

TOWARDS SUSTAINABLE MINING®

2019 HIGHLIGHTS



Towards Sustainable Mining
Vers le développement minier durable

PARTICIPATING ASSOCIATIONS



The Mining Association of Canada (MAC) established the *Towards Sustainable Mining*[®] (TSM[®]) initiative in 2004 and participation in TSM is mandatory for its members. Since then, the Québec Mining Association, the Finnish Mining Association, Cámara Argentina de Empresarios Mineros (the national mining association in Argentina), the Botswana Chamber of Mines, the Confederación nacional de empresarios de la minería y de la metalurgia (the national mining association in Spain) and the Chamber of Mines of the Philippines have adopted TSM for their members. This year, Instituto Brasileiro de Mineração, the national mining association in Brazil, became the latest national mining association to join TSM. This booklet describes how MAC members are implementing TSM in Canada.

In 2018, 64 facilities from 22 companies reported TSM performance. Detailed results can be found in the *2019 TSM Progress Report* available at www.mining.ca. 2019 was an exciting year for TSM with the official unveiling of the new *TSM Water Stewardship Protocol* and the updated *TSM Tailings Management Protocol*. Both of these Protocols provide important standards that raise the bar for mining industry practices when it comes to environmental performance.

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Cover photo: Protecting people and the environment are top priorities; regular water monitoring is conducted near Cameco's Cigar Lake facility in northern Saskatchewan.

WHAT IS TOWARDS SUSTAINABLE MINING?

TSM is an award-winning performance system that helps mining companies evaluate and manage their environmental and social responsibilities. It is a set of tools and indicators to drive performance and ensures that key mining risks are managed responsibly at participating mining and metallurgical facilities.

Participation in *TSM* is mandatory for MAC's members. This involves subscribing to *TSM's Guiding Principles*, which are backed by specific performance indicators that member companies publicly report on annually in *TSM Progress Reports*.

By adhering to *TSM's Guiding Principles*, mining companies exhibit leadership by:

- Engaging with communities.
- Driving world-leading environmental practices.
- Committing to the safety and health of employees and surrounding communities.

Today, communities expect more of mining companies and the industry expects much more of itself. *TSM* helps mining companies meet society's needs for minerals, metals and energy products in the most socially, economically and environmentally responsible way. At its core, *TSM* is:

ACCOUNTABLE

Assessments are conducted at the facility level where mining activity takes place.

TRANSPARENT

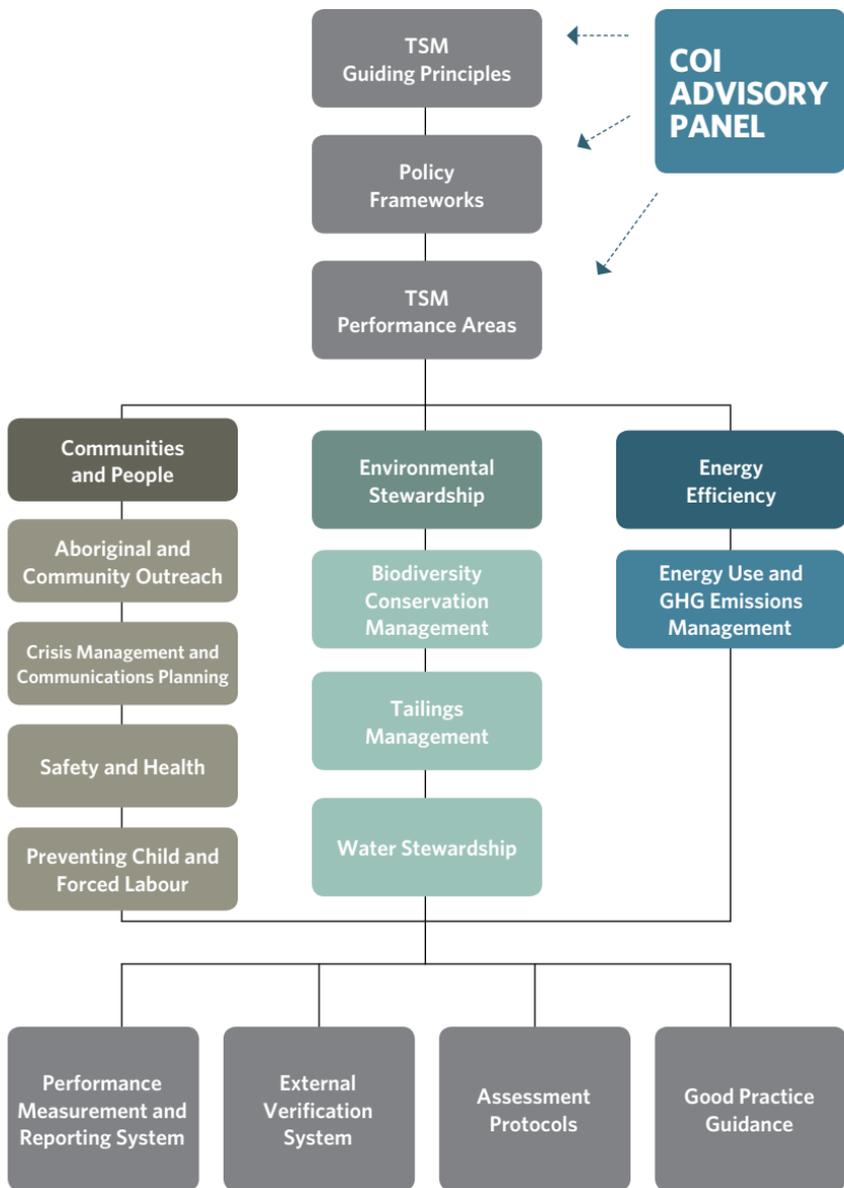
Mining facilities publicly report their performance against the *TSM* indicators in the annual *TSM Progress Report* and results are externally verified every three years.

CREDIBLE

TSM is overseen by an independent Community of Interest (COI) Advisory Panel, which shapes the program for continual advancement.

PERFORMANCE DRIVEN

Includes a requirement to demonstrate measurable continual sustainability improvement.



HOW TSM WORKS

To translate commitments into action on the ground, *TSM*'s eight performance Protocols focus on three core areas: **Communities and People**, **Environmental Stewardship** and **Energy Efficiency**.

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 in key areas of mining activity.

MEASURING, VERIFYING AND REPORTING PERFORMANCE WHERE IT COUNTS – AT THE MINE-SITE.

TSM PROTOCOLS AND INDICATORS

Communities and People

Aboriginal and
Community
Outreach

Crisis Management
and Communications
Planning

Safety and Health

Preventing
Child and Forced
Labour

COI
identification

Crisis management
and communications
preparedness

Commitment and
accountability

Preventing forced
labour

Effective COI
engagement and
dialogue

Review

Planning and
implementation

Preventing child
labour

COI response
mechanism

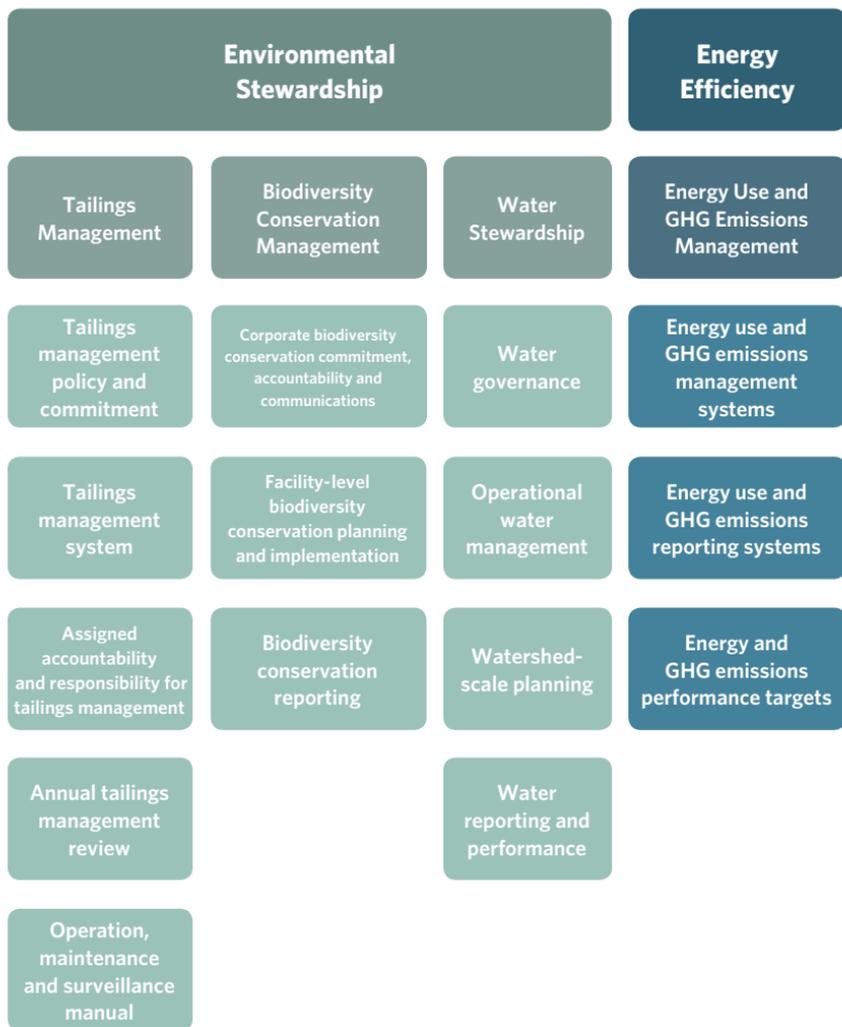
Training

Training,
behaviour
and culture

Reporting

Monitoring
and reporting

Performance



**THE GOAL IS FOR EACH FACILITY
TO ACHIEVE LEVEL A OR HIGHER
IN ALL PERFORMANCE AREAS.**

Syncrude Canada Ltd. employees collect biological matter at the oil sands mining industry's first commercial demonstration of water-capped tailings technology.

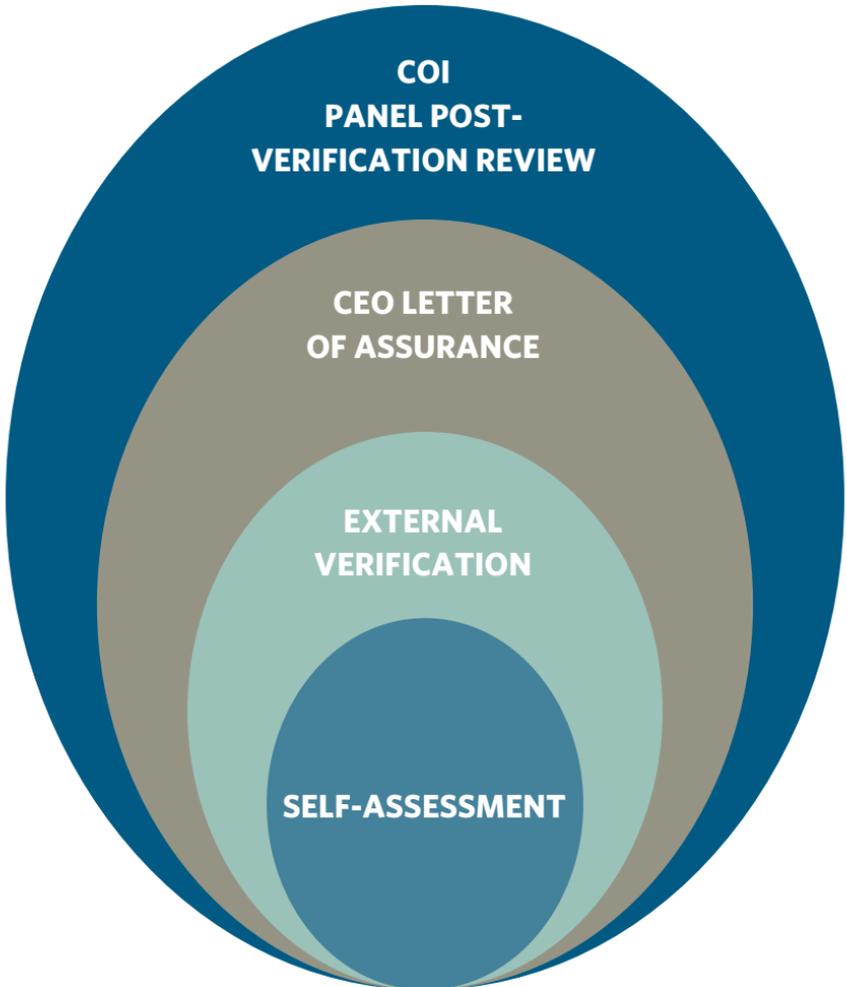
TSM PERFORMANCE RATING SYSTEM

Mining operations annually self-assess their performance against each of the TSM indicators. For each indicator, they assign a letter grade that reflects their performance ranging from Level C to Level AAA. For the *TSM Crisis Management and Communications Planning Protocol*, facilities and head offices are assessed based on a “yes” or “no” rating scale; the *TSM Preventing Child and Forced Labour Protocol* similarly assesses facilities based on a “yes” or “no” rating scale. These grades are made public in the annual *TSM Progress Report* for each facility (available on www.mining.ca).

One of the key strengths of TSM is that mining companies are measured where the mining activity actually takes place – at the facility level. The results provide local communities with a meaningful view of how a nearby mine is faring.

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

LAYERS OF TSM VERIFICATION



TSM VERIFICATION PROCESS

TSM requires a number of checks and balances to ensure that reported results are accurate. Every year, a facility is required to undergo a self-assessment to determine its level of performance. Every three years, an external verifier reviews a company's self-assessments at each of their facilities to determine if there is adequate evidence to support the reported ratings. The company's CEO (or equivalent) is also required to submit a Letter of Assurance confirming that the verification followed *TSM*'s requirements.

Each year, a sample of companies is selected by the Community of Interest (COI) Advisory Panel to present their verified results, providing another opportunity to validate their performance. Letters of Assurance and the COI Advisory Panel's post-verification review reports are publicly available at www.mining.ca.

**THROUGH TSM, CANADA'S MINING
INDUSTRY WAS THE FIRST IN THE WORLD
TO REQUIRE EXTERNAL VERIFICATION OF
SITE-LEVEL PERFORMANCE.**

COI ADVISORY PANEL CORE CATEGORIES

Aboriginal peoples	Individuals who represent the interests of Aboriginal Canadians, including First Nations, Inuit and Métis.
Environmental NGO	Individuals with environmental expertise and advocates 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.
Ex-officio Members <ul style="list-style-type: none"> ▪ MAC Board of Directors ▪ Junior Mining Company Representative 	Industry participation comprises four MAC Board members, one representative of the exploration sector, and the MAC President and CEO. Additional MAC Board Directors are strongly encouraged to regularly sit in as observers. MAC staff members also participate as resource persons.

COI ADVISORY PANEL

The COI Advisory Panel is an independent, multi-interest group that oversees the *TSM* initiative and serves as a consultative body for the Canadian mining industry. The Panel played a key role in the program's design from the very beginning and continues to be integral to its evolution and implementation.

In addition to the Panel's role in the post-verification review process each year, it meets regularly with senior mining representatives to provide support and advice for *TSM*, identifies emerging issues for the sector, and encourages the mining industry to raise the bar in corporate responsibility. Every year, the Panel prepares a statement about *TSM*, the mining sector and relevant issues. The 2019 Panel statement can be found at www.mining.ca.

"I represented the Social Sector and Faith Communities for seven years on the Panel. It has been a constant learning experience and a privilege to share dedicated work, rich conversations, probing ideas, challenging the status quo and making recommendations to MAC and its members on the role and performance of the industry in a world in need of sustainable solutions. Raising issues and questions of corporate accountability and ethics, particularly related to ecological justice, human rights and climate change, I was pleased to always enjoy a receptive environment and a willingness to engage. The community nurtured among non-industry and industry members of the Panel is a unique opportunity to explore ways of building and improving relationships and sharing mutual concerns and responsibilities through frank communication and respectful dialogue. This sort of work is much needed to strengthen democracy and global movements for justice, peace and the integrity of the planet. I can only express my gratitude to all the fellow Panel members over the years, and to the always gracious staff of Stratos and MAC. I wish you all many blessings for the years ahead."

- Joy Kennedy, COI Panel member 2013-2019

COMMUNITIES AND PEOPLE



Ashton Kadjuk is a Mine Supervisor at Agnico Eagle's Meliadine mine.

COMMUNITIES AND PEOPLE

TSM measures mining operations' performance in *Aboriginal and Community Outreach*, *Safety and Health*, *Crisis Management and Communications Planning* and *Preventing Child and Forced Labour*. Through TSM, mining operations can more effectively engage with people in surrounding communities, as well as ensure they are well informed of relevant issues. TSM also helps to ensure the safest possible working environment for employees and contractors at the mine site.

Aboriginal and
Community
Outreach

Crisis
Management and
Communications
Planning

Safety
and Health

Preventing
Child and Forced
Labour

ABORIGINAL AND COMMUNITY OUTREACH

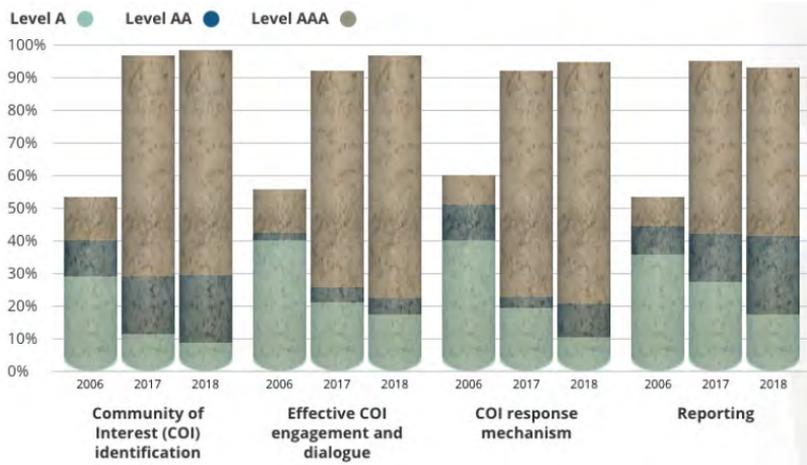
To achieve a Level A, *TSM* requires facilities to have formal systems in place to establish who they should be speaking with about their operations and how to best engage with them. Facilities must also establish two-way dialogue with their Communities of Interest (COI), have systems in place to receive and respond to concerns, and keep the public apprised of their activities and performance. Facilities are also required to publicly report on their engagement with communities.

The criteria to achieve each level in this area are outlined in the *Aboriginal and Community Outreach Protocol*, available at www.mining.ca. Below are examples of actions a facility would have to take to achieve a Level A for this Protocol:

- Implement a formal system to identify local COI, including challenging interests.
- Ensure that communications with COI are written in the local language and in a way that is clear and understandable.
- Establish a formal complaint and response system with processes for follow-up and tracking.

In the early years of *TSM*, most facilities had only informal systems or processes in place for engaging with communities and Aboriginal peoples. Today, the results for this Protocol are very strong, with over 90% of facilities achieving a Level A or higher in all indicators of this Protocol. In the interest of continuously driving performance improvements, MAC is in the process of finalizing a comprehensive review of this Protocol.

ABORIGINAL AND COMMUNITY OUTREACH PERCENTAGE OF FACILITIES AT A LEVEL A OR HIGHER 2006, 2017 AND 2018



98% have implemented mechanisms to identify COI.

94% have engaged in effective and meaningful two-way dialogue with COI.

94% have implemented a COI response mechanism.

93% report publicly on their engagement and dialogue activities.

CRISIS MANAGEMENT AND COMMUNICATIONS PLANNING

For the *Crisis Management and Communications Planning Protocol*, head offices and facilities achieve good performance when they answer “yes” to its three indicators.

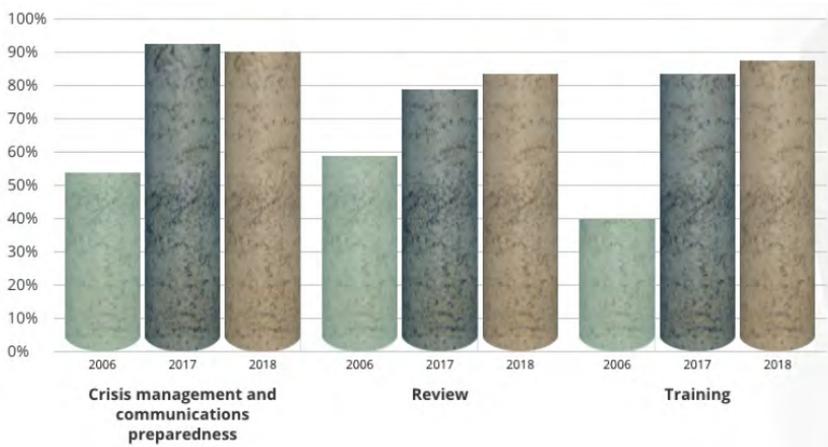
The Protocol requires both head offices and facilities to develop crisis management plans and establish crisis communications teams to support their execution. Facilities must have crisis communications programs in place to effectively alert employees and the public of a crisis, as well as any developments and how the situation is being resolved.

Performance in this area is consistent with the 2017 results, with over 80% of facilities and corporate offices meeting all criteria in the protocol on an aggregate basis. While several facilities reported improved performance since 2017, there are new members that are reporting performance for the first time and are still working to align their systems with the protocol’s criteria.

The criteria to achieve each level in this area are outlined in the *Crisis Management and Communications Planning Protocol*, available at www.mining.ca. Below are examples of actions companies would have to take to meet the Protocol’s requirements:

- Develop a crisis management and communications plan, which is regularly reviewed and updated.
- Conduct “table top” crisis simulation exercises annually and a full crisis simulation every three years.
- Meet annually with senior members of the local emergency response authorities.

**CRISIS MANAGEMENT AND COMMUNICATIONS PLANNING
PERCENTAGE OF COMPANIES AND FACILITIES RESPONDING
“YES”
2006, 2017 AND 2018**



89% have a crisis management and communications plan.

83% regularly review and update their crisis management and communications plan.

86% conduct crisis simulation training exercises.

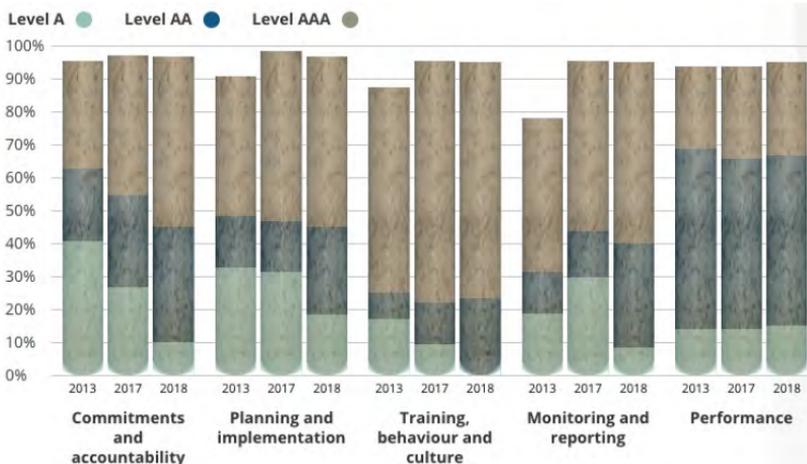
SAFETY AND HEALTH

To achieve a Level A, *TSM* requires facilities to establish clear accountability for safety and health management and performance. They must adopt a formal management system to prevent the occurrence of all incidents, set targets for continuous improvement, and implement a monitoring program to facilitate internal and public reporting of their results. Facilities must also provide a training program that consists of a training needs analysis, as well as risk-based training and orientation for all employees, contractors and visitors.

The criteria to achieve each level in this area are outlined in the *Safety and Health Protocol*, available at www.mining.ca. Below are examples of actions a facility would have to take to achieve a Level A for this Protocol:

- Provide a formal safety observation program for workers to support and reinforce training, and encourage safe behaviour and work practices.
- Establish performance metrics that are clearly defined, consistently applied, regularly assessed and reported, and used for trending and prioritizing improvements.
- Implement a monitoring program that includes tracking and reporting of leading and lagging indicators, safety and health inspection and monitoring, health surveillance, and incident investigation and follow up.

SAFETY AND HEALTH ASSESSMENTS PERCENTAGE OF FACILITIES AT A LEVEL A OR HIGHER 2013, 2017 AND 2018



97% demonstrate commitment and accountability to safety and health.

97% have formal safety and health management systems.

93% have safety and health training programs.

95% monitor and report safety and health performance.

95% have established safety and health performance targets.

PREVENTING CHILD AND FORCED LABOUR

In 2017, the *TSM Guiding Principles* were revised to incorporate commitments consistent with the International Labour Organization conventions on forced and child labour with the objective of preventing child labour and forced labour at mining operations:

MAC members are committed to respecting the rights of our workers and not engaging in practices of forced or child labour, as defined in the International Labour Organization Conventions 29, 238 and 182.

Member companies' adherence to this commitment will be assessed every three years as part of the external verification process.

The criteria to achieve each level in this area are outlined in the *Preventing Forced and Child Labour Protocol*, available at www.mining.ca.

Below are examples of what adherence to this Protocol involves:

- There are processes in place that are commensurate to jurisdictional risks to ensure that forced labour is not used.
- Where there is a high risk of forced labour, supply chains and recruitment agencies are monitored for human trafficking and forced labour.
- There are processes in place that are commensurate to jurisdictional risks to ensure that no child under 18 years of age engages in work that is likely to jeopardize the health, safety or morals of young persons.
- There are processes in place that are commensurate to jurisdictional risks to ensure that no child under 15 years of age is employed.

In the second year of reporting, all facilities undergoing external verification have demonstrated they have processes in place to prevent child and forced labour and any associated risks; these facilities are listed below.

FACILITIES EXTERNALLY VERIFIED FOR THE PREVENTING CHILD AND FORCED LABOUR INDICATORS (2018)

Hudbay Mineral Inc.	Constancia (SABU) Hudson Bay Mining and Smelting Co.
New Gold	New Afton
Vale	Port Colborne Sudbury Operations Voisey's Bay Long Harbour
Suncor	Oil Sands Facility
Teck Resources	Fording River Highland Valley Copper Elkview
Newmont Goldcorp	Musselwhite Porcupine Red Lake

Over the course of the next year, the remaining facilities will undergo external verifications that will include the *Preventing Child and Forced Labour Protocol*. A complete list of facilities that have undergone external verification for this Protocol can be found at www.mining.ca.

ENVIRONMENTAL STEWARDSHIP



Barrenland Caribou in the NWT at Dominion Diamond's Ekati Mine.

ENVIRONMENTAL STEWARDSHIP

Through *TSM*, mining operations have access to best practices in tailings management and biodiversity conservation management and are evaluated on their performance in these areas. *TSM* helps to ensure that mining operations manage their tailings facilities responsibly to protect human safety and the environment. Mining facilities must also adopt management systems and set targets to limit impacts to local biodiversity and are encouraged to collaborate with local conservation groups to improve outcomes. In addition to tailings and biodiversity, MAC recently introduced its *TSM Water Stewardship Protocol*, with public reporting scheduled to begin in 2021.

Tailings Management

Biodiversity Conservation
Management

Water Stewardship

TAILINGS MANAGEMENT

To achieve a Level A, TSM requires a facility to implement a system for responsible tailings management. This includes assigning executive-level accountability and responsibility for tailings management and developing and maintaining an operation, maintenance and surveillance (OMS) manual. A facility must also evaluate the performance and adequacy of their tailings management system annually. The *Tailings Management Protocol* is based on MAC's two tailings management guides, both of which have been recently updated and improved.

The criteria to achieve each level in this area are outlined in the *Tailings Management Protocol*, available at www.mining.ca. Below are examples of actions a facility would have to take to achieve a Level A for this Protocol:

- Consult with COI in the development and/or review of its tailings management policy and management system.
- Annually report the results of the corporate review of tailings management to the accountable executive officer.
- Establish emergency preparedness and response plans.

On an aggregate basis, the 2018 results show strong performance, with over 90% assessed at Level A or higher in all five indicators. There was a drop in performance in 2017 that was partially attributed to facilities new to TSM who are still working to align their systems with the program criteria and seven facilities that identified performance gaps during external verification.

Last year, MAC completed its review of the tailings management component of TSM. The revised Protocol and guides are available at www.mining.ca/tailings-management and reporting will begin in 2020.

TAILINGS MANAGEMENT ASSESSMENTS PERCENTAGE OF FACILITIES AT A LEVEL A OR HIGHER 2006, 2017 AND 2018



90% have implemented a management policy for and demonstrated commitment to responsible tailings management.

94% have implemented a tailings management system.

94% have assigned accountability for tailings management to the company's CEO or COO.

96% have conducted an annual tailings management review.

98% have developed and implemented an operation, maintenance and surveillance manual.

BIODIVERSITY CONSERVATION MANAGEMENT

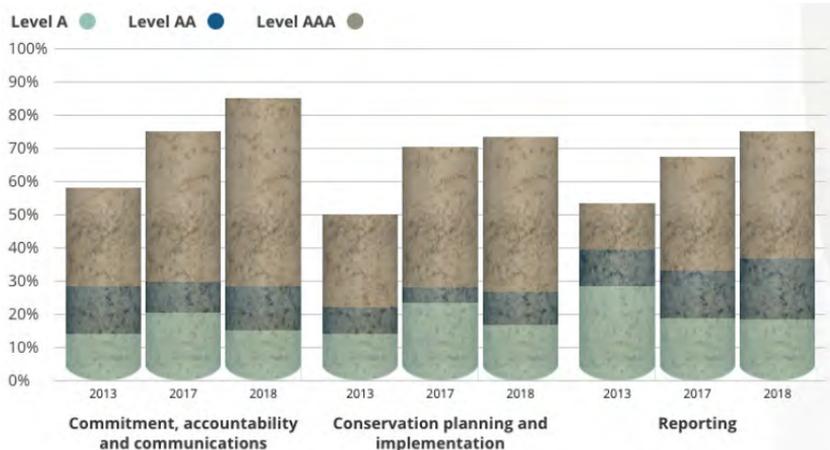
To achieve a Level A, TSM requires facilities to establish formal commitments to manage biodiversity at their sites and ensure that action plans for significant biodiversity aspects are implemented. Facilities must also implement biodiversity reporting systems to inform decision-making and communicate their performance publicly. Performance in this area has been steadily improving year over year.

There have been steady improvements made across all three indicators in this protocol over the last year, with 83% assessed at Level A or higher for Indicator 1 and over 70% assessed at Level A or higher for Indicators 2 and 3.

The criteria to achieve each level in this area are outlined in the *Biodiversity Conservation Management Protocol*, available at www.mining.ca. Below are examples of actions a facility would have to take to achieve a Level A for this Protocol:

- Identify and set targets for significant biodiversity aspects and develop action plans to achieve those targets.
- Assign roles, responsibilities and accountabilities for implementing biodiversity commitments, action plans and reporting.
- Engage with COI on their biodiversity action plans.

BIODIVERSITY CONSERVATION MANAGEMENT ASSESSMENTS PERCENTAGE OF FACILITIES AT A LEVEL A OR HIGHER 2013, 2017 AND 2018



83% have senior management commitment to biodiversity conservation in place.

74% have implemented a biodiversity conservation management system.

75% report publicly on biodiversity conservation activities and performance.

ENERGY EFFICIENCY



Kelsie Trowbridge, an electrical student, maintaining an energy efficient ventilation control system at Vale's Totten Mine in Sudbury, Ontario.

ENERGY EFFICIENCY

Improving energy efficiency and reducing greenhouse gas (GHG) emissions are priorities for the mining industry, and *TSM* measures a facility's ability to track and report energy data, as well as establish and meet targets. Through comprehensive management systems, *TSM* helps mining operations reduce emissions that contribute to climate change, while helping to reduce operational costs.

Energy Use and GHG Emissions Management

ENERGY USE AND GHG EMISSIONS MANAGEMENT

To achieve a Level A, *TSM* requires facilities to establish comprehensive systems for energy use and GHG emissions. This includes providing energy awareness training and establishing systems to track and report data for internal and external reporting. Facilities must also set and meet targets for their energy use and GHG emissions performance.

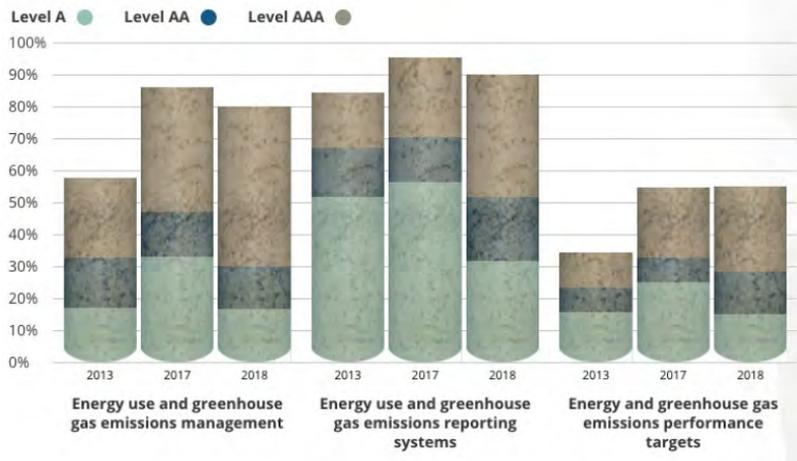
On an aggregate basis, there have been improvements made across all three indicators in this protocol. Over the past year, several facilities that previously reported Level A or Level AA are now reporting Level AAA performance. Since 2017, the percent of facilities achieving Level A or higher in indicators 1 and 2 has decreased slightly. This is due to facilities that are new to *TSM* that are still working to align their systems with the protocol's requirements.

The criteria to achieve each level in this area are outlined in the *Energy Use and GHG Emissions Management Protocol*, available at www.mining.ca. Below are examples of actions a facility would have to take to achieve a Level A for this Protocol:

- **Implement a comprehensive energy use and GHG emissions management and reporting system.**
- **Assign accountability for energy use and GHG emissions to operational managers.**
- **Publicly report energy use and GHG emissions performance data annually.**

In 2020, the *TSM Energy Use and GHG Emissions Management Protocol* will undergo a comprehensive review to ensure that the Protocol reflects current good practice and continues to drive performance improvements in the area of energy and GHG emissions management.

ENERGY USE AND GHG EMISSIONS MANAGEMENT ASSESSMENTS PERCENTAGE OF FACILITIES AT A LEVEL A OR HIGHER 2013, 2017 AND 2018



81% have comprehensive energy use and GHG emissions management systems.

89% have implemented energy use and GHG emissions management reporting systems.

62% have established and met performance targets.

TSM EXCELLENCE AWARD WINNERS

The *TSM Community Engagement Excellence Award* and the *TSM Environmental Excellence Award*, awarded by MAC's COI Panel, honour companies, facilities and individuals that have implemented projects and initiatives that expand and promote sustainable development within the mining sector.

2019 Winner and Finalists

TSM Community Engagement Excellence Award

Glencore Canada: Raglan Mine's Tamatumani Program: Empowering Inuit Communities and Inspiring the Next Generation (**Winner**)

New Gold: Cerro San Pedro Integrated Mine Closure Program

Dominion Diamond: India-Based CSR Project Focused on Clean Water, Sanitation and Sustainable Farming

Suncor: Culturally Significant Wetland Plants Study: Early Engagement with Indigenous Communities Delivers Positive Results for Reclamation Planning

2019 Winner and Finalists

TSM Environmental Excellence Award

IAMGOLD: Essakane Project Provides Innovative Renewable Solar Energy System in Burkina Faso (**Winner**)

Agnico Eagle: Pinos Altos Reforestation Project is Planting the Seeds for Successful Mine Closure

Syncrude: Birch River Conservation Initiative - Establishing the World's Largest Protected Boreal Forest

Dominion Diamond: Long Lake Containment Facility Pilot Study is Ensuring Traditional Knowledge's Role in Closure Objectives

TSM LEADERSHIP AWARD WINNERS

A *TSM Leadership Award* is granted only when a facility meets or exceeds a Level A ranking for all indicators under the *TSM Tailings Management, Energy Use and GHG Emissions Management, Aboriginal and Community Outreach, Biodiversity Conservation Management* and *Safety and Health Protocols* and meets all requirements of the *TSM Crisis Management and Communications Planning, and Preventing Child and Forced Labour Protocols*. To be eligible for a *TSM Leadership Award*, a facility's results must have been externally verified.

The following facilities were granted *TSM Leadership Awards* for their 2018 results:

- Highbay Minerals Inc., Hudson Bay Mining and Smelting Co. Limited
- New Gold Inc., New Afton Mine
- Vale Newfoundland and Labrador Operations, Voisey's Bay
- Vale Ontario Operations, Sudbury
- Teck Resources Limited, Elkview Operations
- Teck Resources Limited, Highland Valley Copper

TSM IN CANADA AND BEYOND

MAC is helping to build capacity within the global mining industry by sharing its expertise in sustainable mining practices. One of the most effective ways MAC and its members have been doing this is by freely sharing the *TSM* initiative with mining associations in other countries that are seeking tools to improve the environmental and social performance of their mining industries.

In recent years, there has been growing global interest and uptake of *TSM*. Since 2015, six national mining associations outside of Canada have officially adopted *TSM* and we are now seeing *TSM* being implemented in Finland, Argentina, Botswana, the Philippines, Spain and Brazil.

“TSM requires mines to publicly report and verify their environmental and social performance and the accountability and transparency that results from TSM provides assurance that mining is being done responsibly. Because it’s not enough to ensure that mining operations in our country are held to the highest standards possible. We want to help in prioritizing responsible mining globally, and with seven countries on five continents already on board, we are only just getting started.”

- Pierre Gratton, President and CEO, MAC

For more information about the *TSM* initiative, visit:

www.mining.ca

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