA internal audit?	17
15	For how long are internal and external audits valid?	17
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20	What is a system?	18





## APPENDIX 1: FREQUENTLY ASKED QUESTIONS

### Protocol-Specific Guidance

#### **1. What is Hazard Identification and Risk Assessment (HIRA)?**

HIRA is a documented process that ensures that all safety and health hazards have been identified, the level of risk assessed, and controls put into place to manage the risk. A typical HIRA process includes the following.

- Site surveys
- Hierarchy of controls
- Risk register
- HAZOP and Failsafe processes
- Management of Change
- Job Safety Analysis
- Field-based risk assessments (or similar)
- Identification of events with a reasonable potential to result in a life altering injury or occupational disease

To demonstrate that a facility has “hazard identification, risk assessment and control processes” in place, it is expected the facility would have documented processes to identify hazards, assess associated risks and identify appropriate controls. A documented or electronic risk register would identify site hazards and controls in place to address the hazards, and the facility would have a risk assessment tool or process that can be applied at the field level.

#### **2. How do you determine if safety and health commitments are consistent with the MAC Safety and Health Framework?**

The MAC Safety and Health Framework establishes a number of commitments that MAC member companies agree to follow. The spirit and intent of a company’s safety and health commitments should be consistent with the spirit and intent of the MAC Safety and Health Framework. While it is not required that corporate commitments include all of the specific commitments identified in the Framework, the commitments should demonstrate general support and alignment with the MAC Safety and Health Framework, without expressly referring to it.

#### **3. What are “Job Observations”?**

Job Observations help to eliminate unsafe or hazardous acts and conditions. It actively encourages the whole workforce to be involved and therefore generates greater safety awareness both individually and collectively. It is a process normally performed by supervision and management with the involvement of the workforce. There are four fundamental steps in a Job Observation process:

- (1) plan to observe
- (2) observe a task
- (3) provide positive feedback or reinstruction back to the worker(s)
- (4) look for a commitment to continue to perform the work in a healthy and safe manner

The observation process can be used to check in on the effectiveness of hazard identification and risk assessment programs as well as health and safety management systems (e.g. field level risk assessments, procedures, training, rules and standards, results of safety investigations).

#### **4. Can corporate documentation be used to demonstrate facility-level commitment?**

Written senior management commitment at the corporate level (e.g. a corporate policy) can only be accepted as evidence during a facility-level self-assessment or TSM verification if it is





accompanied by evidence that the corporate commitment is being applied and adhered to at the facility level. There must be evidence of a link between the corporate documentation and facility-level practices. If this linkage is established, then the corporate documentation can be accepted as evidence of facility-level commitment.

**5. What is meant by “contractors and suppliers at the facility”?**

This term refers to vendors and contractors who work at the site or who physically enter the site. It is expected that a facility communicates relevant health and safety commitments to those contractors and suppliers who work at or physically enter the site.

**6. What level of benchmarking is adequate?**

Recognizing the limitations of doing so, for Indicator 5: Performance (Level AA), it is expected that the facility or company will compare its safety and health performance with the performance of others on a regular basis (i.e. within the last three years). Facilities or companies can use any of a number of methods or sources to obtain these comparative data including, for example, use published industry data (where available), compilation of publicly available data, participation in benchmarking studies or initiation of benchmarking studies.

**7. What would prevent a facility from achieving a level A for indicator 5?**

Facilities that have experienced an occupational fatality within the reporting year are not eligible for level A or higher for indicator 5 (performance). An occupational fatality is defined as the death of an employee, contractor or visitor because of a work-related incident arising from an activity under management control.

**8. What is meant by “control”?**

This term refers to an act, object (engineered) or system (combination of act and object) intended to prevent or mitigate an unwanted event or to reduce or eliminate the consequences of an unwanted event.

For more information, see: ICMM. 2015. *Health and Safety Critical Control Management*.

<http://www.icmm.com/website/publications/pdfs/health-and-safety/8570.pdf>

**9. How can a facility demonstrate that trainers are qualified to deliver safety and health training program?**

Considerations for determining whether a person is qualified include, but are not limited to:

- Previous training experience
- Previous experience in performing the task or activity
- Exam or acknowledgment from the facility on trainer competency
- Knowledge and specific safety and health-related training, formal education, training and third-party credentials
- Demonstrated history in performing the task that is the subject of the training program.

**10. What is meant by health surveillance?**

Occupational health surveillance is the analysis of health information intended to identify problems resulting from occupational exposures that require prevention activities. Surveillance functions as a feedback loop to the employer. Surveillance uses screening results from a group of employees, or single employee, to look for abnormal trends in health status. A review of group results helps to identify potential exposure problems and assess the effectiveness of existing worksite controls and preventive strategies. Personal medical histories of employees must be kept confidential.





**11. What could be included in an industrial hygiene program?**

Typically, an industrial hygiene program will consist of the following:

- Anticipation of potential exposures arising from workplace activities (e.g. purchasing and use of hazardous substances)
- Identification (sometimes called recognition) of exposures by qualitative means (e.g. workplace walk-through surveys)
- Evaluation of identified exposures by monitoring and sampling of contaminants (qualitative and quantitative against applicable criteria)
- Control of exposures to acceptable levels (a hierarchy of control is used)
- Effectiveness of controls – are they working as intended to reduce or eliminate exposures

**12. What is meant by a qualified hygienist?**

To achieve Level AA for Indicator 2, the facility must be able to demonstrate that its industrial hygiene risks and controls have been reviewed by a qualified hygienist. To achieve Level AAA for Indicator 2, the facility must be able to demonstrate that its industrial hygiene program is overseen by a qualified hygienist. These reviews should be conducted by, or under the direction of, a person who is qualified based on knowledge, training and/or experience in accordance with recognized occupational hygiene practice.

**AUDIT**

**13. What is the expected focus of audit activities?**

For Indicator 4: Monitoring and Reporting, it is expected that audit activities would assess the processes in place for collecting, compiling and reporting safety and health data and information to confirm that defined processes are in place and to test that these processes are being consistently applied.

For Indicator 5: Performance (Level AAA), it is expected that external audit activities would test the robustness and accuracy of collected safety and health performance data by reviewing the base data that are collected, testing that these data were accurately screened and entered into a database, and conducting a data review of the aggregate numbers.

**14. Can a company or facility achieve a Level AAA on satisfactory completion of an external audit, without having completed a Level AA internal audit?**

Yes, because the TSM Performance Indicator assessment is a snapshot in time of a company's or facility's status as relates to each specific performance indicator. Assigning a rating of Level AA or AAA is based on whether an audit is internal or external. A company or facility does not need to do an internal audit (qualifying for a rating of Level AA) before receiving a rating of Level AAA for an external audit.

**15. For how long are internal and external audits valid?**

An internal or external audit that was completed within the last three (3) years meets the requirements for an internal or external audit as required by Level AA or Level AAA in many of the indicators of this protocol.

**16. How can a facility set objectives and performance requirements for critical controls?**

Defining critical controls' objectives, performance requirements and how performance is verified in practice is an important step in critical control management. A company can start by defining the objective of the critical control to fully understand the role, expectations and outcomes of the control. The performance requirements are the standards to which a control





must perform, consist of an action and a value. Performance requirements for a control may already exist within company documents. This can be determined by reviewing the relevant processes, procedures, maintenance manuals and other support documents. Industry standards may also help to determine performance requirements. However, caution should be applied as industry-wide standards may not be specific or relate directly to the context of the control. Performance requirements should be specific, measurable, appropriate and realistic. It is also important to define the level of performance that would initiate immediate action to shut down or change an operation or to signal that improvements to the critical control are required. For more information, see: ICMM. 2015. *Critical Control Management Implementation Guide*. <http://www.icmm.com/website/publications/pdfs/health-and-safety/8570.pdf>

## TERMINOLOGY

### **17. How is “senior management” defined?**

For the purposes of safety and health performance measurement, senior management refers to the most senior level of management at the facility level (e.g., General Manager, Site Manager, etc.). Where the protocol requires that accountability for safety and health be assigned at all levels, the expectation would be that accountabilities at the site and at the business unit, regional or corporate level be defined (depending on the corporate structure and location of headquarters). Verification of this requirement will not require engagement with corporate headquarters located outside of Canada or North America.

### **18. What is meant by “planning”?**

Planning includes activities such as identifying hazards, assessing risk, and determining controls; identifying and having access to applicable legal requirements; and, establishing and maintaining documented objectives and supporting programs at relevant functions and levels within the facility (adapted from OHSAS 18001:2007).

### **19. What is “workplace monitoring”?**

Workplace monitoring may include, but is not limited to, such items as workplace examination, industrial hygiene monitoring, fitness for duty monitoring, ambient workplace conditions, or other similar activities.

### **20. What is “compensation”?**

Compensation is defined as the total rewards package provided to employees.

### **21. What is a system?**

A system, or “management system”, represents processes that collectively provide a systematic framework for ensuring that tasks are performed correctly, consistently and effectively to achieve a specified outcome and to drive continual improvement in performance. A systems approach to management requires an assessment of what needs to be done, planning to achieve the objective, implementation of the plan and review of performance in meeting the set objective. A management system also considers necessary personnel, resources and documentation requirements. Other definitions associated with systems are:

- **Policy:** The expression of management’s commitment to a particular issue area that presents the stance of the company to interested external parties.
- **Practice:** Informal, undocumented approaches to carrying out a task.
- **Procedure:** A repeatable description of how a task is to be carried out.

### **22. What does “effective” mean?**

Where the term “effective” is used, it requires the element to be operational in order that





desired outcomes can be achieved.

### **23. What does “accountability” mean?**

Accountability means that the safety and health management system must identify the party who is ultimately answerable for safety and health performance and the development and implementation of the safety and health management system at the facility. This accountability cannot be delegated. Resources are available to the accountable party to ensure proper systems (training, equipment, communications, etc.) are in place to effectively meet their safety and health goals.

### **24. What does “responsibility” mean?**

Responsibility means that, within the safety and health management system, specific safety- and health-related requirements and tasks are identified and assigned to specific positions within the facility. It is important that responsibilities are clearly communicated so that each position understands what is expected of them.

### **25. What are “critical controls”, “mitigating controls” and “underpinning controls”?**

As indicated in FAQ 8, a control is an act, object or system intended to prevent or mitigate an unwanted event or to reduce or eliminate the consequences of an unwanted event.

- A critical control is one that is crucial to preventing or mitigating the consequences of a material unwanted event. The absence or failure of a critical control would significantly increase risk despite the existence of other controls. A control that prevents more than one unwanted event or mitigates more than one consequence is normally classified as critical. A critical mitigating control eliminates or reduces to within an acceptable threshold the consequences of the material unwanted event.
- A mitigating control is one that eliminates or reduces the consequences of the unwanted event.
- An underpinning control is an activity or mechanism that is not critical (i.e. does not represent a direct barrier to an unwanted event) but is important in maintaining or supporting the effectiveness of critical controls. These might include training systems, monitoring activities, and operating or response plans. This is a broad category that may include activities within the management systems that support having the critical control able to do what is required, such as inspections, and that may provide information for verification of the status of the critical control.

For more information, see: ICMM. 2015. *Health and Safety Critical Control Management*. <http://www.icmm.com/website/publications/pdfs/health-and-safety/8570.pdf> and ICMM. 2015. *Critical Control Management Implementation Guide*. <http://www.icmm.com/website/publications/pdfs/health-and-safety/8570.pdf>

### **26. What is a “bowtie analysis”?**

A bowtie analysis (BTA) is an analytical method for identifying and reviewing controls intended to prevent or mitigate a specific unwanted event. For more information, see: ICMM. 2015. *Health and Safety Critical Control Management*. <http://www.icmm.com/website/publications/pdfs/health-and-safety/8570.pdf>

### **27. What are “thresholds” and “triggers”?**

Companies are responsible for defining thresholds of unacceptable critical control performance. Performance below those thresholds should trigger action, which might vary from an investigation to an order to immediately stop the relevant work processes.

For more information, see: ICMM. 2015. *Health and Safety Critical Control Management*. <http://www.icmm.com/website/publications/pdfs/health-and-safety/8570.pdf>





## USEFUL REFERENCES

ICMM. 2009. *Leadership Matters: Elimination of Fatalities*.

<https://www.icmm.com/website/publications/pdfs/health-and-safety/512.pdf>

ICMM. 2015. *Health and Safety Critical Control Management*.

<http://www.icmm.com/website/publications/pdfs/health-and-safety/8570.pdf>

ICMM. 2015. *Critical Control Management Implementation Guide*.

<http://www.icmm.com/website/publications/pdfs/health-and-safety/8570.pdf>





**APPENDIX 2: TSM SELF ASSESSMENT CHECKLIST**

**Safety and Health**

Facility Name:		Company Name:	
Assessed By:		Date Submitted:	

Supporting Documentation / Evidence:	
NAME OF DOCUMENT	LOCATION

Interviewees:			
NAME	POSITION	NAME	POSITION





SAFETY AND HEALTH PROTOCOL

	QUESTION	Y	N	NA	DESCRIPTION & EVIDENCE
<b>INDICATOR 1: COMMITMENT AND ACCOUNTABILITY</b>					
Indicator 1 Level B	1. Is demonstrated commitment to safety and health evident, including commitments related to fatality preventions?				
	2. Is a senior management representative accountable for safety and health?				
	3. Has the company developed an action plan to meet all Level A requirements?				
	<i>If you have answered "Yes" to all the Level B questions, continue to the Level A questions. If you have not answered "Yes" to all the Level B questions, assess the facility as a Level C.</i>				
Indicator 1 Level A	1. Are commitments defined and authorized by the company's senior management and consistent with the intent of the MAC Safety and Health Framework?				
	2. Is there a process in place to ensure that employees, contractors, and suppliers who work at the facility are aware of the company's safety and health commitments?				
	3. Are accountabilities and responsibilities understood at all levels?				
	<i>If you have answered "Yes" to all the Level A questions, continue to the Level AA questions. If you have not answered "Yes" to all the Level A questions, assess the facility as a Level B.</i>				
Indicator 1 Level AA	1. Has an internal audit been conducted to determine:				
	a. The degree of consistency that the commitments are applied with respect to the intent of the MAC Safety and Health Framework?				
	b. Whether accountabilities and responsibilities are understood?				
	c. Whether the commitments to safety and health have been communicated to employees, contractors, and suppliers at the facility?				
	d. Whether processes are in place to ensure that employees, contractors, and suppliers who work at the facility are aware of the safety and health commitments?				
	2. Do employees at the facility demonstrate their commitment to safety and health?				
	<i>If you have answered "Yes" to all the Level AA questions, continue to the Level AAA questions. If you have not answered "Yes" to all the Level AA questions, assess the facility as a Level A.</i>				
Indicator 1 Level AAA	1. Has an external audit been conducted to determine:				
	a. The degree of consistency that the commitments are applied with respect to the intent of the MAC Safety and Health Framework?				





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	QUESTION	Y	N	NA	DESCRIPTION & EVIDENCE
	b. Whether accountabilities and responsibilities are understood?				
	c. Whether the commitments to safety and health have been communicated to employees, contractors, and suppliers at the facility?				
	d. The effectiveness of the process in place to ensure that employees, contractors, and suppliers who work at the facility are aware of the commitments?				
	<i>If you have answered "Yes" to all the Level AAA questions, assess the facility as a Level AAA. If you have not answered "Yes" to all the Level AAA questions, assess the facility as a Level AA.</i>				
<b>ASSESSED LEVEL OF PERFORMANCE FOR INDICATOR 1</b>					Level: _____

	Question	Y	N	NA	Description & Evidence
<b>INDICATOR 2: PLANNING AND IMPLEMENTATION</b>					
Indicator 2 Level B	1. Have some safety and health management systems been established, including a clear incident notification and investigation process?				
	2. Are risk control tools identified and available?				
	3. Has the facility identified the most common tasks?				
	4. Are standard operating procedures and safe work practices in place for the facility's most common tasks?				
	5. Has the company developed an action plan to meet all Level A requirements?				
	<i>If you have answered "Yes" to all the Level B questions, continue to the Level A questions. If you have not answered "Yes" to all the Level B questions, assess the facility as a Level C.</i>				
Indicator 2 Level A	1. Is a documented safety and health management system established, implemented, and maintained? At a minimum, does it incorporate:				
	a. Objectives and targets, with supporting plans to achieve them?				
	b. A hazard identification, risk assessment (HIRA) and control processes?				
	c. Identification of high consequence hazards and related critical controls?				
	d. An industrial hygiene program?				
	e. Defined roles and responsibilities for safety and health management?				
	f. Workplace inspections?				
	g. Maintenance of safety and health records?				
2. Are resources assigned to establish, implement, maintain, and improve the safety and health management system and validate effectiveness of controls?					





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	Question	Y	N	NA	Description & Evidence
	<i>If you have answered "Yes" to all the Level A questions, continue to the Level AA questions. If you have not answered "Yes" to all the Level A questions, assess the facility as a Level B.</i>				
Indicator 2 Level AA	1. Has an internal audit been conducted to determine whether planning and implementation of the safety and health management system meets the requirements of Level A?				
	2. Have industrial hygiene risks and controls been reviewed by a qualified hygienist?				
	3. Has the facility verified that critical controls are in place and functioning, and does the definition of critical controls differentiate between critical controls, mitigating controls and underpinning controls?				
	<i>If you have answered "Yes" to all the Level AA questions, continue to the Level AAA questions. If you have not answered "Yes" to all the Level AA questions, assess the facility as a Level A.</i>				
Indicator 2 Level AAA	1. Has an external audit been conducted to determine whether planning and implementation of the safety and health management system meets the requirements of Level A?				
	2. Is the industrial hygiene program subject to the oversight of a qualified hygienist?				
	3. Have facility-specific and especially hazardous tasks been identified, and critical controls for those tasks identified through an established controls identification methodology (e.g., bowtie analysis)?				
	<i>If you have answered "Yes" to all the Level AAA questions, assess the facility as a Level AAA. If you have not answered "Yes" to all the Level AAA questions, assess the facility as a Level AA.</i>				
	<b>ASSESSED LEVEL OF PERFORMANCE FOR INDICATOR 2</b>			Level: _____	

	Question	Y	N	NA	Description & Evidence
<b>INDICATOR 3: TRAINING, BEHAVIOUR AND CULTURE</b>					
Indicator 3 Level B	1. Has basic training on safety and health hazards and risks, including high consequence tasks, been provided at the facility and are training records maintained?				
	2. Has the company developed an action plan to meet all Level A requirements?				
	<i>If you have answered "Yes" to all the Level B questions, continue to the Level A questions. If you have not answered "Yes" to all the Level B questions, assess the facility as a Level C.</i>				
Indicator 3 or 3 Level	1. Is a planned, documented, and functional safety and health training program in place that includes:				





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	Question	Y	N	NA	Description & Evidence
	a. Training needs analysis for employees, including consideration of required skills and competencies, and Orientation for employees, on-site contractors, and visitors?				
	b. The training program is implemented and includes a mechanism for review?				
	c. Training records are maintained?				
	d. Resources are assigned to implement and maintain the training program?				
	e. Trainees are assessed for competency where tasks have safety and health competency-based requirements?				
	f. Trainers are qualified to deliver safety and health training program?				
	g. Training includes hazard identification and control with a focus on prevention and proactive measures?				
	h. A job observation program supports and reinforces training to ensure routine safety checks and coaching are in place to encourage safe behaviour and work practices?				
	i. Does the facility have mechanisms in place for the participation of workers in hazard identification, risk assessment and determination of controls and considering input from workers in setting OH&S objectives?				
	<i>If you have answered "Yes" to all the Level A questions, continue to the Level A questions. If you have not answered "Yes" to all the Level A questions, assess the facility as a Level B.</i>				
Indicator 3 Level AA	1. Does the facility encourage organizational engagement in key requirements for health and safety by integrating safety and health criteria into core business processes and practices, including:				
	a. The annual business plan?				
	b. Purchasing decisions?				
	c. Performance appraisal processes?				
	d. The compensation system (i.e. compensation is affected by safety and health performance)?				
2. Do the facility's programs promote and encourage health and wellness, including mental health, and a healthy lifestyle?					
<i>If you have answered "Yes" to all the Level AA questions, continue to the Level AAA question. If you have not answered "Yes" to the Level AA questions, assess the facility as a Level A.</i>					
Indicator 3 Level AAA	1. Is the commitment to safety and health visibly embedded throughout the facility?				
	2. Does facility management visibly demonstrate commitment with one-on-one interactions with employees?				
	3. Are trainers are assessed for effectiveness?				





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	Question	Y	N	NA	Description & Evidence
	4. Is a program developed to support worker mental health and provide assistance when required?				
<i>If you have answered "Yes" to all the Level AAA questions, assess the facility as a Level AAA. If you have not answered "Yes" to all the Level AAA questions, assess the facility as a Level AA.</i>					
<b>ASSESSED LEVEL OF PERFORMANCE FOR INDICATOR 3</b>					Level: _____

	Question	Y	N	NA	Description & Evidence
<b>INDICATOR 4: MONITORING AND REPORTING</b>					
<b>Indicator 4 Level B</b>	1. Are some basic safety and health metrics monitored and reported to facility management on a regular basis, beyond regulatory requirements?				
	2. Are key performance indicators reported or posted within the facility?				
	3. The company has developed an action plan to meet all Level A requirements.				
	<i>If you have answered "Yes" to all the Level B questions, continue to the Level A questions. If you have not answered "Yes" to all the Level B questions, assess the facility as a Level C.</i>				
<b>Indicator 4 Level A</b>	1. Is there a, documented safety and health monitoring and reporting program in place that includes:				
	a. Performance metrics that are clearly defined, consistently applied, regularly assessed (including against broader industry performance), and internally reported?				
	b. Performance metrics used to analyze trends for informing decisions and guiding continuous improvement?				
	c. A monitoring program that includes tracking and internal reporting of leading and lagging indicators, safety and health and industrial hygiene inspection and monitoring, health surveillance, and incident investigation and follow up?				
	d. A safety and health audit program in place, and compliance audits and management system audits conducted in accordance with the audit plan?				
	e. The monitoring and audit programs include a focus on high consequence hazards?				
	f. The facility assesses the adequacy and effectiveness of its safety and health management system annually and makes recommendations on how to make continual improvement?				





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	Question	Y	N	NA	Description & Evidence
	g. Regular management review of safety and health performance for the purpose of continual improvement and to inform decision-making?				
	h. Results of workplace monitoring, inspection and follow-up action are recorded and communicated within the facility?				
	i. Safety and health performance communicated to the public on at least an annual basis?				
	<i>If you have answered "Yes" to all the Level A questions, continue to the Level AA questions. If you have not answered "Yes" to all the Level A questions, assess the facility as a Level B.</i>				
Indicator 4 Level AA	1. Has an internal audit been conducted to determine whether the safety and health data and information collection, compilation and reporting meets the requirements of level A?				
	2. Are thresholds and triggers related to the performance of critical controls in the process of being developed and implemented, with some thresholds and triggers already in place?				
	3. Does the monitoring and audit programs include a focus on critical controls?				
	<i>If you have answered "Yes" to all the Level AA questions, continue to the Level AAA question. If you have not answered "Yes" to the Level AA questions, assess the facility as a Level A.</i>				
Indicator 4 Level AAA	1. Has an external audit been conducted to determine whether the safety and health data and information collection, compilation and reporting meets the requirements of level A?				
	2. Has an internal evaluation of effectiveness been conducted, and is a tracking process in place for opportunities for improvement identified? Does this include evaluation of the quality of investigations and the close-out of actions, contributing to a culture of continuous improvement?				
	<i>If you have answered "Yes" to all the Level AAA questions, assess the facility as a Level AAA. If you have not answered "Yes" to all the Level AAA questions, assess the facility as a Level AA.</i>				
<b>ASSESSED LEVEL OF PERFORMANCE FOR INDICATOR 4</b>					Level: _____

	Question	Y	N	NA	Description & Evidence
<b>INDICATOR 5: PERFORMANCE</b>					
Indicator 5 Level B	1. Are safety and health performance targets set for employees of the facility?				
	2. Are targets communicated to employees?				





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	Question	Y	N	NA	Description & Evidence
	3. Has the company developed an action plan to meet all Level A requirements?				
	<i>If you have answered "Yes" to all the Level B questions, continue to the Level A questions. If you have not answered "Yes" to all the Level B questions, assess the facility as a Level C.</i>				
Indicator 5 Level A	1. Do performance targets include on-site contractors?				
	2. Is facility management involved in setting, reviewing, and improving performance relative to targets?				
	3. Are performance results communicated to employees and on-site contractors?				
	4. Is the facility fatality-free in the reporting year?				
	<i>If you have answered "Yes" to all the Level A questions, continue to the Level AA questions. If you have not answered "Yes" to all the Level A questions, assess the facility as a Level B.</i>				
Indicator 5 Level AA	1. Are performance targets set for both leading and lagging indicators?				
	2. Does senior facility management regularly review site targets and improvement plans through meetings?				
	3. Does the facility (or company) benchmark its safety and health performance against its peers?				
	<i>If you have answered "Yes" to all the Level AA questions, continue to the Level AAA question. If you have not answered "Yes" to all the Level AA questions, assess the facility as a Level A.</i>				
Indicator 5 Level AAA	1. Has the facility consistently met its continual improvement performance targets (at least 3 of the last 4 years) and is it fatality-free over the entire four-year period?				
	2. Does the facility externally audit its safety and health performance to ensure accuracy and reliability?				
	<i>If you have answered "Yes" to all the Level AAA questions, assess the facility as a Level AAA. If you have not answered "Yes" to all the Level AAA questions, assess the facility as a Level AA.</i>				
	<b>ASSESSED LEVEL OF PERFORMANCE FOR INDICATOR 5</b>				<b>Level: _____</b>





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