

TSM 101: A Primer





Junior Mechanical Engineer at Agnico Eagle's Goldex mine in Quebec. Photo credit: Agnico Eagle Mines by Mathieu Dupuis.

This document provides an overview of *Towards Sustainable Mining (TSM)* - a globally recognized sustainability program that supports mining companies in managing key environmental and social risks.

First established by the Mining Association of Canada in 2004, *TSM* is increasingly viewed by mining companies, governments, investors, and manufacturers as an important tool to ensure that metals and minerals are produced responsibly. In recent years, mining associations in Quebec, Spain, Finland, Norway, Botswana, Argentina, Brazil, Australia, Colombia and the Philippines have adopted the program.

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What is TSM?

TSM is a globally recognized sustainability program that supports mining companies in managing key environmental and social risks. *TSM* was the first responsible mining standard in the world to require site-level assessments with external verification and is mandatory for all companies that are members of implementing associations.

Through *TSM*, eight critical aspects of social and environmental performance are evaluated, independently validated, and publicly reported against 30 distinct performance indicators.

At its core, TSM is:

Accountable: Assessments are conducted at the facility level where the mining activity takes place – the first sustainability standard in the world to do this in the mining sector. Publicly reported results provide local communities and others with an interest in a mine site's operations with a detailed look at the sustainability performance of mines and metallurgical facilities.

Transparent: Mining companies publicly report their facilities' performance against the performance indicators on the websites of implementing associations. Results are externally verified by qualified auditors and experts every three years.

Credible: *TSM* is overseen by an independent Community of Interest (COI) Advisory Panel. This multi-interest group helps mining companies and communities of interest foster dialogue, improve the industry's performance and continually improve the *TSM* program.

Measuring, verifying and reporting performance where it counts – at the mine site.



Innovation at work at Newmont's all electric Borden Mine.

TSM Guiding Principles

In each country where *TSM* is adopted by the national mining association, a set of guiding principles is developed that outlines commitments to sustainability that will be supported by concrete protocols, indicators, and criteria in the *TSM* program. The Mining Association of Canada's *TSM Guiding Principles* read as follows:

As members of the Mining Association of Canada, our role is to responsibly meet society's needs for minerals, metals and energy products. To achieve this, we engage in the exploration, discovery, development, production, distribution and recycling of these products. We believe that our opportunities to contribute to and thrive in the economies in which we operate must be earned through a demonstrated commitment to sustainable development.

Accordingly, our actions must demonstrate a responsible approach to social, economic and environmental performance that is aligned with the evolving priorities of our communities of interest. Our actions must reflect a broad spectrum of values that we share with our employees and communities of interest, including honesty, transparency and integrity. And they must underscore our ongoing efforts to protect our employees, communities, customers and the natural environment.

We will demonstrate leadership worldwide by:

- Involving communities of interest in the design and implementation of *TSM*.
- Proactively seeking, engaging and supporting dialogue regarding our operations.
- Fostering leadership throughout our companies to achieve sustainable resource stewardship wherever we operate.
- Conducting all facets of our business with excellence, transparency and accountability.
- Protecting the health and safety of our employees, contractors and communities.

- Respecting the rights of our workers and not engaging in practices of forced or child labour, as defined in ILO Conventions 29, 138 and 182.
- Contributing to global initiatives to promote the production, use and recycling of metals and minerals in a safe and environmentally responsible manner.
- Seeking to minimize the impact of our operations on the environment and biodiversity, through all stages of development, from exploration to closure.
- Working with our communities of interest to address legacy issues, such as orphaned and abandoned mines.
- Practicing continuous improvement through the application of new technology, innovation and best practices in all facets of our operations.



Water samples are collected at Key Lake as part of the environmental management system.



Protecting the environment includes the surrounding watersheds near Cameco's northern Saskatchewan operations. Cameco performs more than 20,000 water analyses each year.

In all aspects of our business and operations, we will:

- Respect human rights and treat those with whom we deal fairly and with dignity.
 - Respect the cultures, customs and values of people with whom our operations interact.
 - Recognize and respect the unique role, contribution and concerns of Indigenous peoples in Canada (First Nations, Inuit and Métis) and around the world.
 - Obtain and maintain business through ethical conduct.
 - Comply with all laws and regulations in each country where we operate and apply the standards reflecting our adherence to these guiding principles and our adherence to best international practices.
 - Support the capability of communities to participate in opportunities provided by new mining projects and existing operations.
 - Be responsive to community priorities, needs and interests through all stages of mining exploration, development, operations and closure.
- Provide lasting benefits to local communities through self-sustaining programs to enhance the economic, environmental, social, educational and health care standards they enjoy.

Our actions must reflect a broad spectrum of values that we share with our employees and communities.

TSM Protocols

TSM is comprised of eight protocols that support mining companies in developing management systems and meeting other requirements to achieve the commitments laid out in the *TSM Guiding Principles*. These protocols go beyond regulatory or legislative requirements, to which companies are already expected to adhere.

Each protocol is made up of a set of indicators that help mining facilities build, measure and publicly report on the quality of their management systems and their performance.

The most up-to-date versions of the protocols are available on the Mining Association of Canada's website in English, French and Spanish at www.mining.ca/towards-sustainable-mining/protocols-frameworks.



COMMUNITIES AND PEOPLE

1. Indigenous and Community Relationships

Building strong relationships with our communities of interest, in particular Indigenous communities, is a fundamental component of TSM. The indicators of the Indigenous and Community Relationships Protocol are supported by detailed criteria to determine whether:

- Processes are in place to identify communities of interest, including Indigenous communities and organizations.
- Processes have been established to support the development and maintenance of meaningful relationships with communities of interest.
- Mining facilities are actively building meaningful relationships and implementing engagement and decision-making processes with Indigenous communities.

- Processes have been established to mitigate adverse community impacts and optimize social benefits generated from facilities.
- Processes are in place to respond to incidents, concerns, and feedback from communities of interest.

2. Safety and Health

Protecting the health and safety of employees, contractors and communities is deeply ingrained in the culture of the mining industry. The indicators of the Safety and Health Protocol determine whether a facility:

- Has made senior management accountable for the safety and health of employees and contractors.
- Has processes in place to prevent incidents.
- Sets safety and health targets for continuous improvement and meets them.
- Monitors and publicly reports safety and health performance.
- Conducts risk-based training for all employees, contractors and visitors, and fosters a culture of safety.

3. Crisis Management and Communications Planning

The Crisis Management and Communications Planning Protocol provides mining companies with the tools needed to effectively manage and communicate about a crisis at a facility or at the corporate level. Where the crisis is caused by a physical emergency, such as a fire or flood, the tools offered in this protocol are intended to work in conjunction with emergency response plans at the facility.

The indicators of the Crisis Management and Communications Planning Protocol determine whether a company's corporate office and facilities:



Teck Greenhills Operations located near Elkford, British Columbia.

- Have developed crisis management and communications plans and have teams in place to support the execution of these plans.
- Engage with local emergency responders such as fire, police and ambulance.
- Regularly review crisis management and communications plans and conduct crisis simulation training exercises.

The [Crisis Management and Communications Planning Reference Guide](#) provides recommendations, suggestions and examples to support companies in implementing this protocol.

4. Preventing Child and Forced Labour

The Preventing Child and Forced Labour Protocol requires companies to verify that processes are in place to ensure that neither child nor forced labour, as defined by the relevant International Labour Organization conventions, occur at facilities that implement TSM.

The indicators of the Preventing Child and Forced Labour Protocol require companies to verify that:

- There are processes in place commensurate to jurisdictional risks to ensure that forced labour is not used, that no child under the age of 15 is

employed, and that no child under 18 engages in particularly hazardous work.

- Supply chains and recruitment agencies are monitored for human trafficking and forced labour, where there is a high risk of forced labour.

ENVIRONMENT AND CLIMATE CHANGE

5. Biodiversity Conservation Management

TSM supports mining companies in adopting best practices in biodiversity conservation management through all stages of a mine's life cycle. The indicators of the Biodiversity Conservation Management Protocol determine whether a facility:

- Has made formal commitments to manage biodiversity at the site.
- Has identified significant biodiversity aspects and is implementing action plans.
- Partners with interested stakeholders on conservation planning.
- Publicly reports on its biodiversity activities and performance.

6. Tailings Management

Tailings facilities are necessary components of mining activity, but it is crucial that these facilities be managed responsibly to protect human safety and the environment. As part of *TSM*, the Mining Association of Canada has developed tailings management guides that are used around the world. These include [A Guide to the Management of Tailings Facilities](#) (the Tailings Guide) and [Developing an Operation, Maintenance and Surveillance Manual for Tailings and Water Management Facilities](#) (the OMS Guide). The guides outline best practices in safe tailings management for facilities and the Tailings Management Protocol measures adherence to these guides, determining whether a facility:

- Has a policy and commitments in place to safely manage tailings facilities.
- Has implemented a tailings management system that conforms with the guides mentioned above.
- Has assigned accountability for tailings management to both a senior executive and the company's board of directors.
- Conducts an annual tailings management review.
- Has implemented an Operation, Maintenance and Surveillance Manual that conforms with the OMS Guide.

7. Water Stewardship

The Water Stewardship Protocol includes a set of performance indicators to measure water management at the mine site and engagement in multi-stakeholder activities to govern and manage watershed activities.

The indicators of the Water Stewardship Protocol determine whether a facility:

- Has a commitment and accountabilities in place and has communicated to relevant communities of interest to support water stewardship.
- Has implemented an operational water management system.
- Participates in watershed-scale planning.
- Conducts water reporting focused on performance outcomes at the site level.

8. Climate Change

The *TSM* Climate Change Protocol is designed to support mining companies in managing their climate-related risks and opportunities, including associated mitigation and adaptation strategies, target-setting, and reporting. The indicators of this protocol determine whether a company has:

- Corporate commitments, governance, and processes at the board and management levels to support the consideration of climate change implications in business strategy.
- Facility-level systems to manage energy, GHG emissions, physical climate impacts and adaptation.
- Facility-level energy and GHG emissions performance targets and annual reporting on energy, GHG emissions, potential physical climate impacts, and adaptation measures.

How protocols are developed

The development of *TSM* protocols is a multi-stage process. For many protocols, this starts with a framework or set of commitments that sets the parameters for the development of performance indicators. Members of the national mining association and the multi-interest advisory body work collaboratively and iteratively, often for a year or more, to develop a new protocol or revise an existing one. The independent advisory body plays a particularly important role in validating the credibility and rigour of the *TSM* protocols to ensure that they match emerging expectations from a wide range of groups with an interest in the sustainability of mining activities.

TSM Protocols and Indicators

Each *TSM* protocol is made up of a set of indicators with detailed criteria designed to measure the quality and comprehensiveness of relevant management systems.

COMMUNITIES AND PEOPLE				ENVIRONMENT AND CLIMATE CHANGE			
Indigenous and Community Relationships	Crisis Management and Communications Planning	Safety and Health	Preventing Child and Forced Labour	Tailings Management	Biodiversity Conservation Management	Water Stewardship	Climate Change
Community of Interest (COI) identification	Crisis management preparedness	Policy, commitment and accountability	Preventing forced labour	Tailings management policy and commitment	Corporate biodiversity conservation commitment, accountability and communications	Water governance	Corporate climate change management
Effective COI engagement and dialogue	Review	Planning, implementation and operation	Preventing child labour	Tailings management system	Facility-level biodiversity conservation planning and implementation	Operational water management	Facility climate change management
Effective Indigenous engagement and dialogue	Training	Training, behaviour and culture		Assigned accountability and responsibility for tailings management	Biodiversity conservation reporting	Watershed-scale planning	Facility performance targets and reporting
Community impact and benefit management		Monitoring and reporting		Annual tailings management review		Water reporting and performance	
COI response mechanism		Performance		Operation, maintenance and surveillance manual			

TSM Performance Rating System

Each year, mining facilities assess their performance on the *TSM* protocols. For each indicator, facilities assign a letter grade that reflects their performance. These performance results are published on the website of each national mining association that implements *TSM*, and externally verified every three years.

Most protocols assess performance on a Level C to Level AAA scale, with each performance level described in the diagram to the right. The Crisis Management and Communications Planning Protocol and the Preventing Child and Forced Labour Protocol use a different, Yes-No rating system, which simply assesses whether a company has met or not met the requirements.

The aim of associations that implement *TSM* is to have all of their member facilities achieve a Level A or better in all indicators and meet all of the requirements of the Crisis Management and Communications Planning Protocol and Preventing Child and Forced Labour Protocols.

The goal is for each facility to achieve Level A or higher in all performance areas.

AAA	Excellence and leadership.
AA	Systems and process are integrated into management decisions and business functions.
A	Good practice. Systems and processes are developed and implemented.
B	Procedures exist but are not fully consistent or documented. Systems and processes are planned and being developed.
C	No systems are in place. Activities tend to be reactive. Procedures may exist but are not integrated into policies and management systems.

TSM Reporting and Verification Process

In order to ensure the credibility, accountability, and transparency of the TSM program, there are a number of processes in place to validate that published TSM performance results present an accurate picture of each facility's management systems and performance.

Self-Assessment: Facilities annually self-assess their performance against all indicators under the TSM protocols using the rating system described on the previous page. These results are published on the websites of the national mining associations that implement TSM.

External Verification: Every three years, a trained and accredited verifier critically reviews a company's self-assessments to determine if there is adequate evidence to support the performance ratings reported. Verifiers are experienced independent auditors and technical experts. Verifiers are able to change companies' self-assessed ratings to ensure they accurately reflect evidence of the facility's management practices and performance.

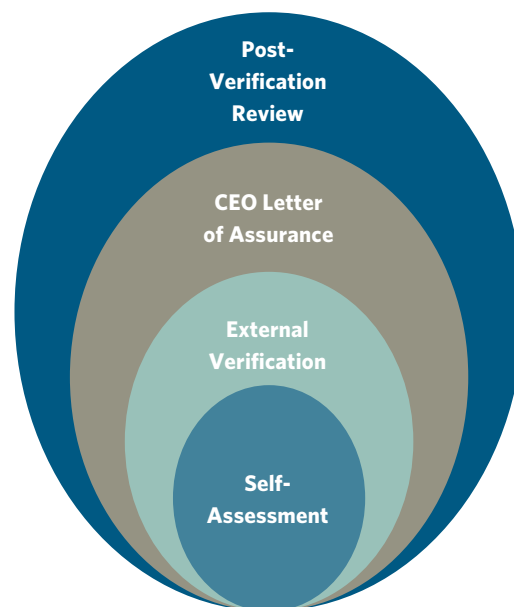
In conducting an external verification, the verifier and the company that they are verifying must adhere to the requirements of the *Terms of Reference for Verifiers*, available on the Mining Association of Canada's website. This includes requirements such as: advance notice of the verification to communities of interest, recognized audit credentials for verifiers, and a quality review of verifications by a third party.

CEO Letter of Assurance: In the year of external verification, a company's CEO, or equivalent, is required to submit a letter to MAC that confirms the external verification has been conducted in accordance with the Terms of Reference for Verifiers. These letters are posted alongside companies' published results on the websites of their national mining associations.

Post-Verification Review: Each year, the Community of Interest Advisory Panel (an independent, multi-interest advisory body) selects a sample of companies to present and discuss their TSM results.

The review process allows the national advisory body to examine facilities' management systems and processes and to engage in dialogue around the challenges faced by facilities around key sustainability issues.

LAYERS OF VERIFICATION



Community of Interest Advisory Panel

In each jurisdiction where *TSM* is adopted by the national mining association, there is a requirement to establish a national, multi-interest advisory body. In the Canadian context, this body is called the Community of Interest Advisory Panel (commonly referred to as “the COI Panel”).

This independent advisory body is comprised of individuals from Indigenous groups, mining communities, non-governmental organizations, and organized labour, among others. The Mining Association of Canada also selects a few representatives to participate in the panel on an ex-officio basis.

The Panel serves as a platform to discuss and collaborate on issues related to *TSM* that are of interest to communities of interest and the mining industry. The panel holds formal meetings twice per year to provide advice on *TSM*. These meetings also involve in-depth dialogue around sustainability issues of continued or emerging importance for the mining industry and its communities of interest.

Another role played by the COI Panel is in relation to the post-verification review process, a key component of the *TSM* assurance framework, as described on a previous page.

More information about the Mining Association of Canada’s COI Panel can be found on the association’s website.



A New Gold employee helps youth from local Indigenous schools plant culturally important shrubs at the company’s New Afton operation in Kamloops, British Columbia.

In each jurisdiction where *TSM* is implemented, the association must build a Community of Interest Advisory Panel - a multi-interest advisory body that reflects a cross-section of societal interests and perspectives. Common categories include:

Indigenous	Individuals who represent the interests of Indigenous Canadians, including First Nations, Inuit and Métis.
Environmental NGO	Individuals with environmental expertise and experience in advocacy for environmental protection.
Economic and community development	Individuals with expertise in business development at the community level and knowledge of community interactions with mining facilities.
Social NGO, including faith-based groups	Individuals who represent civil society with knowledge of social justice issues.
Finance and investment	Individuals with financial expertise and knowledge of socially responsible investing.
International development	Individuals with expertise in alleviating poverty and improving the standard of living through responsible development.
Labour and workplace	Individuals with knowledge of the interests, safety and needs of workers.
Mining company representatives (ex-officio)	Senior representatives of mining companies that are members of the national association.

Governance of TSM

The governance and decision-making process for the *TSM* program involves several groups and committees - both internal and external to the national mining association. Each of these groups has an important role to play in ensuring the credibility, transparency, accountability, and continual improvement of the program.

BOARD OF DIRECTORS

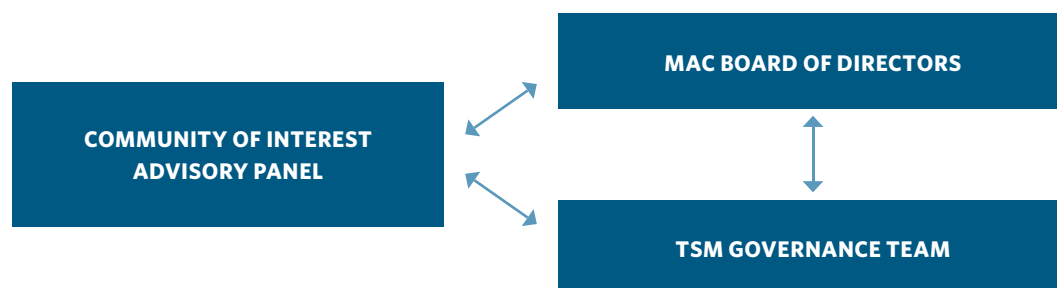
In the Canadian context, one representative of each Mining Association of Canada member company sits on the association's Board of Directors. While the MAC Board has many responsibilities beyond the scope of the *TSM* program, its role with respect to *TSM* is to set overall objectives and approve any major decisions related to the program.

The MAC Board aims to achieve consensus on all decisions related to *TSM*. In practice, the MAC Board will only consider a decision if the Community of Interest Advisory Panel (COI Panel) is comfortable with the direction proposed.

TSM GOVERNANCE TEAM

A sub-committee of the Board of Directors, the *TSM* Governance Team, is responsible for the strategic direction of *TSM*. This sub-committee reviews and considers issues of relevance to the national *TSM* program and, when needed, recommends decisions to the Board of Directors.

As with the decision-making process for the Board of Directors, the *TSM Governance Team* aims to achieve consensus when recommending decisions to the Board. In practice, the *TSM Governance Team* will not recommend a decision to the Board until the COI Panel is comfortable with the direction being proposed.



TSM Implementation

Companies that have recently joined a mining association that implements *TSM* or facilities that have recently entered into production have three years to start publicly reporting *TSM* performance. This phase-in allows companies to conduct a gap analysis, implement management systems and train relevant personnel. In Canada, prospective members of the Mining Association of Canada are also required to conduct an initial *TSM* self-assessment as part of their application for membership.

Year 1: Gap analysis, *TSM* implementation and training

The first step in *TSM* implementation is to ensure that all relevant personnel are trained on the *TSM* protocols. This is an essential step in ensuring that *TSM* is consistently applied at all participating facilities.

Following training, facilities conduct a gap analysis of existing management systems against the *TSM* protocols. This helps the facility to identify any critical gaps and typically results in an action plan to meet Level A performance.

Year 2: Self-assessment and aggregate - level reporting

The facility conducts its first self-assessment and submits these results on a confidential basis to their national mining association. These results are then included in anonymized, industry-level reporting of *TSM* reporting on the association's website. This step gives the company and its facilities an opportunity to become familiar with the reporting process.

Year 3: Self-assessment and public facility-level reporting

The next step is to publicly report facility-level results on the association website, alongside a company profile that describes the results and the company's plans to address any gaps.

Year 4: External verification of self-assessment

The facility coordinates its first external verification process and is responsible for selecting a qualified professional from the approved list of verifiers. The external verification process is described on a previous page.



Over the past 10 years, Agnico Eagle has worked closely with its community partners to create education, training, high-quality jobs and business opportunities in Nunavut.

Training

Comprehensive training is available to facilities that are implementing *TSM*.

Companies can access the self-paced, *TSM* online training platform on the Mining Association of Canada's website: www.learn.vubiz.com/ChAccess/TMAC/Default.asp

To request an in-person or virtual training session, companies can reach out to their national mining association contact.

Global Uptake of TSM

The Mining Association of Canada is supporting other national mining associations to improve their sustainability practices by freely sharing the TSM program.

As of early 2022, eleven national mining associations have adopted TSM, including the mining associations of Canada, Quebec, Finland, Argentina, Botswana, the Philippines, Spain, Brazil, Norway, Colombia and Australia.

Each mining association can tailor its performance areas and approach to reflect their unique national contexts. However, there are core components that associations must implement in order to maintain the high standards of TSM as it is adopted around the world.

These core components include:

- 1. Guiding Principles:** Associations must commit to a set of Guiding Principles that reflect the environmental and social goals of the industry and its communities of interest.
- 2. Performance Indicators:** Associations must implement performance indicators to measure success in adhering to those Guiding Principles.
- 3. Facility-Level Reporting:** Performance indicators must be assessed at the facility level and the results of these assessments must be publicly reported.

4. Independent Verification: Associations must implement an appropriate framework for independent verification of performance to ensure that facilities' self-assessed results accurately reflect performance.

5. Condition of Membership: TSM must be a condition of membership in the implementing association.

6. Multi-Interest Advisory Body: Associations must establish an independent, multi-interest advisory body that represents challenging interests and a broad spectrum of societal perspectives. This body must work closely with the association to support the governance and implementation of TSM.

Companies with operations in two or more TSM implementing jurisdictions can choose how they approach TSM implementation. For example, the company could use the national version of TSM in each jurisdiction, or one national version of TSM in all jurisdictions where it operates.



Alignment with Global Standards

As other mining sustainability standards have emerged in recent years, *TSM* has played a leading role in fostering collaboration among these standards. Increasingly, global investors are looking to *TSM* performance data to make sustainable investment decisions and supply chain stakeholders, like automotive and tech companies, are interested in using responsibly sourced minerals and metals from mines that implement *TSM*.

RESPONSIBLE SOURCING ALIGNMENT SUPPLEMENT

With the *TSM* Responsible Sourcing Alignment Supplement, mine sites can use their *TSM* performance to meet the requirements of four other global standards, including:

- The International Council on Mining and Metals' Mining Principles
- The World Gold Council's Responsible Gold Mining Principles
- The International Copper Alliance's Copper Mark
- The Responsible Minerals Initiative's Risk Readiness Assessment.

Other standards are in the process of being added to this list. Facilities interested in using this tool to support alignment with other sustainability standards should contact their national mining association for more information.

Other Alignment Efforts

The Mining Association of Canada has also worked with the Responsible Jewellery Council to develop and pilot and *Integrated Audit Protocol*, which allows for a single, streamlined audit to meet the requirements of both standards. Other sustainability standards are in the process of being added to this tool.

In 2021, the London Metals Exchange recognized *TSM* as an equivalent environment and safety program and includes *TSM* in the LMEpassport - a register of electronic certificates of analysis and digital credentials.

TSM is also well aligned with the Global Industry Standard on Tailings Management, introduced in 2020, including on requirements related to governance, community relationships and water stewardship. Amendments were made to the Mining Association of Canada's *A Guide to the Management of Tailings Facilities* in 2021 to improve alignment with the Global Industry Standard and application of the *TSM* Tailings Management Protocol will be expanded to closed and inactive sites.

TSM Milestones

YEAR	EVENT
1999	Partially in response to the Whitehorse Mining Initiative of the early 1990s, the Mining Association of Canada's (MAC) Board of Directors establishes a Task Force to consider a sustainability initiative, which is a precursor to the TSM Governance Team.
2002	<i>TSM Guiding Principles</i> are developed. Development of <i>TSM</i> protocols begins.
2004	<i>TSM</i> is launched with four protocols (Tailings Management, Crisis Management, External Outreach and Energy Use and GHG Emissions Management). COI Advisory Panel is formed.
2005	MAC wins the Globe Foundation Award for Environmental Excellence.
2006	First round of external verification by all MAC member facilities.
2011	Two new <i>TSM</i> protocols are introduced (Biodiversity Conservation Management, Safety and Health).
2012	MAC wins the Prospectors and Developers Association of Canada Environmental and Social Responsibility Award.
2013	MAC and Stratos are recognized with the Excellence in Corporate Social Responsibility Award for <i>TSM</i> .
2015	The Finnish Mining Association adopts <i>TSM</i> .
2016	The Argentinean Chamber of Mining Companies adopts <i>TSM</i> .
2017	The Chamber of Mines of the Philippines and the Botswana Chamber of Mines adopt <i>TSM</i> . The Preventing Child and Forced Labour Protocol is introduced.
2018	Spain's national mining association adopts <i>TSM</i> .
2019	The Water Stewardship Protocol is introduced. The Brazilian Mining Association adopts <i>TSM</i> .
2020	The Norwegian Mining and Quarrying Industries Association adopts <i>TSM</i> . The <i>TSM</i> Responsible Sourcing Alignment Supplement is introduced, supporting companies to use <i>TSM</i> to align with the requirements of the International Council on Mining and Metals' Mining Principles, the World Gold Council's Responsible Gold Mining Principles, the International Copper Alliance's Copper Mark, and the Responsible Minerals Initiative's Risk Readiness Assessment.
2021	The Minerals Council of Australia and the Mining Association of Colombia adopt <i>TSM</i> . The London Metals Exchange recognizes <i>TSM</i> as an equivalent environment and safety program and includes <i>TSM</i> in the LMEpassport.

