

# Towards Sustainable Mining Progress Report 2017



The Mining Association  
of Canada | L'association minière  
du Canada



Towards Sustainable Mining  
Vers le développement minier durable

## 2017 Progress Report

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## Introduction

### About Towards Sustainable Mining

*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 ensure that key mining risks are managed responsibly at participating mining and metallurgical facilities. Mining companies that participate in the *TSM* initiative demonstrate their strong commitment to responsible mining.

By adhering to the *TSM 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.

Established in 2004 by the Mining Association of Canada (MAC), *TSM*'s main objective is to enable mining companies to 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

Participation in *TSM* is mandatory for all MAC members, and the Mining Association of British Columbia and the Québec Mining Association are currently implementing *TSM* for their members. Assessments are conducted at the facility level where the mining activity takes place – the only program in the world to do this in our sector.

#### Transparent

Mining companies publicly report their facilities' performance against the *TSM* indicators in the annual *TSM Progress Report*. Results are externally verified 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 shape the *TSM* initiative for continual advancement.

#### Performance driven

Includes a requirement to demonstrate measurable continual sustainability improvement.



## TSM Guiding Principles

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 our <i>Towards Sustainable Mining</i> initiative.
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.
Practising continuous improvement through the application of new technology, innovation and best practices in all facets of our operations.

### 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 Aboriginal peoples (First Nations, Inuit and Métis) and indigenous peoples worldwide.
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.

\* MAC draws on the 1987 Brundtland Commission definition of sustainable development: "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

\*\* We use the term communities of interest to include all of the individuals and groups who have or believe they have an interest in the management of decisions about our operations that may affect them. This includes employees, contractors, Aboriginal or indigenous peoples, mining community members, suppliers, customers, environmental organizations, governments, the financial community, and shareholders.



## Message from the Chair of the TSM Governance Team and MAC's President and CEO

Welcome to the 2017 *TSM Progress Report*. We are pleased to present a detailed look at our members' environmental and social performance for 2016.

### HIGHLIGHTS OF 2016 RESULTS

This report includes the 2016 *TSM* performance results for 65 mining facilities across Canada belonging to 22 of our member companies. This year, 20 mining facilities had their results externally verified as part of *TSM*'s three-year external verification cycle. Two mines reported *TSM* performance for the first time and are included in aggregate graphs for each of the protocols.

Once again, we saw overall performance improvements in many of the *TSM* protocols:

- 98% report publicly on their engagement and dialogue activities, compared to 94% in 2015.
- 93% have a crisis management and communications plan, compared to 86% in 2015.
- 72% report publicly on biodiversity conservation activities and performance, compared to 66% in 2015.
- 56% have established and met energy and GHG emissions performance targets, compared to 44% in 2015.

### TSM DEVELOPMENTS & IMPROVEMENTS

MAC continued to focus on implementing improvements to *TSM*. Particular focus was placed on the recommendations of the *Independent TSM Tailings Management Review Task Force*. Over the course of 2016, several amendments to the *TSM Tailings Management Protocol* were approved by the MAC Board of Directors based on recommendations that resulted from internal and external reviews of MAC's tailings management requirement and guidance.

A revised and strengthened *Guide to the Management of Tailings Facilities*, which facilities must conform to in order to meet the requirements of the protocol, also incorporates the recommendations of the Task Force and MAC Tailings Working Group, and was published earlier this year.

In addition to our work to strengthen *TSM*'s tailings management components, MAC updated the *TSM Crisis Management and Communications Planning Protocol* and the associated reference guide to ensure they reflected current leading practices. The review of the *TSM Safety and Health Protocol* was also completed in 2016 and resulted in several enhancements, incorporating lessons learned from the first few years of the protocol's implementation.

Throughout 2016, MAC and the *TSM Governance Team* explored the possibility of developing a new protocol on water stewardship. Throughout 2017, MAC has been working with the Community of Interest (COI) Advisory Panel and water experts to develop a potential *TSM Water Stewardship Protocol*.

### COI ADVISORY PANEL

The COI Advisory Panel played a key role in *TSM*'s design from the very beginning, and continues to be integral to its evolution and implementation. In 2016, the Panel chose to focus on three main priorities: tailings management, climate change and community engagement.

Specifically, the COI Panel reviewed the recommendations of MAC's *Tailings Working Group* and the *Independent TSM Tailings Management Review Task Force*. The Panel provided valuable input on how to address the recommendations, especially as they related to community engagement.

On climate change, the Panel issued an advisory statement to MAC that proposed specific ideas and actions to assist MAC and its members in building on the progress already made in addressing climate change, and to help guide future endeavours with respect to planning, managing and operating mines and related activities.

A subcommittee of the Panel also explored how companies can measure and evaluate the effectiveness of their engagement with communities of interest.



As MAC embarks on a review of the *TSM Aboriginal and Community Outreach Protocol* in 2018, it will work to incorporate the advice of this subcommittee.

### INCREASED RECOGNITION AND UPTAKE OF TSM

MAC continues to help 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 2015, MAC achieved an important milestone with the Finnish Mining Association's adoption of *TSM* - the first time a mining association outside of Canada had officially signed on to the program. In 2016, the Cámara Argentina de Empresarios Mineros (CAEM) followed suit and became the first Latin American jurisdiction to adopt *TSM*. And most recently, in February 2017, the Botswana Chamber of Mines became the first mining association in Africa to adopt the *TSM* program.

International interest in *TSM* continues to grow, and MAC is currently engaging with other governments, mining associations and responsible standards organizations across the globe.

We hope you enjoy the *2017 TSM Progress Report*.



Peter Read  
Synchrude Canada Ltd.  
Chair of the *TSM* Governance Team



Pierre Gratton  
President and CEO  
The Mining Association of Canada

## Statement from the Community of Interest Advisory Panel

The Community of Interest Advisory Panel (COI Panel) was established in 2004, and has played a key role in the design, and subsequent implementation and evolution of the *Towards Sustainable Mining*® (TSM®) initiative. The Panel is composed of representatives of the various “communities of interest” that are directly or indirectly impacted by the activities of extractive industries as well as select members of the MAC Board who actively engage in the discussions, provide company insights, and help connect the COI’s work to the MAC membership. The current COI Panel includes 18 individuals from Indigenous groups, international development groups, economic and community development organizations, environmental and social NGOs, the finance/investment sector, organized labour, as well as individuals with issue-specific expertise and industry representatives. More information about the COI Panel is available at [www.mining.ca/coi-panel](http://www.mining.ca/coi-panel).

This Panel Statement offers an independent reflection from the non-industry members of the COI Panel on key areas of interest and progress since the previous statement. It covers the October 2016 meeting in Ottawa, the March 2016 meeting in Toronto and all interim activities.

As Canada celebrates its 150<sup>th</sup> anniversary, it is important to remember the central role that the extractive industries have played in defining Canada’s identity—not only over the last century and a half, but going back much further, both before and after the arrival of the first Europeans centuries ago. While anniversaries are invariably seen as moments for celebration, they should also be seen as opportunities for reflection about our past and what we hope to achieve in the future. This is particularly true in relation to the extractives sector. While many positive changes have taken place in recent years, including the adoption of the TSM initiative and the creation of the COI Panel, both old and new challenges faced by the extractive industries mean that there is still work to be done. In many ways, this is reflected in how the COI Panel itself has undergone an important evolution in its role and activities as an independent advisory body to the Mining Association of Canada since it first met in 2004. The activities the COI Panel undertook this past year, which are discussed in this statement, are good examples of this.

### THE COI PANEL’S EVOLVING ROLE

TSM has evolved in important ways since its inception in 2004. This evolution has been conditioned by a number of factors, including the fact that once the TSM program was fully implemented, the COI members could dedicate more of their time to issues that went beyond the TSM protocol areas. This evolution advanced further in 2011, when the Panel undertook a renewal process that led to revisions in its terms of reference, introduced a new mode of operations for the Panel and facilitated the recruitment of new members. In particular, the Panel’s revised mandate shifted membership away from organizational member representation to individual representation and broadened its scope to allow the Panel to address issues beyond TSM. To address these issues, COI Panel members have also expanded their activities in between the two annual meetings, which is perhaps the best indicator of how seriously COI members take their role.

This evolution has also allowed MAC to take advantage of the tremendous asset the COI Panel represents for advancing MAC’s own mission for TSM. Collectively, the COI Panel represents a broad spectrum of non-industry stakeholders, and each member brings a wealth of relevant experience and knowledge. While it continues to play a central role in Post-Verification Reviews and TSM’s own evolution, the Panel has increasingly been advising MAC on many of the key challenges and opportunities that the extractives sector faces. Working with the industry representatives who are ex-officio members of the group, the COI Panel has become an important forum for multi-stakeholder dialogues relating to the extractive sector.

### RISING TO THE CHALLENGE:

#### *COI Advisory Statement on Climate Change Issued to MAC and MAC Members*

A good example of this Panel’s expanded scope is the *COI Advisory Statement on Climate Change*. The Task Force was created in 2015 and the drafting of the statement generated considerable and highly constructive discussions within the Panel, and with MAC and its members. These discussions led to the discussion of a revised draft statement at the October COI Panel meeting. Climate change was also discussed at the October meeting with senior public servants and elected officials from Environment and Climate Change Canada (ECCC) and Natural Resources Canada (NRCan).

Based on these discussions, the final statement “challenges and strongly urges MAC and its members to continue to lead and innovate” in a variety of areas specifically linked to global climate change.



To this end, the Panel proposes specific ideas and actions to assist MAC and its members in building on the progress already made in addressing climate change, and to help guide future endeavours with respect to planning, managing and operating mines and related activities in this changing global context. The statement includes “calls to action” with recommendations for integrating considerations relating to climate change into six areas in which MAC and its members are actively involved:

1. the implementation and continued development of TSM;
2. operational areas (e.g., mine sites, processing plants and smelters);
3. relations with local and Indigenous communities;
4. supply chains;
5. public and policy engagement; and
6. disclosure of climate risks and opportunities.

The statement’s specific recommendations are wide-ranging, addressing important issues such as engagement with local Indigenous interests, rights-holders and stakeholders; actively pursuing effective means to mitigate climate change impacts; focusing efforts on achieving a just transition and proper adaptation for long-term resilience; and challenging supply chain partners and investors to support these efforts. The statement has been positively received by MAC, and a formal response was issued in June 2017.

### THE PANEL’S POST-VERIFICATION REVIEW

This evolution of the Panel’s role is reflected in the other principal activities of the Panel over the past year. Conducting Post-Verification Reviews (PVRs) remains one of the COI’s core activities. The focus of discussions has shifted from reviewing companies’ TSM scores to fostering more dialogue between the Panel and MAC’s member companies. This change allows the companies to take better advantage of the experience and expertise of COI members<sup>1</sup>.

In 2016, PVRs were held with representatives of Hudbay Minerals and Suncor Energy. Important outcomes from the Panel discussion included advice to the companies to continue attempts at Indigenous and community engagement in areas where such engagement may be problematic, noting that relations may change at any time due to contextual factors that the industry might not be aware of. Panel members also recommended that MAC consider some form of endorsement of the Truth and Reconciliation Commission’s Action 92, that companies adopt the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) as a reconciliation framework through the enactment of appropriate corporate policies, integrating them with calls to action directed at other members of society. It was also noted that reconciliation is an ongoing conversation. Finally, Panel members recommended that more attention be paid by companies to the relationship between their energy use and climate change, including the consideration of the development of renewable power options.

### DIALOGUE WITH GOVERNMENT OFFICIALS

As previously noted, the Panel met with senior government and elected officials from ECCC and NRCan during the October meeting. In addition to discussing issues related to climate change, the wide-ranging discussion addressed improving Indigenous and community engagement, international mining social responsibility, and strategic infrastructure development.

### PANEL REFLECTIONS

A session was held at the October meeting to provide for a discussion of the Panel’s objectives to ensure that there was a common understanding of them and to align Panel members’ expectations with available resources. Members were generally comfortable with the objectives set out in their Terms of Reference. The discussion highlighted a number of important issues. These included how to align Panel priorities with the MAC Board’s priorities and the possibility of using a materiality process to set the agenda for COI Panel activities.

It was agreed that a Panel task force be formed to look into this. Panel members recognized the importance of the PVRs, and discussed various ways to improve the process, including how to balance the Panel’s core activities and non-core activities, like those relating to emerging issues. Normally, the fall COI meeting is held at the location of one of the mines undergoing review.

This allows the COI members to visit the operation and interact with local communities of interest. The October 2016 meeting was held in Ottawa, so a site visit was not possible.

<sup>1</sup> To facilitate this, webinars are held before the meeting to review many of the findings and technical aspects of the verification process.



Panel members emphasized this was exceptional given the importance of site visits, particularly the opportunity to meet with their local counterparts. Improving MAC's engagement with the Panel was also discussed. It is also important to note that an ongoing discussion of issues relating to Indigenous peoples continued during this session, although it was difficult to identify next steps to take. This is related more generally to the topic of community engagement, and also builds on the discussion that began with the work of the task force on community engagement, which had presented an update of its activities during the meeting.

### AGENDA SETTING AND AN OPENING ROUNDTABLE DISCUSSION

An important objective of the March 2017 meeting stemmed directly from the October discussion regarding agenda setting and a proposed issues tracking and materiality process. As part of this objective, the March meeting began with the first of what will be a new feature of Panel meetings: a roundtable discussion whereby Panel members and industry representatives exchange their views on what Panel members believe are important and relevant issues for their COI. The rich and dynamic discussion touched on a wide range of issues, including income inequality, impact and opportunity of mine automation for low-skilled jobs, the transition to a low carbon economy, climate change, the UN Sustainable Development Goals, cybersecurity, mine closure, recognition and reconciliation, Indigenous rights, internationalization of *TSM*, and Canada's global competitiveness in mining. Although most members found the discussion worthwhile, it was also noted that the focus needed to be on what was relevant to the mining industry to maximize its usefulness for agenda setting for the COI Panel.

### TSM INTERNATIONALIZATION

As part of the internationalization of *TSM*, two members from Argentina's Cámara Argentina de Empresarios Mineros (the national mining association that recently adopted *TSM* in October 2016), and one member from Ecuador's Ministry of Mines (interested in adopting *TSM*) joined the March meeting. The COI Panel also heard from FinnMin, (the Finnish Mining Association that adopted *TSM* in November 2015) via webinar regarding its work on developing a water protocol. The Panel is grateful for these opportunities to connect with people from other countries who are implementing or interested in *TSM* as we see value in working together on common issues. The conversations are lively and valuable and also help us see mining in the broader global context.

### WATER STEWARDSHIP STANDARDS

The focus of the March 2017 Panel meeting was for MAC to gather feedback from Panel members as it begins to develop a *TSM Water Stewardship Protocol*. Four water-related standards were discussed in detail: 1) the ICMM Position Statement on Water Stewardship; 2) the Alliance for Water Stewardship Standard; 3) the Finnish *TSM Water Protocol*; and 4) the CDP Water Program. To prepare for the discussion, MAC held a webinar to share information on the four water standards. During the meeting, Panel members were invited to discuss each standard and identify aspects of each that MAC should consider as it begins working on a *TSM Water Stewardship Protocol*.

Along with a detailed discussion of each of the standards, several general conclusions stood out. There was general agreement on the importance of having a water protocol. It would be one of the few protocols to help companies manage impacts in the larger community, and it would recognize how water is generally the most important issue for communities, particularly from an Indigenous perspective. It was noted that Canadians have a certain understanding of water abundance that is not a worldwide reality. Even within Canada, there is a need to consider water flows. In many respects, mining is about managing water and there is a need to emphasize its importance in *TSM*. Yet water is a complex subject and MAC may need more expert advice (e.g., hydrologists, experts on water scarcity) to capture all of the necessary perspectives. At the same time, it was noted that the industry can play a problem-solving role for local communities, especially where the government is not taking on that role. More generally, this exercise demonstrated how the COI Panel could play an important role in reviewing the standards. It was a constructive discussion that was timely, even if it was often "outside our comfort zone."

### MOVING FORWARD

The effectiveness of community engagement has been an ongoing theme in COI Panel meetings for some time, and in 2016 a Task Force on this topic was established. In particular, questions concerning the confidence companies had in the effectiveness of their engagement activities were raised. Initial conversations among the original Task Force members explored what role MAC could play in helping member companies ensure that their engagement activities are effective. The Task Force has received support from the full COI Panel and the *TSM Governance Team* to continue to progress this work.



The Task Force was expanded to include members of the *TSM Initiative Leaders* committee as well. Comments received from two departing Panel members, who were also on the Task Force, resulted in further discussion on the effectiveness of community engagement during the March meeting.

Given the importance of relations with Indigenous communities and their participation on the COI Panel, MAC will be reviewing the *TSM Aboriginal and Community Outreach Protocol* in 2018, and it is anticipated that the Panel will use this opportunity to prioritize this topic. A related theme that came up in the March meeting was how the Panel might pay greater attention to the implementation of the Truth and Reconciliation Commission and endorsement of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) by MAC members. Given that anniversaries, especially important ones like Canada's 150<sup>th</sup>, are times for both celebration and reflection, both themes would be appropriate priorities for the COI Panel's attention in the coming year.



MAC's Community of Interest Advisory Panel at Glencore's Raglan Mine in Northern Quebec.

## TSM Community of Interest Advisory Panel

COI PANEL CATEGORY		REPRESENTATIVES
Social NGOs, including faith-based groups	Individuals who represent civil society with knowledge of social justice issues.	Joy Kennedy
Aboriginal peoples	Individuals who represent the interests of Métis, First Nations and Inuit.	Dan Benoit Vacant Theresa Hollet
Environmental NGOs	Individuals with environmental expertise and advocates for environmental protection.	Nathan Lemphers Stephen Hazell** Alan Young*
International development	Individuals with expertise in alleviating poverty and improving the standard of living through responsible development.	Dr. Philip Oxhorn
Economic/community development	Individuals with expertise in business development at the community level and knowledge of community interactions with mining facilities.	Chief David Walkem Tim Johnston
Finance/investment	Individuals with financial expertise and knowledge of socially responsible investing.	Stephen Kibsey
Labour/workforce	Individuals with knowledge of the interests, safety and needs of workers.	Doug Olthuis
Expert category	The Panel may choose to select expert categories to be filled as specific issues are identified.	Alan Penn* Maya Stano Luc Zandvliet*
Industry representatives (ex-officio)	Industry participation comprises five MAC Board members, one representative of the exploration sector, and the MAC President and CEO. Additional MAC Board members are strongly encouraged to regularly sit in as observers. MAC staff members also participate as resource persons.	Cory McPhee Scott Yarrow Pierre Gratton Peter Read Mark Travers Michel Julien Joseé Méthot

\*Left the Panel in 2016

\*\*Joined the Panel in 2016



## How TSM Works

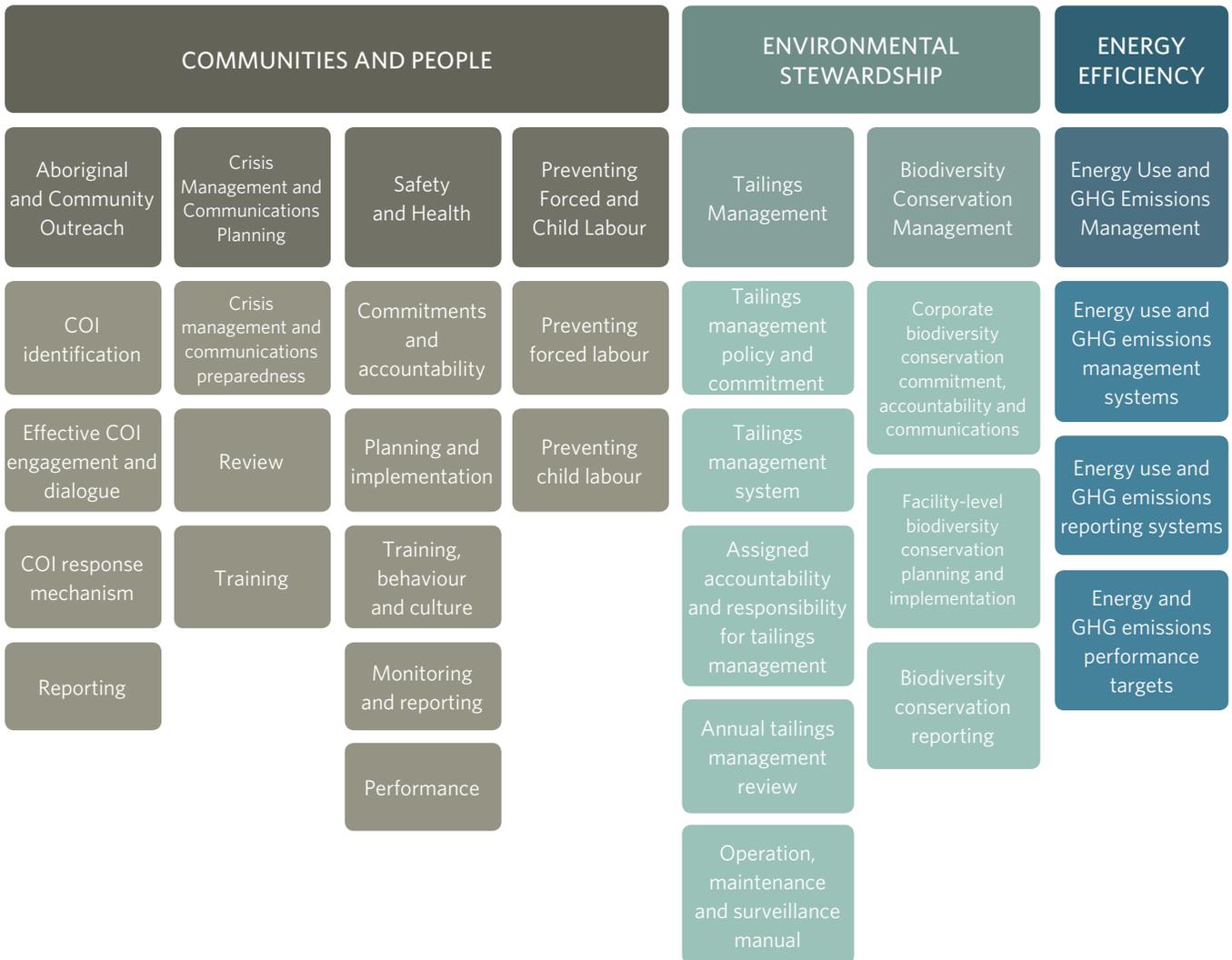
### OUR COMMITMENTS

Mining companies that participate in TSM have collectively articulated their commitment to responsible mining through the *TSM Guiding Principles*. The *TSM Guiding Principles* are at the core of the initiative and represent mining companies' commitments pertaining to community engagement, environmental stewardship, and energy efficiency, with the goal of leaving lasting benefits for communities and future generations.

### WHAT WE MEASURE

To translate commitments into action at the facility level, TSM employs performance protocols that focus on three core areas: communities and people, environmental stewardship and energy efficiency. The performance protocols are designed to help companies build and evaluate their systems and processes for key aspects of mining activity, as well as show Canadians what the industry's current environmental and social performance is and how it can be improved.

### TSM Performance Protocols and Indicators



Each performance protocol is made up of a set of indicators that focus on different components of a management system. Participating facilities are required to assess their management practices against the indicators for each of the seven performance protocols:



Detailed assessment protocols for each performance area provide guidance to assist companies in their self-assessments and to facilitate consistent application of TSM across companies and their facilities.

For each indicator, facilities receive one of five scores based on the criteria they meet. The scores are described below.

### TSM Rating Scale

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

TSM's overarching goal is for all facilities to achieve a Level A or higher, which means they have fully implemented leading practices and procedures to effectively address the TSM Aboriginal and Community Outreach, Safety and Health, Tailings Management, Biodiversity Conservation Management, and Energy Use and GHG Emissions Management protocols. For the TSM Crisis Management and Communications Planning Protocol, head offices and facilities are assessed based on a "yes" or "no" rating scale.

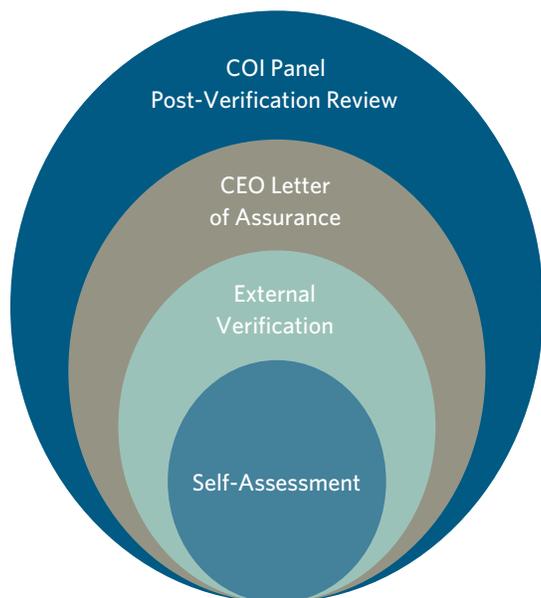
#### REPORTING AND EXTERNAL VERIFICATION

TSM's primary objectives are to drive performance improvement and, through demonstration of this improvement, to build trust with communities of interest. This means that communities need to understand TSM and trust the performance results that the mining companies report. To build this trust, the program includes a number of checks and balances to ensure that reported results present an accurate picture of each facility's management systems and performance.

**Self-Assessment:** Facilities annually self-assess their performance against the TSM indicators across seven protocols. For each indicator, they assign a letter grade that reflects their performance ranging from Level C to Level AAA.



## Layers of TSM External Verification



These grades are available in the *TSM Performance by Company* section of this report. New members have three years to start publicly reporting, which allows them the opportunity to train employees for full implementation.

*This report includes externally verified performance results for 20 of the 65 facilities assessed in 2016.*

**External Verification:** Every three years, a trained Verification Service Provider (VSP) critically reviews a company's self-assessments to determine if there is adequate evidence to support the performance ratings the facility has reported. The VSPs are experienced auditors who are independent of the company being verified. The VSPs rigorously apply the protocols and, where required, can change the ratings to ensure they accurately reflect the facility's management practices and performance.

**CEO Letter of Assurance:** In the year of external verification, the company's CEO, or most senior executive in Canada, submits a letter to MAC that confirms the external verification has been conducted in accordance with the Terms of Reference for Verification Service Providers. The letter is then posted on MAC's website ([www.mining.ca](http://www.mining.ca)).

**COI Panel Post-Verification Review:** Each year, MAC's independent COI Advisory Panel invites two companies to appear before it to present and discuss their *TSM* results. Through these discussions, the Panel tests to see whether and how facility systems are leading to performance improvement. The Panel explores the challenges faced by the facilities and the steps companies are taking to address them.

**New Member Phase-In:** New members and facilities that have recently entered into production have three years to start publicly reporting *TSM* performance. This phase-in period allows companies to conduct a gap analysis against *TSM* protocol criteria and train relevant employees.

### NEW MEMBER PHASE-IN SCHEDULE

Year 1: Training and gap analysis

Year 2: Aggregate-level reporting

Year 3: Public facility-level reporting

Year 4: External verification

In 2016, two facilities began reporting *TSM* results for the first time and their performance is incorporated into the aggregate graphs for each of the six protocols.

### REPORTING AND VERIFICATION PROCESS FOR HIGH PERFORMERS

In 2014, a revised reporting and verification framework was implemented for facilities that consistently achieve high levels of *TSM* performance. For facilities that follow this optional process, these changes reduce reporting burdens and provide more flexibility to align *TSM* verification requirements with other audit and verification commitments.

The new framework is applied as follows:

#### **Externally Verified Level A or AA**

When a facility achieves an externally verified Level A or AA across all indicators of a protocol, or a "yes" in crisis management planning and communications planning, the annual self-assessment becomes voluntary for three years for the protocol(s) that reach these levels. The facility must then undergo external verification before the end of that three-year period. During the three-year period, facilities will remain at the same level for each indicator, but they can voluntarily report annually if they choose to demonstrate improved performance.

### *Two Cycles of Level A or AA/Externally Verified Level AAA*

When a facility achieves a Level A or AA in two consecutive verification cycles, or a Level AAA in one verification cycle, the facility can move to a reduced verification cycle for the protocol(s) that reach these thresholds. This means that the facility would conduct an internal verification and submit a letter of assurance from its CEO after three years. The facility would then undergo an external verification after six years.

In 2016, several companies were eligible to apply the revised reporting and verification framework for at least one protocol. Three facilities that had achieved a Level AAA in their previous external verifications conducted internal audits instead of external verification for at least one of the protocols this year.

### COMMUNITY OF INTEREST ADVISORY PANEL

MAC established the Community of Interest (COI) Advisory Panel in 2004 to advise on the design and implementation of *TSM* and to provide a mechanism for two-way dialogue between MAC and its communities of interest in Canada. To date, the Panel has held 27 formal meetings and discussed a wide range of topics, including biodiversity conservation, tailings management, human rights, international development and, most recently, climate change and effectiveness of community engagement mechanisms. The Panel's core functions include:

- Identifying current and emerging priority issues (environmental, social/cultural and economic) for the sector.
- Learning about the industry's performance on issues of interest, including how companies are engaging with local communities.
- Providing a place for rich dialogue and a source of input and guidance for MAC and its members on *TSM* and other work areas.
- Advising and encouraging MAC and its members to improve and raise the bar for environmental, social and economic performance.
- Advising MAC on the ongoing development and implementation of *TSM* and reviewing *TSM* implementation results.

🔗 For more information on the COI Panel, visit [www.mining.ca/tsm](http://www.mining.ca/tsm)



## Industry Performance

### Understanding the Results

TSM assessments are conducted at the facility level, where they are most meaningful. In 2006, 15 companies reported facility-level performance, and in 2016, this number grew to 22 companies, totalling 65 facilities. This report includes externally verified results for seven companies: ArcelorMittal Mines Canada, De Beers Canada, Glencore, New Gold, Rio Tinto, Syncrude and Teck.

In 2006, all reporting MAC members went through external verification of their TSM performance. The graphs that follow compare the percentage of facilities that achieved a Level A or higher in 2006 to the percentage of facilities that achieved a Level A or higher in 2015 and 2016 for the *TSM Aboriginal and Community Outreach Protocol* and the *TSM Tailings Management Protocol*. The graph for the *TSM Crisis Management and Communications Planning Protocol* shows the percentage of companies and facilities that answered "yes" for each indicator. The graphs for the *TSM Biodiversity Conservation Management Protocol* and the *TSM Safety and Health Protocol* compare the aggregate results for 2012, 2015 and 2016, as 2012 is the baseline year for these two protocols. The graph for the *TSM Energy Use and GHG Emissions Management Protocol* compares the aggregate results for 2013, 2015 and 2016, as 2013 is the baseline year for this revised three-indicator protocol. For detailed facility-level results, please see the *TSM Performance by Company* section of this report.



Wetlands monitoring at Suncor's oil sands facilities near Fort McMurray, Alberta.



## Industry Performance

### Communities and People

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.

– TSM Guiding Principles

This section highlights members' performance in the following protocols: *Aboriginal and Community Outreach*, *Crisis Management and Communications Planning*, and *Safety and Health*.

#### ABORIGINAL AND COMMUNITY OUTREACH

The *TSM Aboriginal and Community Outreach Protocol* helps mining facilities evaluate their activities and practices related to engagement with Aboriginal peoples and other communities of interest (COI). To achieve a Level A, a facility must identify the parties it should engage with, ensure engagement and dialogue are ongoing and meaningful, effectively respond to community concerns, and report on engagement activities in an open and transparent manner. See Figure 1 for a description of the requirements for achieving Levels A, AA and AAA.

Performance in this protocol is measured against four indicators:

Indicator 1: COI identification

Indicator 2: Effective COI engagement and dialogue

Indicator 3: COI response mechanism

Indicator 4: Reporting

In the early years of *TSM*, many facilities' community engagement activities were guided by informal mechanisms. In 2006, approximately half of the participating facilities met the criteria of Level A performance, and only a handful had achieved Level AAA.

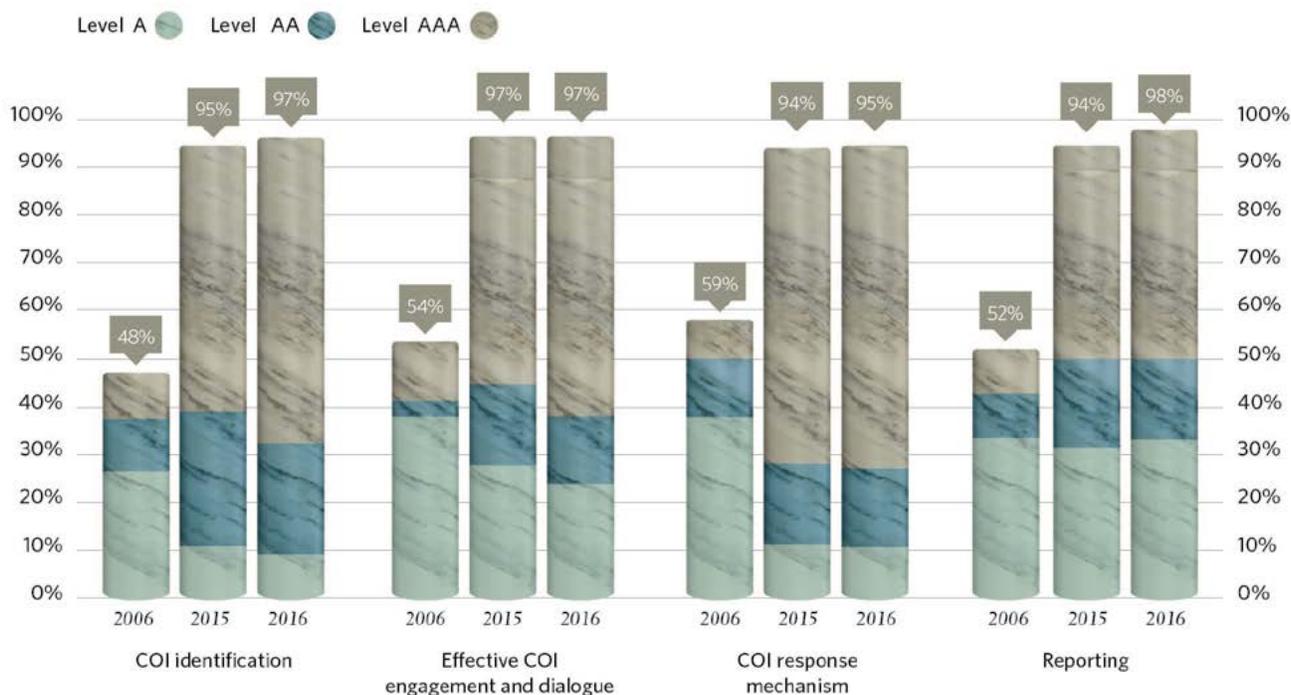
FIGURE 1 - ABORIGINAL AND COMMUNITY OUTREACH PROTOCOL: WHAT IS GOOD PRACTICE?

<b>AAA</b>	<ul style="list-style-type: none"> <li>✓ COI are invited to provide input into the identification of COI.</li> <li>✓ COI contribute to reviews of engagement processes.</li> <li>✓ Negotiated agreements with Aboriginal people are in place where appropriate.</li> <li>✓ Facilities collaborate with COI to establish and achieve common objectives.</li> </ul>
<b>AA</b>	<ul style="list-style-type: none"> <li>✓ COI with indirect and issue-based interests in the operation have been identified (e.g., a national non-governmental organization).</li> <li>✓ COI capacity-building needs are identified to allow them to engage in effective participation on issues of interest or concern.</li> <li>✓ Culturally specific engagement training is provided to the appropriate personnel.</li> <li>✓ COI are invited to provide feedback on public reporting.</li> </ul>
<b>A</b>	<ul style="list-style-type: none"> <li>✓ COI have been identified.</li> <li>✓ Meaningful two-way dialogue with COI occurs on a regular basis.</li> <li>✓ Employees are trained in meeting Aboriginal consultation requirements.</li> <li>✓ Assistance is provided to ensure COI are able to participate in engagement and dialogue processes when appropriate.</li> <li>✓ A complaint and response mechanism provides the facility with an understanding of COI concerns.</li> <li>✓ COI input is considered in decision making.</li> <li>✓ Reporting on COI engagement includes responses to COI concerns.</li> </ul>



Since 2015, improvements were made across all four of the protocol's indicators. Of the facilities achieving a Level A or better, over 50% of facilities are now being assessed at a Level AAA for Indicator 2. As Figure 2 shows, the results for this protocol are strong, with an overwhelming majority of facilities surpassing the goal of a Level A performance.

FIGURE 2 - ABORIGINAL AND COMMUNITY OUTREACH  
PERCENTAGE OF FACILITIES AT A LEVEL A OR HIGHER 2006, 2015 AND 2016



## 2016 Highlights

- 97% have implemented mechanisms to identify COI.
- 97% have engaged in effective and meaningful two-way dialogue with COI.
- 95% have implemented a COI response mechanism.
- 98% report publicly on their engagement and dialogue activities.

## CRISIS MANAGEMENT AND COMMUNICATIONS PLANNING

The *TSM Crisis Management and Communications Planning Protocol* provides mining companies with tools to effectively plan for communications in the unfortunate event of a crisis at one of their facilities 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 protocol requires both head offices and facilities to develop crisis management plans, as well as establish crisis communications teams to support the execution of these plans. Facilities must be able to demonstrate, among other requirements, that they have crisis communications programs in place to effectively alert employees and the public of a crisis, its development and its resolution. They must also be able to demonstrate that their crisis management plan is regularly tested and updated. See Figure 3 for a description of the requirements for this protocol.

In 2016, the *TSM Crisis Management and Communications Planning Protocol* (formerly the *Crisis Management Planning Protocol*) was reviewed and several amendments were made to ensure that the protocol reflected current and leading practices.



Performance in this protocol is measured using a “yes” or “no” rating scale against three indicators:

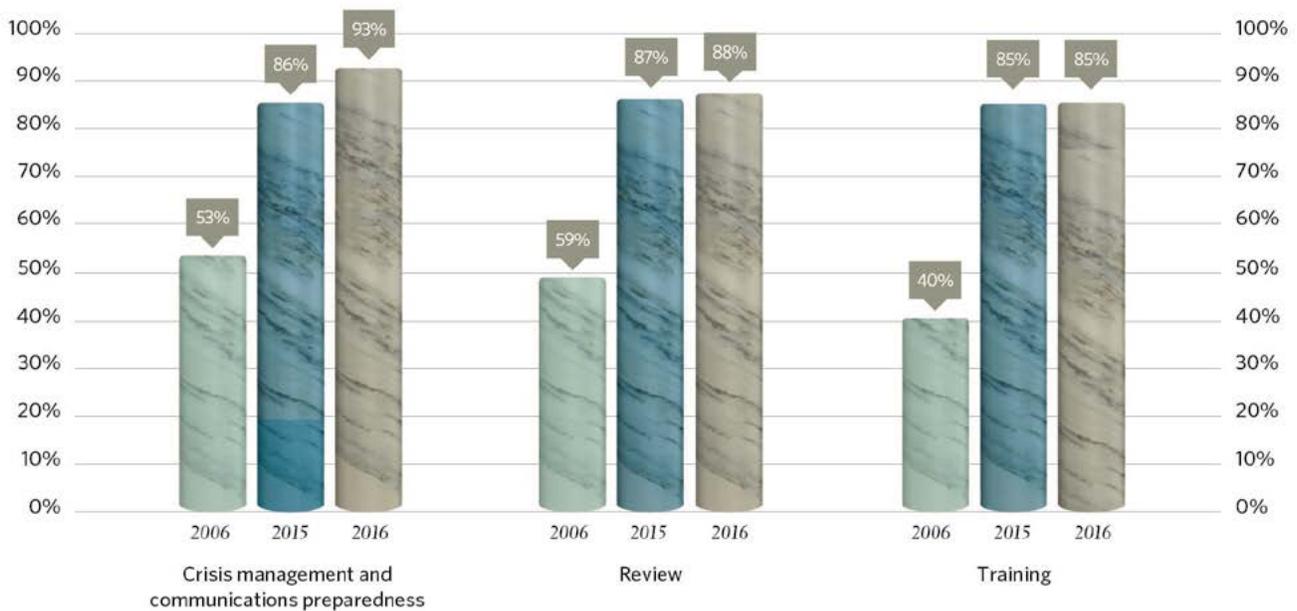
- Indicator 1: Crisis management and communications preparedness
- Indicator 2: Review
- Indicator 3: Training

FIGURE 3 - CRISIS MANAGEMENT AND COMMUNICATIONS PLANNING PROTOCOL: WHAT IS GOOD PRACTICE?

YES	<ul style="list-style-type: none"> <li>✓ Crisis management and communications plan is implemented and regularly updated.</li> <li>✓ CEO has endorsed the crisis management and communications plan.</li> <li>✓ A media spokesperson is trained.</li> <li>✓ Threats and risks have been identified.</li> <li>✓ A notification system to activate the crisis management and communications plan is in place.</li> <li>✓ Key media contact and telephone logs are prepared.</li> <li>✓ Crisis management team is established and trained.</li> <li>✓ Crisis control centre is established and equipped.</li> <li>✓ Meetings with senior members of the local emergency response authorities occur every year.</li> <li>✓ Mechanisms designed to communicate with employees and key stakeholders in the event of a crisis are tested.</li> <li>✓ Crisis simulation training exercises are conducted every year.</li> </ul>
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In 2006, approximately half of the participating facilities and companies had a crisis management plan that fulfilled TSM requirements. Since then, on an aggregate basis, the results show steady improvement, with further progress made since 2015. Figure 4 shows the results for each indicator.

FIGURE 4 - CRISIS MANAGEMENT AND COMMUNICATIONS PLANNING  
PERCENTAGE OF COMPANIES AND FACILITIES RESPONDING “YES” 2006, 2015 AND 2016



## 2016 Highlights

- 93% have a crisis management and communications plan.
- 88% regularly review and update their crisis management and communications plan.
- 85% conduct crisis simulation training exercises.



## SAFETY AND HEALTH

The *TSM Safety and Health Protocol* is designed to evaluate a facility's management practices related to occupational safety and health. Protecting the safety and health of employees and contractors is a fundamental component of *TSM* and is deeply engrained in the Canadian mining industry's culture. To achieve a Level A performance, facilities must demonstrate clear accountability for safety and health management, have processes in place that prevent the occurrence of incidents, provide proper training, and report their performance internally and externally. See Figure 5 for a description of the requirements for achieving Levels A, AA and AAA.

Performance in this protocol is measured against five performance indicators:

Indicator 1: Commitments and accountability

Indicator 2: Planning and implementation

Indicator 3: Training, behaviour and culture

Indicator 4: Monitoring and reporting

Indicator 5: Performance

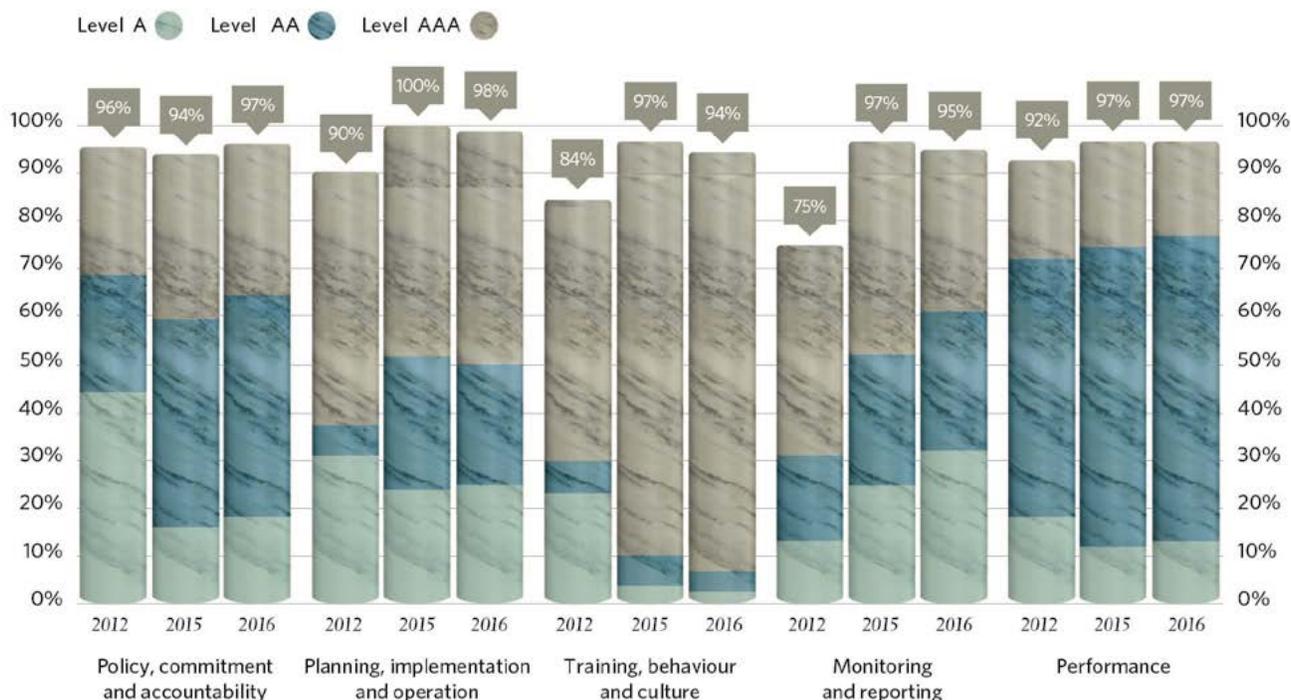
FIGURE 5 - SAFETY AND HEALTH PROTOCOL: WHAT IS GOOD PRACTICE?

<b>AAA</b>	<ul style="list-style-type: none"> <li>✓ External audit of safety and health commitments, management system and reporting mechanisms occurs.</li> <li>✓ Commitment to safety and health is visibly embedded throughout the facility.</li> <li>✓ Continual improvement targets are met and the facility is fatality-free for at least four years.</li> </ul>
<b>AA</b>	<ul style="list-style-type: none"> <li>✓ Internal audit of safety and health commitments, management system and reporting mechanisms occurs.</li> <li>✓ Safety-based culture is encouraged by integrating safety and health criteria into business processes (e.g., in purchasing decisions).</li> <li>✓ Benchmarking of safety and health performance against peers is conducted.</li> <li>✓ Performance targets are set for leading and lagging indicators.</li> </ul>
<b>A</b>	<ul style="list-style-type: none"> <li>✓ Commitments to safety and health are endorsed by senior management and communicated facility-wide.</li> <li>✓ Documented safety and health standards and procedures are implemented.</li> <li>✓ Workplace inspections occur.</li> <li>✓ Roles and responsibilities for safety and health are understood by all.</li> <li>✓ Risk-based training as well as orientation for all personnel is conducted.</li> <li>✓ Training is focused on hazard identification and presentation measures.</li> <li>✓ Safety and health performance is monitored and tracked against leading and lagging indicators.</li> <li>✓ Safety and health performance is publicly reported.</li> <li>✓ Safety and health performance targets are established and communicated to the workforce.</li> </ul>

On an aggregate basis, the results for this protocol have been strong since public reporting began in 2012. Over 90% of facilities have achieved a Level A or higher across all five indicators, with many facilities assessed at Levels AA and AAA. As Figure 6 shows, the results for 2016 are consistent with data presented in previous *TSM Progress Reports*.



FIGURE 6: SAFETY AND HEALTH ASSESSMENTS  
PERCENTAGE OF FACILITIES AT A LEVEL A OR HIGHER 2012, 2015 AND 2016



## 2016 Highlights

- 97% demonstrate commitment and accountability to safety and health.
- 98% have formal safety and health management systems.
- 94% have safety and health training programs.
- 95% monitor and report safety and health performance.
- 97% have established safety and health performance targets

In 2016, the *TSM Safety and Health Protocol* underwent a comprehensive review. The review focused on incorporating lessons learned from the first few years of the protocol's implementation, which resulted in several amendments. The most substantive change was the addition of requirements related to industrial hygiene. To achieve a Level A, an industrial hygiene program must be in place. A Level AA requires industrial hygiene risks and controls to be reviewed by a hygienist. A Level AAA will now require that the industrial hygiene program be overseen by a qualified hygienist. Facilities will work to implement the new requirements throughout 2017 and begin reporting against the revised protocol in 2018. The next comprehensive review of the *TSM Safety and Health Protocol* is scheduled for 2022, with an interim review planned for 2019.

## PREVENTING FORCED AND CHILD LABOUR

In 2017, the *TSM Guiding Principles* were revised to incorporate commitments to the prevention of 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. Adherence to this commitment will be validated during the external verification process. Recognizing that the level of risk associated with these issues varies considerably by jurisdiction, and that the complexity of company processes should be based on risk, processes will vary from company to company and will range from ensuring human resources practices are consistent with national/sub-national labour laws to following sophisticated due diligence processes. Verification against the new *TSM Preventing Forced and Child Labour Verification Protocol* will begin in 2018.



🔍 The following case studies illustrate what TSM excellence and leadership look like in practice. The initiatives described below are in the spirit of the TSM Guiding Principles and protocols related to communities and people.



### *Glencore Case Study*

## Attracting and Advancing Inuit Talent

Located in the Nunavik territory of Northern Quebec, Glencore's Raglan Mine has prioritized hiring as many local Inuit employees as possible. In 2008, Glencore launched the Tamatumani program, a skills development initiative that has contributed to the training and hiring of hundreds of Nunavimmiut. Today, 176 Inuit employees work at Raglan Mine, representing around 20% of the operation's workforce, and the mine has become one of the largest employers in the territory.

Raglan Mine developed the Tamatumani program with several community partners, including the Kativik Regional Government and the Kativik School Board, and they continue to monitor its evolution. This collaboration helps to ensure that the program addresses the needs and realities of the local communities. A major barrier to employment is the low education rate in the region. In the years before the program launched, 94% of all Inuit high school students dropped out before graduation. The Tamatumani program, which means "second start" in Inuktitut, fills a critical gap.

Today, Tamatumani offers a diverse range of programs. There is an essential skills program, which includes French and English courses, a transition-to-work program and applied technical training for various positions. There is also a two-year apprenticeship program called the Stope School, in which Inuit employees are trained to become underground miners. In 2013, the Raglan Mine created the RIDE (Rapid Inuit Development and Employment) program to accelerate internal mobility for high-potential employees. In 2014, the mine introduced cultural awareness training, with the help of the Avataq Cultural Institute, to promote cultural sensitivity and communication among all employees.

Working with local employment offices in the Nunavik communities, Tamatumani maintains a bank of candidates and visits communities to ensure residents are aware of available positions. All parties are working with the same goal: seeing as many Nunavimmiut employees in various positions as possible at Raglan Mine.



Computer technician at Glencore's Raglan Mine and recent graduate of the Tamatumani program.



## *IAMGOLD Case Study*

### Supporting Vulnerable Households

Burkina Faso's Sahel region, where IAMGOLD's Essakane Gold Mine is located, has a long dry season and a short rainy season. The climate makes food production challenging and is one reason why four out of every 10 households live below the poverty line. Since 2008, IAMGOLD has provided food support to those in need living near the mine. Initially, the program focused on 1,000 vulnerable individuals, including the elderly, persons with disabilities, and women who were the heads of their households. After evaluating the program, however, IAMGOLD shifted the focus of its support towards households as a means to generate longer-term benefits for both vulnerable individuals and their families.

In 2015, IAMGOLD engaged community leaders and A2N, an NGO, to develop poverty indicators to help identify the households that would benefit most from the support. This also informed the types of support that would be provided, with the aim of battling poverty and increasing food security over the long term. Their input led IAMGOLD to supply 258 vulnerable households with the following supports: two goats and veterinary care for the animals, two bags of agro-industrial goods and two 100-kilogram bags of millet. Goat husbandry was selected because the animals are well adapted to the Sahel region and can reproduce quickly. Food support was also provided to help prevent the households from selling the goats during hungry gaps and to enable them to maintain an inventory of grain for their food supply.

IAMGOLD and the communities regularly review the program, and recent data has shown that the number of vulnerable households has declined by 50%. The program, therefore, has been instrumental in helping these families escape poverty, improve food security and increase their social stature within their communities. The number of daily meals per household is up from two to three, increasing both in quantity and quality. Additionally, more than 140 goats have been born, giving children access to nutritious goat's milk.



Essakane Gold Mine representative delivering food support to a household near the mine site.



Industry Performance

Environmental Stewardship

A goal of TSM is to minimize the impact of mining activity on the environment and biodiversity through all stages of development, from exploration to closure.

- TSM Guiding Principles

This section describes how facilities have developed systems to bolster environmental stewardship through best practices in *Tailings Management* and *Biodiversity Conservation Management*.

**TAILINGS MANAGEMENT**

The current *TSM Tailings Management Protocol* is designed to go beyond adherence to technical standards and to ensure the responsible management of tailings facilities. Currently, in order to achieve a Level A or higher, facilities must demonstrate adherence to the tailings management guides. This includes having a policy and demonstrating commitment to responsibly manage tailings facilities. Achieving a Level A or higher also includes implementing a robust tailings management system, conducting annual reviews of tailings management performance, and assigning accountability for tailings management to the most senior officer of the company (e.g., the CEO). See Figure 7 for a description of the requirements for achieving Levels A, AA and AAA.

Performance in this protocol is measured against five indicators:

- Indicator 1: Tailings management policy and commitment
- Indicator 2: Tailings management system
- Indicator 3: Assigned accountability and responsibility for tailings management
- Indicator 4: Annual tailings management review
- Indicator 5: Operation, maintenance and surveillance manual

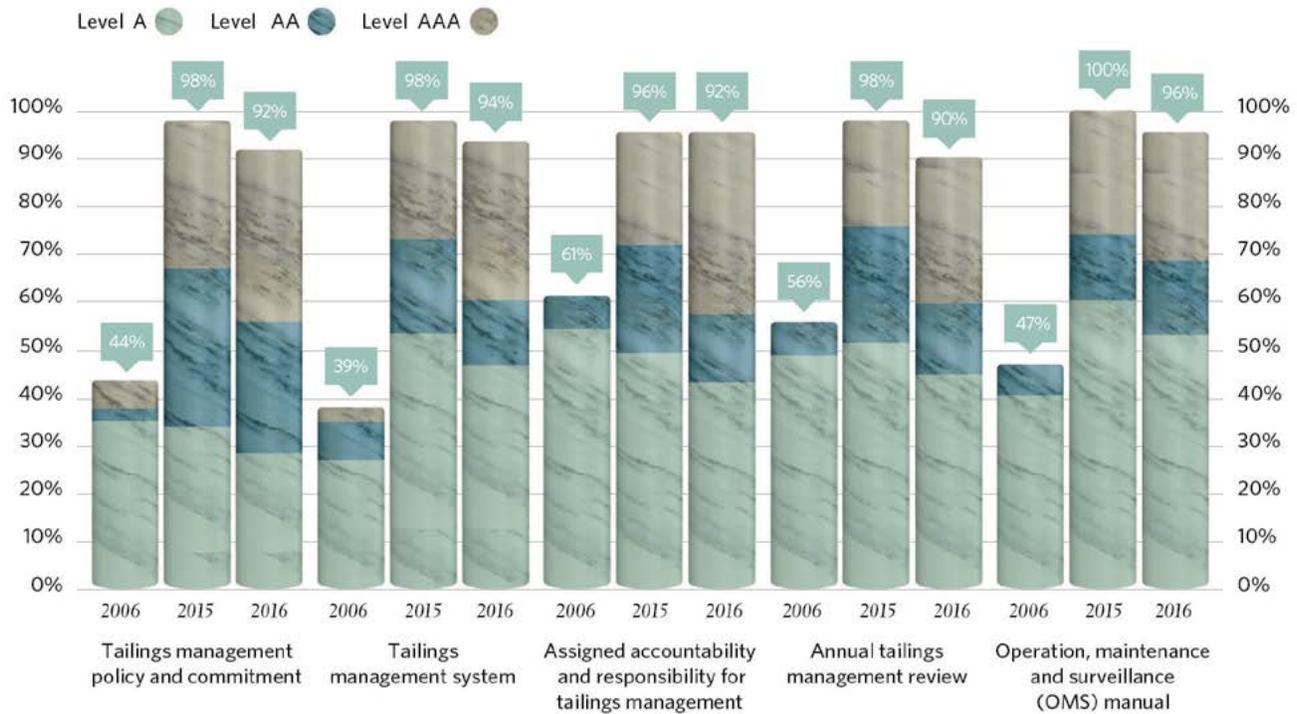
FIGURE 7 - TAILINGS MANAGEMENT PROTOCOL: WHAT IS GOOD PRACTICE?

<b>AAA</b>	<ul style="list-style-type: none"> <li>✓ Independent external audit or assessment of the facility's tailings management policy, system and procedures occurs.</li> </ul>
<b>AA</b>	<ul style="list-style-type: none"> <li>✓ Independent internal audit or assessment of the facility's tailings management policy, system and procedures occurs.</li> </ul>
<b>A</b>	<ul style="list-style-type: none"> <li>✓ Tailings management policy is implemented and commitment demonstrated.</li> <li>✓ Tailings management system includes criteria and procedures to:                             <ul style="list-style-type: none"> <li>- Mitigate negative environmental impacts.</li> <li>- Protect public health and safety.</li> <li>- Plan for decommissioning and closure.</li> <li>- Ensure regulatory requirements are met and company policies followed.</li> </ul> </li> <li>✓ Overall accountability for tailings management is assigned to the company's CEO or COO.</li> <li>✓ Risk assessment is conducted.</li> <li>✓ Emergency preparedness plans are developed.</li> <li>✓ Annual review of tailings management system occurs.</li> <li>✓ Operation, maintenance and surveillance manual is in place.</li> </ul>



Overall, the results for this protocol remain strong, with over 90% of facilities assessed at a Level A or higher. As Figure 8 shows, a growing number of facilities are achieving Level AA and AAA performance across all five indicators. Notably, in 2016, 63% of facilities achieved a Level AA or higher for Indicator 1 compared to 36% in 2014. However, on an aggregate basis, the number of facilities achieving a Level A or higher between 2015 and 2016 decreased, as evidenced by reports of Levels B and C results. This drop was caused by facilities new to TSM that are still working to align their systems with the program criteria. This year, two facilities that achieved Levels AA and AAA were downgraded to Level B for Indicator 4 during external verification.

FIGURE 8: TAILINGS MANAGEMENT ASSESSMENTS  
PERCENTAGE OF FACILITIES AT A LEVEL A OR HIGHER 2006, 2015 AND 2016



## 2016 Highlights

- 92% have implemented a management policy for and demonstrated commitment to responsible tailings management.
- 94% have implemented a tailings management system.
- 92% have assigned accountability for tailings management to the company’s CEO or COO.
- 90% have conducted an annual tailings management review.
- 96% have developed and implemented an operation, maintenance and surveillance manual.

### TAILINGS MANAGEMENT REVIEW

Immediately following the Mount Polley tailings dam breach in 2014, the MAC Board of Directors launched a thorough review of the *TSM Tailings Management Protocol* and associated guidance documents. As part of this review, MAC commissioned an *Independent TSM Tailings Management Review Task Force* in March 2015 to perform an external review of TSM’s requirements and guidance for tailings management. In November 2015, the Task Force provided MAC with its final report containing 29 recommendations to enhance the protocol and guides. The full Task Force’s report can be downloaded at [www.mining.ca/reports](http://www.mining.ca/reports).



Since the release of the Task Force's report in 2015, MAC and its members have been working to implement the 29 recommendations and strengthen the *TSM Tailings Management Protocol* and guides. Amendments to the protocol and indicators are described below and will take effect in 2019.

#### *Tailings Management Policy and Commitments are Effectively Communicated and Well Understood*

Amendments to Indicator 1 will ensure that tailings management policy and commitments are communicated to all employees. Additionally, the indicator will now require that the policy is fully understood by those with direct and indirect responsibility for the safety of tailings facilities. This means that policy requirements are understood by personnel with direct responsibility (e.g., the mill manager who is directly responsible for tailings management), and that processes are in place to ensure that those with indirect responsibilities (e.g., individuals making purchasing decisions related to tailings management) understand the facility's commitments under this protocol.

#### *Endorsement at the Highest Level of a Company*

Another amendment to Indicator 1 requires that the governance or board level of a company endorse its tailings management policy and commitments. Previously, senior management approved the policy and commitments.

#### *Stronger Audit Requirements*

MAC has strengthened the audit requirements across all five indicators of the protocol. An internal audit is now required to achieve a Level A; an external audit is required to achieve a Level AA; and an external audit, which includes an evaluation of effectiveness, is required for a Level AAA. These amendments will help ensure that the criteria of the tailings management guides are effectively implemented.

#### *Action Plans to Achieve a Level A*

MAC has amended the protocol to require facilities that have not achieved a Level A performance to develop and publish action plans (in the *TSM Progress Report*) for attaining that level. The amendment also requires that those actions be implemented within three years.

#### *Stronger Requirements for Emergency Preparedness and Accountability*

During its work to implement the Task Force's recommendations, MAC identified additional opportunities to strengthen the protocol's requirements for emergency preparedness and accountability for tailings management.

Currently, the protocol requires that companies develop their emergency preparedness plans at a Level A and achieve a Level AA when the plans are tested. MAC has amended the protocol to require that companies develop and test their emergency preparedness plans at a Level AA.

MAC has amended the criteria for achieving a Level B for Indicator 3. The criteria for attaining a Level B require that companies assign accountability to an executive officer and delegate responsibility for tailings-related issues and performance to appropriate personnel. Currently, the requirement to delegate responsibilities is at Level A. MAC has also strengthened the criteria for achieving a Level A by specifying that companies delegate responsibility for tailings facilities to qualified personnel.

#### *Application to Inactive Tailings Facilities*

Inactive tailings facilities that are associated with an operating facility are already included in the scope of *TSM* and members apply the protocol to these facilities. A process has been developed to bring high-risk inactive tailings facilities into *TSM*, as recommended by the Task Force. This process involves requiring all members to conduct a risk assessment of their inactive tailings facilities and apply the *TSM Tailings Management Protocol* to inactive tailings facilities determined to be high risk. In 2017, the process and the revised protocol will be piloted at selected members' inactive tailings facilities. Following this phase, piloting companies will report back to the rest of the membership and share lessons learned. If necessary, additional guidance for inactive tailings facilities may need to be developed.

### **ENHANCEMENTS TO MAC'S TAILINGS MANAGEMENT GUIDES**

In addition to the amendments MAC has made to this protocol, it is also updating the associated tailings management guides, which are internationally recognized as providing leading guidance for the safe operation and management of tailings facilities.

MAC's Tailings Working Group, comprising experts from within our membership, spent 2016–17 updating the *Guide to the Management of Tailings Facilities* to incorporate the recommendations of the Task Force and to add additional elements to further strengthen the document.



The revised third edition of the Guide was released in the fall of 2017. While the revised Guide continues to provide essential guidance on management systems, it now:

- Includes additional guidance on the technical aspects of responsible tailings facility management.
- Integrates a risk-based approach and emphasizes the importance of selection and implementation of site-specific best available technologies (BAT) and best available/applicable practices (BAP) for tailings management.
- Stresses the importance of independent review and provides guidance on how to do so effectively.

A new table of conformance has been developed to define, for the purpose of the *TSM Tailings Management Protocol*, what constitutes conformance with the *Guide to the Management of Tailings Facilities*. This table will replace the *Guide to Audit and Assessment of Tailings Facilities*.

The *Tailings Working Group* is now working on reviewing and revising the *Guide to the Development of an Operation, Maintenance and Surveillance Manual*. This work will progress throughout 2017 with the goal of finalizing the guide by early 2018. The revised *TSM Tailings Management Protocol* will take effect in the 2019 reporting year, once the associated tailings guides have been fully updated.

## BIODIVERSITY CONSERVATION MANAGEMENT

Adopting best practices in biodiversity conservation management through all stages of a mine's life cycle is an industry priority. The *TSM Biodiversity Conservation Management Protocol* evaluates and confirms a facility's commitment to biodiversity conservation. Facilities that achieve Level A performance in this protocol engage with key communities of interest – government, Aboriginal communities and conservation organizations – to develop biodiversity objectives and strategies. They also put in place mechanisms to assess, mitigate and compensate for impacts on biodiversity. See Figure 9 for a description of the requirements for achieving Levels A, AA and AAA.

Performance in this protocol is currently measured against three indicators:

Indicator 1: Corporate biodiversity conservation commitment, accountability and communications

Indicator 2: Facility-level biodiversity conservation planning and implementation

Indicator 3: Biodiversity conservation reporting

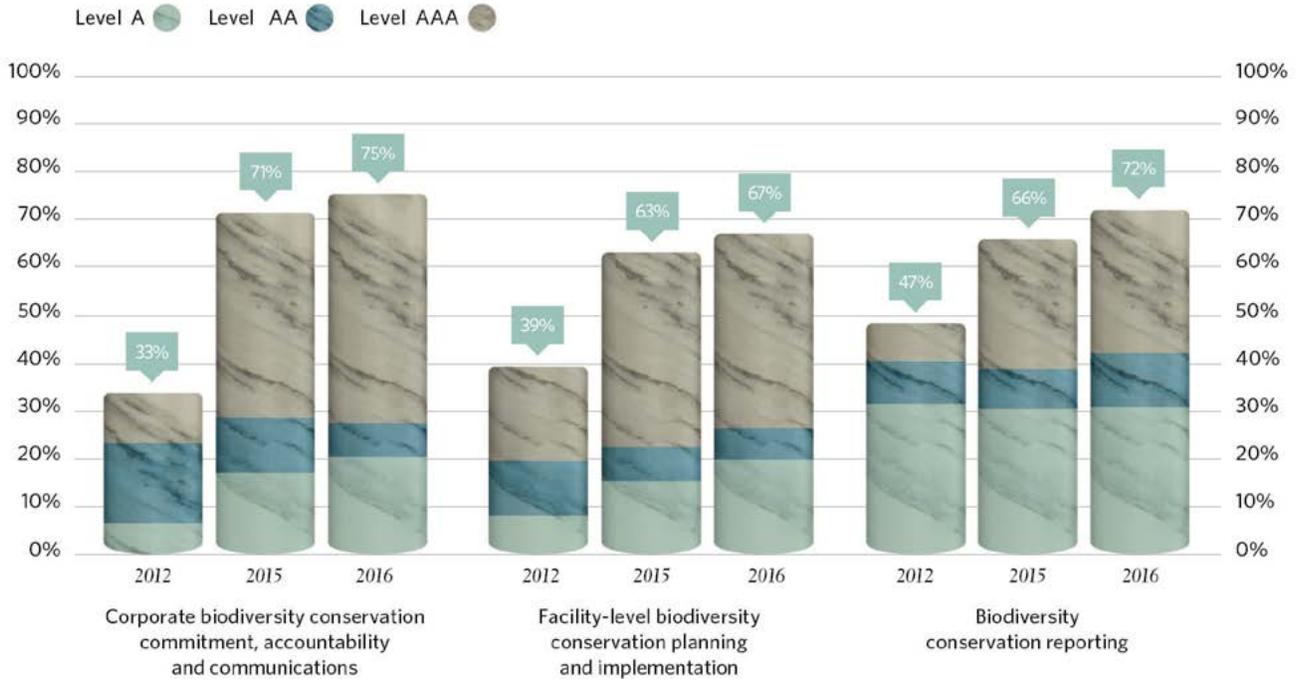
FIGURE 9 - BIODIVERSITY CONSERVATION MANAGEMENT PROTOCOL: WHAT IS GOOD PRACTICE?

<b>AAA</b>	<ul style="list-style-type: none"> <li>✓ Partnerships are sought with other organizations (e.g., an environmental non-governmental organization) to achieve conservation objectives.</li> <li>✓ Investments in research and development enhance understanding of and contribution to biodiversity conservation, science and Traditional Knowledge.</li> <li>✓ Enhancements to biodiversity are made beyond the facility.</li> <li>✓ Employee volunteerism in community-based biodiversity initiatives is encouraged.</li> <li>✓ Community of interest feedback on public reporting is actively sought and publicly reported.</li> </ul>
<b>AA</b>	<ul style="list-style-type: none"> <li>✓ Biodiversity conservation management is integrated into core business planning processes (e.g., the annual budget process).</li> <li>✓ Internal verification of biodiversity conservation commitments, management and public reporting occurs.</li> </ul>
<b>A</b>	<ul style="list-style-type: none"> <li>✓ Senior management commitment to biodiversity conservation is demonstrated.</li> <li>✓ Impacts and risks to biodiversity are assessed and mitigated.</li> <li>✓ Key communities of interest (e.g., governments, Aboriginal communities and conservation groups) are involved in biodiversity conservation efforts.</li> <li>✓ Awareness for biodiversity conservation is included in facility training programs.</li> <li>✓ Biodiversity conservation activities and performance are publicly reported.</li> </ul>



MAC members have continued to make significant improvements across the three indicators since 2012, the first year of public reporting for this protocol. As Figure 10 shows, on an aggregate basis, the results for all three indicators have improved over the past year.

FIGURE 10: BIODIVERSITY CONSERVATION MANAGEMENT ASSESSMENTS  
PERCENTAGE OF FACILITIES AT A LEVEL A OR HIGHER 2012, 2015 AND 2016



### 2016 Highlights

- 75% have senior management commitment to biodiversity conservation in place.
- 67% have implemented a biodiversity conservation management system.
- 72% report publicly on biodiversity conservation activities and performance.



🔍 The following case studies illustrate what TSM excellence and leadership look like in practice. The initiatives described below are in the spirit of the TSM Guiding Principles and protocols related to environmental stewardship.



### *Cameco Case Study*

## Improving Environmental Protection through Education

Cameco's Key Lake Operation employs 600 people, and approximately half of the workforce is from northern Saskatchewan. In 2011, the operation found that a number of incidents that affected the environment were the result of complacent behaviour and were, therefore, preventable. Staff took action and in 2012 launched the Key Lake Environmental Awareness Week for all site employees. Over the years, Key Lake's annual awareness week has not only increased workers' knowledge of environmental protection, but it has significantly reduced environmental incidents. It has also been recognized as best practice across the company and by northern Saskatchewan communities, and is effective at encouraging people to be good stewards of the environment.

Activities during the annual event are designed to be fun and informative. Throughout the week, there are interactive demonstrations as well as classroom sessions that feature presentations and hands-on activities that enable employees to learn and apply the information. Every day, staff are sent environmental tips and stories, and environmentally themed movies are played in the theatre each night. All activities are designed to communicate technical information to an often non-technical audience in an engaging and easy-to-understand way.

The initiative has enabled Key Lake to reach its environmental goals by targeting the root issues behind the incidents and by instilling an environmentally passionate and caring culture on site. It has also inspired changes in how Cameco staff communicate with stakeholders during the company's annual Northern Saskatchewan Community Tour to make their connection more interactive and engaging. In 2015, Cameco employed an interactive "science fair" approach during its tour of five northern communities. This enabled Key Lake staff to connect with community members, including youth and elders, by providing uranium mining information in ways that were meaningful to them. Based on the project's success, Cameco is planning to adopt similar awareness weeks at other sites.



Wing identification station at Key Lake's annual environmental awareness event.



## *De Beers Case Study*

### Caribou Monitoring Program

The De Beers Canada Victor Mine Wildlife Monitoring Program is a long-term study initiated in 2001. The initial surveys were associated with the Victor Diamond Project Environmental Assessment (EA) process. The monitoring program was subsequently agreed to under the Comprehensive Study Report (CSR) by De Beers Canada, Attawapiskat First Nation and the Government of Canada under the Victor Follow-Up Program Agreement (FUPA).

The monitoring program includes continuous radio-telemetry monitoring of collared woodland caribou (*Rangifer tarandus*), as well as early (December) and late (end of February/early March) winter aerial wildlife surveys every two years during the operation of the mine, or as otherwise agreed to by parties involved in FUPA. The monitoring program operates under a passive adaptive management framework where monitoring results are reviewed to assess whether modifications to survey methods are required to accommodate specific observations and possible concerns as they become apparent in the data.

Attawapiskat First Nation members have been participating in the monitoring program by assisting with the spotting of caribou and the retrieval of caribou collars that have fallen off. Elders also participate by acting as spotters during the winter aerial surveys. Caribou are regularly harvested by Attawapiskat First Nation, and the satellite collars have confirmed the information provided by hunters and Elders about their movement.

The studies have indicated that both the forest-forest and forest-tundra woodland caribou ecotypes occur in the Victor study area, which is located in a mixing zone where both ecotypes concurrently occur during the winter in some years. However, during the spring calving and summer post-calving periods, both types of caribou demonstrate a strong fidelity to the study area. These patterns have remained the same from 2004 to 2016, suggesting that use of calving areas in the study area has not changed as the mine was developed and went into production.



De Beers' Victor Mine, near Attawapiskat First Nation in northeastern Ontario.





*Industry Performance*

Energy Efficiency

Mining companies that participate in TSM practice continuous improvement by applying new technology, innovation and best practices in all facets of their operations.

- TSM Guiding Principles

This section highlights members' performance in *Energy Use and GHG Emissions Management*.

**ENERGY USE AND GHG EMISSIONS MANAGEMENT**

Improving energy efficiency and reducing GHG emissions are priorities for the Canadian mining industry as a way to limit impacts to the environment, address climate change and help reduce operational costs at a facility. The *TSM Energy Use and GHG Emissions Management Protocol* helps facilities evaluate their practices and processes related to energy conservation and GHG emissions reduction. To achieve a Level A in this protocol, facilities must ensure energy data are reviewed regularly and are well integrated into operator actions. They must also set and achieve performance targets. See Figure 11 for a description of the requirements for achieving Levels A, AA and AAA.

Performance in this protocol is measured against three indicators:

Indicator 1: Energy use and GHG emissions management systems

Indicator 2: Energy use and GHG emissions reporting systems

Indicator 3: Energy and GHG emissions performance targets

**FIGURE 11 - ENERGY USE AND GHG EMISSIONS MANAGEMENT PROTOCOL: WHAT IS GOOD PRACTICE?**

<b>AAA</b>	<ul style="list-style-type: none"> <li>✓ Procurement policies incorporate energy efficiency and GHG emissions reduction elements.</li> <li>✓ Investments in renewable energy and research and development occur.</li> <li>✓ Energy use and GHG emissions reporting and performance is externally verified</li> <li>✓ Some Scope 3 emissions are included in public reporting.</li> <li>✓ Continuous improvement targets are used to demonstrate reductions against historical trends.</li> </ul>
<b>AA</b>	<ul style="list-style-type: none"> <li>✓ Energy use and GHG emissions are factored into business planning.</li> <li>✓ Energy use and GHG emissions reporting and performance is internally verified.</li> <li>✓ Corporate energy use and GHG emissions strategy is publicly available.</li> <li>✓ Energy use and GHG emissions performance targets are consistently met.</li> </ul>
<b>A</b>	<ul style="list-style-type: none"> <li>✓ Comprehensive procedures and practices related to energy use and GHG emissions are in place.</li> <li>✓ Energy consumption and GHG emissions data are monitored, tracked and publicly reported.</li> <li>✓ Energy and GHG emissions data are used to support senior management decision making.</li> <li>✓ Accountability for energy use and GHG emissions is assigned to operational managers.</li> <li>✓ Training on energy efficiency is provided to personnel.</li> <li>✓ Energy use and GHG emissions performance targets are set and achieved.</li> </ul>

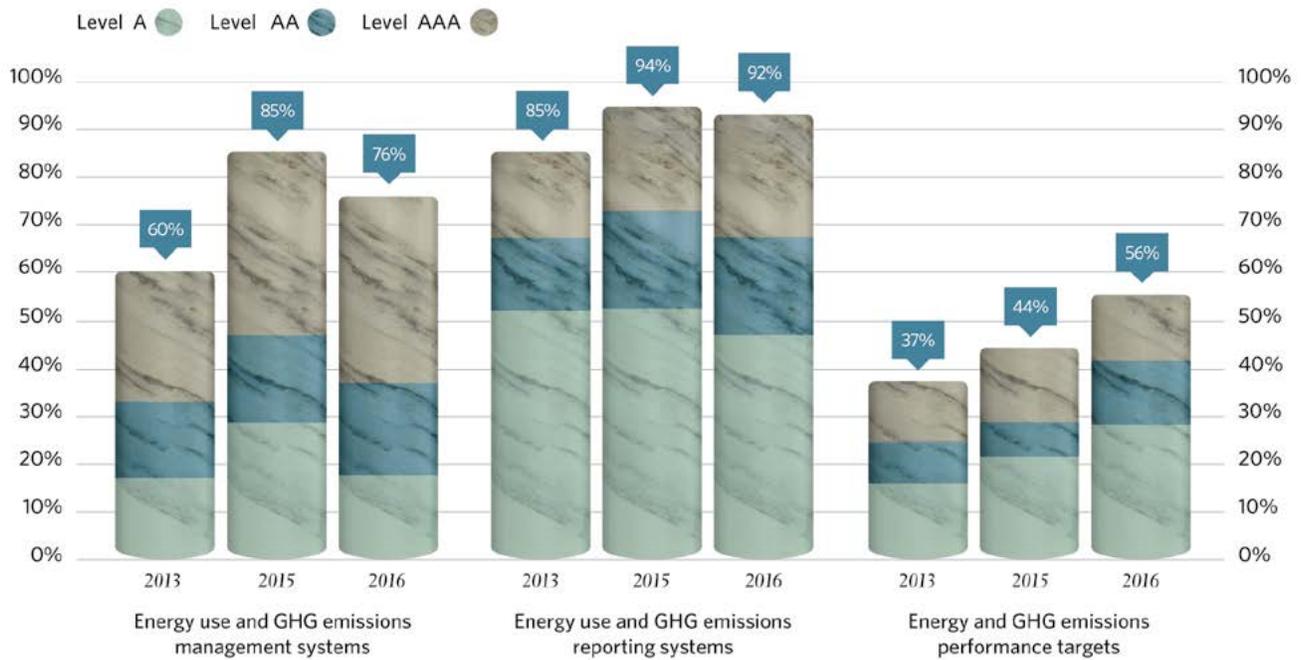
Recognizing that energy use and GHG emissions are not a material business risk for all companies and facilities, MAC has incorporated a materiality threshold into the protocol. Facilities whose GHG emissions are less than 25 kilotonnes of CO<sub>2</sub> equivalent, or whose on-site energy usage is less than 25,000 gigajoules, are not required to report on Indicators 1 or 3 of this protocol.



In 2013, MAC revised this protocol, condensing the number of indicators for this protocol from six to three. This change acknowledged that in the mining sector, facilities produce GHGs primarily through the burning of fossil fuels for energy and, as a result, GHG emissions are controlled by managing energy consumption. Historical data from 2006 to 2012 are available in the 2014 *TSM Progress Report*. Figure 12 presents the 2013, 2014 and 2015 performance for the three indicators and shows the steady improvements that have been made since 2013 for Indicators 1 and 2.

However, on an aggregate basis, the percentage of facilities that have achieved a Level A or higher for Indicator 1 has decreased since 2015. This decline is the result of two facilities dropping from a Level A or higher in 2015 to a Level B in 2016, and five new facilities being assessed for the first time at either a Level C or B. The 2% decrease in Indicator 2 is the result of one new facility being assessed at a Level C. For Indicator 3, which requires a facility to set and achieve its energy use and GHG emissions performance assessed targets in the reporting year, the results improved by 12%.

**FIGURE 12: ENERGY USE AND GHG EMISSIONS MANAGEMENT ASSESSMENTS  
PERCENTAGE OF FACILITIES AT A LEVEL A OR HIGHER 2013, 2015 AND 2016**



## 2016 Highlights

- 76% have comprehensive energy use and GHG emissions management systems.
- 92% have implemented energy use and GHG emissions management reporting systems.
- 56% have established and met performance targets.



🔍 The following case study illustrates what TSM excellence and leadership look like in practice. The initiatives described below are in the spirit of the TSM Guiding Principles and protocols related to energy efficiency.



### IAMGOLD Case Study

## Generating Powerful Community Benefits through Solar Energy

The Brokopondo region in Suriname, where IAMGOLD's Rosebel Gold Mine is located, has often faced power shortages due to an overburdened electricity grid. IAMGOLD saw an opportunity to harness the sun to help power the mine and to support nearby communities. In 2014, the company worked alongside five communities and a local workforce of 150 people to construct a large-scale 5-megawatt solar energy farm – the first in Suriname. The project has returned a significant amount of power to the national grid, has reduced GHG emissions, and has inspired IAMGOLD to invest in solar-powered community projects to enhance the quality of life for those living in neighbouring communities.

In 2015, IAMGOLD and community partners opened a solar-powered multi-functional classroom, which is run by the community of Nieuw Koffiekamp. The classroom is equipped with computers, wireless internet and a library. A digital learning program was also launched to improve local students' access to education. A few months after the classroom opened, IAMGOLD introduced a computer course, which is offered to the broader community. To date, 26 men and women have successfully completed the course, which includes training on internet and Microsoft programs.

The community of Galibi, an indigenous village accessible only by boat, has also benefited from IAMGOLD's investments and expertise in solar power. The community approached IAMGOLD to help them overcome the significant challenges it was facing in accessing reliable power. The village's central generator had become increasingly unreliable, leaving most residents without access to electricity for extended periods. IAMGOLD stepped in and financed the construction of a solar project in 2015, which was handed over to the community in November 2016. The new solar-powered system provides electricity to the heart of the village, powering classrooms, a health clinic and other critical buildings.



IAMGOLD'S solar farm in Suriname.



## International Application of TSM

While mandatory for their Canadian facilities, a growing number of MAC members are voluntarily applying *TSM* and publicly reporting performance for their international operations. These include First Quantum Minerals, Agnico Eagle Mines Limited, IAMGOLD Corporation and New Gold. Hudbay Minerals has begun to apply *TSM* at its Constancia operation in Peru and its performance is included in the aggregate results for each of the six protocols, with full disclosure of facility results to begin in 2018. By adopting *TSM* at their operations abroad, these companies demonstrate that they are managing mining risks responsibly throughout the world at the same high standard as their Canadian operations.

International application of *TSM*, however, is not always feasible for companies. Many MAC members follow other standards and participate in various international initiatives that drive environmental and social performance in the mining sector and foster performance improvement. The table on page 36 summarizes the implementation of these standards globally.

### GLOBAL UPTAKE OF TSM

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 countries seeking tools to improve the performance of their mining industries.

In 2015, *TSM* achieved an important milestone with the Finnish Mining Association's (FinnMin) adoption of the program for its members' operations in Finland. Since then, Cámara Argentina de Empresarios Mineros (CAEM), the national mining association in Argentina, and the Botswana Chamber of Mines (BCM) have formally adopted *TSM*. All three associations are working towards full implementation of the program.

While *TSM* can be applied to any mining operation regardless of jurisdiction, the priorities of each adopting country may vary and, as such, implementation of *TSM* may need to be modified to suit the local context. For example, FinnMin has modified the *TSM Aboriginal and Community Outreach Protocol* to reflect the Finnish mining sector's relationship with the Sami community. However, each association is required to establish a Community of Interest Advisory Body similar to that of MAC's, and must also implement the following foundational components of *TSM*:

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:** Associations must have measures to track progress against the performance indicators at the facility level, where the mining activity takes place.
4. **Independent Verification:** Associations must implement an appropriate framework for independent verification of performance to ensure that reported self-assessed results accurately reflect performance.
5. **Public Disclosure of Facility-Level Reporting:** A mechanism must facilitate the public reporting of facility-level performance results.
6. **Condition of Membership:** *TSM* must be a condition of membership in the implementing association.
7. **Community of Interest Advisory Body:** Associations must ensure that a Community of Interest Advisory Body, which represents challenging interests and a broad spectrum of societal perspectives, is in place.

International interest in *TSM* continues to grow. Over the past year, MAC has met with mining company representatives from Ecuador, Spain, Norway, South Africa, Cuba and Dominican Republic to discuss the program. In 2017, MAC will develop a strategy for continued expansion of *TSM*.



## VOLUNTARY PRINCIPLES ON SECURITY AND HUMAN RIGHTS

In March 2017, MAC adopted a new membership commitment to implement the Voluntary Principles on Security and Human Rights (VPs).

Created in 2000, the VPs are standards to help extractive sector companies fulfil the obligation to respect human rights while protecting the assets and people at their operations. The Government of Canada has identified the VPs as one of six leading standards in Canada's Corporate Social Responsibility (CSR) Strategy for the Extractive Sector. More information on the VPs can be found at [www.voluntaryprinciples.org](http://www.voluntaryprinciples.org).

Several MAC members already formally participate in the Voluntary Principles on Security and Human Rights Initiative (VPI) and several others apply the VPs at their operations abroad. With this new membership condition, all MAC member companies that rely on private or public security forces have committed to implementing a human rights and security approach consistent with the VPs and based on a determination of risk at the mining facilities they control. In addition, MAC members with international mining operations will report on their implementation of the VPs annually in MAC's *TSM Progress Report* beginning in 2018.

MAC has assessed security-related human rights risks at members' facilities in Canada. Because of Canada's rule of law, rigorous police training and accreditation mechanisms for third-party security providers, MAC has determined the risks to be low. As well, these risks are further mitigated at members' Canadian facilities through the implementation of the *TSM Crisis Management and Communications Planning Protocol*, which contains two relevant criteria. The first criterion requires that "credible threats and risks have been identified and protocols established to address them." The second criterion requires that "facilities meet annually with senior members of the local emergency response authorities." Together, these criteria provide the effective basis for implementing the VPs in low-risk situations.



First Quantum's Çayeli mine in Turkey.

## INTERNATIONAL INITIATIVES

MAC member company application of International Standards and Programs	Industry Sustainability Initiatives		Management System Standards		International Voluntary Initiatives				Reporting, Disclosure and Transparency Standards				Financing Standards		Listed on Socially Responsible Investing Indices		Commodity Specific Standards			
	MAC Towards Sustainable Mining*	ICMM Sustainable Development Framework	WGC Conflict Free Gold Standard	ISO 14001: EMS Standard	OHSAS 18001	UN Global Compact	Extractive Industries Transparency Initiative	Voluntary Principles on Security and Human Rights	OECD Guidelines for Multinational Enterprises	AA 1000	Global Reporting Initiative	Carbon Disclosure Project	Water Disclosure Project	Carbon Pricing Leadership Coalition	IFC Social and Environmental Performance Standards	Dow Jones Sustainability Index	Jantzi Social Index	Responsible Jewellery	International Cyanide Code	Kimberley Process
*Applied at international facilities. **TSM is applied at international facilities, but results are not reported publicly.																				

### Companies/Business units headquartered in Canada with international operations:

Agnico Eagle Mines Ltd.	✓		✓							✓	✓	✓			✓			✓	✓	
Barrick Gold Corporation		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	
IAMGOLD Corporation	✓			✓	✓			✓		✓	✓			✓		✓				
Kinross Gold Corporation			✓	✓	✓	✓	✓			✓	✓	✓		✓		✓			✓	
HudBay Minerals Inc.**	✓			✓	✓		✓	✓		✓	✓	✓		✓						
First Quantum Minerals Inc.	✓					✓	✓	✓			✓			✓						
Teck Resources Limited **	✓	✓		✓		✓	✓		✓	✓	✓	✓	✓	✓	✓					
Vale (Base Metals)				✓	✓	✓	✓			✓	✓	✓	✓	✓						
New Gold Inc.**	✓		✓	✓	✓	✓				✓	✓					✓			✓	
Eldorado Gold			✓	✓	✓	✓				✓	✓	✓							✓	
Goldcorp		✓	✓		✓	✓	✓		✓		✓	✓		✓					✓	
Lundin				✓	✓	✓		✓	✓	✓	✓	✓								

### Companies headquartered outside of Canada with Canadian operations:

Glencore		✓		✓	✓	✓	✓			✓	✓	✓		✓	✓					
De Beers Canada Inc.**	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓			✓				✓		✓
Newmont Mining Corporation		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓			✓	
Rio Tinto		✓		✓	✓	✓	✓	✓	✓	✓	✓			✓	✓			✓		✓
ArcelorMittal				✓	✓		✓			✓										





## TSM Awards - 2017 Recipients

### TSM Excellence Awards

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

#### TSM COMMUNITY ENGAGEMENT EXCELLENCE AWARD

*2017 Winner and Finalists*

##### WINNER

Vale: *Shipping Program Recognizes Inuit Connection to the Land-Fast Sea Ice*

##### FINALISTS

Glencore: *Attracting and Advancing Inuit Talent*

IAMGOLD: *Supporting Vulnerable Households*

#### TSM ENVIRONMENTAL EXCELLENCE AWARD

*2017 Winner and Finalists*

##### WINNER

Dominion Diamond: *Transforming Waste Management*

##### FINALISTS

IAMGOLD: *Generating Powerful Community Benefits through Solar Energy*

Cameco: *Improving Environmental Protection through Education*

IAMGOLD: *Progressive Reclamation of Mined Areas*



## 2017 TSM EXCELLENCE AWARD WINNERS

In May, MAC awarded Dominion Diamond Corporation's Ekati Diamond Mine and Vale Newfoundland and Labrador Limited's Voisey's Bay Mine with the 2017 *TSM Excellence Awards* for their innovative sustainability projects.

This year, a total of 20 nominations were submitted by mining companies that participate in the *TSM* initiative. The selection committee, composed of members from the COI Advisory Panel, selected the finalists and winners based on criteria such as innovation, involvement of and engagement with communities, and project outcomes. *TSM* performance was also considered as an indicator of the company's ongoing commitment to corporate responsibility.

### TSM COMMUNITY ENGAGEMENT EXCELLENCE AWARD 2017 WINNER: VALE

The Innu and Inuit on the north coast of Labrador have a deep cultural connection to the land-fast sea ice. During winter, the ice serves as a transportation route for harvesting and for accessing other coastal communities. Vale's Voisey's Bay mine and concentrator operation, which is located in the region, uses the Anaktalak Bay shipping route to transport its products and resupply the site. Top priorities for both the company and the local communities are to ensure that shipping minimally interferes with Aboriginal traditional lifestyles and that residents can safely cross the ship's track. For more than a decade, Vale and local communities and stakeholders have collaborated to achieve these goals, resulting in new and innovative approaches and technologies.

Years before Voisey's Bay became operational, the Vale and the Labrador Inuit Association (now the Nunatsiavut Government) developed a Shipping Agreement, incorporating Inuit traditional knowledge and requiring Inuit involvement to implement. The Winter Shipping Program launched in 2005 when Voisey's Bay became operational. In 2007, Vale evaluated the program and, based on feedback from the local communities, worked to reduce the time it took to get safely across the ship's track. Vale worked with Sikumiut Environmental Management, a local Inuit company that had been monitoring and supporting the winter shipping program for Vale, to develop a floating pontoon-type bridge. A prototype was successfully tested and a full system was implemented in 2008. The pontoon bridges are deployed across the ship's fresh track at key locations along the 40-kilometre shipping route. Reflective markers and signage are added along the route to ensure safe crossing. When the track freezes, additional "ice bridges" are established at other locations. Once safe crossing locations are established, a multi-faceted communications system alerts residents of their locations as well as shipping activity.

Community input has been paramount to the program's success and is also reflected in other aspects of the agreement. For example, there are two six-week closure periods when shipping cannot take place: in the fall when ice is forming and in the spring when ice is breaking up. Closure periods have also been adjusted to reflect weather conditions and public holidays.



Vale's Umiak 1 entering Anaktalak Bay.

## TSM ENVIRONMENTAL EXCELLENCE AWARD 2017 WINNER: DOMINION DIAMOND

Dominion Diamond Corporation purchased the Ekati Diamond Mine in the Northwest Territories in 2013. Since that time, the company has worked to transform how waste is managed at the site to improve sustainability and limit environmental impacts. Various actions throughout the years have significantly reduced the mine's waste and GHG emissions and have inspired communities and other mining companies in the region to follow Dominion's lead.

In 2013, Dominion started purchasing environmentally friendly products for the mine, such as corn-oil-based garbage bags, sugar-cane take-out containers, and compostable disposable utensils to reduce the amount of chlorine-rich plastics in the waste incinerator. The company then restricted incineration to paper and organic waste and launched a two-year educational campaign for all staff on waste management and segregation. Items such as oily rags, glass, plastics, cans and other recyclables are removed from the mine site and sent for recycling or proper disposal. These actions have prevented nearly 75,000 kilograms of plastics and 193,000 kilograms of oily rags from being incinerated, reducing emissions from the mine's two incinerators into the environment and keeping them well below federal guidelines.

In 2015, Dominion installed an in-vessel composter – the first mine in Canada's North to do so. Now, roughly half of organic waste generated at the Ekati mine is composted. By the end of 2016, more than 67,000 kilograms of organic waste was diverted, reducing GHG emissions by 210 tonnes of CO<sub>2</sub> equivalent and diesel consumption by 74,000 litres. Thanks to the in-vessel composter, Dominion is often able to shut down one or both incinerators entirely, which has decreased scrubber water consumption by an estimated 25%.

Also in 2016, Dominion launched a study to evaluate the use of site-generated compost in reclamation work as a means of adding nutrients to the processed kimberlite and to promote vegetation growth. If the study shows positive results, it will create a new opportunity to transform site-generated waste into a powerful tool in reclamation.

"Dominion takes our responsibility to the environment seriously, as demonstrated through our waste management program, and we are honoured to be recognized for those efforts. We are particularly proud of our teams that have worked so hard to transform how waste is managed at the site to reduce emissions, improve sustainability, and keep the environment clean and safe," stated Brendan Bell, Chief Executive Officer, Dominion Diamond Corporation.



Community tour of Dominion Diamond's Ekati Mine (2016).



## TSM Awards - 2017 Recipients

### TSM Leadership Awards

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 Protocol*. 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 2016 RESULTS

Glencore Nickel, Raglan Mine  
 Glencore Zinc, Brunswick Smelter  
 Glencore, Kidd Operations  
 New Gold, Cerro San Pedro Mine  
 Rio Tinto, Diavik Diamond Mine  
 Syncrude Canada, Oil Sands Operations  
 Teck Resources Limited, Cardinal River Operations  
 Teck Resources Limited, Greenhills Operation  
 Teck Resources, Trail Smelter

This year, Teck's Cardinal River Operations, Greenhills Operations and Trail Smelter each received *TSM Leadership Awards* for achieving Level AAA performance and "yes" in crisis management and communications planning in all of the program's 23 indicators during external verification. Only one other facility, Teck's Elkview Operations, has achieved this performance level.

## TSM Performance by Company

### Measuring Company Performance



This section of the report presents facility-level results for all companies participating in *TSM*. The number of facilities participating in *TSM* continues to grow. In 2006, 49 facilities publicly reported performance, and in 2016, this number grew to 65 facilities. This section includes externally verified results for seven companies (ArcelorMittal Mines Canada, De Beers Canada, Glencore, New Gold\*, Rio Tinto, Syncrude and Teck Resources Limited\*\*).

Besides being MAC members, many companies in this report belong to either the Mining Association of British Columbia or the Québec Mining Association, which are both formal participants in *TSM*. Each company's affiliation is indicated by the following logos:



\*New Gold conducts external verification for a sample of its facilities on an annual basis. In 2016, Cerro San Pedro underwent external verification.  
 \*\*Teck Resources Limited conducts external verification for a sample of its facilities on an annual basis. In 2016, Teck's Cardinal River Operations, Greenhills Operations and Trail Smelter underwent external verification.

*TSM Performance by Company*  
 Agnico Eagle Mines Limited



Agnico Eagle is a senior Canadian gold mining company that has produced precious metals since 1957. The company's eight mines are located in Canada, Finland and Mexico, with exploration and development activities in each of these regions as well as in the United States and Sweden. Agnico Eagle is listed on the Toronto and New York stock exchanges (AEM) and employs more than 8,000 people.

Agnico Eagle's four fundamental values of operating safely, respecting its employees, protecting the environment and respecting its communities are integral to the company's culture and social responsibility leadership. In 2016, Agnico Eagle improved its performance in the areas of health and safety, water management and community engagement. The company also identified opportunities to improve its energy management and reduce its GHG emissions.

During 2016, Agnico Eagle also took steps to further enhance its internal Health, Safety, Environment and Community Relations (HSEC) Management System, known as the Responsible Mining Management System (RMMS). An internal audit of the management system was performed and findings and best practices were identified.

### SUMMARY OF TSM PERFORMANCE

#### *Aboriginal and Community Outreach*

Agnico Eagle's operations achieved at least a Level A performance under the *TSM Aboriginal and Community Outreach Protocol*, with the exception of the Meadowbank mine, which achieved a Level B for Indicator 3. Meadowbank is working towards full implementation of its formal response mechanism and anticipates that it will achieve a Level A performance in 2018.

#### *Crisis Management and Communications Planning*

Agnico Eagle's corporate office and facility-level operations have consistently met all of the requirements of the *TSM Crisis Management and Communications Planning Protocol*.



### Safety and Health

With the exception of the Kittila mine, which achieved a Level B for Indicator 5 of the *TSM Safety and Health Protocol*, Agnico Eagle's operations each achieved a minimum of a Level A performance. While Kittila has all of the criteria in place to achieve a Level A for Indicator 5, it is assessed at a Level B due to a tragic work accident at the end of December 2016, which took the life of a contractor. In 2016, Agnico Eagle's combined lost time and restricted work frequency was 0.97 – a 21% reduction from the previous year's performance and substantially below the company's target rate of 1.4. This is the seventh consecutive year that the company has posted its lowest ever combined rate.

The company's Lapa mine received the John T. Ryan Regional Safety Award in 2016 for exceptional safety performance. This was a remarkable achievement given that Lapa was winding down its operations towards closure, many employees were transferring to other divisions and more contractors were being used.

Agnico Eagle's Meadowbank mine was also recognized as one of Canada's Safest Employers at the annual Canadian Occupational Safety Awards.

### Tailings Management

All of Agnico Eagle's tailings facilities achieved a Level A across all indicators under the *TSM Tailings Management Protocol*. The company also contributed its technical expertise to the review and update of MAC's *Guide to the Management of Tailings Facilities* and is working to ensure all facilities have implemented the new criteria of the revised protocol.



Underground workers at Agnico Eagle's Pinos Altos mine in Mexico.

### *Biodiversity Conservation Management*

Agnico Eagle's results in this area are strong, with most facilities reporting at least a Level A performance across all three indicators of the *TSM Biodiversity Conservation Management Protocol*. La India reported a Level C for Indicator 2, but is working towards implementation of its biodiversity conservation plan. As the La India mine is a relatively new operation, it has not had sufficient time to trend monitoring data over time and prioritize significant biodiversity aspects.

### *Energy Use and GHG Emissions Management*

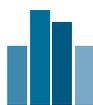
The company's overall performance in this area is also strong, with many facilities achieving a Level A or better for the three indicators of the *TSM Energy Use and GHG Emissions Management Protocol*. Goldex and Lapa do not report performance for Indicators 1 and 3 because their annual emissions are under 25,000 tonnes of CO<sub>2</sub> equivalent. In 2016, Agnico Eagle's average GHG emission intensity (tonnes of CO<sub>2</sub> equivalent per tonne of ore processed) across its operating mines was 0.0189, a 6% reduction from 2015. This is due to La India's completion of its two construction projects and the development slow-down at Lapa as it approaches closure.

Other notable achievements include:

- Agnico Eagle Mexico has consistently been acknowledged as one of the top employers in Mexico:
  - The company is the only mining company to be recognized for a fifth consecutive year in the Great Place to Work rankings for northwest Mexico. Agnico Eagle Mexico also placed highly in the Millennial and Most Trusted Director categories.
  - The company was recognized as a Socially Responsible Company for a ninth consecutive year, and the La India mine was recognized for the first time.
  - The company was presented with the distinguished Mexico Without Child Labour Award, an honour that is bestowed annually by the Mexican government to recognize workplaces that design and implement employment practices aimed at preventing and eliminating child labour and protecting its employees and young workers.
- In April, Agnico Eagle received the Corporate Award at the NorTerra Group of Companies Mining Awards in Iqaluit, Nunavut, for making a significant contribution to the economic and social development of the Nunavut region. In June, Agnico Eagle was named one of the Best 50 Corporate Citizens in Canada for the fourth time. This honour, given out annually by Corporate Knights Inc., places Agnico Eagle among the top sustainability performers in the country. The company also achieved its highest ranking to date, as the 32<sup>nd</sup> best corporate citizen in Canada, an improvement over its initial 2012 ranking of 39<sup>th</sup>.
- Agnico Eagle also formally adopted the Voluntary Principles on Security and Human Rights (VP) in 2016, one of a series of standards created to help extractive sector companies balance the obligation to respect human rights while protecting the assets and people at their operations.

🔗 For more information, please visit [agnicoeagle.com](http://agnicoeagle.com)





2016 TSM Results

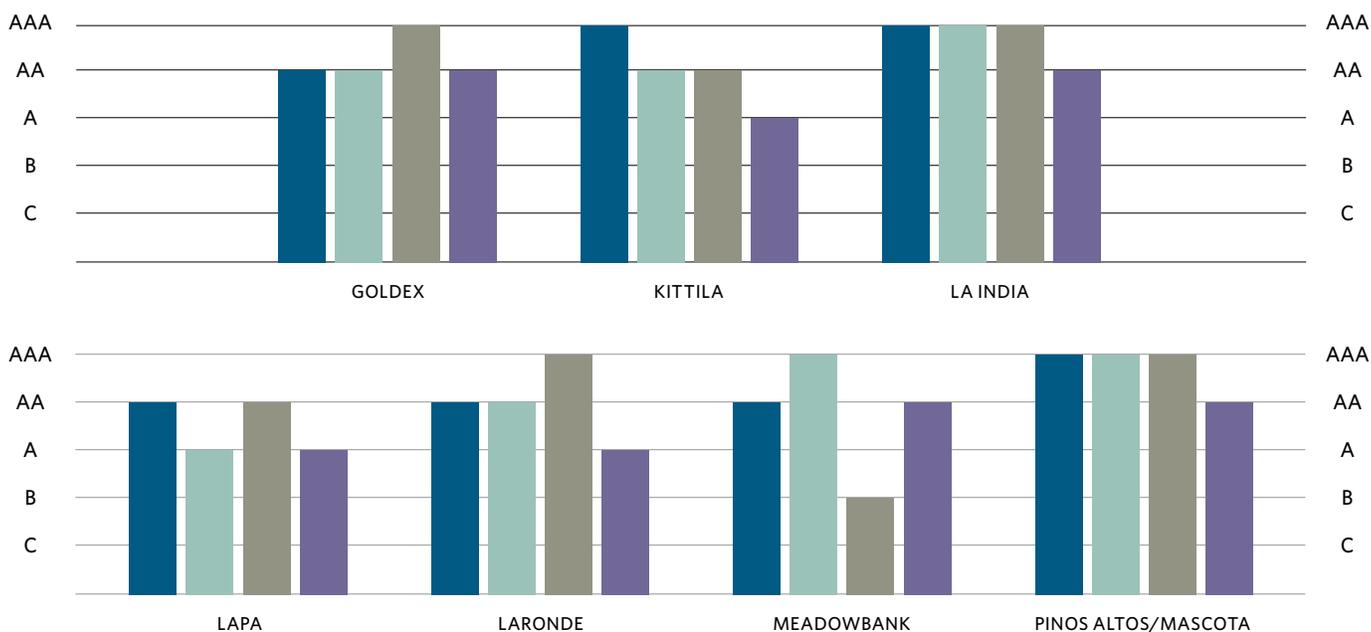
Agnico Eagle Mines Limited

Crisis Management and Communications Planning Assessment

FACILITY	PREPAREDNESS	REVIEW	TRAINING
AGNICO EAGLE CORPORATE	✓	✓	✓
GOLDEX	✓	✓	✓
KITTILA	✓	✓	✓
LA INDIA	✓	✓	✓
LAPA	✓	✓	✓
LARONDE	✓	✓	✓
MEADOWBANK	✓	✓	✓
PINOS ALTOS/MASCOTA	✓	✓	✓

Aboriginal and Community Outreach Assessment

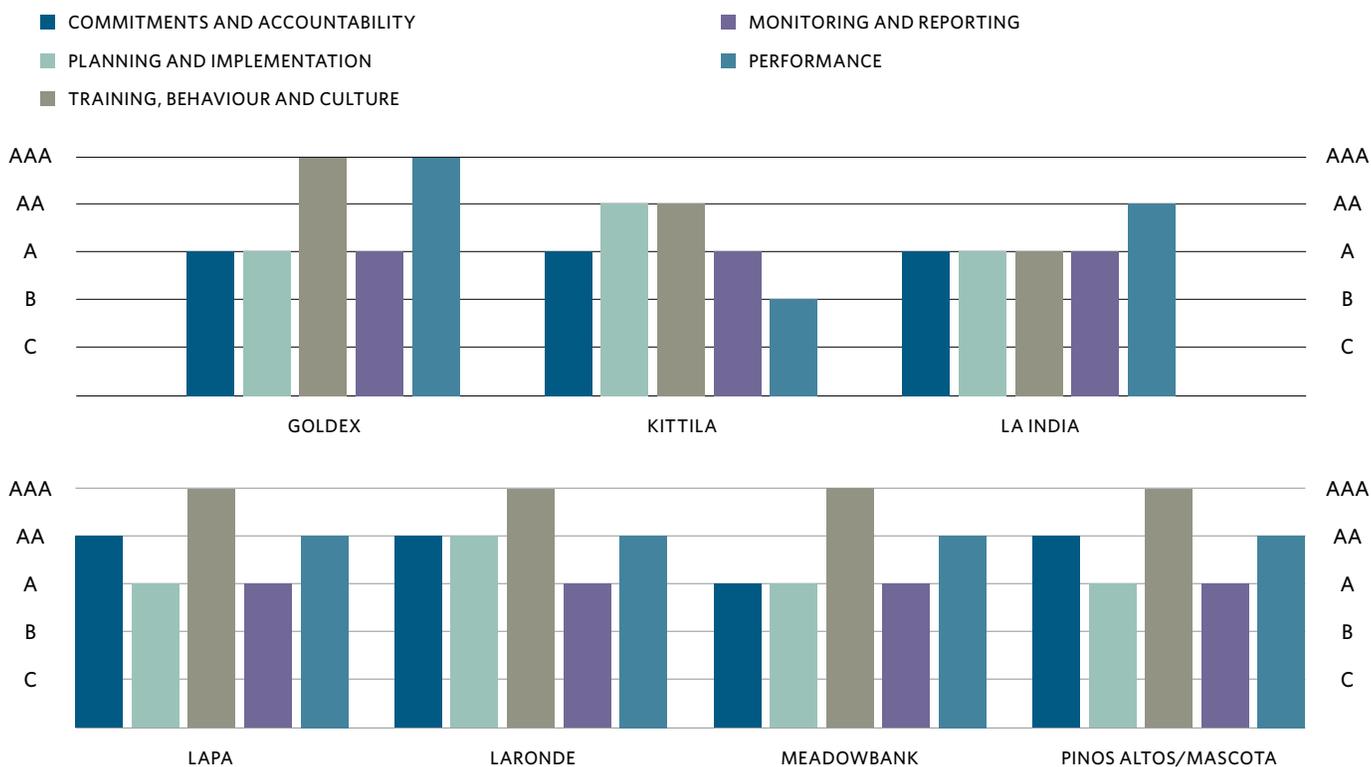
- COMMUNITY OF INTEREST (COI) IDENTIFICATION
- COI RESPONSE MECHANISM
- EFFECTIVE COI ENGAGEMENT AND DIALOGUE
- REPORTING



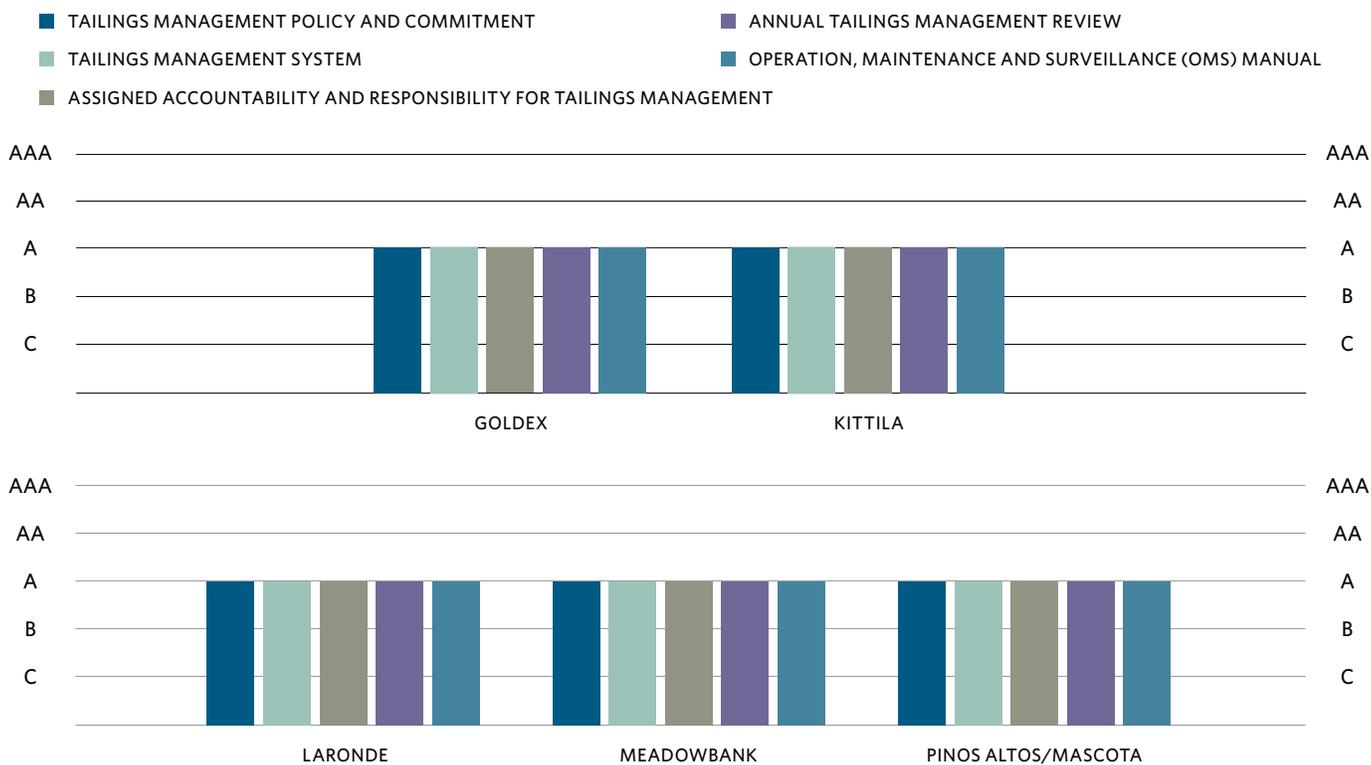
Self-assessed results; last external verification: 2015; next external verification: 2018.



## Safety and Health Assessment



## Tailings Management Assessment

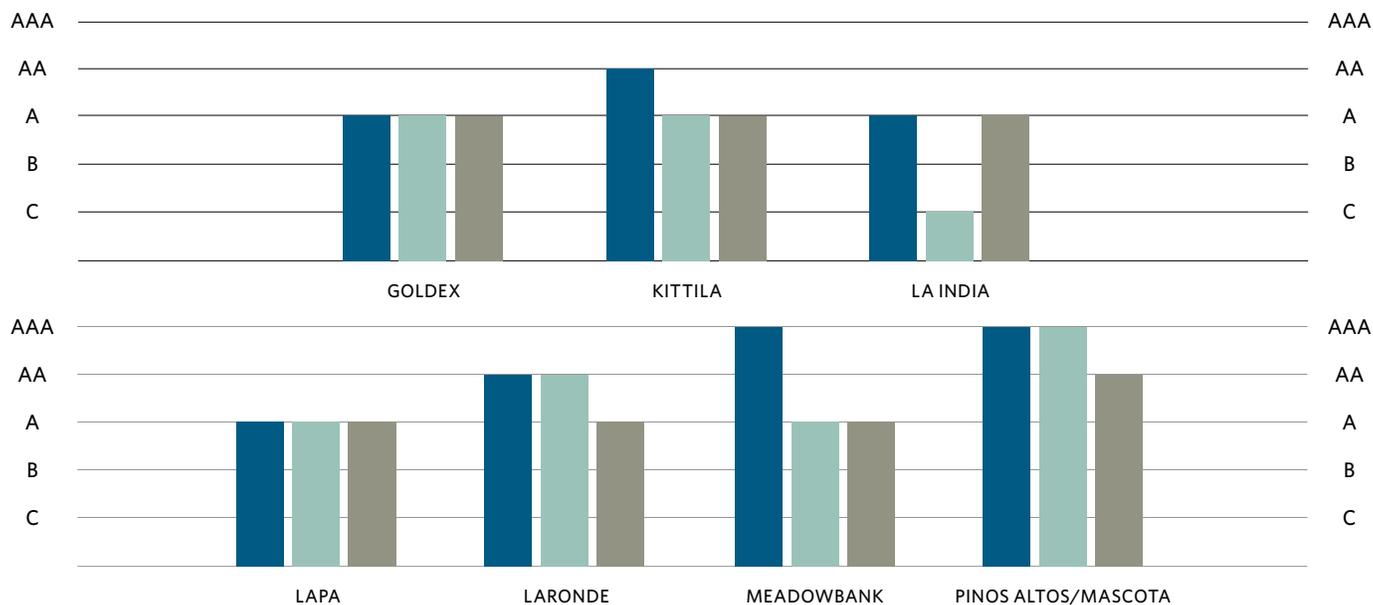


Self-assessed results; last external verification: 2015; next external verification: 2018.



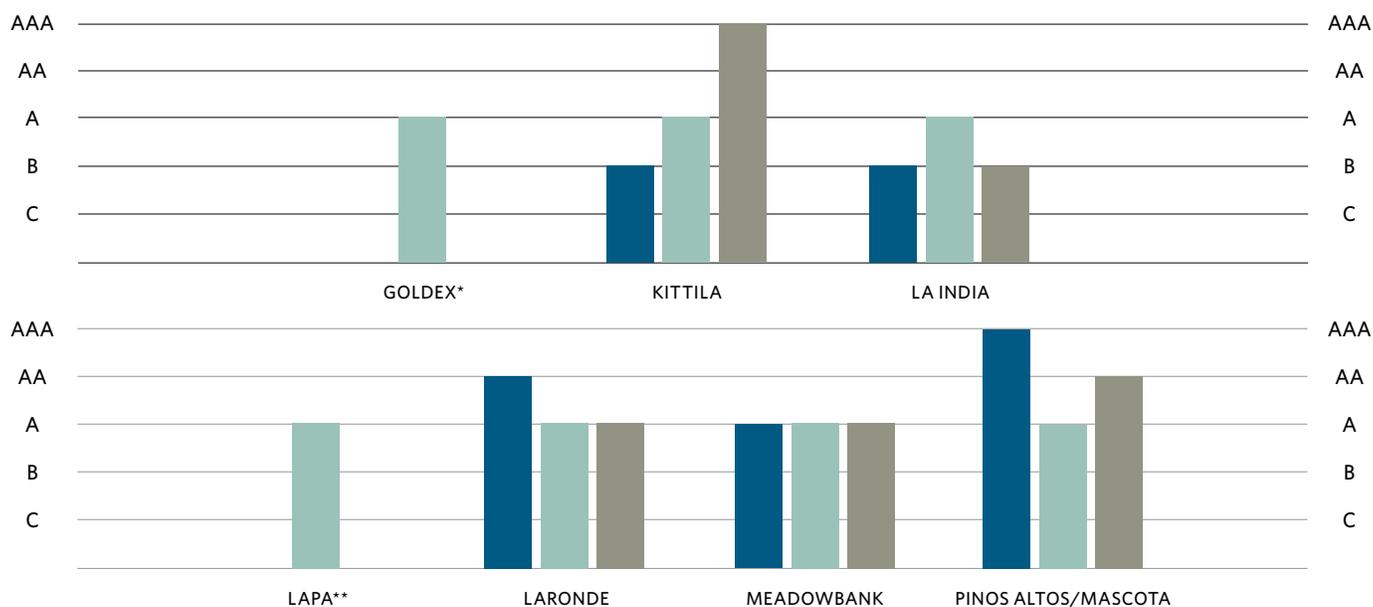
## Biodiversity Conservation Management Assessment

- CORPORATE BIODIVERSITY CONSERVATION POLICY, ACCOUNTABILITY AND COMMUNICATIONS
- FACILITY-LEVEL BIODIVERSITY CONSERVATION PLANNING AND IMPLEMENTATION
- BIODIVERSITY CONSERVATION REPORTING



## Energy Use and GHG Emissions Management Assessment

- ENERGY USE AND GHG EMISSIONS MANAGEMENT SYSTEMS
- ENERGY USE AND GHG EMISSIONS REPORTING SYSTEMS
- ENERGY AND GHG EMISSIONS PERFORMANCE TARGETS



Self-assessed results; last external verification: 2015; next external verification: 2018.

\*Goldex's total GHG emissions are under 25 kt CO<sub>2</sub>e and therefore are not required to report performance for indicators 1 and 3 of the energy use and GHG emissions management protocol.

\*\*Lapa's total GHG emissions are under 25 kt CO<sub>2</sub>e and therefore are not required to report performance for indicators 1 and 3 of the energy use and GHG emissions management protocol.



## TSM Performance by Company

### ArcelorMittal Mines Canada



ArcelorMittal Mining Canada G.P. is the largest mining subsidiary of ArcelorMittal involved in the extraction of iron ore and is the main Canadian supplier of iron ore products for the global steel market. With activities in both the mining and primary processing sectors, the company produced 26 million tonnes of iron ore concentrate in its Quebec facilities in 2016. ArcelorMittal operates a mining complex at Mont-Wright, a mine at Fire Lake, a crusher-concentrator, as well as a 420-kilometre railway, a pellet plant, a port and rail workshops in Port-Cartier. In 2016, ArcelorMittal Infrastructure Canada G.P. shipped 25.3 million tonnes of concentrate and iron oxide pellets to clients in America, Europe, Africa and Asia.

As a MAC member, the company supports the TSM initiative and is continuously improving its application of various protocols. ArcelorMittal is committed to protecting the health and safety of its employees and the environment, as demonstrated by its adoption of other standards related to management systems. As well, the company is implementing the measures required to maintain certification for its environmental management system under the updated ISO 14001:2015 standard and for its quality management system under ISO 9001:2015.

ArcelorMittal's occupational health and safety system received OHSAS 18001:2007 standard certification in 2011. The company has been practising Courageous Leadership in occupational health and safety for several years. The words "in action" were added to the company's policy to encourage ongoing dialogue between management and employees with the aim of reducing hazards in the workplace. Everyone has the right to return home safe every day. The Courageous Leadership initiative has contributed greatly to reducing the rate of injury causing loss in working time, which fell from 4.1 in 2011 to 0.8 in 2016. ArcelorMittal is continuing its efforts to reduce this rate to zero.

As a responsible company, ArcelorMittal has established a stringent management system for its tailings sites at Mont-Wright and Port-Cartier. The company achieved a Level AAA for all indicators under the *TSM Tailings Management Protocol* at both sites during its external verification.

In summer 2016, the company hired world-renowned external consultant SRK Consulting to perform a technical audit of its largest tailings site at Mont-Wright. The company is also currently working on a revegetation project at this site. So far, 150 hectares have been permanently greened and turned into grasslands.

ArcelorMittal is continuously improving its energy efficiency and reducing its overall GHG emissions. In order to diversify the company's energy portfolio, ArcelorMittal has secured investments from the Government of Quebec of up to \$4.5 million. These funds are used to finance a pilot project, launched in 2017, to switch part of the pellet production process over to liquefied natural gas. This project is yet another step towards achieving the company's energy-related goals, and is in addition to its efforts to introduce biomass-based energy sources. As well, since November 2016, ArcelorMittal staff who drive electric vehicles have been charging them for free at the Port-Cartier site, where rapid-charging stations have been installed.

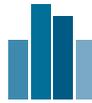
From the outset, ArcelorMittal has been very involved in its communities. Current activities include donations to non-profit organizations and employee volunteer initiatives. The company also works with two official joint committees that provide a forum for local community representatives to discuss challenges directly with it. In 2012, ArcelorMittal signed an impact and benefit agreement with the Uashat mak Mani-Utenam Inuit community, which is now being jointly implemented.

Now more than ever, ArcelorMittal is committed to improving its approach to the TSM initiative.

📄 For more information, please visit [www.transformerlavenir.com](http://www.transformerlavenir.com)



ArcelorMittal's port and rail workshops in Port-Cartier.



Externally  
Verified Results

2016 TSM Results

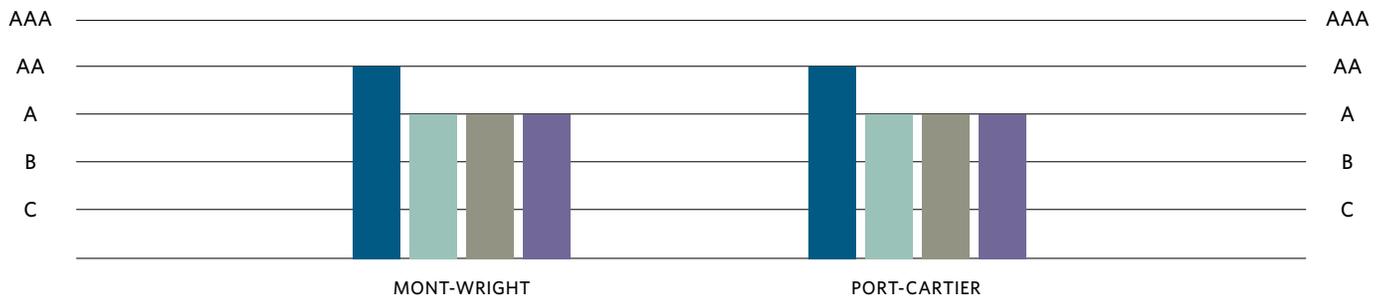
ArcelorMittal Mines Canada

Crisis Management and Communications Planning Assessment

FACILITY	PREPAREDNESS	REVIEW	TRAINING
ARCELORMITTAL MINING CANADA G.P.	✓	✓	✗
MONT-WRIGHT	✓	✓	✓
PORT-CARTIER	✓	✓	✓

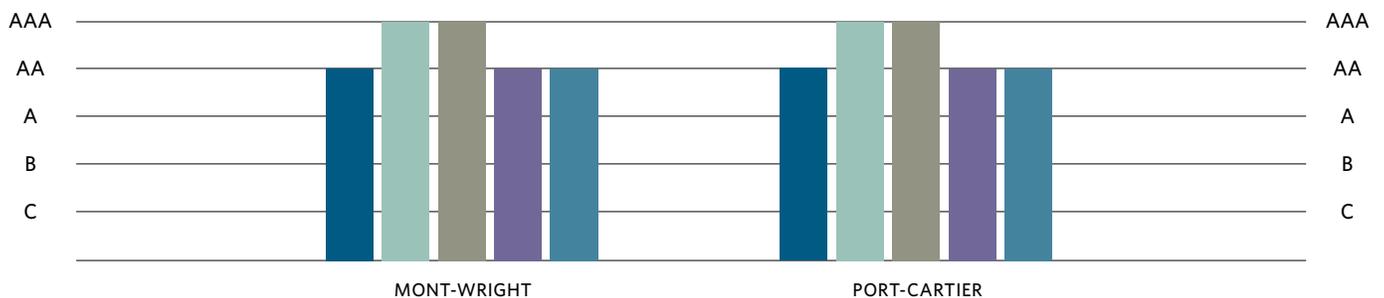
Aboriginal and Community Outreach Assessment

- COMMUNITY OF INTEREST (COI) IDENTIFICATION
- EFFECTIVE COI ENGAGEMENT AND DIALOGUE
- COI RESPONSE MECHANISM
- REPORTING



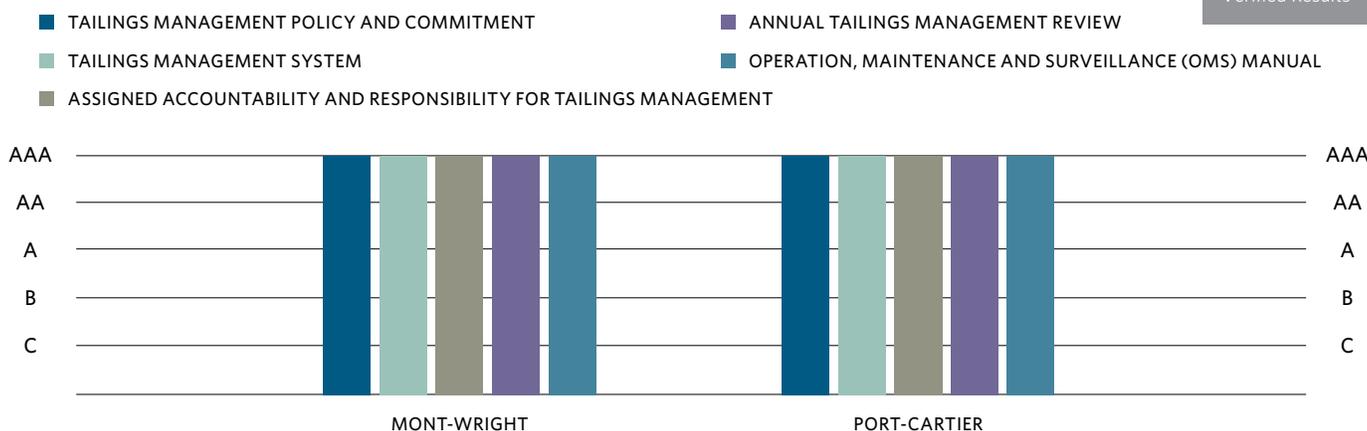
Safety and Health Assessment

- COMMITMENTS AND ACCOUNTABILITY
- PLANNING AND IMPLEMENTATION
- TRAINING, BEHAVIOUR AND CULTURE
- MONITORING AND REPORTING
- PERFORMANCE

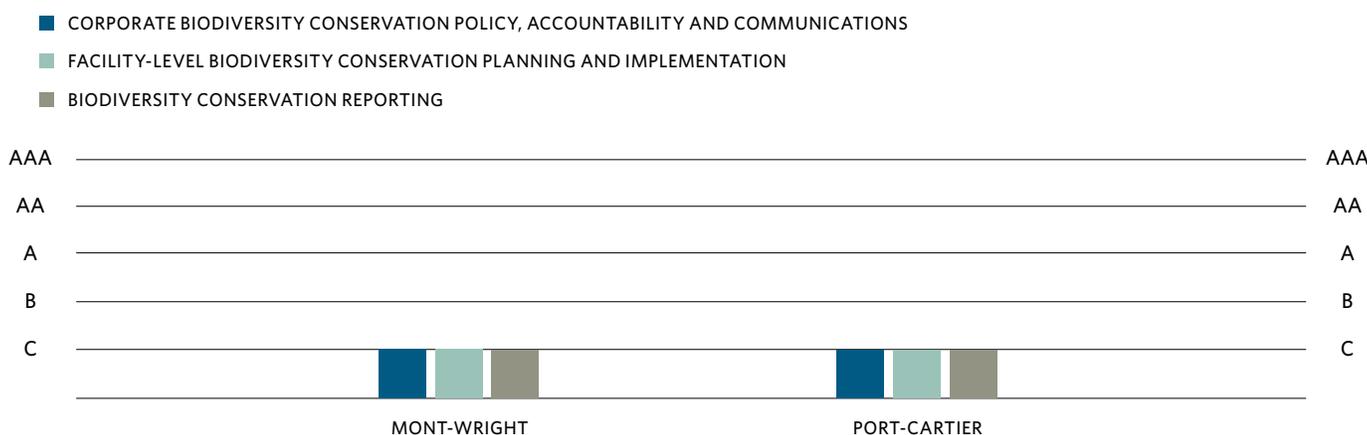


## Tailings Management Assessment

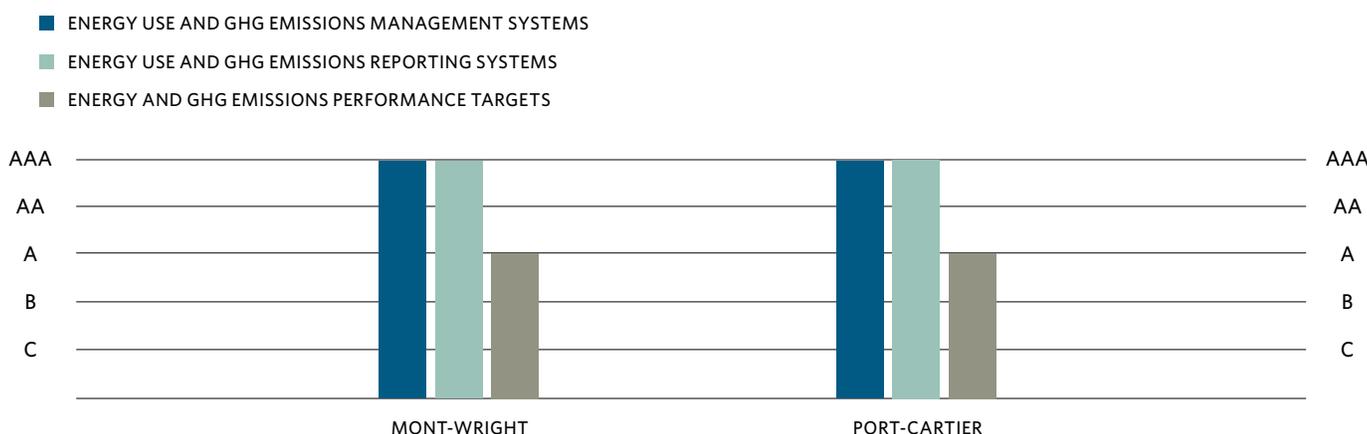
Externally  
Verified Results



## Biodiversity Conservation Management Assessment

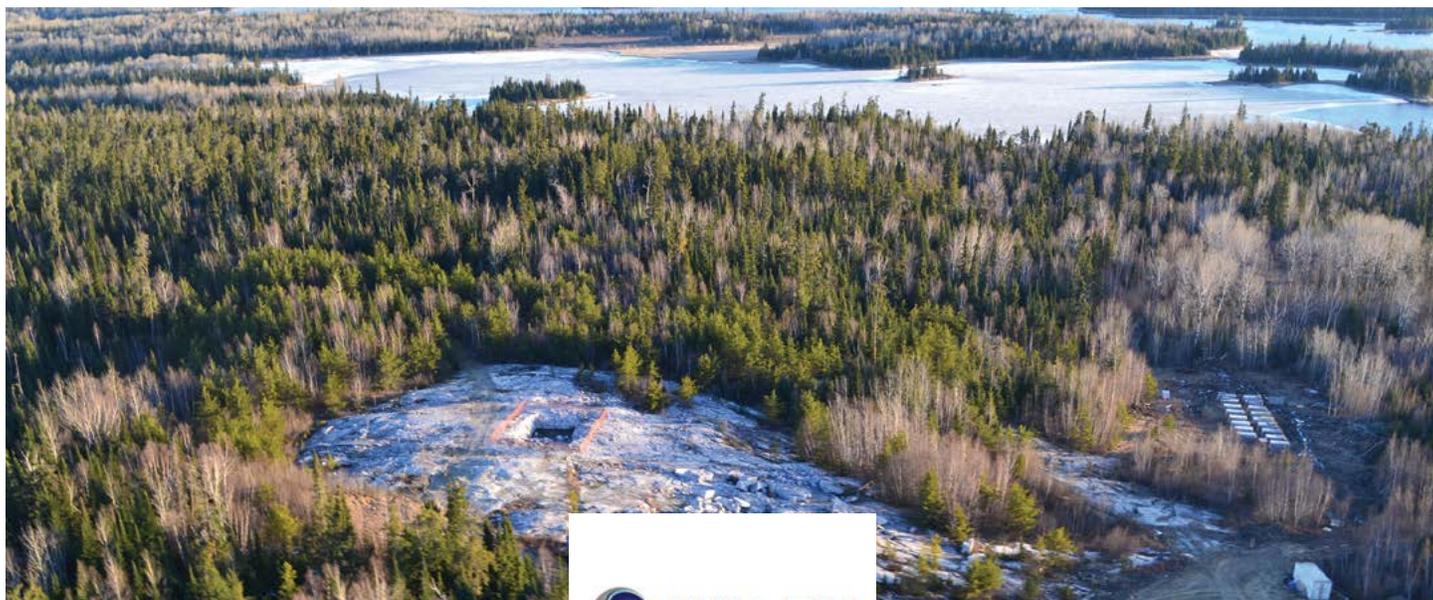


## Energy Use and GHG Emissions Management Assessment



## TSM Performance by Company

### Avalon Advanced Materials



Avalon Advanced Materials is a Canadian mineral development company with a primary focus on niche market metals and minerals with growing demand in new technologies. The company has three advanced-stage projects across Canada, all 100% owned, which are focused on lithium, tin, indium, zirconium and the rare earth elements. Avalon is currently focusing on its Separation Rapids Lithium Project near Kenora, Ontario, and its East Kemptville Tin-Indium Project in Yarmouth, Nova Scotia.

Avalon believes that a strong sustainability framework is fundamental to its long-term success. The company has implemented the *TSM Guiding Principles* in order to meet or exceed industry best practices, and to continuously improve on its social, environmental, and health and safety performance. As Avalon is a development stage company, its annual TSM self-assessment is voluntary.

Avalon has demonstrated leadership among junior companies in the mineral development sector by producing an annual sustainability report compliant with the Global Reporting Initiative's (GRI) guidelines. Avalon reports on its activities to hold itself accountable, drive company performance and demonstrate the benefits of sustainable practices to its stakeholders.

In December 2016, Avalon published its fifth annual sustainability report and its third in accordance with GRI G4 guidelines. For two consecutive years (2015 and 2016), Avalon placed among Corporate Knights' Future 40 Responsible Corporate Leaders in Canada.

#### *Highlights of Avalon's Voluntary 2016 TSM Self-Assessment*

During the 2016 reporting period (September 1, 2015, to August 31, 2016), Avalon continued to advance its projects openly and transparently, with a commitment to the economic and social well-being of its projects' local communities.

#### SAFETY AND HEALTH

Avalon completed risk assessments and prepared safety management plans for special projects at the company's East Kemptville Tin-Indium Project site in Yarmouth County, Nova Scotia.



During the reporting period, Avalon largely completed due diligence on the East Kemptville project and an external study of the tailing management facility (TMF). The company also prepared a conceptual TMF for the Separation Rapids Lithium Project in northwestern Ontario.

### ENERGY USE AND GHG EMISSIONS MANAGEMENT

Energy measurement continued during drilling at the East Kemptville project. Avalon also investigated clean energy options at the Separation Rapids project.

### ABORIGINAL AND COMMUNITY OUTREACH

Outreach at Avalon's Separation Rapids project took priority during the reporting period, where discussions advanced with two Indigenous governments.

### CRISIS MANAGEMENT AND COMMUNICATIONS PLANNING

Avalon updated its emergency response plan at the East Kemptville project and reviewed its Crisis Management Plan. Personnel at East Kemptville were updated and trained.

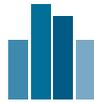
### BIODIVERSITY CONSERVATION MANAGEMENT

Avalon completed a gap analysis for an Environmental Social Impact Assessment (ESIA), including biodiversity assessment, at the Separation Rapids project. The contract for the ESIA and the biodiversity work was initiated, but put on hold pending project financing.

🔗 For more information, please visit [www.avalonadvancedmaterials.com](http://www.avalonadvancedmaterials.com)



Avalon's senior geologist consultant, Chris Pedersen, speaks in front of a rack of core from the company's Separation Rapids Lithium Project near Kenora, Ontario.



2016 TSM Results

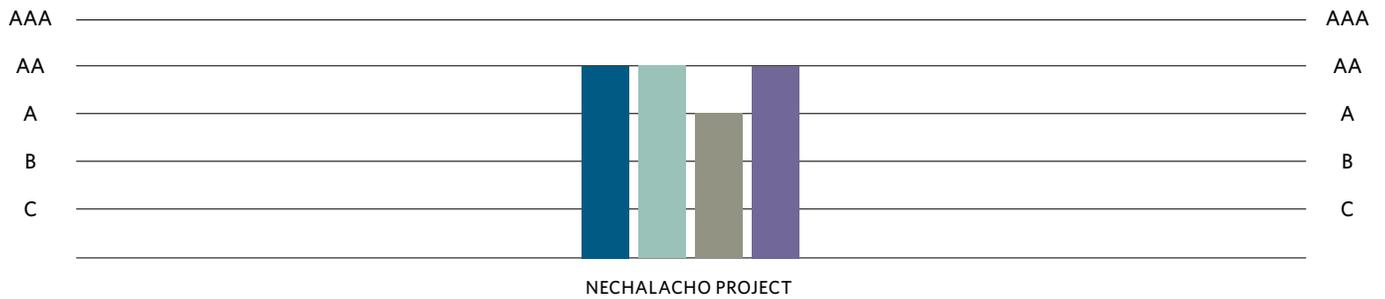
Avalon Advanced Materials

Crisis Management and Communications Planning Assessment

FACILITY	PREPAREDNESS	REVIEW	TRAINING
NECHALACHO PROJECT	✓	✓	✓

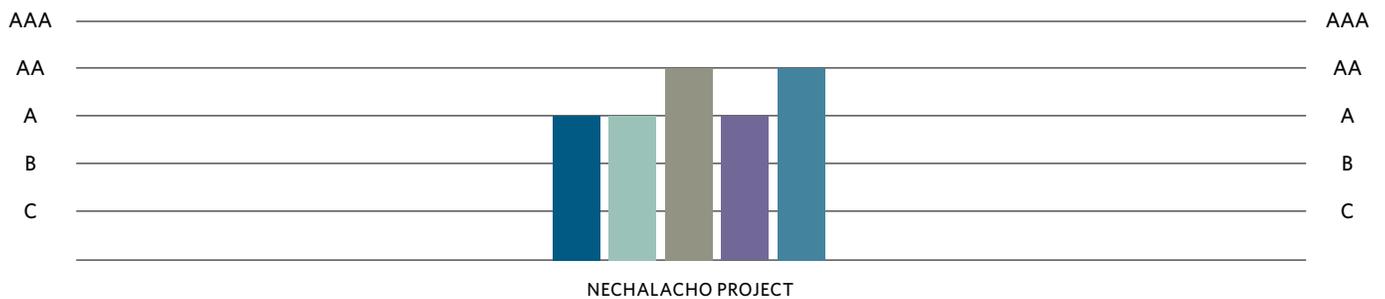
Aboriginal and Community Outreach Assessment

- COMMUNITY OF INTEREST (COI) IDENTIFICATION
- EFFECTIVE COI ENGAGEMENT AND DIALOGUE
- COI RESPONSE MECHANISM
- REPORTING



Safety and Health Assessment

- COMMITMENTS AND ACCOUNTABILITY
- PLANNING AND IMPLEMENTATION
- TRAINING, BEHAVIOUR AND CULTURE
- MONITORING AND REPORTING
- PERFORMANCE

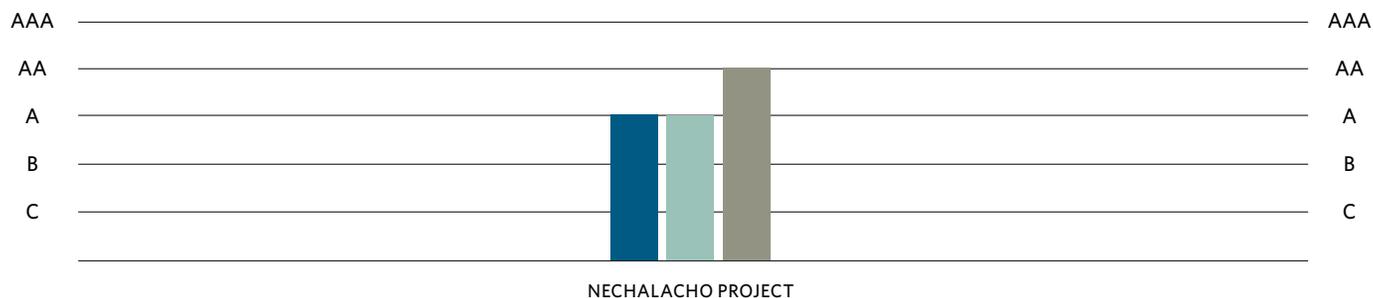


Voluntary self-assessment.



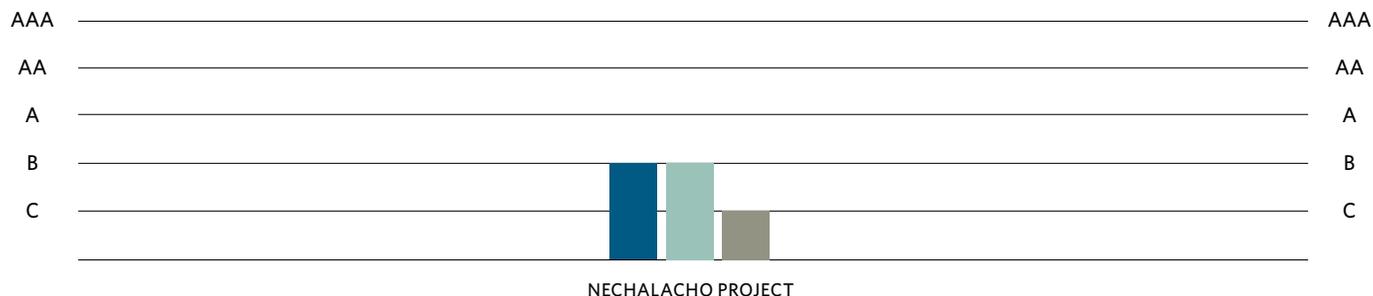
## Biodiversity Conservation Management Assessment

- CORPORATE BIODIVERSITY CONSERVATION POLICY, ACCOUNTABILITY AND COMMUNICATIONS
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## Energy Use and GHG Emissions Management Assessment

- ENERGY USE AND GHG EMISSIONS MANAGEMENT SYSTEMS
- ENERGY USE AND GHG EMISSIONS REPORTING SYSTEMS
- ENERGY AND GHG EMISSIONS PERFORMANCE TARGETS



Voluntary self-assessment.



## TSM Performance by Company

### Barrick Gold Corporation



Barrick has mining operations in Argentina, Australia, Canada, Chile, Dominican Republic, Papua New Guinea, Peru, Saudi Arabia, the United States and Zambia. More than 75% of its gold production comes from the Americas. The company was founded in 1983 by Canadian entrepreneur and philanthropist, Peter Munk, and is headquartered in Toronto. Barrick's shares trade on the New York Stock and Toronto stock exchanges under the symbol ABX.

Barrick's vision is the generation of wealth through responsible mining – wealth for the company's owners and people, and for the countries and communities with which it partners.

Barrick aims to be the leading mining company focused on gold, growing its cash flow per share by developing and operating high-quality assets through disciplined allocation of human and financial capital and operational excellence.

The Hemlo mining operation is located approximately 46 kilometres east of Marathon, Ontario, and has produced gold continuously since 1985. The operation includes an underground mine and open-pit mine complex with a processing facility. Recently, the Hemlo operation entered a new phase of its productive life with the purchase of adjacent lands, increasing the site's mineable reserves. The site's mine life is now extended until 2020 with the possibility of additional expansions.

Hemlo's original TSM goal was to achieve and maintain a minimum ranking of a Level A within each protocol. The site's extended mine life provides new opportunities for further enhancements to Hemlo's practices and operating standards. As a result, the site is now seeking higher rankings through continued diligence and the application of TSM, coupled with other international practices and standards.

Hemlo's commitment to improve is further demonstrated by the site's continued certification by independent third-party auditors under the International Cyanide Management Code and ISO 14001 for environmental management systems.

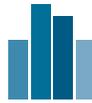
These certifications, together with *TSM*, reinforce Barrick's commitment to the environment and continued sustainability. Hemlo has been recognized by Canada's Department of Natural Resources for its innovative energy conservation program. It received a Canadian Industry Program for Energy Conservation (CIPEC) Leadership Award for implementing a project that reduced greenhouse gas emissions by 24% and lowered energy consumption by 10% between 2013 and 2015.

As part of its commitment to sustainability, Hemlo continues to expand its external engagement and partnerships. The site was the first in Canada to receive the Mining Essentials and Environmental Monitoring training program for Aboriginal people. This program enabled 10 members of the Pic River First Nation and Pic Mobert First Nation to receive training. Hemlo continues to work on several initiatives with both First Nations communities and other communities of interest.

🔗 For more information, please visit [www.barrick.com](http://www.barrick.com)



Barrick's Hemlo operation near Marathon, Ontario.



Externally  
Verified Results

2016 TSM Results

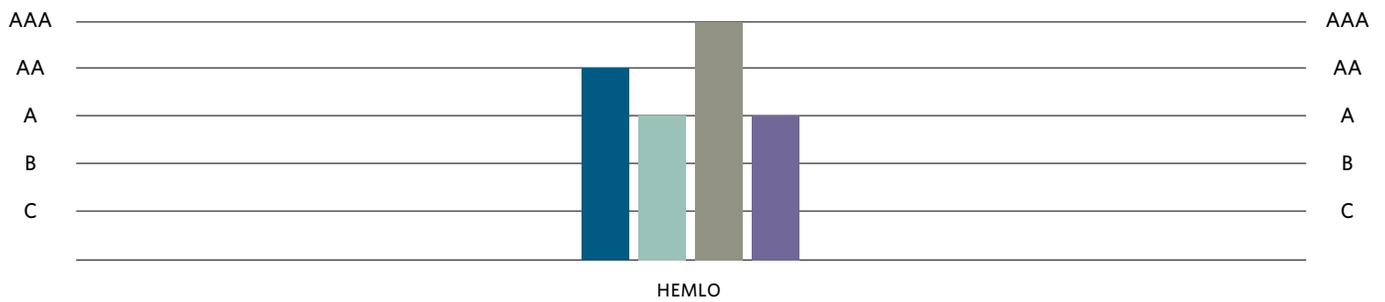
Barrick Gold Corporation

Crisis Management and Communications Planning Assessment

FACILITY	PREPAREDNESS	REVIEW	TRAINING
BARRICK GOLD CORPORATION	✓	✓	✓
HEMLO	✓	✓	✓

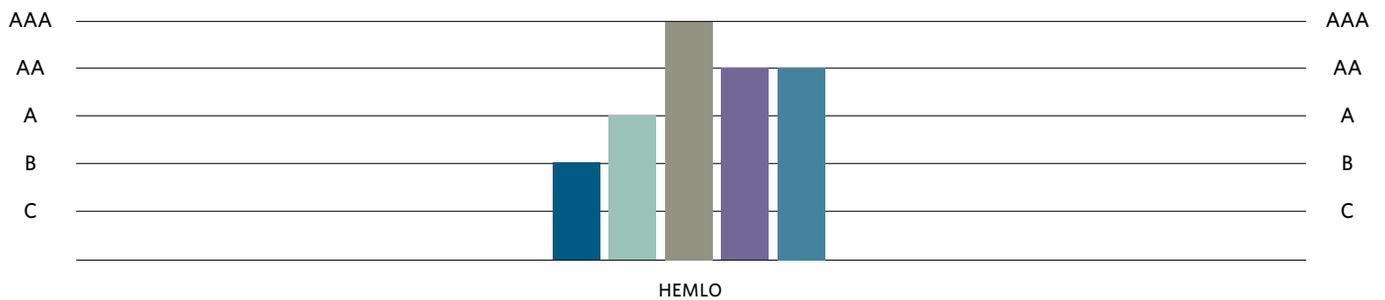
Aboriginal and Community Outreach Assessment

- COMMUNITY OF INTEREST (COI) IDENTIFICATION
- COI RESPONSE MECHANISM
- EFFECTIVE COI ENGAGEMENT AND DIALOGUE
- REPORTING



Safety and Health Assessment

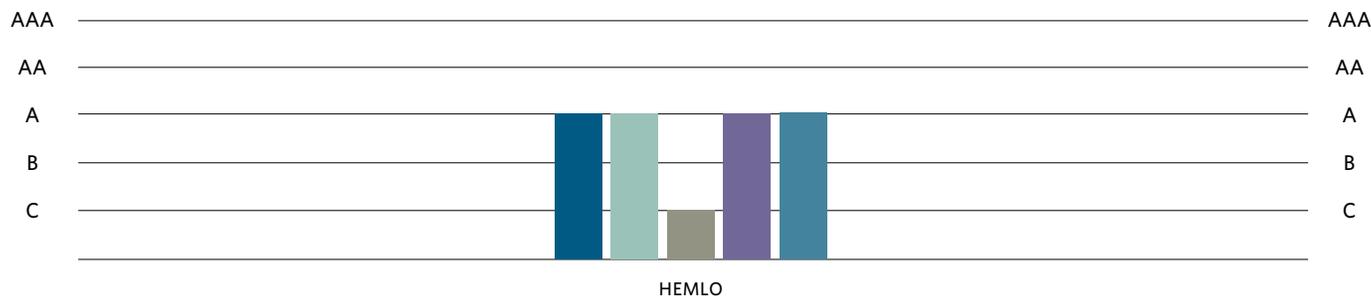
- COMMITMENTS AND ACCOUNTABILITY
- MONITORING AND REPORTING
- PLANNING AND IMPLEMENTATION
- PERFORMANCE
- TRAINING, BEHAVIOUR AND CULTURE



## Tailings Management Assessment

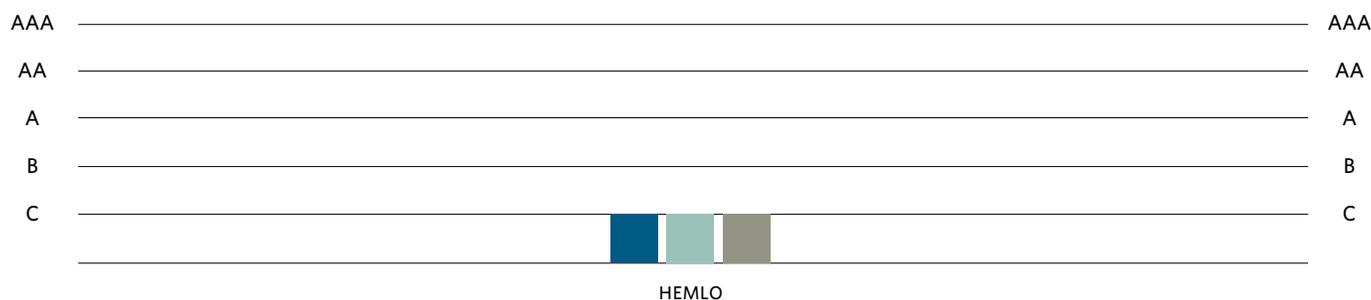
Externally  
Verified Results

- TAILINGS MANAGEMENT POLICY AND COMMITMENT
- ANNUAL TAILINGS MANAGEMENT REVIEW
- TAILINGS MANAGEMENT SYSTEM
- OPERATION, MAINTENANCE AND SURVEILLANCE (OMS) MANUAL
- ASSIGNED ACCOUNTABILITY AND RESPONSIBILITY FOR TAILINGS MANAGEMENT



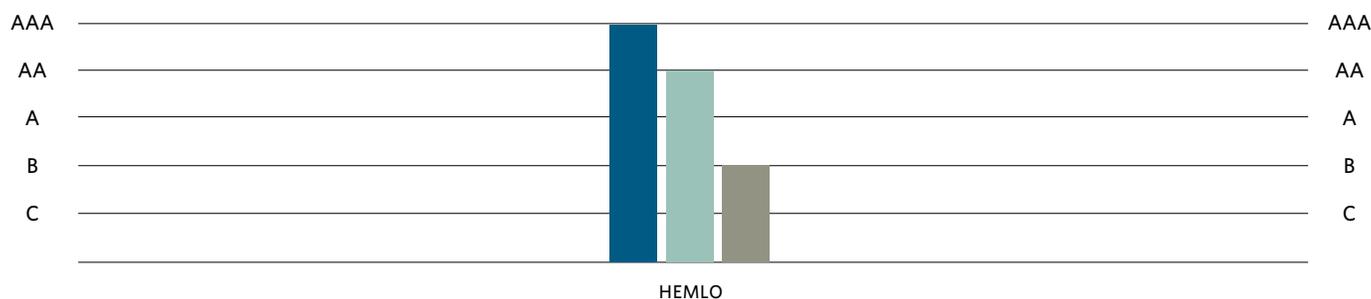
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## Energy Use and GHG Emissions Management Assessment

- ENERGY USE AND GHG EMISSIONS MANAGEMENT SYSTEMS
- ENERGY USE AND GHG EMISSIONS REPORTING SYSTEMS
- ENERGY AND GHG EMISSIONS PERFORMANCE TARGETS



## TSM Performance by Company

### Cameco Corporation



Cameco Corporation is one of the world's largest uranium producers. Nuclear energy plants around the world use its uranium products to generate one of the cleanest sources of electricity available today. Cameco is committed to delivering its products safely and responsibly. Sustainable development principles and practices are integrated at each level of Cameco's organization, from overall corporate strategy to individual employee practice in day-to-day operations.

Cameco's corporate objectives are set out under four measures of success: a safe, healthy and rewarding workplace, a clean environment, supportive communities, and outstanding financial performance.

#### SAFE, HEALTHY, REWARDING WORKPLACE

Cameco is committed to fostering a strong safety culture, while looking to continually improve. As a result of this commitment, the company has a long history of robust safety performance at its operations and across the organization.

##### *2016 Highlights:*

- Several operations reached significant safety milestones, including the Blind River refinery and the Crow Butte operation, passing 10 and nine years, respectively, without a lost time incident.
- The McArthur River mine was recognized with the John T. Ryan National Safety Award for the third consecutive year.

#### CLEAN ENVIRONMENT

Cameco is committed to being a leading environmental performer. The company keeps risks as low as reasonably achievable and looks for opportunities to move beyond regulatory requirements. Cameco tracks progress by monitoring the air, water and land near its operations, and by measuring the amount of energy used and waste generated. This information helps Cameco identify opportunities to improve.

Cameco's commitment to the environment was recognized this year when Key Lake's Environmental Week initiative was selected as a finalist for the 2017 *TSM Community Engagement Excellence Award*.



### 2016 Highlights:

- Improved effluent performance at the McArthur River mine.
- Successfully transitioned the Rabbit Lake operation into care and maintenance with no significant environmental incidents.
- Continued to carry out industry-leading research and innovation in groundwater restoration at the company's US in situ recovery operations.

## SUPPORTIVE COMMUNITIES

Gaining the trust and support of communities, Indigenous people and governments is necessary to sustainable mining. Cameco earns support and trust through excellent safety and environmental performance, by proactively engaging with stakeholders in an open and transparent way, and by making a difference in communities wherever the company operates.

### 2016 Highlights:

- Procured over \$210 million in services from locally owned northern Saskatchewan companies (80% of total).
- Employed 1,088 local workers from northern Saskatchewan (704 Cameco employees, 384 contractors).
- Signed a collaboration agreement, the company's third in northern Saskatchewan, with the seven communities of the Athabasca Basin, including three First Nations.

## TSM PERFORMANCE

### Aboriginal and Community Outreach

Cameco's commitment to meaningful community engagement is reflected in the *TSM* results for its facilities. Key Lake, Rabbit Lake and McArthur River maintained a Level A performance or higher for all indicators of the *TSM Aboriginal and Community Outreach Protocol*.

### Crisis Management and Communications Planning

Cameco's corporate office and three participating facilities met all of the criteria of the *TSM Crisis Management and Communications Planning Protocol*.

### Safety and Health

Cameco continued to demonstrate high levels of performance in the area of safety and health. Key Lake, McArthur River and Rabbit Lake each achieved at least a Level A performance for all of the *TSM Safety and Health Protocol's* five indicators.

### Tailings Management

Cameco has maintained a Level A performance under the *TSM Tailings Management Protocol* for both its Key Lake and Rabbit Lake operations. The company has been engaged in MAC's review of the protocol and is working to implement the new criteria at its facilities.

### Biodiversity Conservation Management

Key Lake, Rabbit Lake and McArthur River maintained strong performance in biodiversity conservation management as well, with at least a Level A performance for all three indicators in the *TSM Biodiversity Conservation Management Protocol*.

### Energy Use and GHG Emissions Management

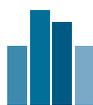
The area of energy use and GHG emissions management represents an opportunity for improvement for Cameco's facilities. The company is working to improve its energy management and expects performance for the *TSM Energy Use and GHG Emissions Management Protocol* to improve in the coming years.

## ACHIEVEMENTS

Cameco is a five-time Gold award winner in the Progressive Aboriginal Relations program, which is judged by the Canadian Council for Aboriginal Business. The company is a leading employer of Indigenous peoples in Canada, and has procured nearly \$3.5 billion in services from local suppliers in northern Saskatchewan since 2004. For more information on Cameco's social and environmental performance, please review its Sustainable Development report at [www.cameco.com/about/sustainability](http://www.cameco.com/about/sustainability).

📄 For more information, please visit [www.cameco.com](http://www.cameco.com)



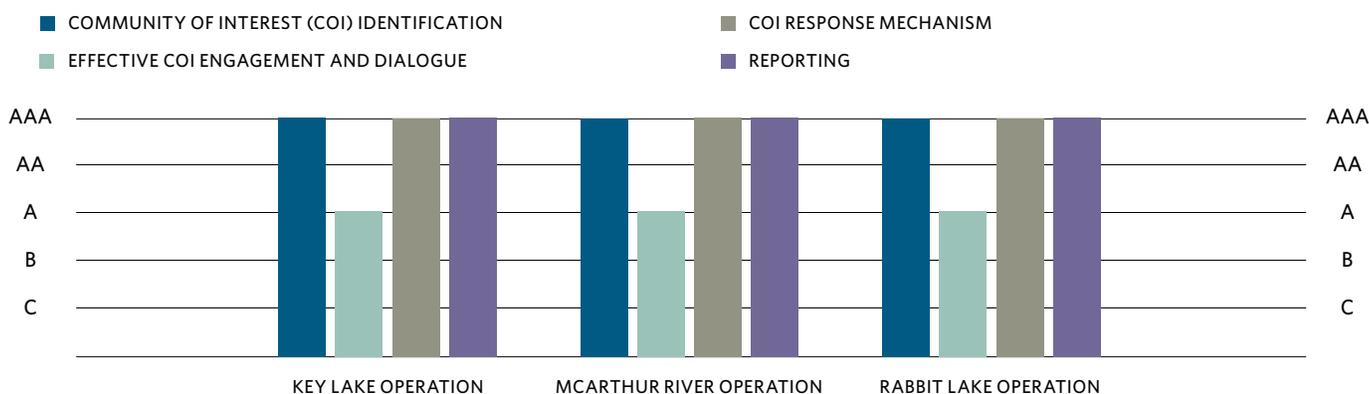


## 2016 TSM Results Cameco Corporation

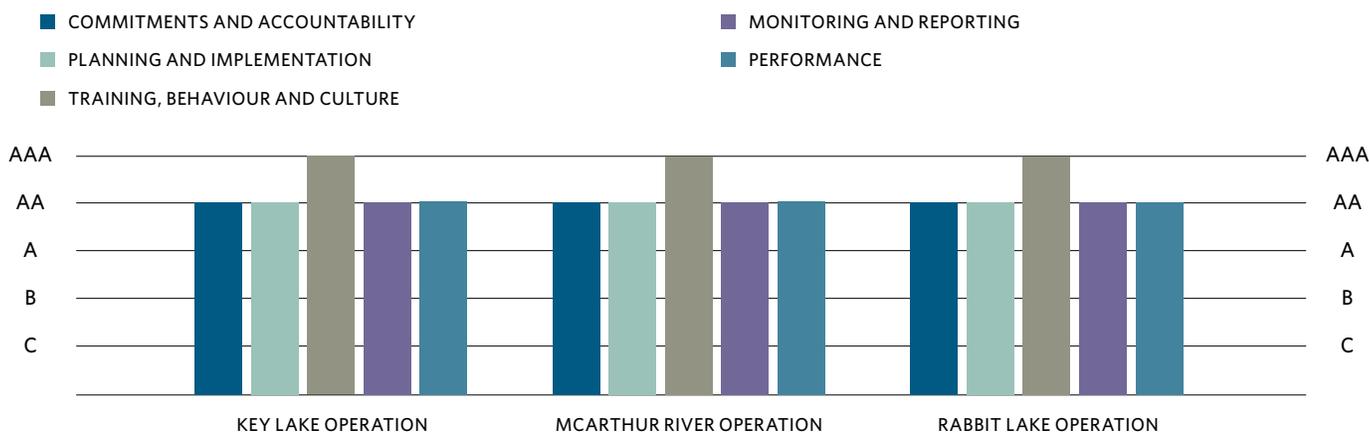
### Crisis Management and Communications Planning Assessment

FACILITY	PREPAREDNESS	REVIEW	TRAINING
CAMECO CORPORATION	✓	✓	✓
KEY LAKE OPERATION	✓	✓	✓
MCARTHUR RIVER OPERATION	✓	✓	✓
RABBIT LAKE OPERATION	✓	✓	✓

### Aboriginal and Community Outreach Assessment



### Safety and Health Assessment

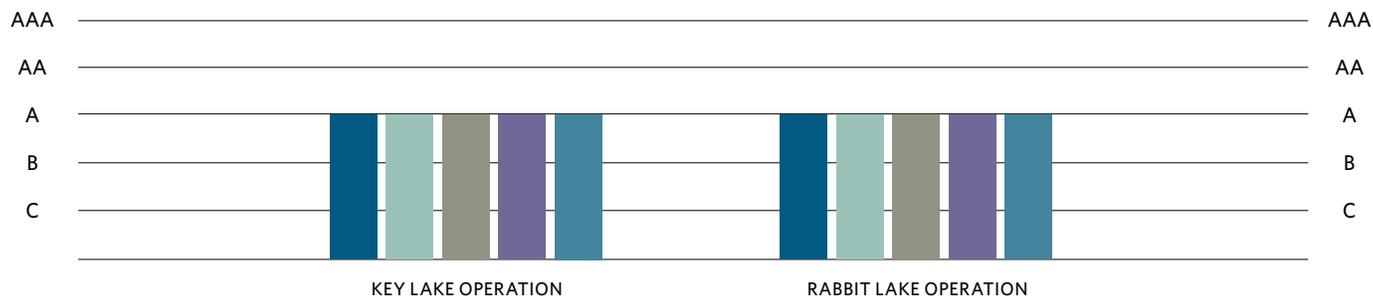


Self-assessed results; last external verification: 2014; next external verification: 2017.



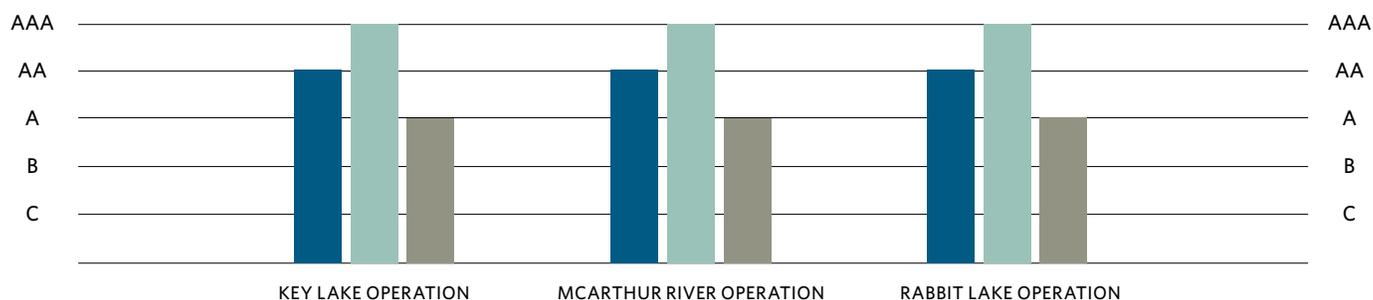
## Tailings Management Assessment

- TAILINGS MANAGEMENT POLICY AND COMMITMENT
- TAILINGS MANAGEMENT SYSTEM
- ASSIGNED ACCOUNTABILITY AND RESPONSIBILITY FOR TAILINGS MANAGEMENT
- ANNUAL TAILINGS MANAGEMENT REVIEW
- OPERATION, MAINTENANCE AND SURVEILLANCE (OMS) MANUAL



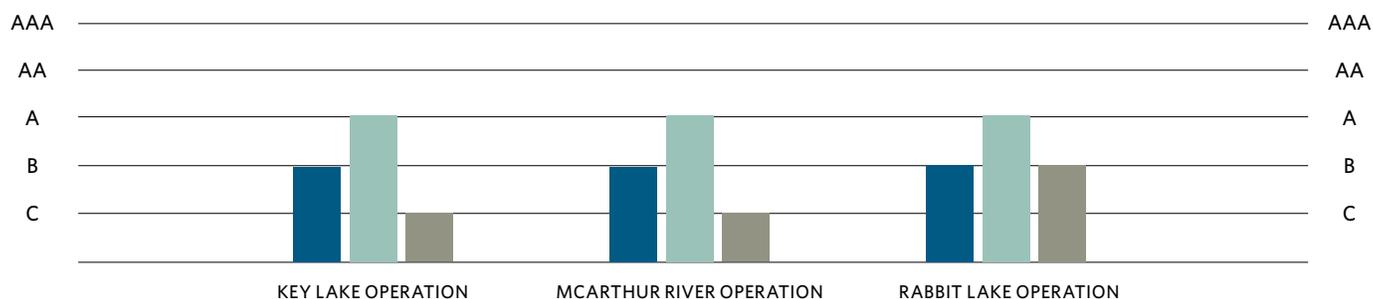
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## Energy Use and GHG Emissions Management Assessment

- ENERGY USE AND GHG EMISSIONS MANAGEMENT SYSTEMS
- ENERGY USE AND GHG EMISSIONS REPORTING SYSTEMS
- ENERGY AND GHG EMISSIONS PERFORMANCE TARGETS



Self-assessed results; last external verification: 2014; next external verification: 2017.



## TSM Performance by Company

### Canadian Natural Resources Limited



2017 was a year of transition for the Athabasca Oil Sands Project (AOSP). In 2016, Shell Canada Energy (Shell) operated the Muskeg River and Jackpine mines, located 75 kilometres north of Fort McMurray, Alberta, on behalf of the owners of the Athabasca Oil Sands Project (AOSP): Shell Canada Energy (60%), Chevron Canada Limited (20%) and Marathon Oil Canada Corporation (20%). In June 2017, Canadian Natural Resources Limited acquired 70% ownership of the AOSP, becoming operator of Albion Sands and its oil sands mines. The following is a summary of the former Shell oil sands mining operations' Towards Sustainable Mining (TSM) performance for 2016 and Canadian Natural will be reporting performance going forward.

#### INDIGENOUS COMMUNITIES

Shell has been working closely with Indigenous peoples in Canada for decades. Engagements include direct consultation on projects and operations, ongoing interaction and collaboration through industry relations committees, and formal engagement with Elders and First Nations and Métis leaders.

Shell greatly values the perspectives and input of Indigenous communities, and has successfully established agreements with several local First Nations and Métis groups. Shell also provides opportunities to qualified local businesses and residents, with an emphasis on ensuring Indigenous businesses are able to participate in the contracting and employment processes. Since 2005, the AOSP has invested nearly \$1.9 billion with more than 70 Indigenous-owned businesses and contractors that provide a broad array of products and services to Shell's operations.

The Canadian Council for Aboriginal Business has certified Shell for its work in Aboriginal relations across four areas: employment, business development, community investment, and community engagement. The certification provides high-level assurance from a jury of Aboriginal business people on corporate performance.

## INVESTING IN THE COMMUNITY

Social investment is Shell's voluntary contribution to communities in Canada. The company seeks to initiate and support programs relevant to business activities and focuses social investment around science, education, innovation and business skills. In 2016, Shell made approximately \$2.2 million in contributions on behalf of the AOSP and in-situ operations. One example is Shell's long-term support for Indspire, an Indigenous-led charitable organization that invests in the education of Indigenous youth in Canada. Shell's partnership with Indspire began nearly 30 years ago with investments in Indigenous post-secondary education, and has since evolved into a 360-degree approach with investments in Kindergarten to Grade 12 programs, post-secondary scholarships and events that recognize Indigenous leaders.

## ENVIRONMENTAL PERFORMANCE

Producing oil sands safely and in a manner that minimizes impact to the environment and society is of the utmost importance to Shell.

In 2004, the Muskeg River Mine was certified to the ISO 14001:2004 standard – the first oil sands operation in the world to attain this accreditation. This certificate was renewed in 2013, extending the scope to include the Jackpine Mine. The most recent ISO 14001:2004 surveillance audit was completed in February 2016. This ISO standard, though voluntary, is externally audited and is recognized as the top international standard for environmental management systems.

Shell is one of the founding members of Canada's Oil Sands Innovation Alliance (COSIA). COSIA is a first-of-its-kind alliance of oil sands producers that collaborate on innovation and technology to drive accelerated environmental performance improvement. Leveraging technical expertise globally within Shell and taking part in collaborative industry associations like COSIA help Shell identify and act on promising opportunities and conduct research, both cost effectively and efficiently.

Shell strives to reduce the GHG footprint of its oil sands operations. On a well-to-wheels basis, GHG emissions from oil sands crudes are greater than the average emissions of crudes refined in the United States, according to research by IHS Markit. However, the GHG intensity of Shell's oil sands operations has been improving for several years due to operational enhancements, and the successful operation of the Quest carbon capture and storage (CCS) project has improved Shell's performance even further.

Through operational excellence, Shell has improved approximately 3% each year over the past six years for a total 18% decline in GHG intensity. In 2016, Shell successfully completed a pilot program at its Shell Albian Sands site that avoids low quality, poor processing material, leading to improvements in energy efficiency and reduced emissions.

The Quest CCS project in Alberta was launched in 2015, and in 2016, it captured over one million tonnes of CO<sub>2</sub> from the Scotford Upgrader for storage deep underground – the equivalent to emissions from about 250,000 cars. Quest has a rigorous monitoring program to ensure that the CO<sub>2</sub> remains safely and securely in place. This includes continuous monitoring and early warning systems, groundwater sampling and 3-D seismic surveying.

By capturing one-third of direct CO<sub>2</sub> emissions from the Scotford Upgrader, Quest helps decrease the GHG intensity of Shell's operations. This brings Shell's oil sands products more in line with the average emissions of North American crude oil. Quest is the first CCS project in the oil sands and serves as a model for advancing and deploying more CCS facilities in other industrial settings worldwide.

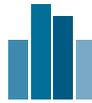
## TSM PERFORMANCE

Shell maintains high standards in the TSM performance protocols of *Crisis Management and Communications Planning*, and *Aboriginal and Community Outreach*, with management programs in place that are reviewed, tested and documented. Shell informs stakeholders about its environmental performance through its annual Oil Sands Performance Report.

Shell's tailings management initiatives continued in 2016, focusing on advancing technologies to treat fluid fine tailings (FFT) to meet the Alberta Tailings Management Framework set in March 2015. In 2014, Shell completed a successful pilot of a tailings centrifuge, which advanced the units to be moved into commercial scale in 2015. Shell has invested approximately \$474 million since 2005 in research to develop technologies that speed up the drying or dewatering process for FFT. Shell continues to work towards improving tailings treatment technologies to treat FFT that have a high percentage of fine particles.

🔗 For more information, please visit [www.shell.ca](http://www.shell.ca).





2016 TSM Results

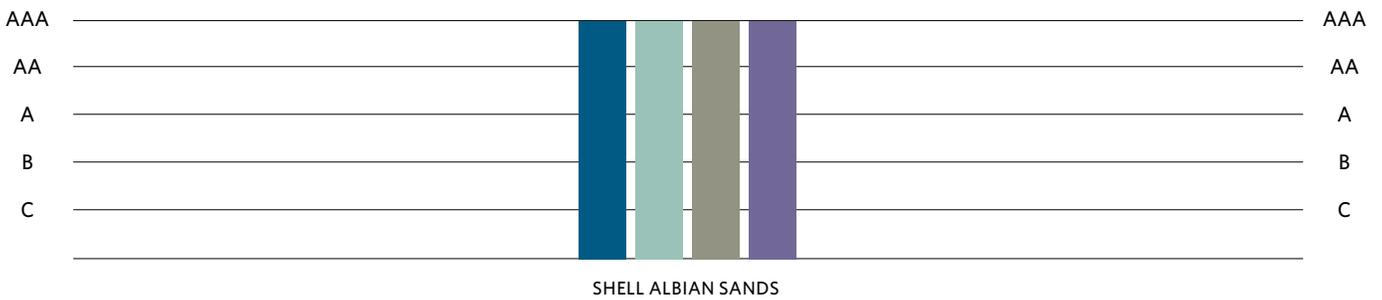
Canadian Natural Resources Limited

Crisis Management and Communications Planning Assessment

FACILITY	PREPAREDNESS	REVIEW	TRAINING
SHELL CANADA ENERGY	✓	✓	✓
SHELL ALBIAN SANDS	✓	✓	✓

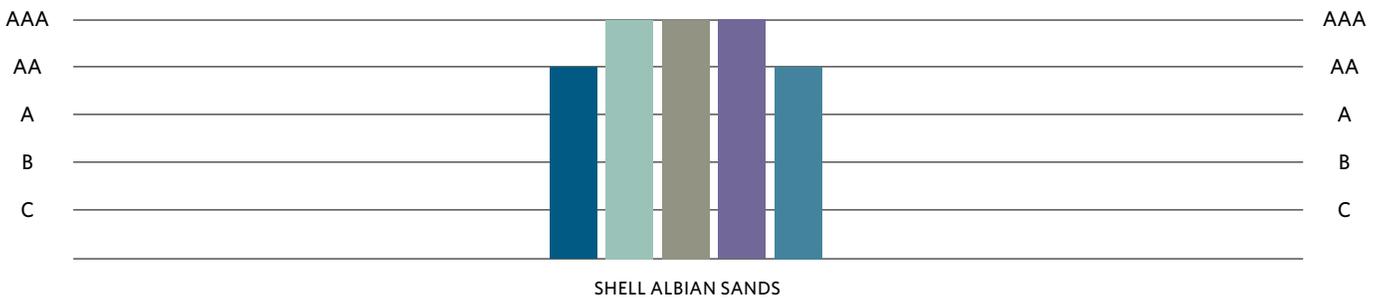
Aboriginal and Community Outreach Assessment

- COMMUNITY OF INTEREST (COI) IDENTIFICATION
- COI RESPONSE MECHANISM
- EFFECTIVE COI ENGAGEMENT AND DIALOGUE
- REPORTING



Safety and Health Assessment

- COMMITMENTS AND ACCOUNTABILITY
- TRAINING, BEHAVIOUR AND CULTURE
- PLANNING AND IMPLEMENTATION
- MONITORING AND REPORTING
- PERFORMANCE

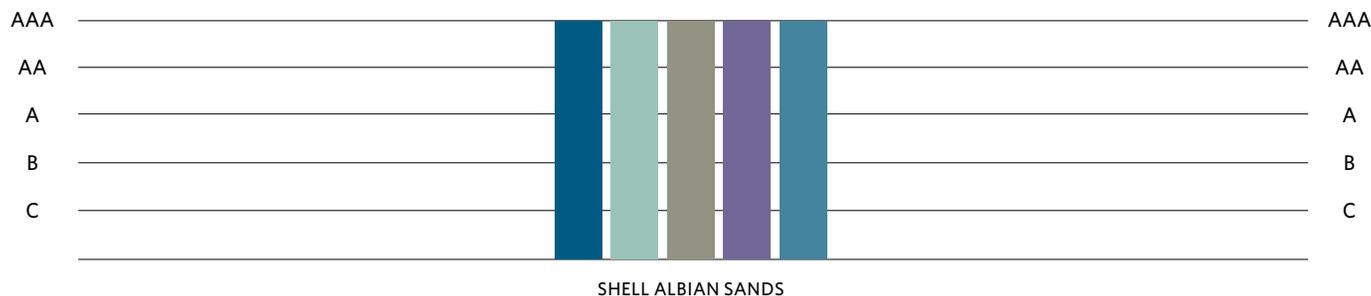


Self-assessed results; last external verification: 2016; next external verification: 2019.



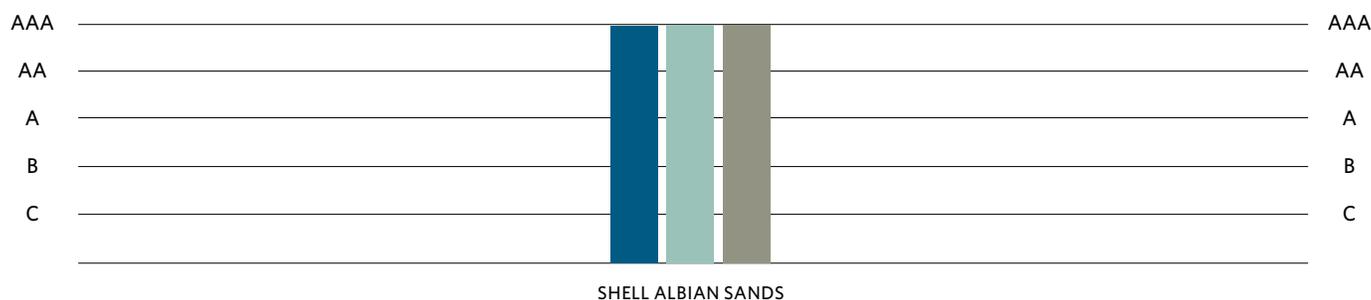
## Tailings Management Assessment

- TAILINGS MANAGEMENT POLICY AND COMMITMENT
- TAILINGS MANAGEMENT SYSTEM
- ASSIGNED ACCOUNTABILITY AND RESPONSIBILITY FOR TAILINGS MANAGEMENT
- ANNUAL TAILINGS MANAGEMENT REVIEW
- OPERATION, MAINTENANCE AND SURVEILLANCE (OMS) MANUAL



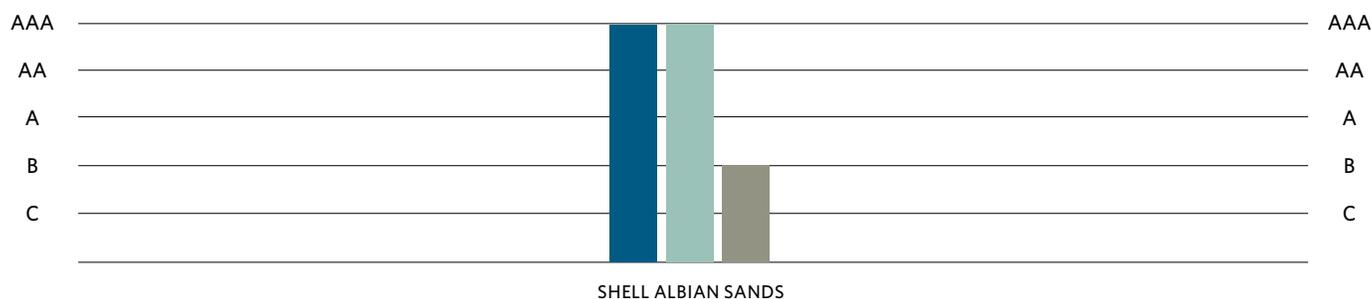
## Biodiversity Conservation Management Assessment

- CORPORATE BIODIVERSITY CONSERVATION POLICY, ACCOUNTABILITY AND COMMUNICATIONS
- FACILITY-LEVEL BIODIVERSITY CONSERVATION PLANNING AND IMPLEMENTATION
- BIODIVERSITY CONSERVATION REPORTING



## Energy Use and GHG Emissions Management Assessment

- ENERGY USE AND GHG EMISSIONS MANAGEMENT SYSTEMS
- ENERGY USE AND GHG EMISSIONS REPORTING SYSTEMS
- ENERGY AND GHG EMISSIONS PERFORMANCE TARGETS

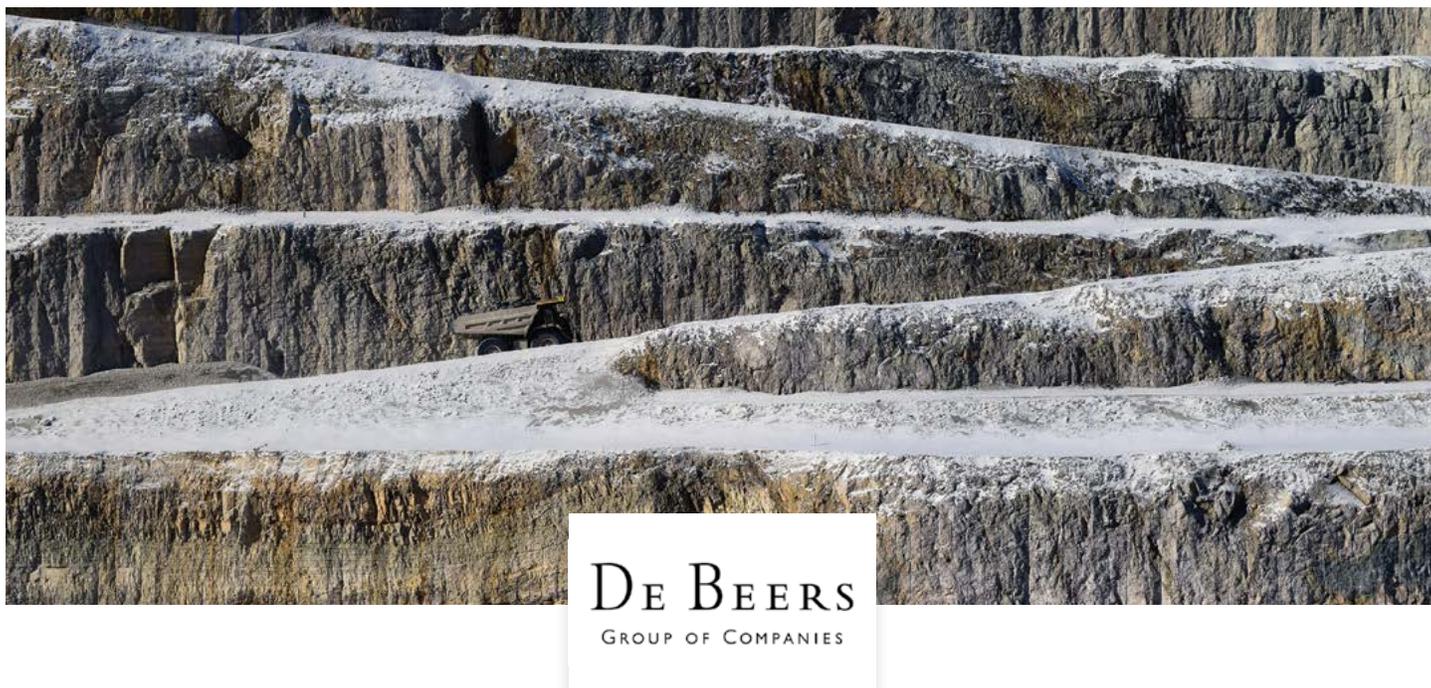


Self-assessed results; last external verification: 2016; next external verification: 2019.



## TSM Performance by Company

### De Beers Canada Inc.



De Beers has three major assets in Canada: the Victor Mine, the Snap Lake Mine and the Gahcho Kué Mine. The Victor Mine, Ontario's first and only diamond mine, is located 90 kilometres west of the Attawapiskat First Nation in northeastern Ontario. The Snap Lake Mine, located approximately 200 kilometres northeast of Yellowknife in the Northwest Territories, was Canada's first fully underground diamond mine. In December 2015, the mine was placed into care and maintenance due to a downturn in market conditions. De Beers is also the majority partner and operator of the Gahcho Kué Mine, which began production in August 2016, and is located 280 kilometres northeast of Yellowknife.

De Beers Canada's operations are committed to sustainable development. The Gahcho Kué, Snap Lake and Victor mines have a combined total of 14 impact benefit agreements with First Nations and Métis communities in Canada. The operating mines, Gahcho Kué and Victor, maintain environmental management systems that have been certified to ISO 14000. The Victor Mine is also certified to the safety and health OHSAS 18001 standard. Gahcho Kué plans to seek OHSAS 18001 certification in the near future.

De Beers Canada is a member of the Canadian Diamond Code of Conduct and Jewellers Vigilance Canada. As part of the larger De Beers Group of Companies, De Beers Canada is also a supporter, participant or signatory of the Global Reporting Initiative, the Responsible Jewellery Council standards, the United Nations Global Compact, the Extractive Industries Transparency Initiative and the Kimberley Process.

The following is a summary of *TSM* results for De Beers Canada in 2016.

#### CRISIS MANAGEMENT AND COMMUNICATIONS PLANNING

Crisis management plans for the corporate office and the Victor Mine conform to all *TSM* performance requirements, as will Gahcho Kué's plan in the near future.

### ENERGY USE AND GHG EMISSIONS MANAGEMENT

The Victor Mine has a mature energy management system, with two out of three indicators assessed at a Level AA. The energy use and GHG emissions reporting system was assessed at a Level A.

Gahcho Kué is in the process of developing an energy management system.

### TAILINGS MANAGEMENT

The Victor Mine maintained a Level AAA for three of the tailings management performance indicators, except for Indicator 4, which was externally assessed at a Level B, and Indicator 5 which was assessed at a Level A.

### ABORIGINAL AND COMMUNITY OUTREACH

The Victor Mine maintained either a Level AA or AAA for all of the Aboriginal and community outreach performance indicators.

### BIODIVERSITY CONSERVATION MANAGEMENT

The Victor Mine improved and was assessed at Level AA or above. The mine has extensive environmental monitoring programs, which were already in place for various permits, environmental assessment follow-up programs and research initiatives. Improvements focused on increasing communication with communities of interest and making information publicly available about the mine's biodiversity conservation performance.

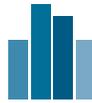
### SAFETY AND HEALTH

The safety and health management system at Victor Mine was certified in 2016 to OHSAS 18001. The mine achieved externally verified results of Level AAA for all indicators under this protocol.

🔗 For more information, please visit [www.debeersgroup.com/canada/en/](http://www.debeersgroup.com/canada/en/)



De Beers' Victor Mine, near Attawapiskat First Nation in northeastern Ontario.



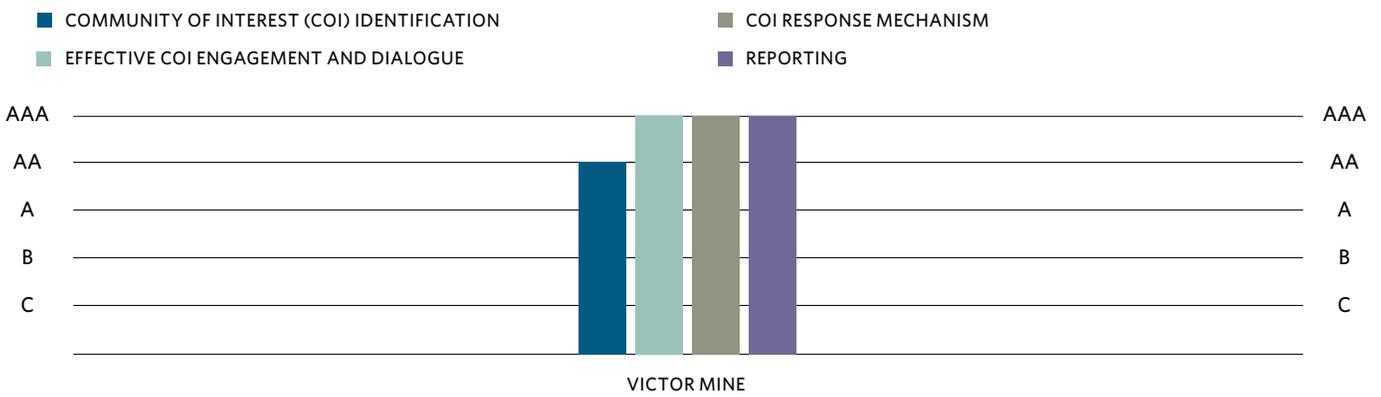
Externally  
Verified Results

## 2016 TSM Results De Beers Canada Inc.

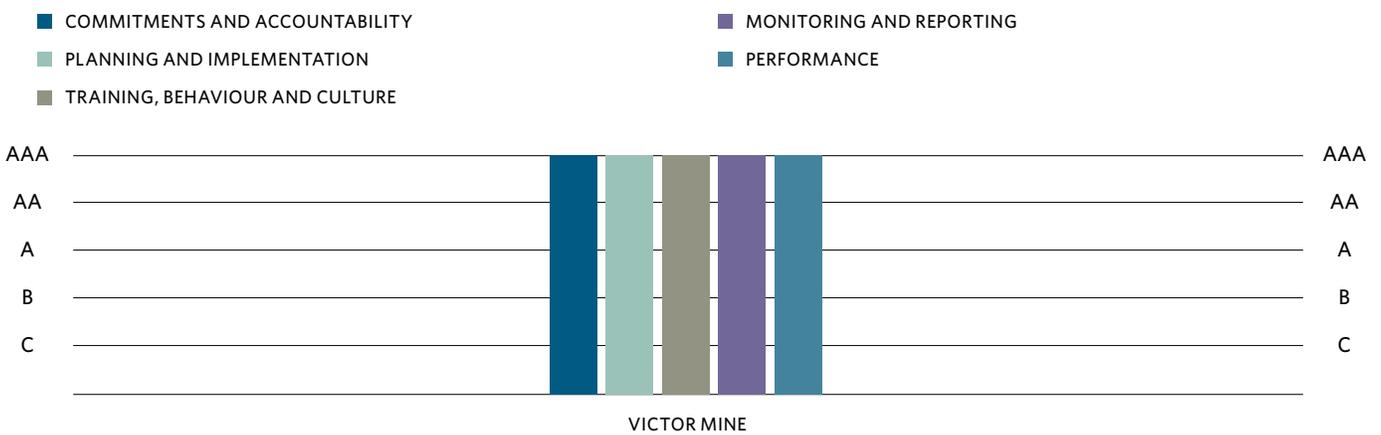
### Crisis Management and Communications Planning Assessment

FACILITY	PREPAREDNESS	REVIEW	TRAINING
DE BEERS CANADA INC.	✓	✓	✓
VICTOR MINE	✓	✓	✓

### Aboriginal and Community Outreach Assessment



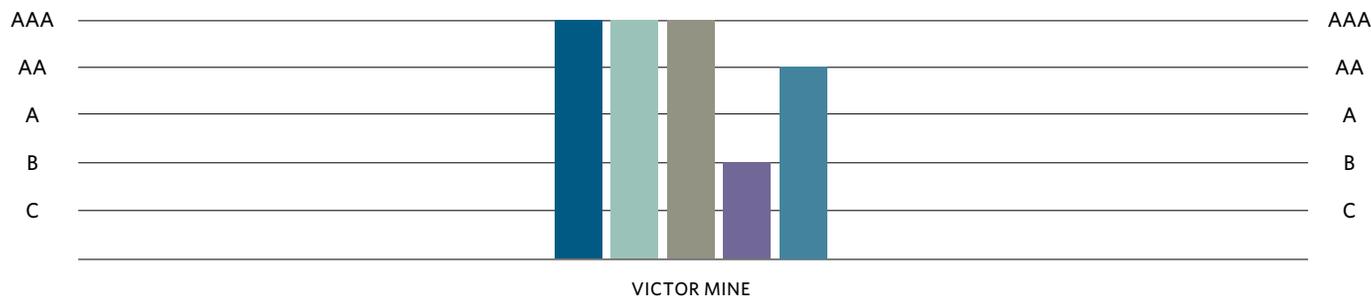
### Safety and Health Assessment



## Tailings Management Assessment

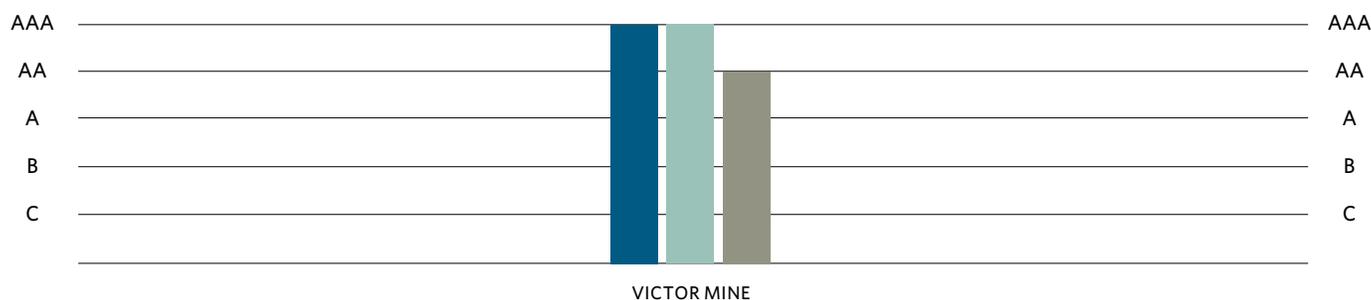
Externally  
Verified Results

- TAILINGS MANAGEMENT POLICY AND COMMITMENT
- ANNUAL TAILINGS MANAGEMENT REVIEW
- TAILINGS MANAGEMENT SYSTEM
- OPERATION, MAINTENANCE AND SURVEILLANCE (OMS) MANUAL
- ASSIGNED ACCOUNTABILITY AND RESPONSIBILITY FOR TAILINGS MANAGEMENT



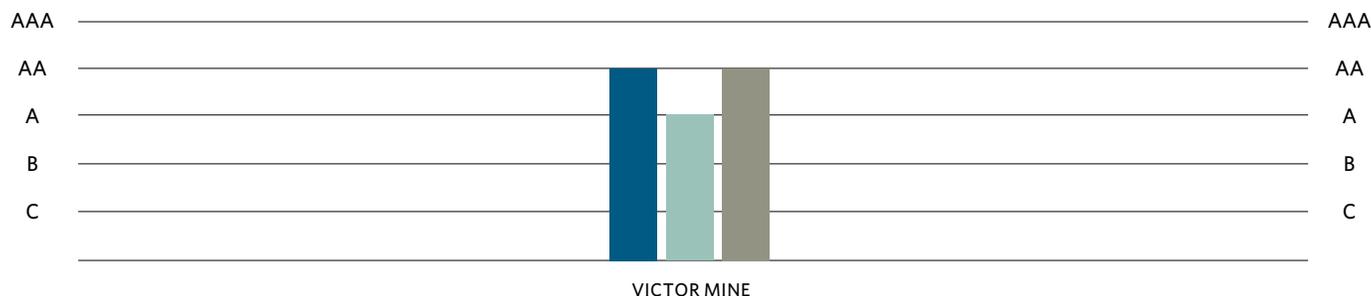
## Biodiversity Conservation Management Assessment

- CORPORATE BIODIVERSITY CONSERVATION POLICY, ACCOUNTABILITY AND COMMUNICATIONS
- FACILITY-LEVEL BIODIVERSITY CONSERVATION PLANNING AND IMPLEMENTATION
- BIODIVERSITY CONSERVATION REPORTING



## Energy Use and GHG Emissions Management Assessment

- ENERGY USE AND GHG EMISSIONS MANAGEMENT SYSTEMS
- ENERGY USE AND GHG EMISSIONS REPORTING SYSTEMS
- ENERGY AND GHG EMISSIONS PERFORMANCE TARGETS



## TSM Performance by Company

### Dominion Diamond Corporation



Dominion Diamond Corporation is a Canadian diamond mining company with ownership interests in two major producing diamond mines situated approximately 200 kilometres south of the Arctic Circle in the Northwest Territories. The company operates and has a controlling interest in the Ekati Diamond Mine, and also owns 40% of the Diavik Diamond Mine. It supplies rough diamonds to the global market through its sorting and selling operations in Canada, Belgium and India, and is listed on both the Toronto and New York stock exchanges.

The Ekati Diamond Mine site is located roughly 300 kilometres northeast of Yellowknife and can be accessed by air and by a 400-kilometre ice road in the winter. Diavik Diamond Mines Inc., a subsidiary of Rio Tinto plc, operates the Diavik Diamond Mine. *TSM* results for Diavik are provided by Rio Tinto and can be found on page 113 of this report.

At Dominion, performance means delivering sustainable growth by investing in the future. This involves supporting excellence in leadership and delivering on the commitment of zero harm: to the company's own people, through consistent and risk-based work practices; to its host communities, through communication and the inclusion of their opinions and concerns in mine plans and mine-life extension projects; and to the environment, through innovative adaptive management and intensive monitoring of the mine's impact.

Dominion is proud of the Ekati mine's performance and is dedicated to building on its legacy. The company will continue to work closely with its impact benefit agreement (IBA) groups, maintaining a focus on the empowerment and sustainability of northern communities. With such a solid foundation, Dominion will concentrate on making improvements and enhancements.

Dominion uses *TSM* reporting as part of a suite of tools that drive continuous improvement across the company's operations. The company conducts extensive internal and external monitoring and auditing of all sustainable development practices, and the *TSM* initiative draws many of these processes into a forum for wider reporting across Canada.

This extra level of self-regulation adds value because processes are reviewed from a different reporting perspective than would be the case under other HSEC (health, safety, environment and community) and ISO audits.

The Ekati mine has consistently scored high for the *TSM Biodiversity Conservation Management* and *Aboriginal and Community Outreach* protocols, and that trend continued in 2016. The company meets regularly with stakeholders to share information about its operations and future plans and to hear feedback on decisions that may affect them. The Ekati mine has created community development plans that focus the company on where its efforts will make the most difference. While the company inherited the IBAs, which are in place until the end of mine life, Dominion is in ongoing dialogue with its IBA partners to explore additional community development initiatives.

Dominion continues to make considerable efforts in environmental stewardship. The results achieved in 2016 confirm that the company is on track in terms of understanding and conserving biodiversity, effectively disposing of processed kimberlite, and managing associated water quality.

In June 2016, both the Surface and Underground teams from the Ekati mine placed first overall in the annual Mine Rescue Competition held in Yellowknife. This accomplishment marked seven consecutive years for the Surface team and four in a row for the Underground team.

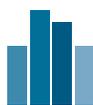
Dominion's results illustrate that the company is committed to fulfilling its vision of strengthening and deepening its relationships with community stakeholders and extending mine life. The company is striving to enhance the Ekati mine's socio-economic and environmental records where sustainable resource development and community growth are paramount.

By aligning Traditional Knowledge and feedback from community partners with our approach, Dominion is continually improving its programs. The company genuinely cares about its people and wants to make investments that have long-lasting benefits.

🔗 For more information, please visit [www.ddcorp.ca](http://www.ddcorp.ca)



Environmental monitoring at Dominion Diamond's Ekati mine.



## 2016 TSM Results

# Dominion Diamond Corporation



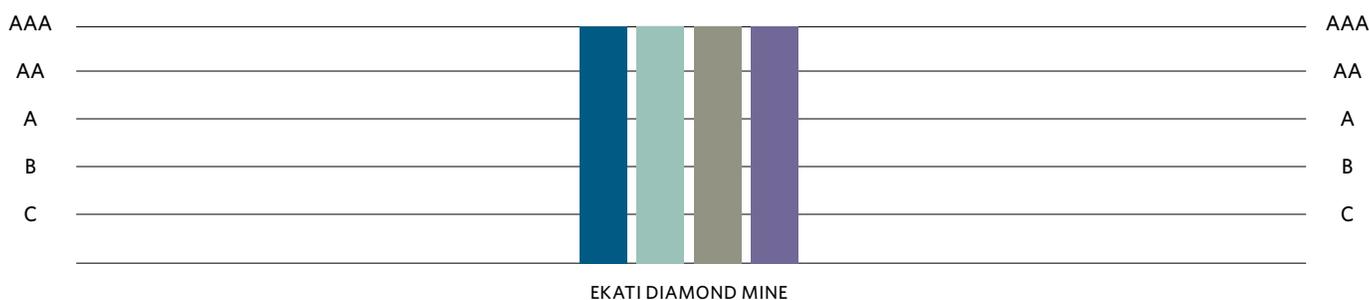
### Crisis Management and Communications Planning Assessment

FACILITY	PREPAREDNESS	REVIEW	TRAINING
EKATI DIAMOND MINE	✓	✓	✓



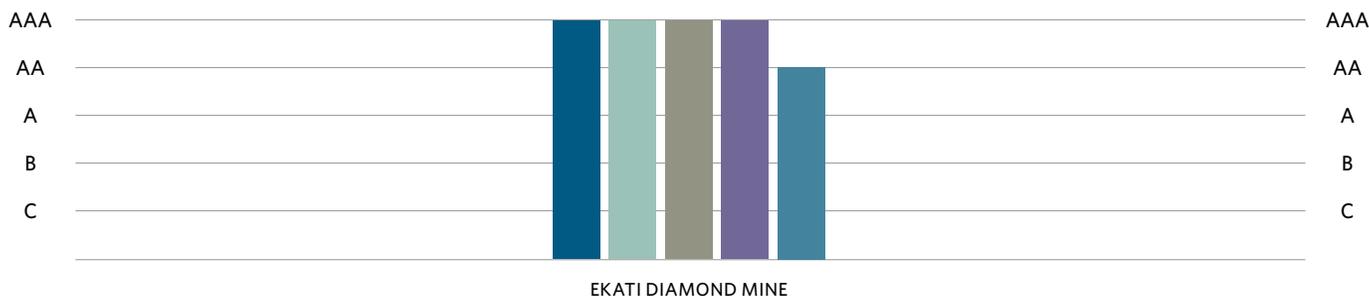
### Aboriginal and Community Outreach Assessment

- COMMUNITY OF INTEREST (COI) IDENTIFICATION
- COI RESPONSE MECHANISM
- EFFECTIVE COI ENGAGEMENT AND DIALOGUE
- REPORTING



### Safety and Health Assessment

- COMMITMENTS AND ACCOUNTABILITY
- MONITORING AND REPORTING
- PLANNING AND IMPLEMENTATION
- PERFORMANCE
- TRAINING, BEHAVIOUR AND CULTURE

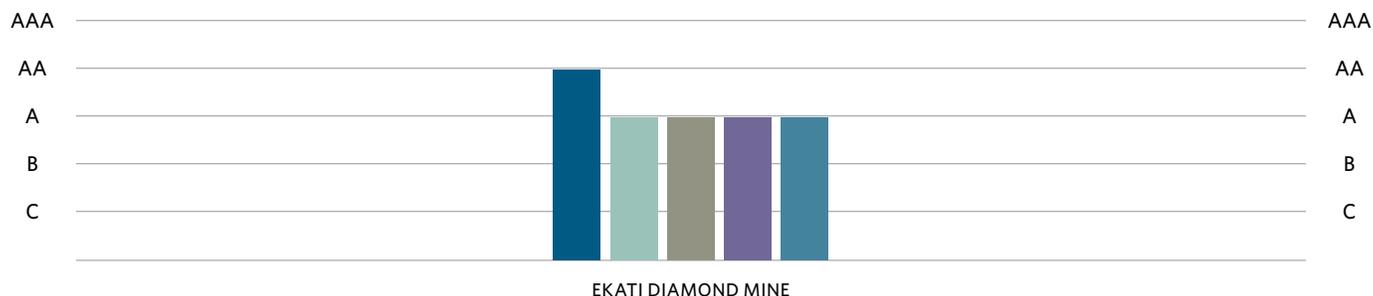


Self-assessed results; last external verification: 2014; next external verification: 2017.



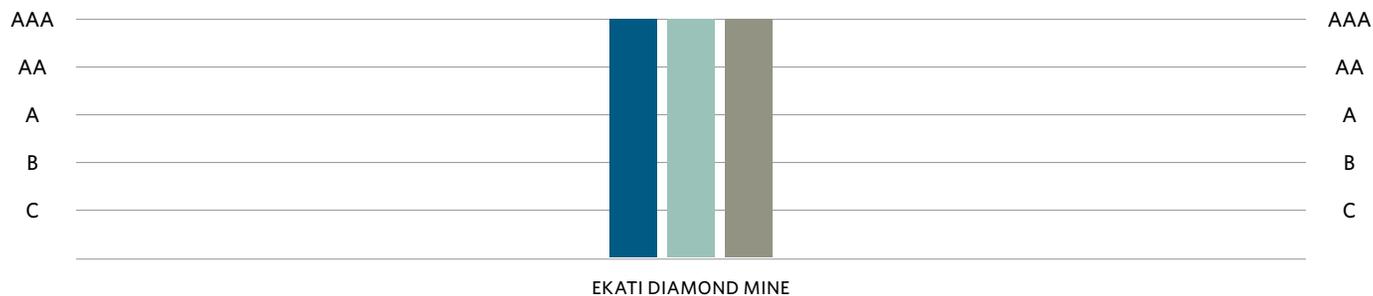
## Tailings Management Assessment

- TAILINGS MANAGEMENT POLICY AND COMMITMENT
- TAILINGS MANAGEMENT SYSTEM
- ASSIGNED ACCOUNTABILITY AND RESPONSIBILITY FOR TAILINGS MANAGEMENT
- ANNUAL TAILINGS MANAGEMENT REVIEW
- OPERATION, MAINTENANCE AND SURVEILLANCE (OMS) MANUAL



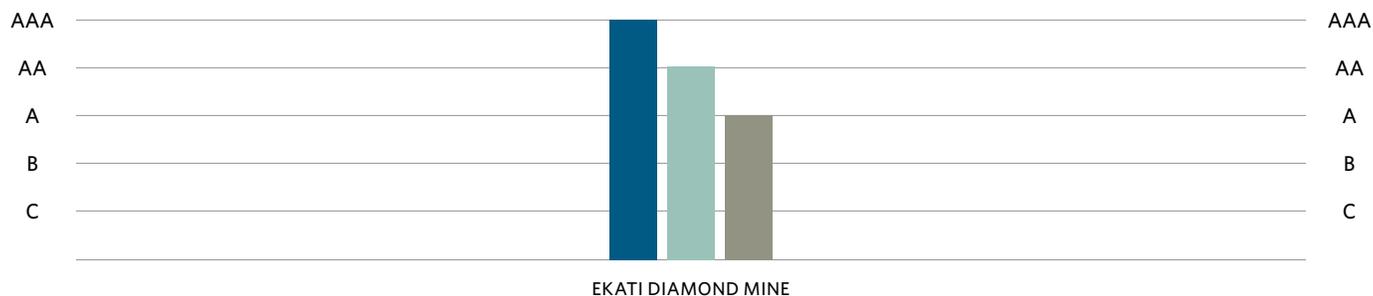
## Biodiversity Conservation Management Assessment

- CORPORATE BIODIVERSITY CONSERVATION POLICY, ACCOUNTABILITY AND COMMUNICATIONS
- FACILITY-LEVEL BIODIVERSITY CONSERVATION PLANNING AND IMPLEMENTATION
- BIODIVERSITY CONSERVATION REPORTING



## Energy Use and GHG Emissions Management Assessment

- ENERGY USE AND GHG EMISSIONS MANAGEMENT SYSTEMS
- ENERGY USE AND GHG EMISSIONS REPORTING SYSTEMS
- ENERGY AND GHG EMISSIONS PERFORMANCE TARGETS



Self-assessed results; last external verification: 2014; next external verification: 2017.



TSM Performance by Company  
 First Quantum Minerals Ltd.



First Quantum Minerals Ltd. is a well-established and rapidly growing mining and metals company engaged in mineral exploration, development and mining. The company produces copper, gold, nickel, platinum, palladium, zinc and sulphuric acid.

All of First Quantum's Canadian facilities, which are closed mines, participate in *TSM*. In addition, the company's operations in Turkey voluntarily participate in *TSM* and have reported on their progress.

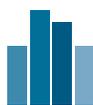
First Quantum has reported performance for the Pyhäsalmi mine in Finland in the past. However, in 2015, the Mining Association of Finland (FinnMin) adopted *TSM* for its membership, which includes the Pyhäsalmi mine. In the future, performance for this operation will be reported through FinnMin.

When combined, all participating facilities achieved a conformance rate of 85% at a Level A or better across all *TSM* indicators. Notably, all of First Quantum's facilities achieved at least a Level A performance for the *TSM Safety and Health, Tailings Management* and *Aboriginal and Community Outreach* protocols, and met all of the requirements of the *TSM Crisis Management and Communications Planning Protocol*. The company's operating mine in Turkey met the requirements for a Level A or better for all indicators in 2016 and was granted a *TSM Leadership Award* in 2015.

While First Quantum is pleased with the overall performance achieved this year, it is committed to continuous improvement and has put measures in place to continue pursuing excellence. The company aims to improve its performance in the area of setting and achieving targets for energy use and GHG emissions management and in biodiversity conservation management at its closed properties in Canada.

🔗 For more information, please visit [www.first-quantum.com](http://www.first-quantum.com)





2016 TSM Results

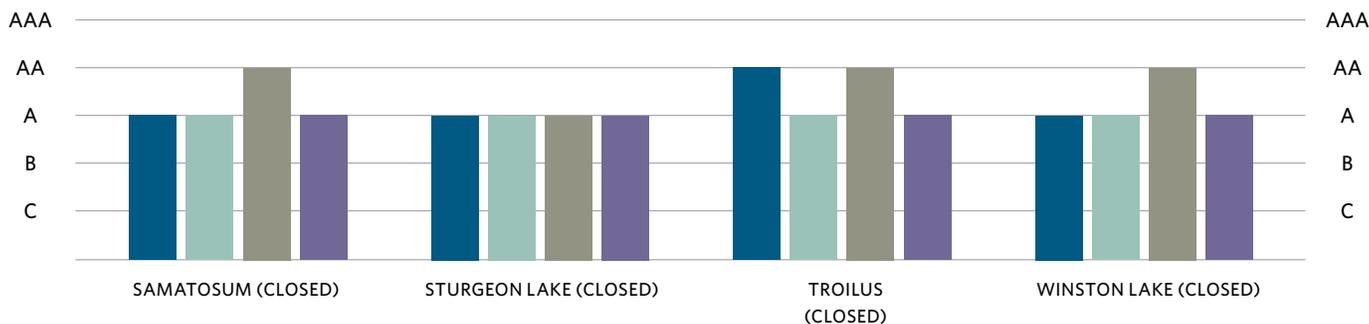
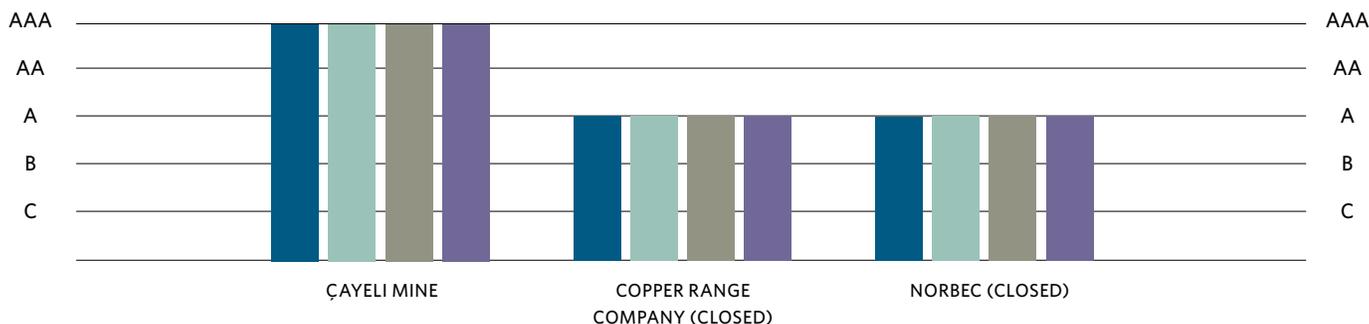
First Quantum Minerals Ltd.

Crisis Management and Communications Planning Assessment

FACILITY	PREPAREDNESS	REVIEW	TRAINING
ÇAYELI MINE	✓	✓	✓
COPPER RANGE COMPANY (CLOSED)	✓	✓	✓
FIRST QUANTUM MINERALS	✓	✓	✓
NORBEC (CLOSED)	✓	✓	✓
SAMATOSUM (CLOSED)	✓	✓	✓
STURGEON LAKE (CLOSED)	✓	✓	✓
TROILUS (CLOSED)	✓	✓	✓
WINSTON LAKE (CLOSED)	✓	✓	✓

Aboriginal and Community Outreach Assessment

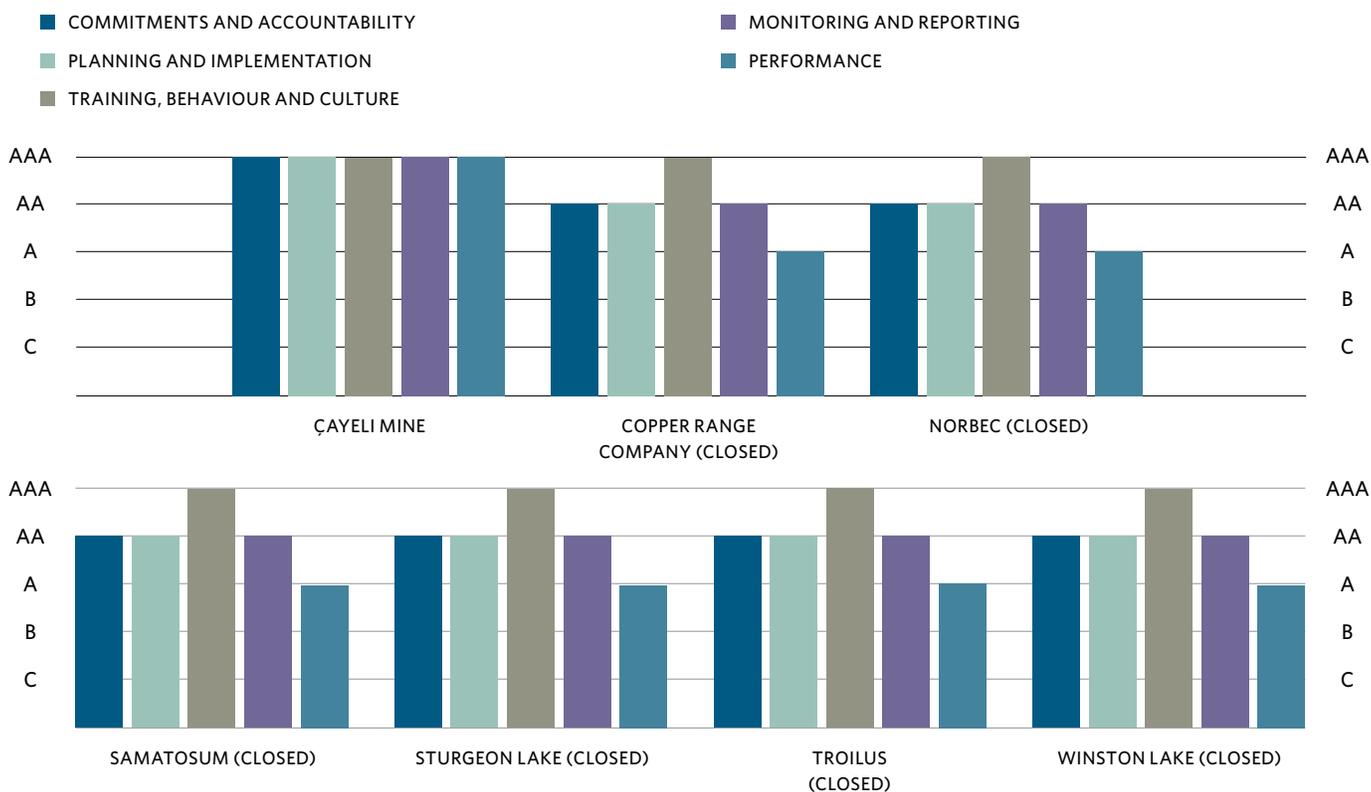
- COMMUNITY OF INTEREST (COI) IDENTIFICATION
- COI RESPONSE MECHANISM
- EFFECTIVE COI ENGAGEMENT AND DIALOGUE
- REPORTING



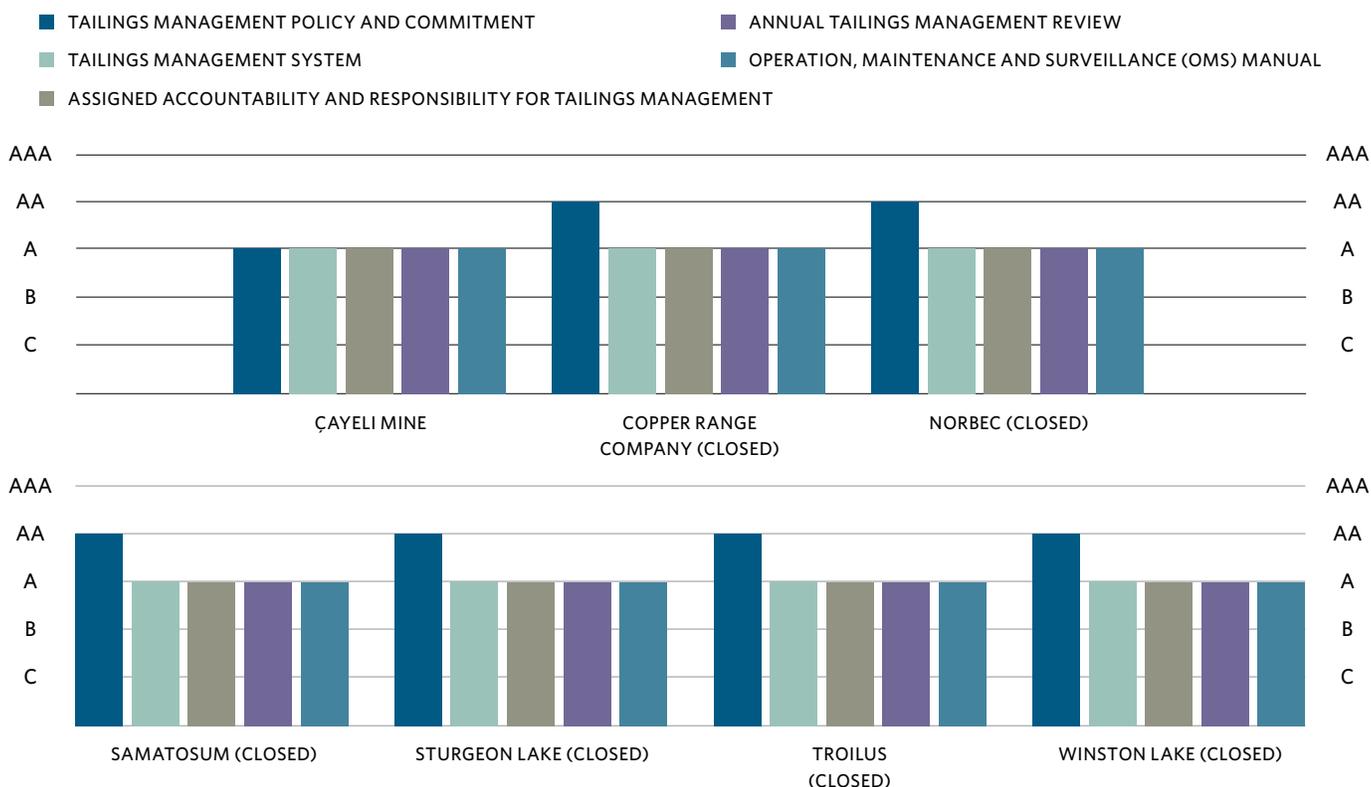
Self-assessed results; last external verification: 2015; next external verification: 2018.



## Safety and Health Assessment



## Tailings Management Assessment

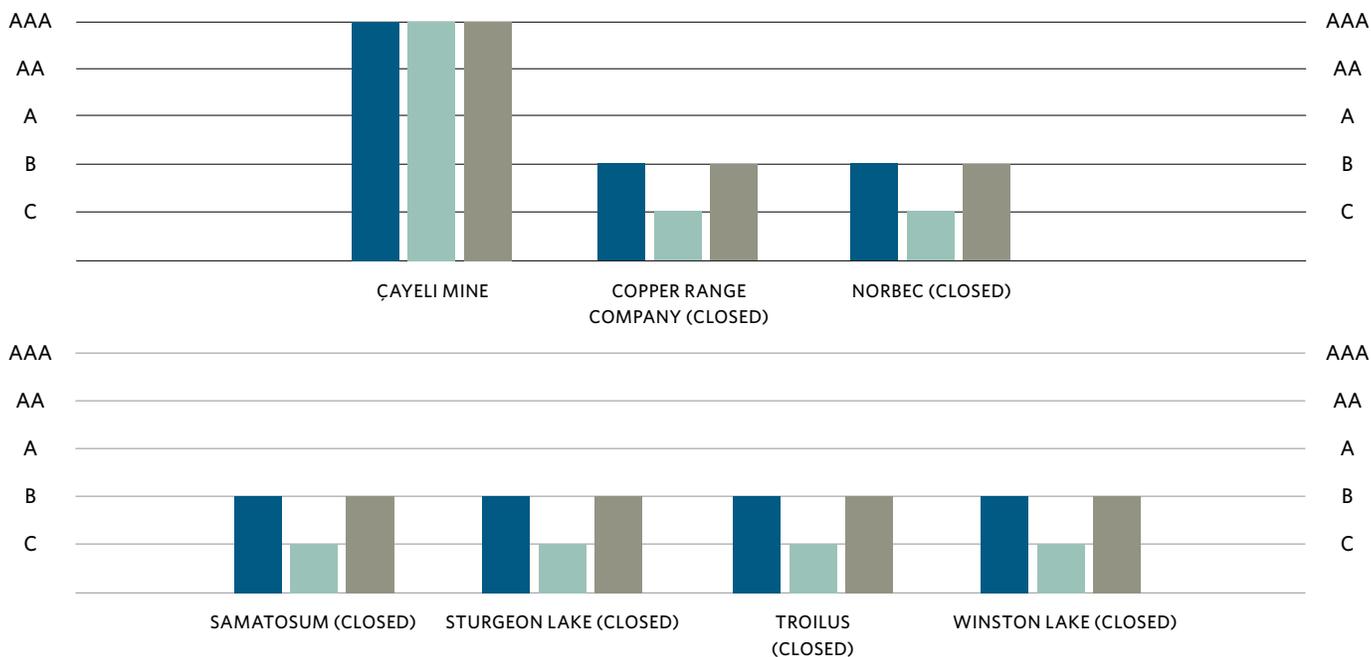


Self-assessed results; last external verification: 2015; next external verification: 2018.



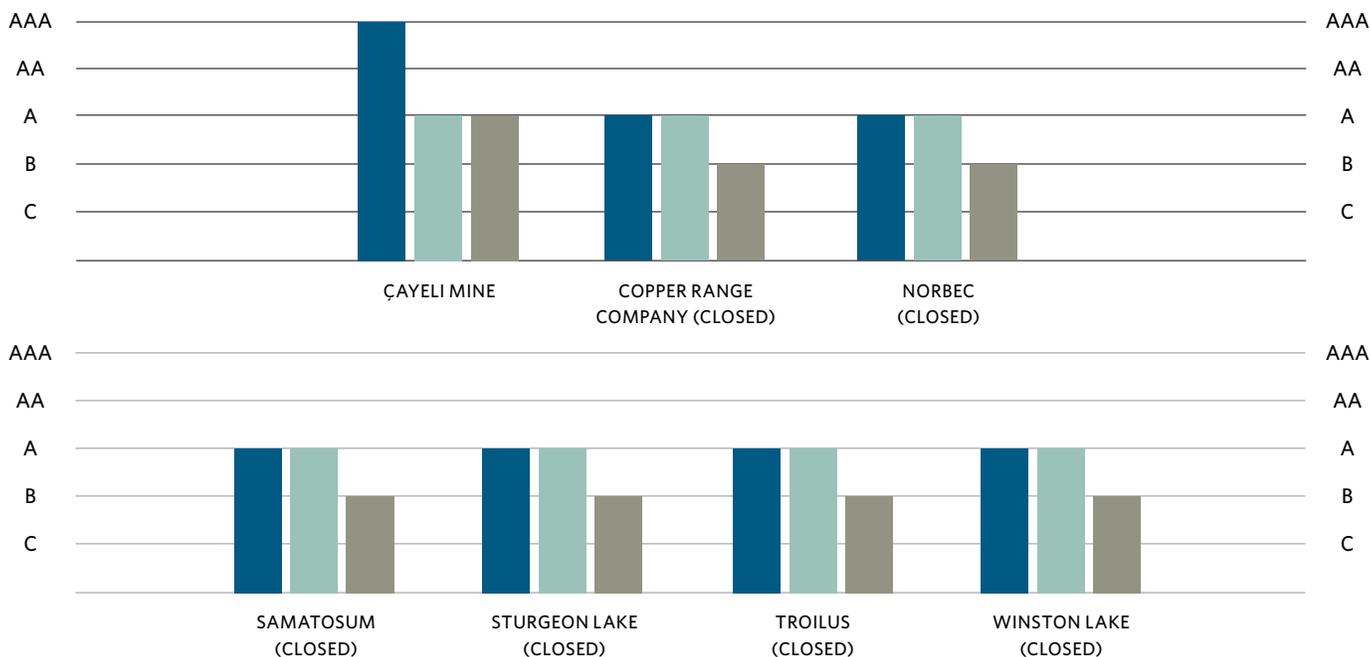
## Biodiversity Conservation Management Assessment

- CORPORATE BIODIVERSITY CONSERVATION POLICY, ACCOUNTABILITY AND COMMUNICATIONS
- FACILITY-LEVEL BIODIVERSITY CONSERVATION PLANNING AND IMPLEMENTATION
- BIODIVERSITY CONSERVATION REPORTING



## Energy Use and GHG Emissions Management Assessment

- ENERGY USE AND GHG EMISSIONS MANAGEMENT SYSTEMS
- ENERGY USE AND GHG EMISSIONS REPORTING SYSTEMS
- ENERGY AND GHG EMISSIONS PERFORMANCE TARGETS



Self-assessed results; last external verification: 2015; next external verification: 2018.



## TSM Performance by Company

### Glencore



Glencore is one of the world's largest global diversified natural resource companies and a major producer and marketer of more than 90 commodities. The company's operations comprise more than 150 mining and metallurgical sites, oil production assets and agricultural facilities.

Glencore's Canadian operations are guided by the *TSM* initiative and have participated since 2004. The following Glencore facilities have implemented *TSM*:

- Glencore Copper:
  - Horne Smelter, Rouyn-Noranda, Quebec
  - Canadian Copper Refinery (CCR), East Montreal, Quebec
- Glencore Nickel:
  - Sudbury Integrated Nickel Operations (INO), Sudbury, Ontario
  - Raglan Mine, Nunavik region, Quebec
- Glencore Zinc:
  - Brunswick Smelter, Bathurst, New Brunswick
  - Kidd Operations, Timmins, Ontario
  - CEZinc Refinery, Valleyfield, Quebec
  - Matagami Mine, Matagami, Quebec (joined in 2017)



Sustainability lies at the foundation of Glencore's business strategy and activities. Sustainability requires meaningful engagement with communities of interest (COI). At the same time, it requires maintaining the highest regard for environmental stewardship, social responsibility, corporate governance and transparent reporting, while delivering superior shareholder returns.

### 2016 TSM RESULTS

All of Glencore's facilities underwent external verification this year for its 2016 performance, with the exception of CEZinc and Matagami. Since the beginning of 2017, CEZinc has been going through an ongoing labour dispute, which prevented the facility from conducting its external verification. The results for CEZinc that follow are based on the facility's 2015 self-assessment. The facility will undergo external verification in 2018. Matagami is still in the phase-in period for TSM and will be reporting self-assessed and externally verified results in future TSM Progress Reports.

### ABORIGINAL AND COMMUNITY OUTREACH

All of Glencore's facilities have achieved at least a Level A performance in all of the indicators under the *TSM Aboriginal and Community Outreach Protocol*. Notably, Horne Smelter, Raglan Mine, Kidd Operations and Brunswick Smelter achieved a Level AAA performance for all four of the protocol's indicators. Glencore's performance in the area of community outreach was highlighted in 2016, when the company was presented with the TSM Community Engagement Excellence Award for Kidd Operations' Community Partnerships Initiative. This year, Raglan Mine was selected as a finalist for the 2017 TSM Community Engagement Excellence Award for the Tamatumani program, a skills development initiative that has contributed to the training and hiring of hundreds of Nunavimmiut.

### CRISIS MANAGEMENT AND COMMUNICATIONS PLANNING

Glencore reports corporate performance in this area for Glencore Copper, Glencore Nickel and Glencore Zinc, as well as facility-level performance for each of its participating facilities. Glencore's corporate results for the *TSM Crisis Management and Communications Planning Protocol* are strong with a few areas where improvement is needed. Glencore Copper corporate met all of the requirements for Indicator 1 of the protocol, but did not meet the requirements for Indicators 2 or 3. Glencore Nickel corporate met all of the requirements for Indicators 1 and 3, but did not meet all of the requirements for Indicator 2. Glencore Zinc corporate met all of the requirements for Indicators 1 and 2, but did not meet all of the requirements for Indicator 3. Glencore's facilities met all of the criteria for the protocol's three indicators.

### SAFETY AND HEALTH

In the area of safety and health, the company's results remain strong. All of Glencore's facilities achieved at least a Level A performance for all five of the *TSM Safety and Health Protocol's* indicators.

### TAILINGS MANAGEMENT

Glencore's results in this area remain strong with each participating facility achieving at least a Level A performance. Notably, the Horne Smelter, Raglan Mine and Kidd Operations achieved a Level AAA performance for all five indicators of the *TSM Tailings Management Protocol*. Glencore is working to ensure that the criteria of this revised protocol are integrated within the company.

### BIODIVERSITY CONSERVATION MANAGEMENT

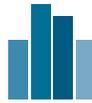
Results in this area are strong with a few areas identified for improvement. Both the CCR Refinery and the Horne Smelter are working to improve performance in this protocol to achieve a Level A for all three indicators. CEZinc and Kidd Operations achieved at least a Level A performance for this protocol, and Raglan, Sudbury Integrated Nickel Operations and Brunswick Smelter achieved a Level AAA performance.

### ENERGY USE AND GHG EMISSIONS MANAGEMENT

All of Glencore's facilities achieved at least a Level A for the *TSM Energy Use and GHG Emissions Management Protocol*, with the exception of the Horne Smelter, Sudbury Integrated Nickel Operations and CEZinc, which achieved a Level B for Indicator 3. To achieve a Level A, a facility must demonstrate that it has met its energy use and GHG emissions performance targets in the reporting year. In 2017, these facilities will focus on ensuring set targets are achieved. Glencore's commitment to reducing its carbon footprint was celebrated last year when the Raglan Mine was presented with the 2016 TSM Environmental Excellence Award for its 120-metre high wind turbine and storage facility.

📄 For more information, please visit [www.glencore.com](http://www.glencore.com).





Externally  
Verified Results

## 2016 TSM Results Glencore Copper

### Crisis Management and Communications Planning Assessment

FACILITY	PREPAREDNESS	REVIEW	TRAINING
GLENCORE COPPER	✓	✗	✓
CCR REFINERY	✓	✓	✓
HORNE SMELTER	✓	✓	✓

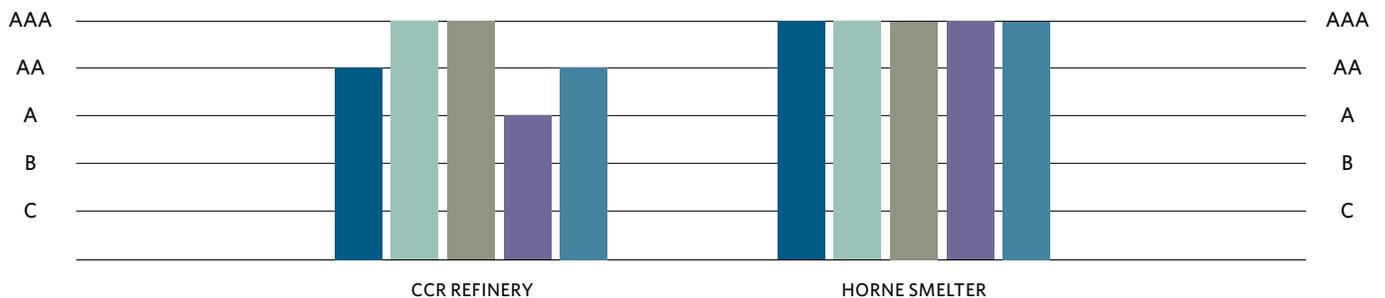
### Aboriginal and Community Outreach Assessment

- COMMUNITY OF INTEREST (COI) IDENTIFICATION
- EFFECTIVE COI ENGAGEMENT AND DIALOGUE
- COI RESPONSE MECHANISM
- REPORTING



### Safety and Health Assessment

- COMMITMENTS AND ACCOUNTABILITY
- PLANNING AND IMPLEMENTATION
- TRAINING, BEHAVIOUR AND CULTURE
- MONITORING AND REPORTING
- PERFORMANCE



## Tailings Management Assessment

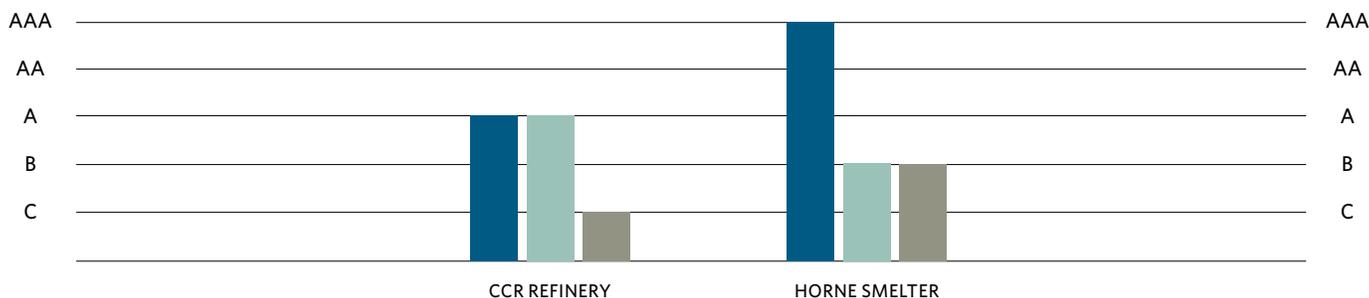
Externally  
Verified Results

- TAILINGS MANAGEMENT POLICY AND COMMITMENT
- TAILINGS MANAGEMENT SYSTEM
- ASSIGNED ACCOUNTABILITY AND RESPONSIBILITY FOR TAILINGS MANAGEMENT
- ANNUAL TAILINGS MANAGEMENT REVIEW
- OPERATION, MAINTENANCE AND SURVEILLANCE (OMS) MANUAL



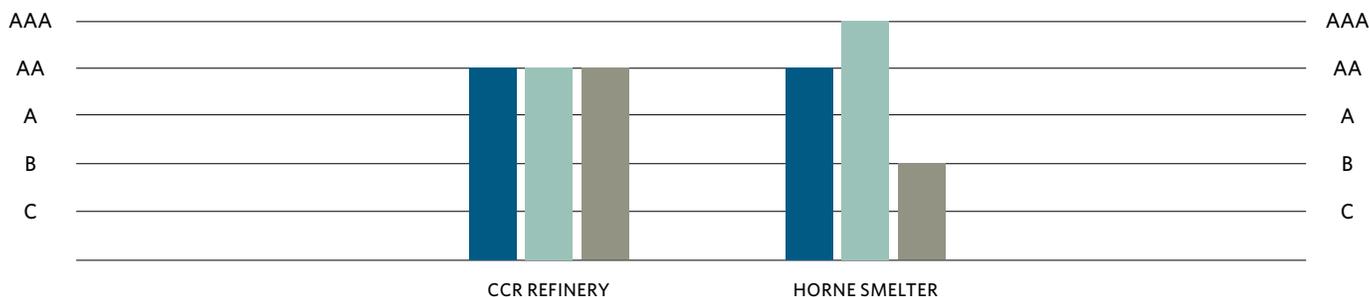
## Biodiversity Conservation Management Assessment

- CORPORATE BIODIVERSITY CONSERVATION POLICY, ACCOUNTABILITY AND COMMUNICATIONS
- FACILITY-LEVEL BIODIVERSITY CONSERVATION PLANNING AND IMPLEMENTATION
- BIODIVERSITY CONSERVATION REPORTING



## Energy Use and GHG Emissions Management Assessment

- ENERGY USE AND GHG EMISSIONS MANAGEMENT SYSTEMS
- ENERGY USE AND GHG EMISSIONS REPORTING SYSTEMS
- ENERGY AND GHG EMISSIONS PERFORMANCE TARGETS





Externally  
Verified Results

2016 TSM Results

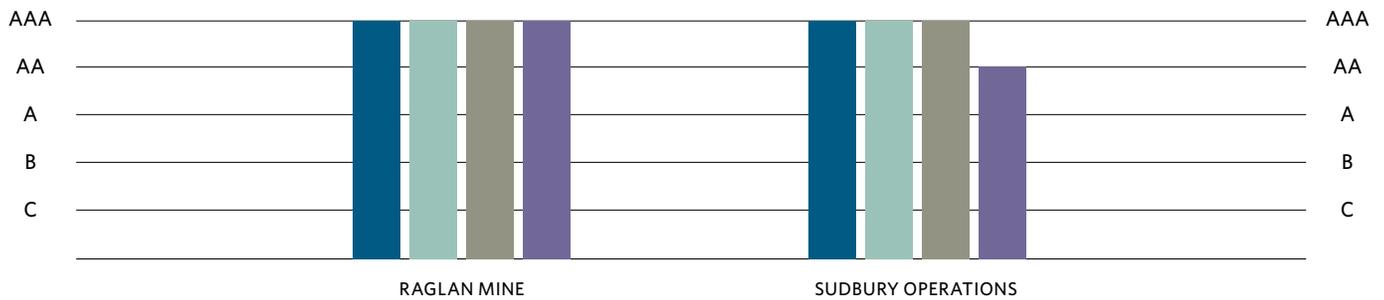
Glencore Nickel

Crisis Management and Communications Planning Assessment

FACILITY	PREPAREDNESS	REVIEW	TRAINING
GLENCORE NICKEL	✓	✗	✓
RAGLAN MINE	✓	✓	✓
SUDBURY OPERATIONS	✓	✓	✓

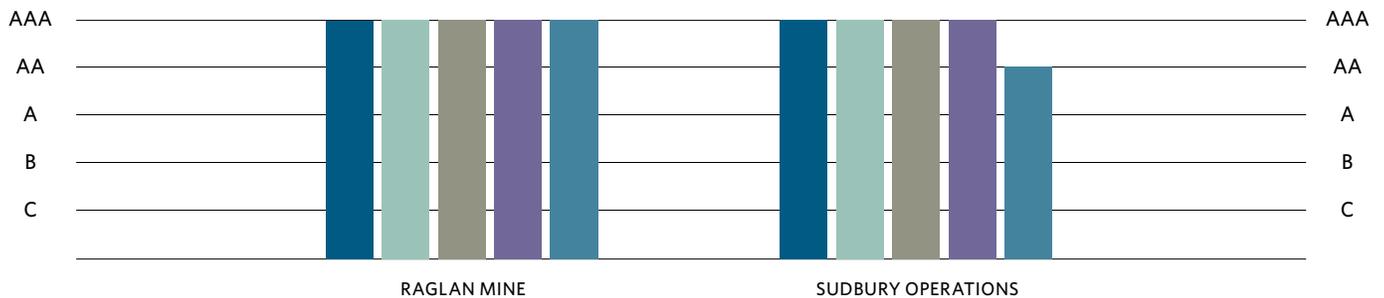
Aboriginal and Community Outreach Assessment

- COMMUNITY OF INTEREST (COI) IDENTIFICATION
- COI RESPONSE MECHANISM
- EFFECTIVE COI ENGAGEMENT AND DIALOGUE
- REPORTING



Safety and Health Assessment

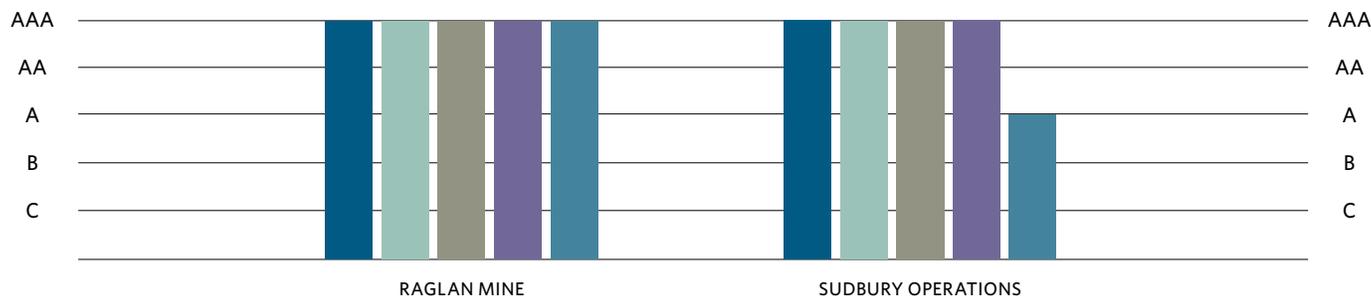
- COMMITMENTS AND ACCOUNTABILITY
- PLANNING AND IMPLEMENTATION
- TRAINING, BEHAVIOUR AND CULTURE
- MONITORING AND REPORTING
- PERFORMANCE



## Tailings Management Assessment

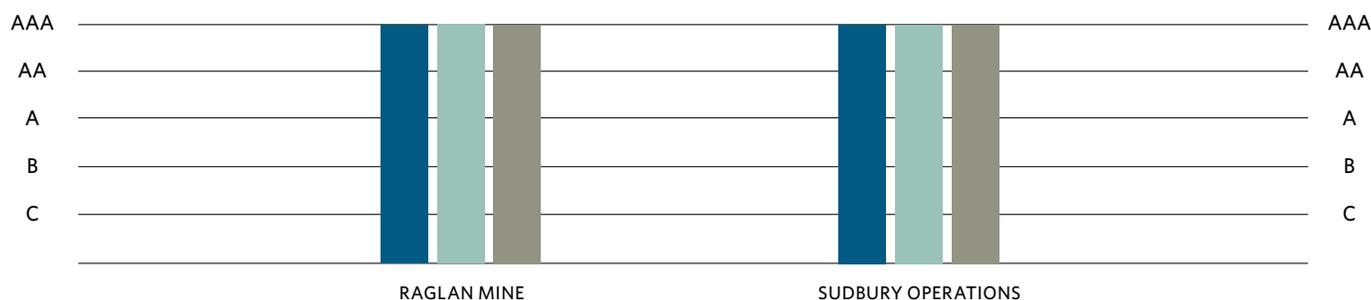
Externally  
Verified Results

- TAILINGS MANAGEMENT POLICY AND COMMITMENT
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- ASSIGNED ACCOUNTABILITY AND RESPONSIBILITY FOR TAILINGS MANAGEMENT
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- OPERATION, MAINTENANCE AND SURVEILLANCE (OMS) MANUAL



## Biodiversity Conservation Management Assessment

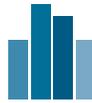
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- BIODIVERSITY CONSERVATION REPORTING



## Energy Use and GHG Emissions Management Assessment

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- ENERGY USE AND GHG EMISSIONS REPORTING SYSTEMS
- ENERGY AND GHG EMISSIONS PERFORMANCE TARGETS





Externally  
Verified Results

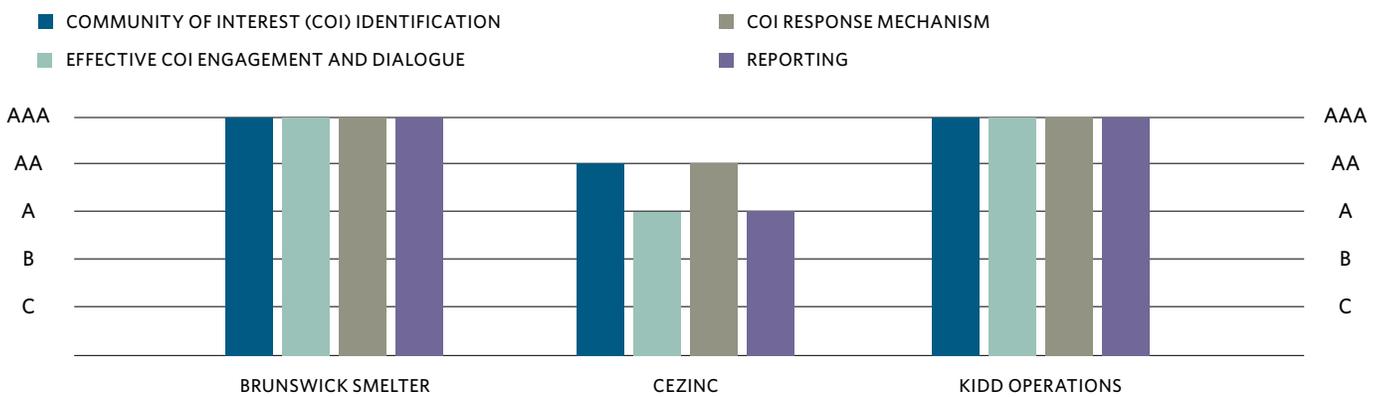
## 2016 TSM Results

### Glencore Zinc

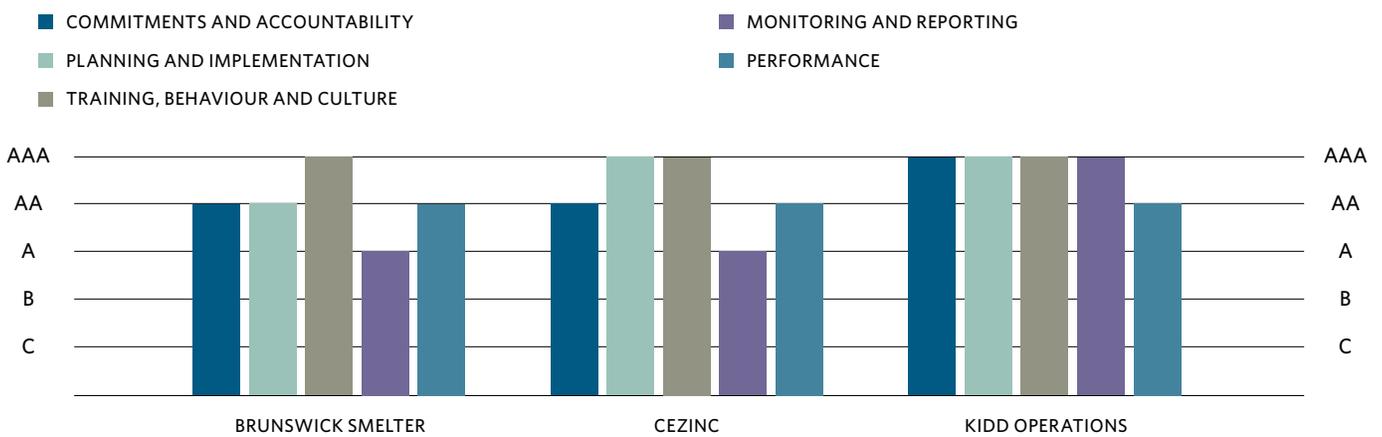
#### Crisis Management and Communications Planning Assessment

FACILITY	PREPAREDNESS	REVIEW	TRAINING
GLENCORE ZINC	✓	✓	✓
BRUNSWICK SMELTER	✓	✓	✓
CEZINC	✓	✓	✓
KIDD OPERATIONS	✓	✓	✓

#### Aboriginal and Community Outreach Assessment



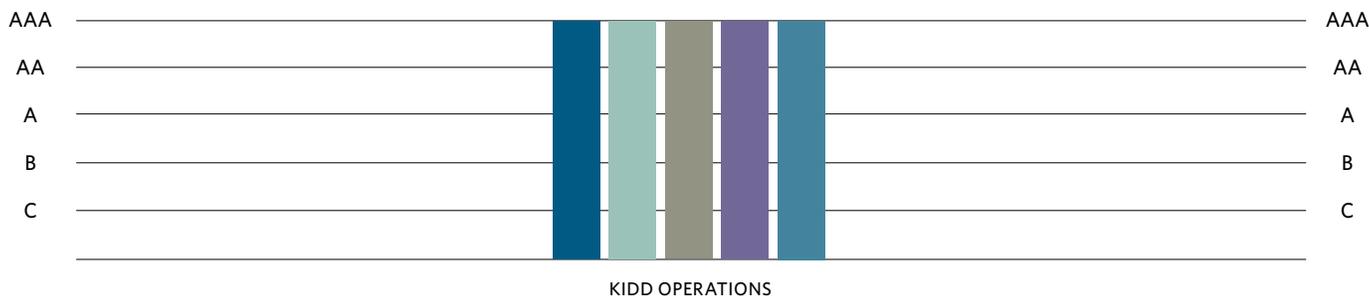
#### Safety and Health Assessment



## Tailings Management Assessment

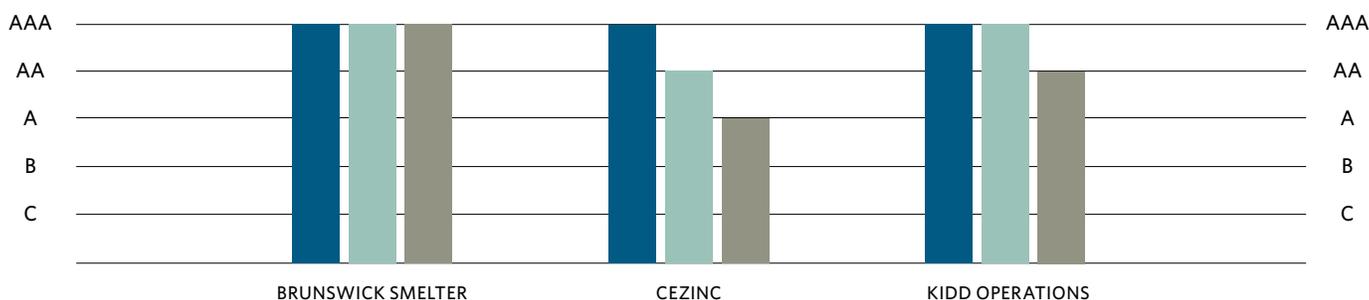
Externally  
Verified Results

- TAILINGS MANAGEMENT POLICY AND COMMITMENT
- TAILINGS MANAGEMENT SYSTEM
- ASSIGNED ACCOUNTABILITY AND RESPONSIBILITY FOR TAILINGS MANAGEMENT
- ANNUAL TAILINGS MANAGEMENT REVIEW
- OPERATION, MAINTENANCE AND SURVEILLANCE (OMS) MANUAL



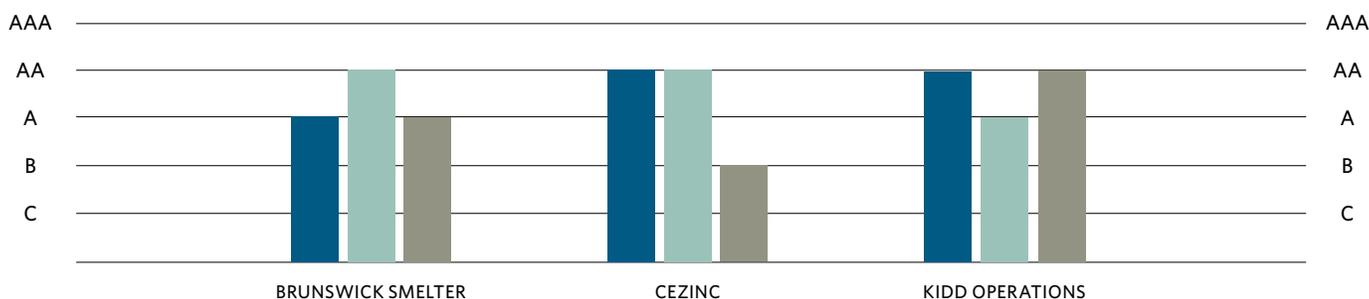
## Biodiversity Conservation Management Assessment

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- FACILITY-LEVEL BIODIVERSITY CONSERVATION PLANNING AND IMPLEMENTATION
- BIODIVERSITY CONSERVATION REPORTING



## Energy Use and GHG Emissions Management Assessment

- ENERGY USE AND GHG EMISSIONS MANAGEMENT SYSTEMS
- ENERGY USE AND GHG EMISSIONS REPORTING SYSTEMS
- ENERGY AND GHG EMISSIONS PERFORMANCE TARGETS



## TSM Performance by Company

### Hudbay Minerals Inc.



Hudbay is an integrated mining company that produces copper concentrate (containing copper, gold and silver) and zinc metal. The company is headquartered in Toronto, and is listed on the Toronto, New York and Lima stock exchanges under the symbol “HBM.” Hudbay has operating mines in Manitoba and the Cusco Region of Peru, and has a development project in Arizona.

Commodities advance and commodities decline. Demand and prices were both low for much of 2016. That’s the nature of mining. As a company, Hudbay focuses on what it can control – efficiency, sustainability and productivity – so when the cycle turns, the company is positioned to capitalize on it. That’s the nature of Hudbay. When Hudbay started in 1927, its operations were based in Manitoba and its primary market was North America. Today, the company is international and its market is global.

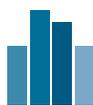
This report provides *TSM* performance results for the operating facilities located in Flin Flon and Snow Lake, Manitoba. The Manitoba Business Unit (MBU) maintained a Level A or higher (and “yes” in crisis management and communications planning) for all of the *TSM* indicators. The 2016 assessment was completed at the Constancia mine in Peru, and the results are included in the aggregate data published in this *TSM Progress Report*. Facility-level details will be disclosed for Constancia’s 2017 performance. Further validating Hudbay’s 2016 results for the *TSM Aboriginal and Community Outreach Protocol* was the company’s achievement of Progressive Aboriginal Relations (PAR) bronze certification from the Canadian Council for Aboriginal Business (CCAB). Additional details regarding the PAR program can be found in Hudbay’s corporate social responsibility (CSR) report, which is available on the company’s website.

Hudbay continued to work on its tailings governance program in 2016, in part to address the anticipated changes to the *TSM Tailings Management Protocol* and MAC’s tailings management guidance documents.

For 2017, Hudbay is again anticipating that its *TSM* performance results will be maintained at the MBU and that a minimum of Level A is achieved at Constancia in Peru.

🔗 For more information, please visit [www.hudbayminerals.com](http://www.hudbayminerals.com)





2016 TSM Results

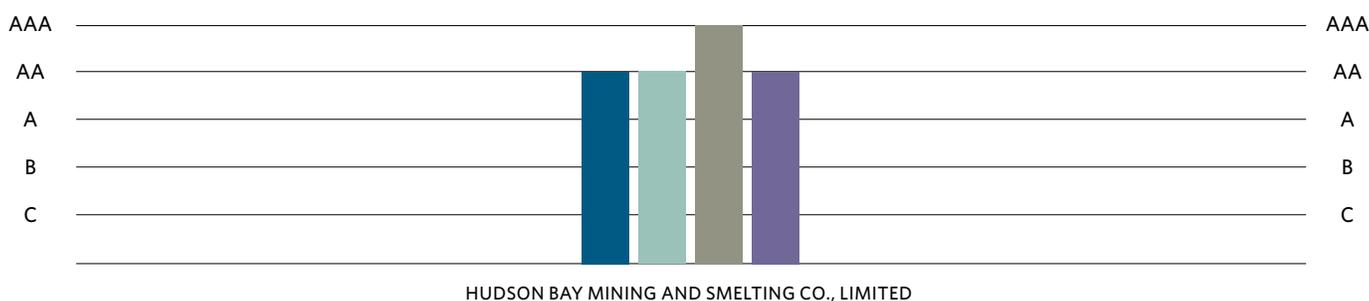
Hudbay Minerals Inc.

Crisis Management and Communications Planning Assessment

FACILITY	PREPAREDNESS	REVIEW	TRAINING
HUBBAY MINERALS INC	✓	✓	✓
HUDSON BAY MINING AND SMELTING CO., LIMITED	✓	✓	✓

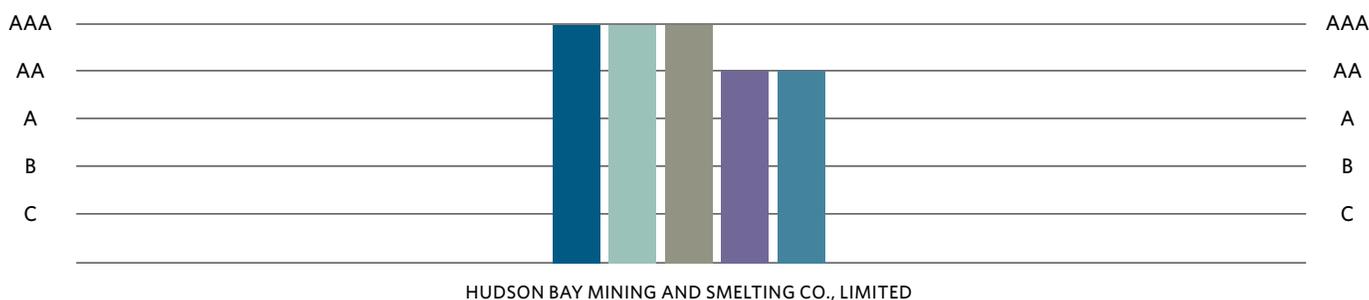
Aboriginal and Community Outreach Assessment

- COMMUNITY OF INTEREST (COI) IDENTIFICATION
- COI RESPONSE MECHANISM
- EFFECTIVE COI ENGAGEMENT AND DIALOGUE
- REPORTING



Safety and Health Assessment

- COMMITMENTS AND ACCOUNTABILITY
- MONITORING AND REPORTING
- PLANNING AND IMPLEMENTATION
- PERFORMANCE
- TRAINING, BEHAVIOUR AND CULTURE

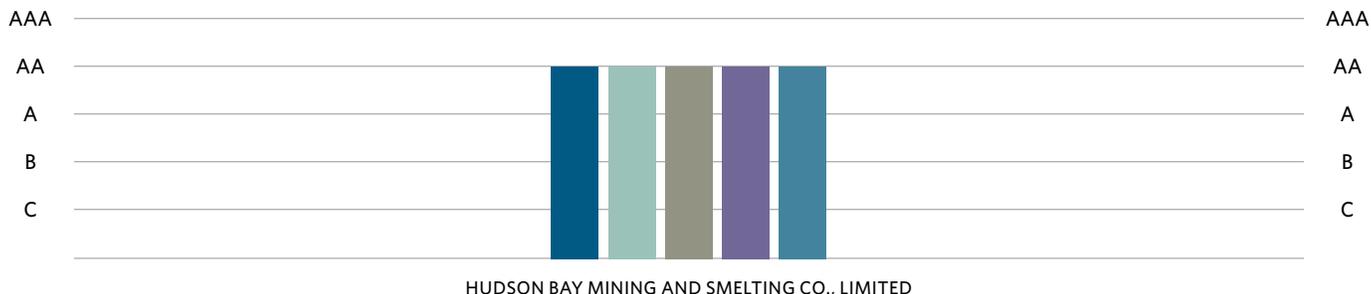


Self-assessed results; last external verification: 2015; next external verification: 2018.



## Tailings Management Assessment

- TAILINGS MANAGEMENT POLICY AND COMMITMENT
- TAILINGS MANAGEMENT SYSTEM
- ASSIGNED ACCOUNTABILITY AND RESPONSIBILITY FOR TAILINGS MANAGEMENT
- ANNUAL TAILINGS MANAGEMENT REVIEW
- OPERATION, MAINTENANCE AND SURVEILLANCE (OMS) MANUAL



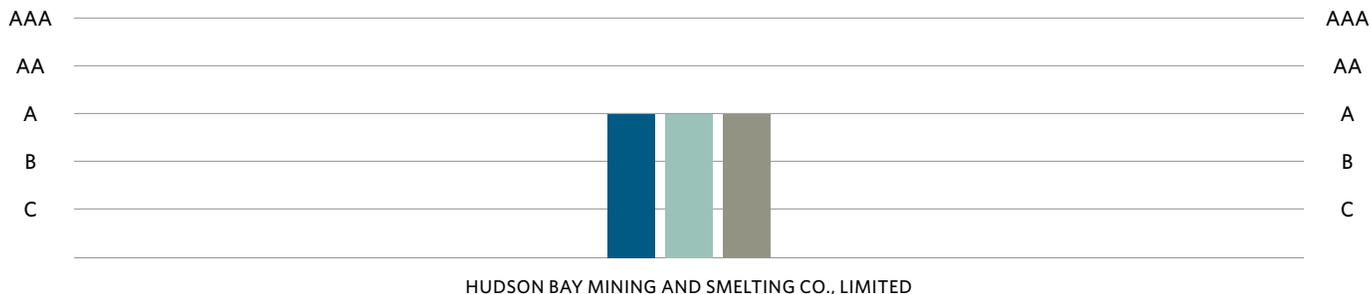
## Biodiversity Conservation Management Assessment

- CORPORATE BIODIVERSITY CONSERVATION POLICY, ACCOUNTABILITY AND COMMUNICATIONS
- FACILITY-LEVEL BIODIVERSITY CONSERVATION PLANNING AND IMPLEMENTATION
- BIODIVERSITY CONSERVATION REPORTING



## Energy Use and GHG Emissions Management Assessment

- ENERGY USE AND GHG EMISSIONS MANAGEMENT SYSTEMS
- ENERGY USE AND GHG EMISSIONS REPORTING SYSTEMS
- ENERGY AND GHG EMISSIONS PERFORMANCE TARGETS

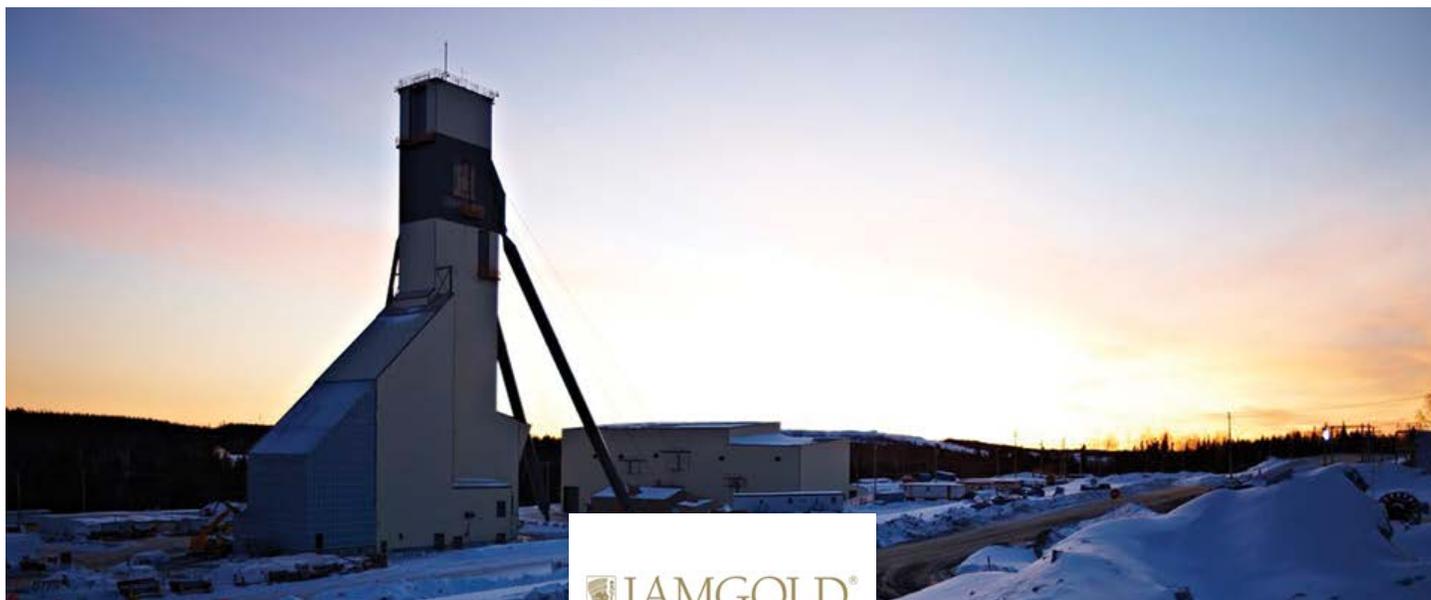


Self-assessed results; last external verification: 2015; next external verification: 2018.



## TSM Performance by Company

### IAMGOLD Corporation



IAMGOLD is a mid-tier mining company with four operating gold mines on three continents. A solid base of strategic assets in North and South America and West Africa is complemented by development and exploration projects and continued assessment of accretive acquisition opportunities. IAMGOLD is in a strong financial position with extensive management and operational expertise.

As part of its vision to achieve zero harm, IAMGOLD brings high standards of safety, environmental responsibility and social sensitivity to areas without a history of modern mining or exploration. IAMGOLD believes that partnering with employees, communities and host countries to build a healthy, safe and sustainable future is both the right thing to do and good business practice. The *TSM* initiative is strongly embedded in IAMGOLD's operating practices and pursuit of excellence.

Over the years, IAMGOLD has continued to strengthen the application of the *TSM* protocols. In 2015, *TSM* performance across IAMGOLD's operations was externally verified for the 2014 year and demonstrated an overall improvement from the previous year. In 2016, the company continued to show results that meet or exceed a Level A ranking across all six *TSM* protocols for IAMGOLD's three owner-operated operations: Westwood, Rosebel and Essakane.

Westwood is located in Quebec and began commercial production in 2014. IAMGOLD has included the mine in its *TSM* reporting since 2009. The Westwood Mine has minimized its overall environmental footprint by reducing the amount of newly disturbed land by using the former Doyon open pit for tailings storage. Westwood has also repurposed some of the former Doyon mine infrastructure for its operations.

In 2017, Rosebel and Essakane operations were selected as finalists for the *TSM Excellence Awards*, which celebrate leadership in sustainable mining practices through innovative approaches to environmental protection and community engagement.

Essakane works continuously to build capacity through various projects and initiatives in the mine's host communities in Burkina Faso. For example, a food support program focuses on building resiliency among vulnerable populations living near the mine.



The community and a local NGO worked together to develop the program, which helps to reduce the poverty of vulnerable individuals and their families and improves their food security over the long term.

Essakane has also undertaken innovative environmental projects that have resulted in significant benefits for communities near the mine. For example, IAMGOLD launched an initiative in 2014 to progressively rehabilitate a waste rock pile. From the outset, the community, government and development organizations were consulted and encouraged the project's implementation. Today, the site now provides pastureland potential for animal husbandry, which could improve the food and financial resources of the nearby communities.

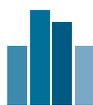
IAMGOLD's Rosebel operation is a leader in solar energy in Suriname as a result of the successful construction of a large 5-megawatt solar panel project and of smaller solar projects supporting local communities.

In 2012, IAMGOLD acquired the Côté Gold Project in northeastern Ontario. The project is located in the Chester and Neville Townships in the District of Sudbury. After receiving environmental assessment approvals at both the federal and provincial levels, IAMGOLD is continuing to assess the potential of constructing and operating a new open-pit gold mine on the property. If this project advances towards construction and development, IAMGOLD will incorporate it in future *TSM* reporting.

🔗 For more information, please visit [www.iamgold.com](http://www.iamgold.com)



IAMGOLD's Westwood Mine using the old Doyon Pit for their tailings and waste storage.



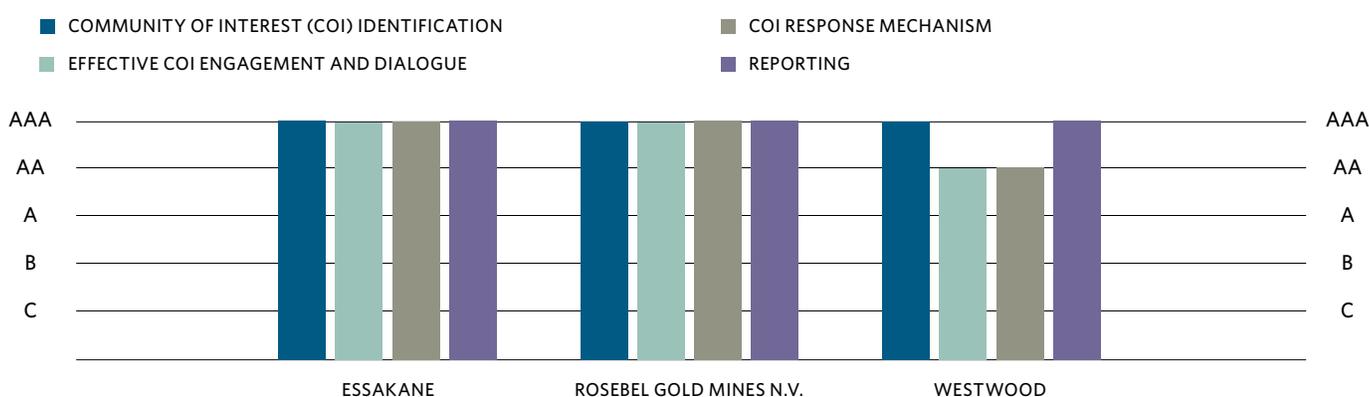
2016 TSM Results

IAMGOLD Corporation

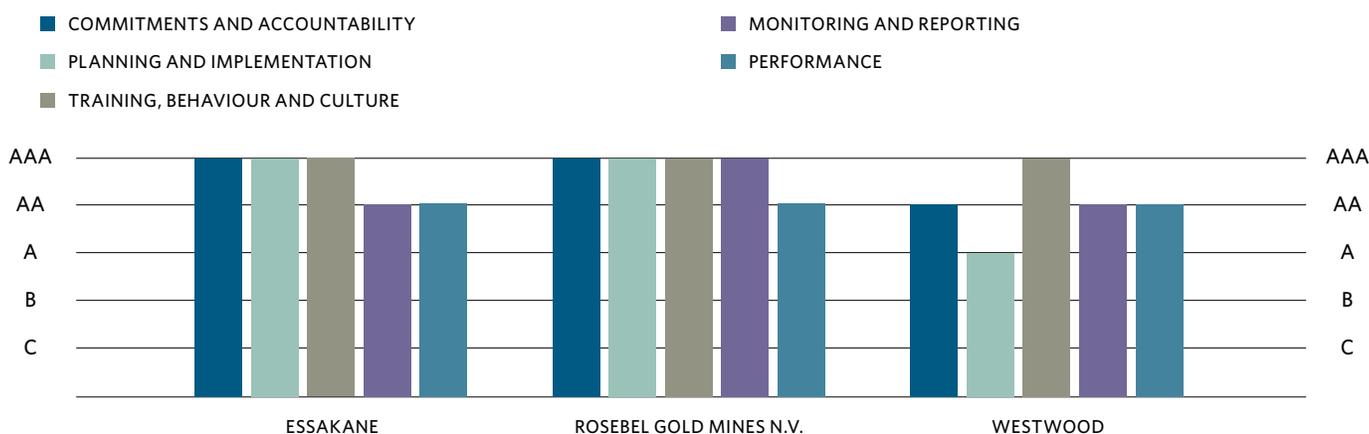
Crisis Management and Communications Planning Assessment

FACILITY	PREPAREDNESS	REVIEW	TRAINING
IAMGOLD CORPORATION	✓	✓	✗
ESSAKANE	✓	✓	✓
ROSEBEL GOLD MINES N.V.	✓	✓	✓
WESTWOOD	✓	✓	✓

Aboriginal and Community Outreach Assessment



Safety and Health Assessment



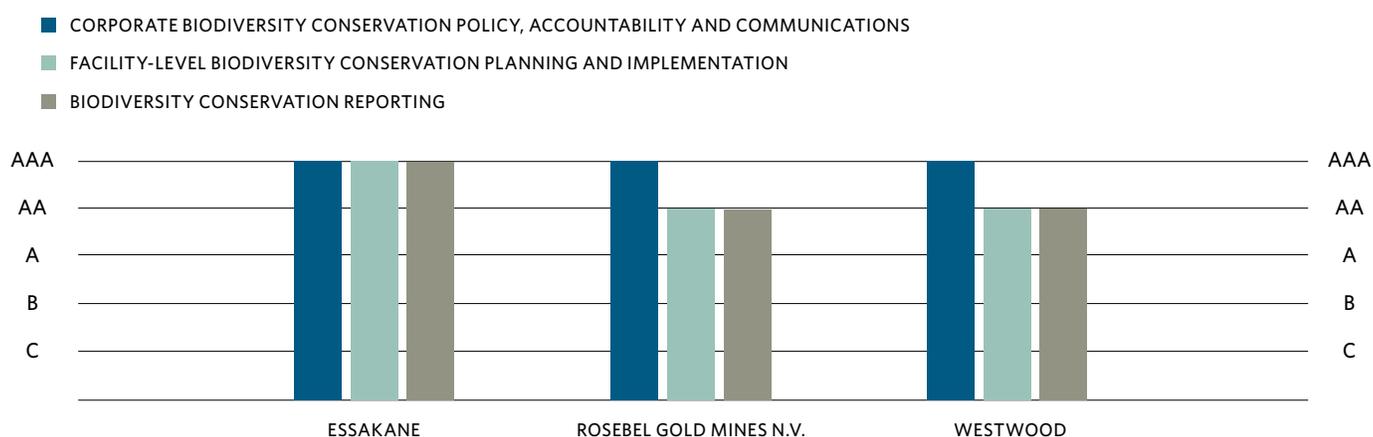
Self-assessed results; last external verification: 2014; next external verification: 2017.



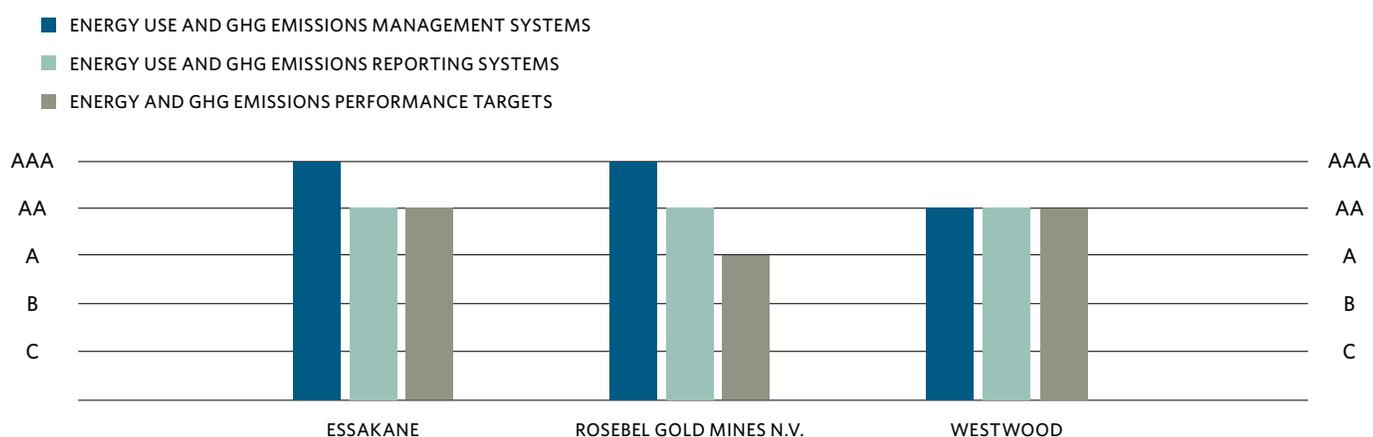
## Tailings Management Assessment



## Biodiversity Conservation Management Assessment



## Energy Use and GHG Emissions Management Assessment



Self-assessed results; last external verification: 2014; next external verification: 2017.



## TSM Performance by Company

### Imperial Metals Corporation



Imperial Metals Corporation (Imperial) is a BC mining company active in base and precious metal acquisition, exploration, development and mine operation. Imperial has three mine operations in BC producing copper and gold, with silver and molybdenum as by-products. Imperial's property portfolio includes Red Chris (100%), Mount Polley (100%), Huckleberry (50% interest, non-operating partner; currently under care and maintenance), Ruddock Creek (50% interest), and Sterling (100%) in Nevada.

#### MOUNT POLLEY MINE

Imperial's Mount Polley Mine, operated by Mount Polley Mining Corporation (MPMC), is an open-pit copper and gold mine with a developing underground project. It is located in south-central BC.

Following a period of care and maintenance from August 2014 to July 2015, the Mount Polley Mine returned to modified operations in August 2015 and transitioned into full operations in June 2016.

#### Aboriginal and Community Outreach

The Mount Polley Mine is in the traditional territory of the Soda Creek Indian Band (Xat'sūll First Nation) and the Williams Lake Indian Band. MPMC has participation agreements in place with both First Nations, and those agreements were the first to be completed by any mining company in the province at a brownfields site. The strong relationship between MPMC and its First Nation partner communities is reflected in Imperial's ratings for the *TSM Aboriginal and Community Outreach Protocol* and has been key to the successes achieved at the Mount Polley Mine.

#### Tailings Management

In the area of tailings management, MPMC maintained a Level A for all five indicators of this protocol. The facility is reviewing its tailings management system to ensure that it meets Level A requirements of the revised *TSM Tailings Management Protocol* and associated guidance documents.



### *Safety and Health*

MPMC's health and safety management system has a strong alignment with the *TSM Safety and Health Protocol*. For this protocol, MPMC has achieved a Level A or better for all five indicators.

### *Energy Use and GHG Emissions Management*

MPMC reports in accordance with the GHG requirements at both the provincial (mandatory) and federal (voluntary) levels. Integration of energy use and GHG emissions management systems into the operation represents a new focus area for MPMC, and this, along with not setting and achieving energy and GHG emissions performance targets limit the *TSM*-assessed level for this protocol to a Level C.

### *Crisis Management and Communications Planning*

MPMC does not have formalized crisis management plans at the facility or corporate levels (or corresponding sharing of these between parties) at this time, although site-level mine emergency response and tailings management emergency preparedness response plans are established and regularly tested. Initial-stage development of a crisis management plan at the corporate level is underway.

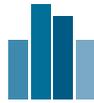
### *Biodiversity Conservation Management*

MPMC is committed to biodiversity conservation management, and has worked extensively with Aboriginal groups, COI, industry, government and the scientific community to pursue initiatives at Mount Polley. However, these initiatives do not meet *TSM*'s indicator requirements for improved scoring.

🔗 For more information, please visit [www.imperialmetals.com](http://www.imperialmetals.com)



Haul truck at Imperial Metals' Mount Polley mine.



2016 TSM Results

Imperial Metals Corporation



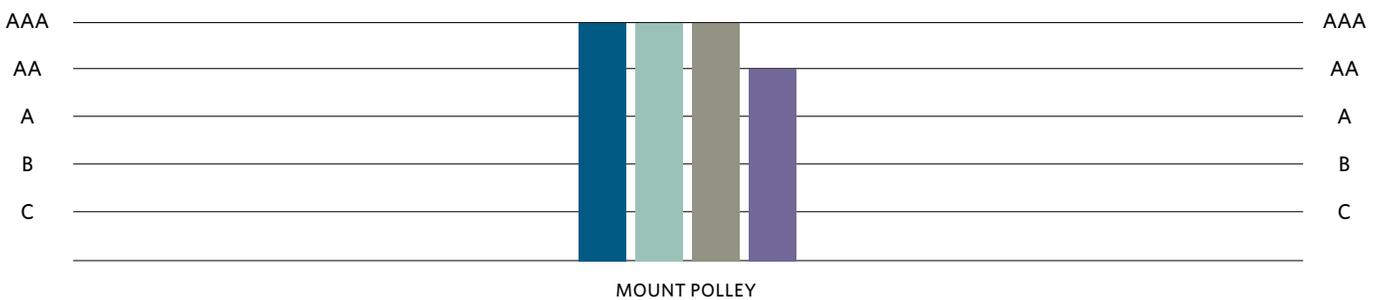
Crisis Management and Communications Planning Assessment

FACILITY	PREPAREDNESS	REVIEW	TRAINING
IMPERIAL METALS CORPORATION	×	×	×
MOUNT POLLEY	×	×	×



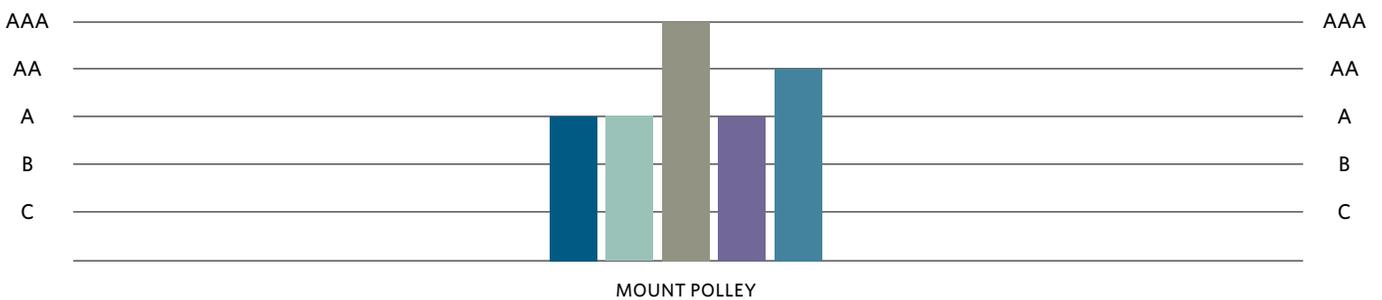
Aboriginal and Community Outreach Assessment

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- COI RESPONSE MECHANISM
- EFFECTIVE COI ENGAGEMENT AND DIALOGUE
- REPORTING



Safety and Health Assessment

- COMMITMENTS AND ACCOUNTABILITY
- PLANNING AND IMPLEMENTATION
- TRAINING, BEHAVIOUR AND CULTURE
- MONITORING AND REPORTING
- PERFORMANCE

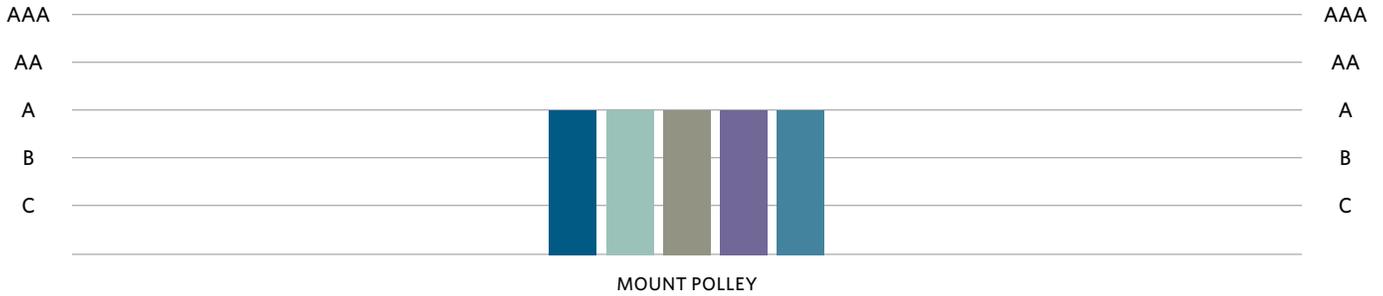


Self-assessed results; last external verification:2015; next external verification: 2018.



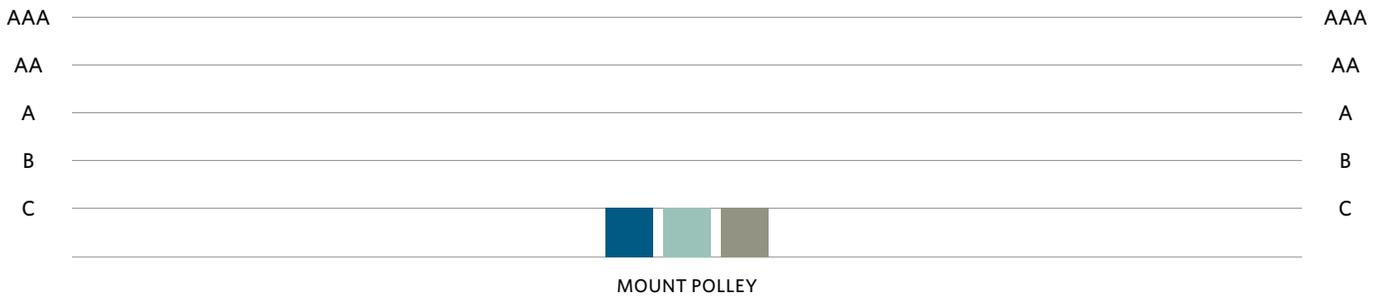
## Tailings Management Assessment

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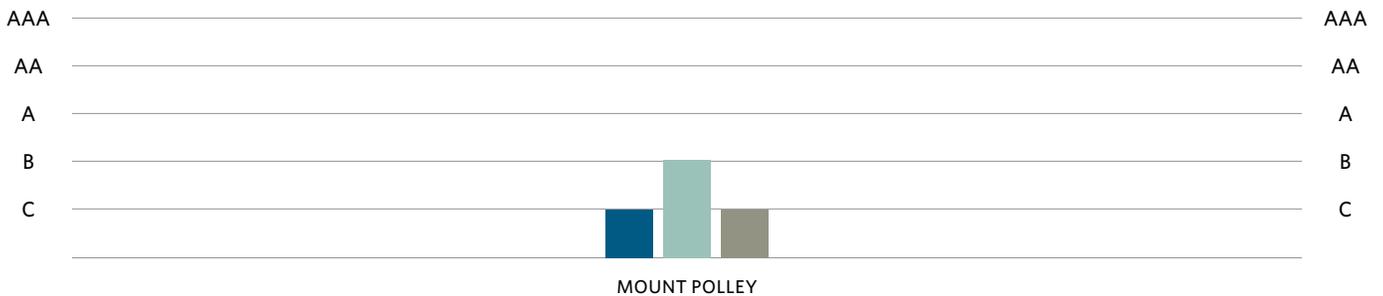
## Biodiversity Conservation Management Assessment

- CORPORATE BIODIVERSITY CONSERVATION POLICY, ACCOUNTABILITY AND COMMUNICATIONS
- FACILITY-LEVEL BIODIVERSITY CONSERVATION PLANNING AND IMPLEMENTATION
- BIODIVERSITY CONSERVATION REPORTING



## Energy Use and GHG Emissions Management Assessment

- ENERGY USE AND GHG EMISSIONS MANAGEMENT SYSTEMS
- ENERGY USE AND GHG EMISSIONS REPORTING SYSTEMS
- ENERGY AND GHG EMISSIONS PERFORMANCE TARGETS



Self-assessed results; last external verification:2015; next external verification: 2018.



## TSM Performance by Company

### KGHM International Ltd.



KGHM Polska Miedź S.A. is an innovative and globally diverse mining company headquartered in Lubin, Poland, that employs 33,000 people around the world. KGHM is among the top copper and silver producers. The company has been conducting advanced geological, mining and metallurgical activities for over 55 years. It boasts a geographically diversified portfolio of mining projects. Its facilities are located on three continents - Europe, North America and South America. KGHM International Ltd. (KGHMI) is a wholly owned subsidiary of KGHM Polska Miedź S.A. and is based in Vancouver, British Columbia.

KGHMI's operating assets (held through its subsidiaries) are located in Canada (Morrison), the United States (Robinson and Carlota) and Chile (Franke and Sierra Gorda, a 55% joint venture). Development projects include Ajax and Victoria (Canada) and Sierra Gorda Oxide (Chile).

KGHM is committed to sustainable development from exploration through closure and reclamation. In early 2017, the KGHM group published a revised strategy for 2017 to 2021, with an outlook to 2040. The company will be developing a sustainability system with a focus on optimum, efficient and rational use of natural resources. KGHM will achieve growth by implementing actions in three key areas of significance for sustainable development:

- **Technical and economic:** through employee safety and rational economic efficiency supported by state-of-the-art technologies
- **Ecological:** through minimizing the negative impact on the natural environment
- **Social:** through cooperation and partnerships with local communities of interest

KGHM operations are carried out in accordance with the highest environmental standards and regulations. The company joined MAC in late 2013.

The implementation of *TSM* is carried out in the Sudbury facility, which includes the Morrison mine and the Victoria project. In 2016, the KGHM group adopted a Corporate Social Responsibility (CSR) Strategy, with objectives that are aligned with the *TSM* framework. This will enable gradual *TSM* integration at KGHMI's operating assets outside of Canada.

While recognizing that there is always opportunity for improvement, KGHM is proud of its progress towards achieving a Level A or greater for 13 of the 15 indicators applicable to the Sudbury facility. Sudbury does not operate a tailings storage facility and, therefore, does not self-assess against the *TSM Tailings Management Protocol* indicators.

### SAFETY AND HEALTH

KGHMI developed a new Health, Safety and Environment (HSE) Strategic Plan in 2016. The plan focuses on minimizing operational risk through the development and implementation of a corporate integrated HSE management system. The HSE management system was developed in 2016 and is being implemented in 2017. It will serve as a standard for existing site and project HSE management systems, and a template for those sites that do not already have a formal HSE management system. The primary focus of this effort is risk management. Sites and projects have begun a more systematic assessment of HSE risks beyond what is required for regulatory compliance.

### ABORIGINAL AND COMMUNITY OUTREACH

The company recognizes the importance of building constructive Aboriginal and stakeholder relations. Over the years, KGHMI has developed formal programs to ensure that dialogue is maintained with communities of interest. This dialogue is important to ensure that trust is maintained, opportunities to share value are identified, and the company's overall performance in Aboriginal and community outreach is improved. Stakeholder identification, prioritization and subsequent engagement at the Sudbury facility and the Ajax project are based on the *TSM Aboriginal and Community Outreach Protocol* and the International Council on Mining and Metals' Community Development Toolkit. The company is committed to transparently reporting on performance through various channels, including the annual sustainability reports prepared according to the Global Reporting Initiative (GRI 4.0) and the International Integrated Reporting Framework. Reports are available on the company's website.

### ENERGY USE AND GHG EMISSIONS MANAGEMENT

The Sudbury facility has developed a formal system to manage energy usage and emissions outputs. Although the facility had an overall energy intensity and CO<sub>2</sub> equivalent reduction from the previous year, the established targets were not met. In 2017, more realistic targets will be established to drive efficiency.

### BIODIVERSITY CONSERVATION MANAGEMENT

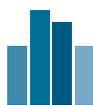
In 2016, KGHMI revised its environmental policy to demonstrate senior management's commitment to biodiversity conservation management. A formal biodiversity conservation management plan has been implemented at the facility level. The Sudbury facility has ongoing regional, provincial and national partnerships in this management area. One example is the partnership with the City of Greater Sudbury's Land Reclamation Program, where forest floor mats from the Victoria and Podolsky properties were donated to act as seed sources in areas of low biodiversity.

### CRISIS MANAGEMENT AND COMMUNICATIONS PLANNING

While KGHMI strives to avoid all crises, this is not always possible. Some crises are externally imposed and occur in spite of a company's best intentions for prediction and prevention. Therefore, KGHMI recognizes that crisis preparedness is a critical component of operating. In 2016, both the corporate and facility-level crisis preparedness plans were reviewed and revised. In 2017, the plans and their associated communication systems will be tested for effectiveness and to ensure that key personnel understand the established processes. These actions will substantially improve both corporate and facility-level performance in 2017 under the *TSM Crisis Management and Communications Planning Protocol*.

🔗 For more information, please visit [www.kghm.com/en/sustainable-development](http://www.kghm.com/en/sustainable-development)





2016 TSM Results

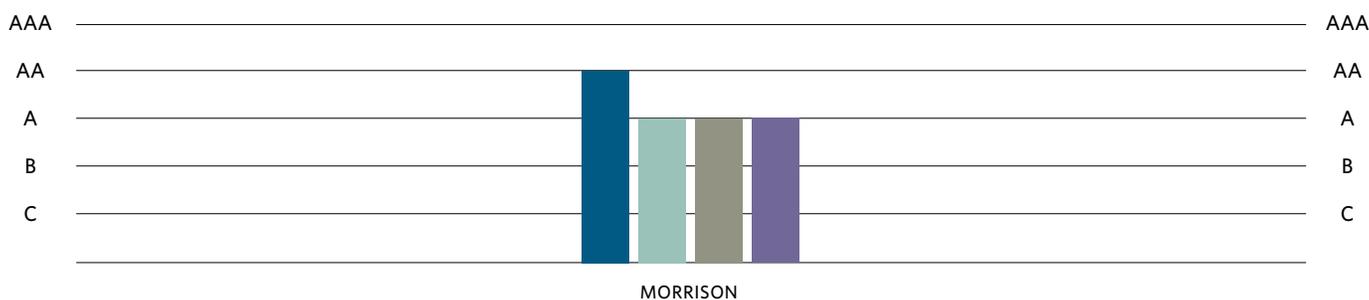
KGHM International Ltd.

Crisis Management and Communications Planning Assessment

FACILITY	PREPAREDNESS	REVIEW	TRAINING
KGHM INTERNATIONAL LTD.	×	×	×
MORRISON	×	×	×

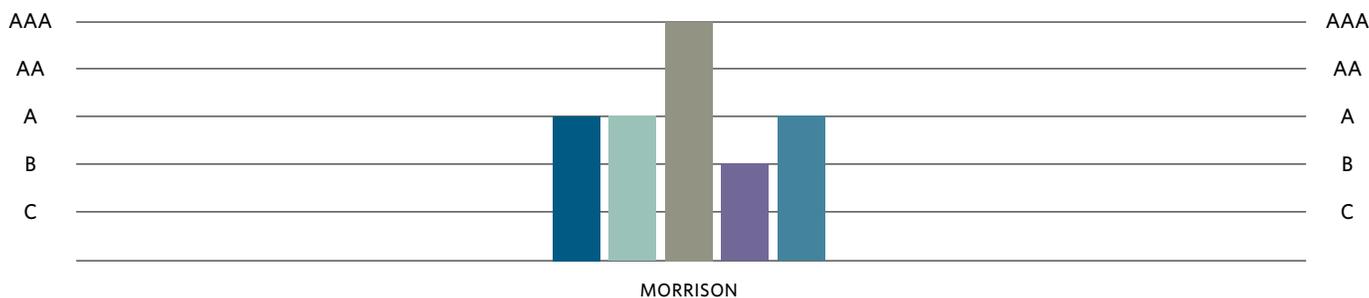
Aboriginal and Community Outreach Assessment

- COMMUNITY OF INTEREST (COI) IDENTIFICATION
- EFFECTIVE COI ENGAGEMENT AND DIALOGUE
- COI RESPONSE MECHANISM
- REPORTING



Safety and Health Assessment

- COMMITMENTS AND ACCOUNTABILITY
- PLANNING AND IMPLEMENTATION
- TRAINING, BEHAVIOUR AND CULTURE
- MONITORING AND REPORTING
- PERFORMANCE

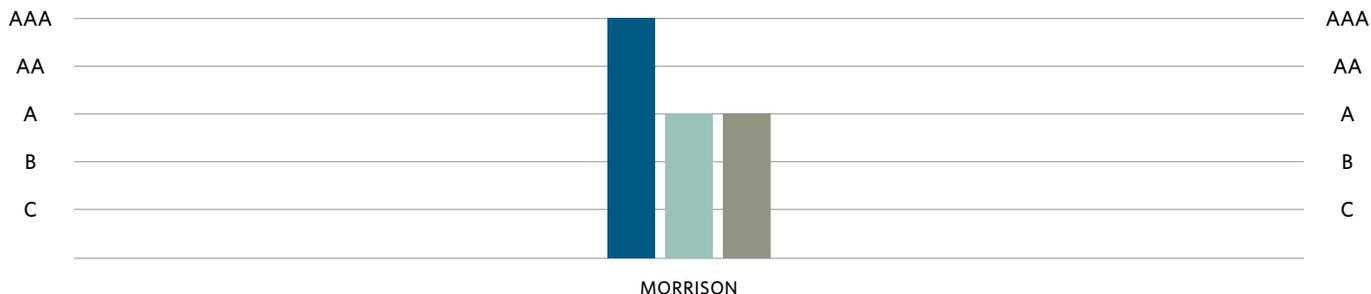


Self-assessed results; first external verification is scheduled for 2017.



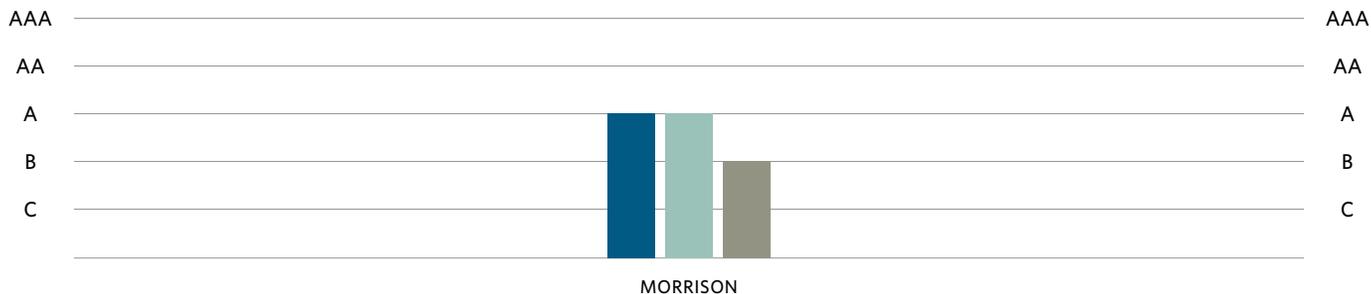
## Biodiversity Conservation Management Assessment

- CORPORATE BIODIVERSITY CONSERVATION POLICY, ACCOUNTABILITY AND COMMUNICATIONS
- FACILITY-LEVEL BIODIVERSITY CONSERVATION PLANNING AND IMPLEMENTATION
- BIODIVERSITY CONSERVATION REPORTING



## Energy Use and GHG Emissions Management Assessment

- ENERGY USE AND GHG EMISSIONS MANAGEMENT SYSTEMS
- ENERGY USE AND GHG EMISSIONS REPORTING SYSTEMS
- ENERGY AND GHG EMISSIONS PERFORMANCE TARGETS

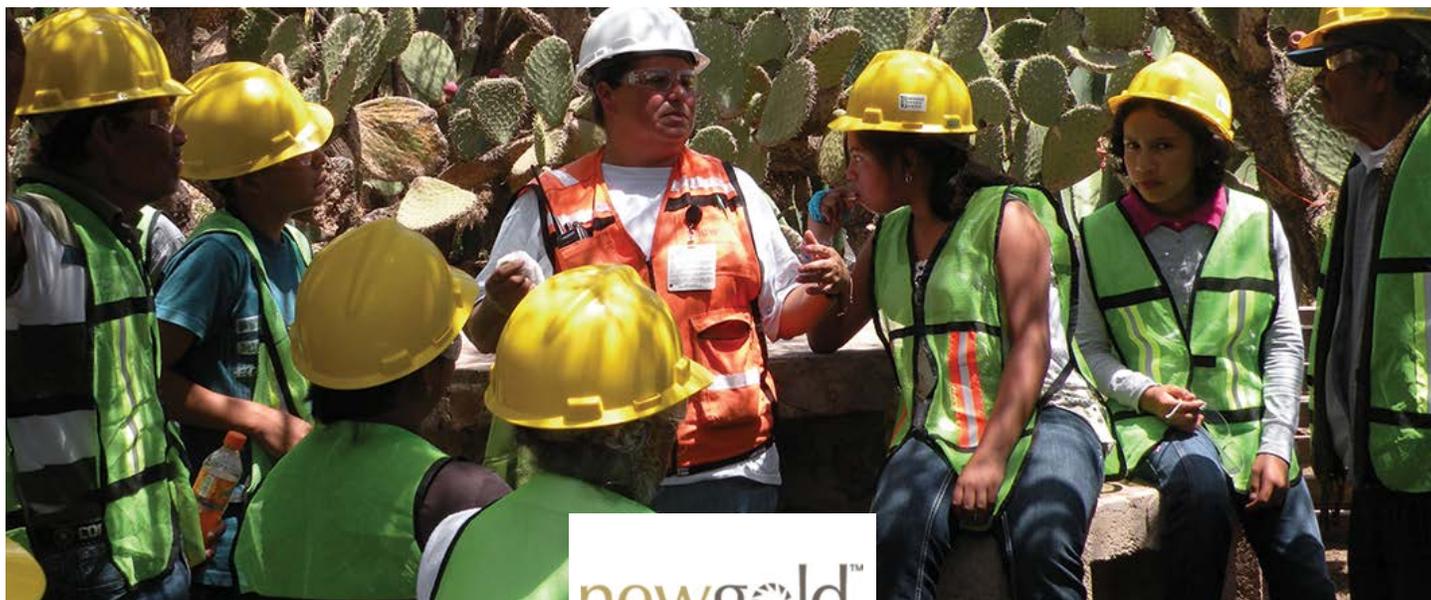


Self-assessed results; first external verification is scheduled for 2017.



## TSM Performance by Company

### New Gold Inc.



New Gold is an intermediate gold producer with operating mines in Canada (New Afton Mine), the United States (Mesquite Mine), Australia (Peak Mines) and Mexico (Cerro San Pedro Mine). In addition, New Gold's principal development projects are its 100% owned Rainy River and Blackwater projects, which are both in Canada.

New Gold is committed to excellence in corporate social responsibility. The company considers its ability to make a lasting and positive contribution to host communities a key driver in achieving a productive and profitable business. New Gold contributes to sustainable development by ensuring it understands how its activities impact communities and the environment, and works to mitigate them. This approach is applied throughout the mining life cycle, from early exploration through development and operation, to decommissioning and mine closure.

New Gold is committed to positively contributing to the mining industry. It is a member of the World Gold Council, Business for Social Responsibility, the Mining Association of Canada, the Prospectors and Developers Association of Canada, the Ontario Mining Association, and the Mining Association of British Columbia. The company is also a member of the Mexican Mining Chamber, the Canadian Chamber of Commerce in Mexico, and the American Exploration and Mining Association in the United States.

New Gold is committed to achieving the highest possible level of performance for safety, environmental protection and sustainable community development. This commitment drives New Gold to seek out those standards, protocols and performance indicators that assist its people in achieving these goals. As a result, New Gold has adopted standards such as the International Cyanide Management Code and the United Nations Global Compact's 10 principles on human rights, labour standards, the environment and anti-corruption. New Gold has also attained ISO 14001 environmental management certification for two of its four operations, and follows the guidelines of the Global Reporting Initiative and the Carbon Disclosure Project to ensure relevant information is shared with its communities of interest.

New Gold has incorporated *TSM*'s requirements into both its Environmental Standards and its Community Engagement and Development Management Standards. These standards ensure that *TSM* principles are applied at all New Gold operations, in Canada and abroad.

New Afton enthusiastically adopted *TSM* protocols, in addition to implementing ISO 14001, as it moved from the project development phase through commissioning and into production in July 2012. This is New Afton's fourth year of *TSM* reporting.

To demonstrate its continuing commitment to transparency and to the *TSM* program, New Gold had its results externally verified this year even though it was not required to do so. The company elected to verify the results to ensure that progress had been made in areas important to its local communities and First Nations partners.

Managed Process Consulting Inc. completed the verification report for Cerro San Pedro, which assessed the facility's reported *TSM* performance results against the *TSM* performance indicators. The scope of the review included the company's *TSM* verification processes for the following *TSM* protocols: *Tailings Management, Energy Use and GHG Emissions Management, Biodiversity Conservation Management, Aboriginal and Community Outreach, Safety and Health, and Crisis Management and Communications Planning*. The review was conducted in accordance with generally accepted standards, consisting primarily of interviews, data analysis, and examination of other evidence relevant to management's assertion of conformance to the requirements of the *TSM* performance indicators.

New Gold's results in 2016 showed continual improvement from its 2015 results. Notably, New Afton achieved significant success in the area under Tailings Management – a key area of interest to its neighbours and First Nations partners. The company also maintained or improved its results Under the *TSM* protocols *Biodiversity Conservation Management, Aboriginal and Community Outreach, and Energy Use and GHG Emissions Management*.

New Afton hosted its first Independent Tailings Review Board meeting within New Gold. This group consists of experts in geotechnical engineering, hydrology and geochemistry, and provides additional peer review as well as corporate oversight on the operation's tailings facilities. This increased diligence ensures that its structures are safe by ensuring that risks are understood, studied and mitigated.

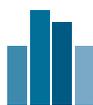
To meet the requirements of the *TSM Aboriginal and Community Outreach Protocol*, New Afton has successfully developed a partnership agreement with the Skeetchestn Indian Band and the Tk'emlúps te Secwépemc. New Afton has also been recognized with several awards in this area, such as the Mining Association of British Columbia's 2011 Mining and Sustainability Award, the 2012 Corporate Champion for Aboriginal Business Award, and the 2013 British Columbia Mining Human Resources Diversity Award. In 2016, New Afton met its targets and achieved a Level AA or AAA in all of the performance indicators within the *TSM Aboriginal and Community Outreach Protocol*.

In 2013, New Afton made significant progress towards achieving its vision of sustainable energy management. In early 2014, it became the first mine in North America to be certified under ISO 50001 (for energy management systems). During 2015, as a result of New Afton's energy management system, the facility was able to achieve energy savings that reduced not only costs but also GHG emissions. Further savings are expected in the near future.

All of New Gold's sites (both Canadian and international) were assessed in 2015 against the protocols.

🔗 For more information, please visit [www.newgold.com](http://www.newgold.com)





Externally  
Verified Results

## 2016 TSM Results

### New Gold Inc.

#### Crisis Management and Communications Planning Assessment

FACILITY	PREPAREDNESS	REVIEW	TRAINING
NEW GOLD INC.	✓	✓	✓
NEW AFTON MINE	✓	✓	✓
CERRO SAN PEDRO	✓	✓	✓
PEAK GOLD MINE	✓	✓	✓
WESTERN MESQUITE MINE	✓	✗	✗

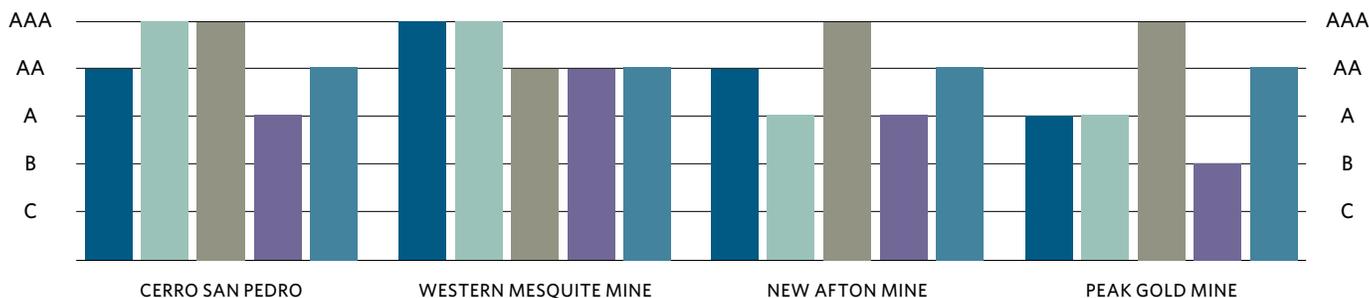
#### Aboriginal and Community Outreach Assessment

- COMMUNITY OF INTEREST (COI) IDENTIFICATION
- EFFECTIVE COI ENGAGEMENT AND DIALOGUE
- COI RESPONSE MECHANISM
- REPORTING



#### Safety and Health Assessment

- COMMITMENTS AND ACCOUNTABILITY
- PLANNING AND IMPLEMENTATION
- TRAINING, BEHAVIOUR AND CULTURE
- MONITORING AND REPORTING
- PERFORMANCE



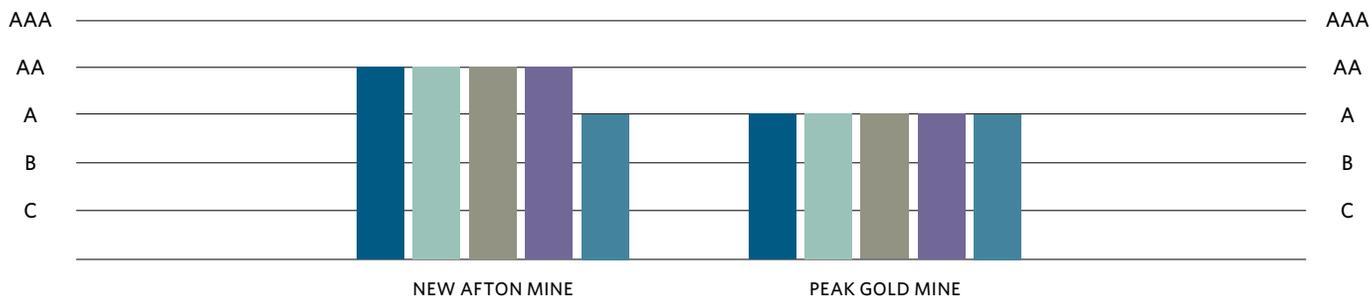
New Gold externally verifies its facilities on a rotating basis. In 2016, Cerro San Pedro was externally verified. In 2015, New Afton and the corporate office were externally verified. The results for Peak Gold Western Mesquite are based on self-assessments.



## Tailings Management Assessment

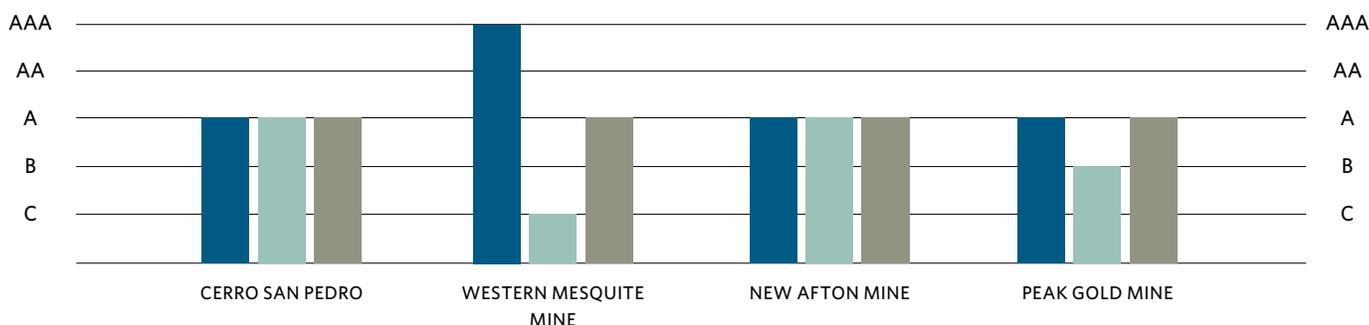
Externally Verified Results

- TAILINGS MANAGEMENT POLICY AND COMMITMENT
- TAILINGS MANAGEMENT SYSTEM
- ASSIGNED ACCOUNTABILITY AND RESPONSIBILITY FOR TAILINGS MANAGEMENT
- ANNUAL TAILINGS MANAGEMENT REVIEW
- OPERATION, MAINTENANCE AND SURVEILLANCE (OMS) MANUAL



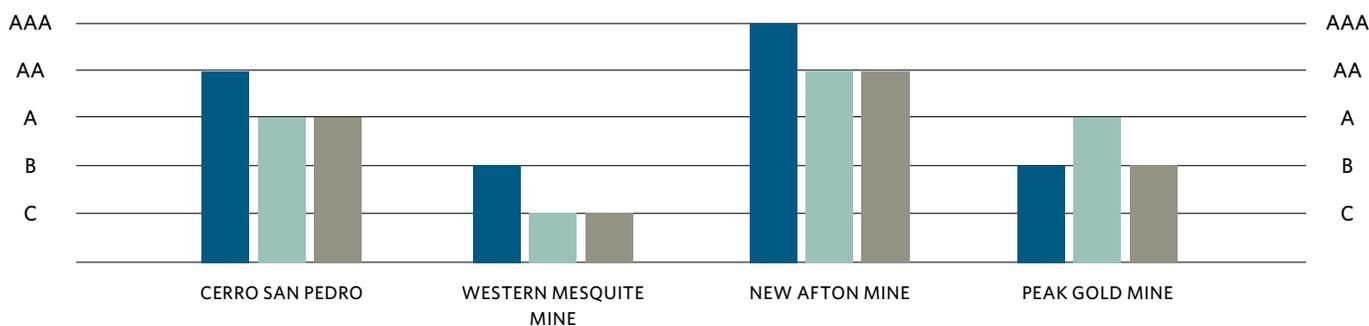
## Biodiversity Conservation Management Assessment

- CORPORATE BIODIVERSITY CONSERVATION POLICY, ACCOUNTABILITY AND COMMUNICATIONS
- FACILITY-LEVEL BIODIVERSITY CONSERVATION PLANNING AND IMPLEMENTATION
- BIODIVERSITY CONSERVATION REPORTING



## Energy Use and GHG Emissions Management Assessment

- ENERGY USE AND GHG EMISSIONS MANAGEMENT SYSTEMS
- ENERGY USE AND GHG EMISSIONS REPORTING SYSTEMS
- ENERGY AND GHG EMISSIONS PERFORMANCE TARGETS



New Gold externally verifies its facilities on a rotating basis. In 2016, Cerro San Pedro was externally verified. In 2015, New Afton and the corporate office were externally verified. The results for Peak Gold Western Mesquite are based on self-assessments.



## TSM Performance by Company

### Nyrstar



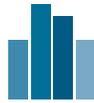
Nyrstar is a global multi-metals business with market-leading positions in zinc and lead, and growing positions in other base and precious metals. Nyrstar employs approximately 4,200 people and has mining, smelting and other operations located in the Americas, Australia and Europe. Its operations include two mines located in Canada: Myra Falls in British Columbia and Langlois in Quebec. The company's corporate office is located in Zurich, Switzerland.

At Nyrstar, sustainability is viewed as a key driver of business success, and the company is committed to working with its stakeholders to achieve continual improvement in safety, health, environment and community (SHEC) performance. Nyrstar's Group SHEC Management Framework sets the direction for all SHEC activities and establishes a common approach to the management of SHEC risks at Nyrstar's sites. The framework is aligned with ISO 14001 and OHSAS 18001, and many of Nyrstar's sites are certified to these standards. The TSM performance protocols help Nyrstar's Canadian sites address key safety, health and environmental risks and processes, and TSM requirements are integrated into the sites' SHEC management systems.

The Myra Falls and Langlois operations joined Nyrstar in 2011 as part of the acquisition of Breakwater Resources. Nyrstar Myra Falls is an underground base metal mine located on Vancouver Island, 90 kilometres southwest of Campbell River. The mine's location inside Strathcona Provincial Park presents unique challenges that heighten the importance of robust environmental and community management programs. The Myra Falls operation has been on care and maintenance since 2015. As TSM applies to operating facilities, public reporting of TSM performance will resume once the mine begins production activities again. In the meantime, the mine is working to address gaps identified during its internal self-assessment. The Langlois mine is located in northwest Quebec near the town of Lebel-sur-Quévillon. Following a period of care and maintenance, the mine resumed commercial production in 2012 and has been reporting TSM results publicly since 2015. The results of the 2015 and 2016 self-assessments revealed several improvement opportunities across Langlois' crisis management, safety and health, environmental and community management systems. These opportunities are being addressed through prioritized action plans, training and other efforts aimed at strengthening the SHEC performance of the site.

For more information, please visit [www.nyrstar.com](http://www.nyrstar.com)





2016 TSM Results

Nyrstar



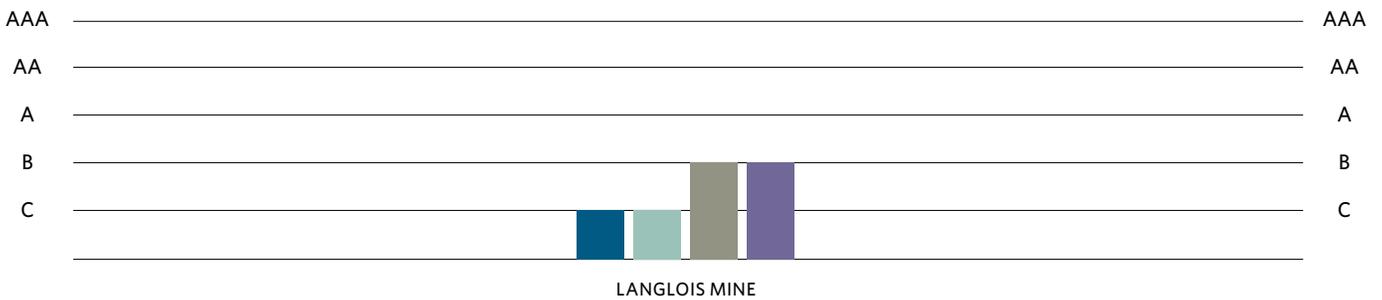
Crisis Management and Communications Planning Assessment

FACILITY	PREPAREDNESS	REVIEW	TRAINING
NYRSTAR	×	×	×
LANGLOIS MINE	×	×	×



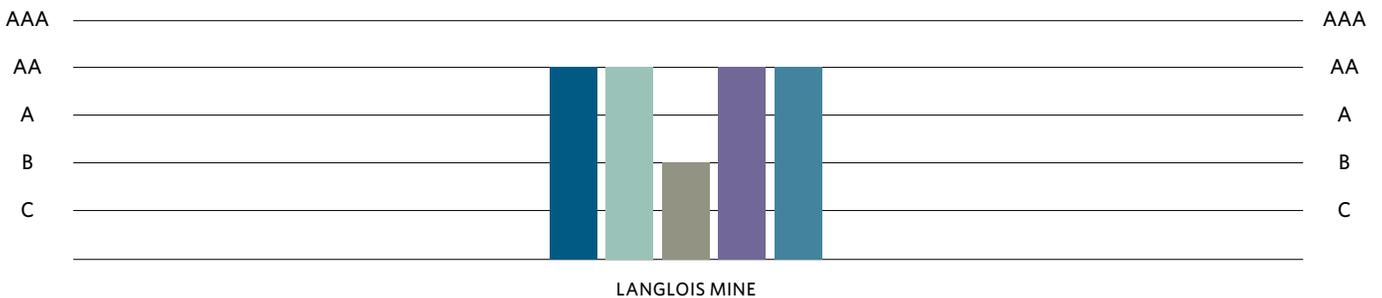
Aboriginal and Community Outreach Assessment

- COMMUNITY OF INTEREST (COI) IDENTIFICATION
- COI RESPONSE MECHANISM
- EFFECTIVE COI ENGAGEMENT AND DIALOGUE
- REPORTING



Safety and Health Assessment

- COMMITMENTS AND ACCOUNTABILITY
- PLANNING AND IMPLEMENTATION
- TRAINING, BEHAVIOUR AND CULTURE
- MONITORING AND REPORTING
- PERFORMANCE

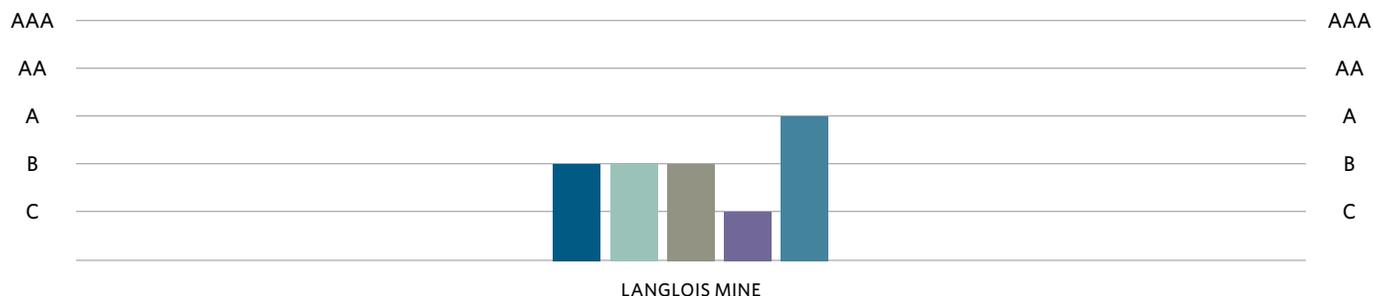


Self-assessed results.  
 Nyrstar was scheduled to externally verify 2016 performance for Langlois. However, external verification has been deferred until 2017.



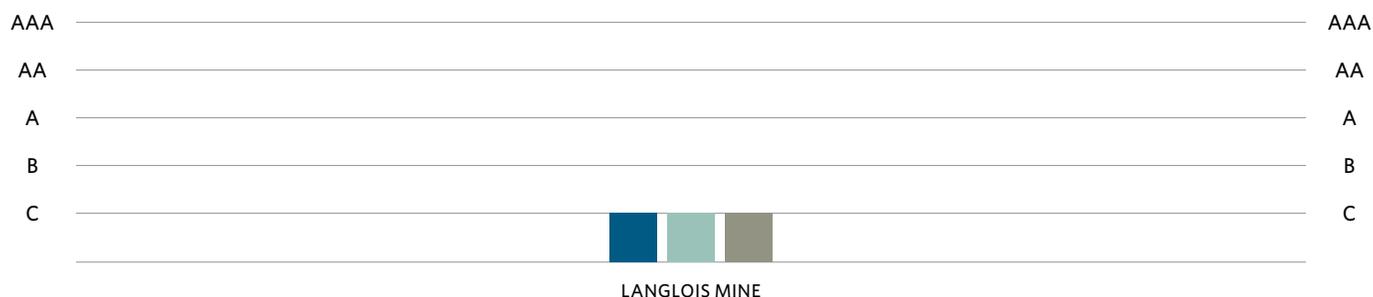
## Tailings Management Assessment

- TAILINGS MANAGEMENT POLICY AND COMMITMENT
- TAILINGS MANAGEMENT SYSTEM
- ASSIGNED ACCOUNTABILITY AND RESPONSIBILITY FOR TAILINGS MANAGEMENT
- ANNUAL TAILINGS MANAGEMENT REVIEW
- OPERATION, MAINTENANCE AND SURVEILLANCE (OMS) MANUAL



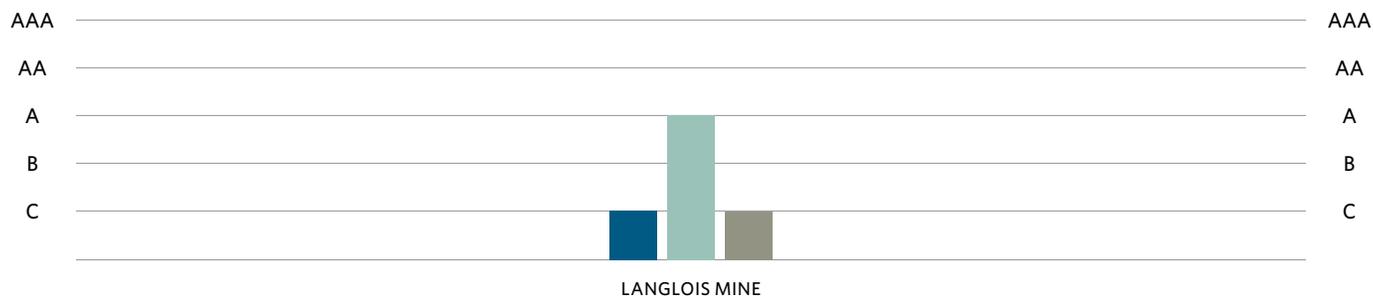
## Biodiversity Conservation Management Assessment

- CORPORATE BIODIVERSITY CONSERVATION POLICY, ACCOUNTABILITY AND COMMUNICATIONS
- FACILITY-LEVEL BIODIVERSITY CONSERVATION PLANNING AND IMPLEMENTATION
- BIODIVERSITY CONSERVATION REPORTING



## Energy Use and GHG Emissions Management Assessment

- ENERGY USE AND GHG EMISSIONS MANAGEMENT SYSTEMS
- ENERGY USE AND GHG EMISSIONS REPORTING SYSTEMS
- ENERGY AND GHG EMISSIONS PERFORMANCE TARGETS



Self-assessed results.  
 Nyrstar was scheduled to externally verify 2016 performance for Langlois. However, external verification has been deferred until 2017.



## TSM Performance by Company

### Rio Tinto



Rio Tinto is a leading mining group that focuses on finding, mining and processing the Earth's mineral resources. As a pioneer in mining and metals, Rio Tinto produces materials essential for human progress: aluminium, copper, diamonds, gold, iron ore, coal, uranium and various industrial minerals, including titanium dioxide. The company's activities span the world, notably in Australia and Canada. Rio Tinto also has significant businesses in the United States, Asia, Europe, Africa and South America.

Rio Tinto is headquartered in the United Kingdom, combining Rio Tinto plc, a London and New York Stock Exchange-listed company, and Rio Tinto Limited, which is listed on the Australian Securities Exchange.

In Canada, Rio Tinto operates 35 sites across seven jurisdictions, with approximately 15,000 people working for the company across the country. Its investments have been focused on improving health and safety and environmental performance, advancing innovative technologies and supporting community development. The company's Canadian assets that currently report on TSM performance include the Iron Ore Company of Canada (IOC), the Diavik Diamond Mine, and Rio Tinto Fer et Titane (RTFT).

- IOC is a leading Canadian producer of iron ore pellets and concentrate that serves customers worldwide. IOC has a workforce of 2,500 and is the largest private-sector employer in Newfoundland and Labrador. IOC is a joint venture of Rio Tinto, Mitsubishi Corporation and Labrador Iron Ore Royalty Corporation. The company operates a mine, a concentrator and a pelletizing plant in Labrador City, as well as port facilities in Sept-Îles, Quebec. It also operates a 418-kilometre railway that links the mine to the port.
- IOC maintains its commitment to environmental stewardship through programs such as tailings rehabilitation and mine-dust suppression, and through air quality monitoring. Working directly with the community is an integral part of IOC's culture. In 2016, IOC joined Rio Tinto operations across the globe in introducing Critical Risk Management to the broader workplace, including employees at all levels.



Employees and key stakeholders made a significant contribution in 2016 to further reduce costs and increase productivity, laying the foundation for future growth. In early 2017, IOC announced it would be proceeding with the Wabush 3 project, which will extend the life of the mine.

- The Diavik Diamond Mine in the Northwest Territories is a joint venture between Rio Tinto (60%) and Dominion Diamond Corporation (40%). Diavik began producing in 2003, and has an annual production of six to seven million carats of predominantly large, white gem-quality diamonds. Diavik has been recognized for its efforts and successes in providing socio-economic benefits to local Indigenous communities over the last 17 years. Since 2000, Diavik has spent \$5.2 billion on northern businesses, or 72% of the company's total business expenditures. Half of its northern expenditures has supported northern Indigenous businesses and their joint ventures.

Diavik employs 1,187 people (as of 2016). Of these, 557 are non-Indigenous northerners and 233 are Indigenous northerners. In 2016, Diavik supported 31 apprentices: 21 northern Indigenous students and 10 non-Indigenous students from local communities. Diavik maintains a strong relationship with its community partners and is committed to supporting sustainable northern and Indigenous economic development, with a focus on improving the quality of life for local residents. It does so through direct support for local businesses and a continued commitment to training and innovation.

In May 2016, Diavik announced a major milestone: the production of 100 million carats of rough diamonds since its start in 2003. In 2016, Diavik continued to focus on the construction of its fourth ore body, A21, as well ongoing closure planning with community stakeholders.

- RTFT, which is wholly owned by Rio Tinto, operates a world-class ilmenite deposit at Lac Tio near Havre-Saint-Pierre, Quebec. RTFT is one of the leading manufacturers of raw materials for the titanium dioxide industry and a leader in the production of iron, steel and high-quality metal powders. It pioneered the process of removing iron from ilmenite and has operated in Quebec for 65 years. RTFT employs approximately 230 people (as of 2016) at Havre-Saint-Pierre.

In 2016, RTFT continued to focus on strengthening its relationship with its Indigenous partners in the region. Both the mine and metallurgical complex continued to focus on health and safety, implementing its Critical Risk Management Framework. RTFT continues to invest in projects aimed primarily at improving environmental performance, while advancing its management practices. RTFT improved its effluent water treatment system in 2016 with a new water management plan, and has set a voluntary target to reduce nickel concentration in the Petit-Pas Lake watershed.

## ABORIGINAL AND COMMUNITY OUTREACH

Community engagement is an integral part of Rio Tinto's culture. The company continues to strengthen partnerships with Indigenous peoples in communities where it operates through strategic investments. In 2014, Rio Tinto contributed \$1 million over five years to Indspire to create the Rio Tinto Award for Indigenous Students, which supports individuals pursuing post-secondary education. This contribution is the most significant made by a metal and mining company to Canada's largest Indigenous-led education organization. During Rio Tinto's partnership with Indspire, which is entering its third year, over 1,300 students from the company's communities of interest have received bursaries through the organization.

IOC has been partnering with communities in Labrador West and Sept-Îles for more than five decades. Rio Tinto is a strong believer in developing and maintaining meaningful partnerships with local Indigenous groups, which is reflected by its strong performance in stakeholder outreach. In 2016, despite suspension of community investments, as the company and local communities worked to navigate through the economic downturn, IOC found alternative ways to support community groups through various in-kind contributions and partnerships. However, in 2017, the community investment program was reinstated. IOC strengthened its relationship with its communities of interest through ongoing engagement with the Regional Taskforce and Community Advisory Panel, helping to ensure successful management of the changing economic situation in the Labrador West region. IOC Labrador City achieved a Level AAA across all indicators, and Sept-Îles attained a Level B for COI identification and effective COI engagement and dialogue, and a Level AA for COI response mechanism and reporting.

Diavik sees itself as a guest in a land where Indigenous people assert a centuries-old presence. In recent years, Diavik renewed its formal participation agreements with all five of its community partners. These long-term renewals ensure Indigenous northerners continue to benefit from training, employment and business opportunities at Diavik. The mine has consistently reported a Level A or above under the *Aboriginal and Community Outreach Protocol* since implementing the TSM program.



RTFT worked hard in 2016 to strengthen its engagement with its community stakeholders, including its Indigenous partners near the mine. Despite the economic conditions, RTFT maintained its commitment to community investment in 2016, which helped to mitigate impacts on the community from the downturn in the sector. RTFT has self-assessed at a Level A or above for Indicators 1, 2 and 4, but not for Indicator 3, COI response mechanism.

During the last several years, RTFT has worked very diligently on forging positive and productive working relations with the Indigenous community near its mining operations. The results of this outreach are demonstrated in Havre-Saint-Pierre's first externally verified TSM assessment. It achieved a Level AAA for COI identification and effective COI engagement and dialogue, a Level AA for COI response mechanism, and a Level A for reporting.

### CRISIS MANAGEMENT AND COMMUNICATIONS PLANNING

Rio Tinto meets the requirements of the *Crisis Management and Communications Protocol* at the corporate level, as well as at all of its sites, including Labrador City, Sept-Îles, Havre-Saint-Pierre, and Diavik.

### TAILINGS MANAGEMENT

Responsible tailings management is a priority for Rio Tinto. For example, after the Mount Polley and Samarco tailings incidents, Rio Tinto further strengthened its tailings controls. It checked the integrity of all its tailings facilities across the group, and critically reviewed its tailings standard to ensure that it is up to date and world class. Rio Tinto also worked very closely with its peer companies through MAC's Tailings Working Group and the International Council on Mining and Metals to ensure that it shares a common platform and a common way forward in tailings management across the industry.

Rio Tinto reports a Level AAA performance in 2016 across all indicators except the annual tailings management review indicator for its IOC operations. Diavik has also maintained a strong performance for tailings management over the years. This year, it achieved a Level A rating across all five indicators. (Havre-Saint-Pierre does not have tailings facilities at its site.)

### ENERGY USE AND GHG EMISSIONS MANAGEMENT

Rio Tinto has maintained good levels of performance for its energy use and GHG emissions management practices. In 2016, Labrador City and Sept-Îles achieved a Level AA for two out of three indicators for this protocol. Diavik scored a Level AAA for Indicator 1 and a Level AA for Indicators 2 and 3.

In 2016, Diavik's four-turbine, 9.2-megawatt wind farm achieved peak power penetration of 52% (one half of the mine's energy needs), produced 14.3 gigawatt hours, and offset 3.4 million litres of diesel.

Rio Tinto remains committed to responsible energy management and continues to explore opportunities to improve performance for this protocol.

### SAFETY AND HEALTH

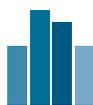
A priority for all Rio Tinto operations is the safety and health of its employees. The company has undertaken several initiatives to help foster education and awareness. In 2016, Critical Risk Management was introduced across all of the company's global sites, including those in Canada. Rio Tinto's commitment to safety is reflected in this year's TSM results, with strong performance across the four indicators. Minor improvement, however, is needed in some areas of training and reporting at Havre-Saint-Pierre.

### BIODIVERSITY CONSERVATION MANAGEMENT

Rio Tinto's corporate biodiversity strategy governs biodiversity management systems across its business. The operations have focused their attention on implementing Rio Tinto's strategy and furthering understanding of the requirements of this TSM protocol.

🔗 For more information, please visit [www.riotinto.com/canada](http://www.riotinto.com/canada)





Externally  
Verified Results

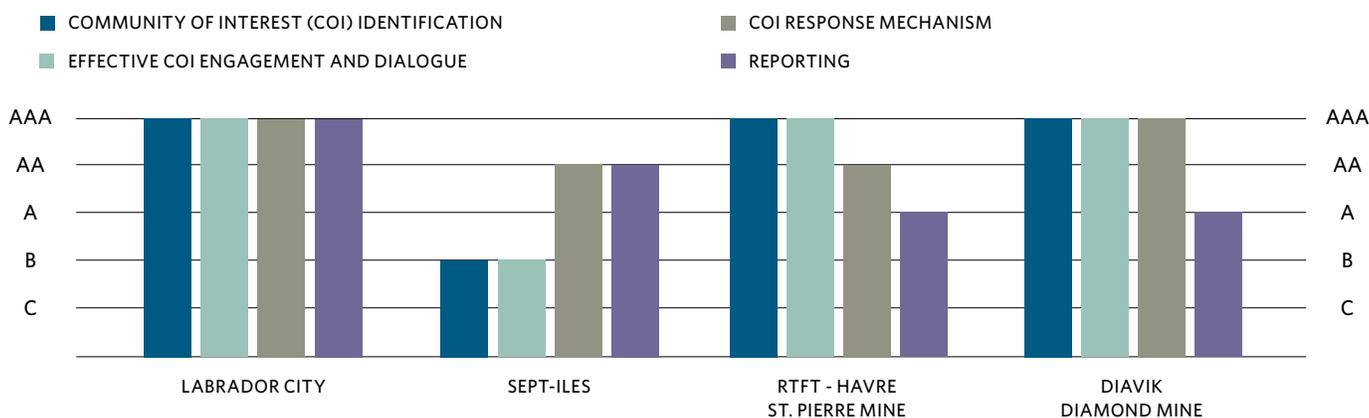
## 2016 TSM Results

### Rio Tinto

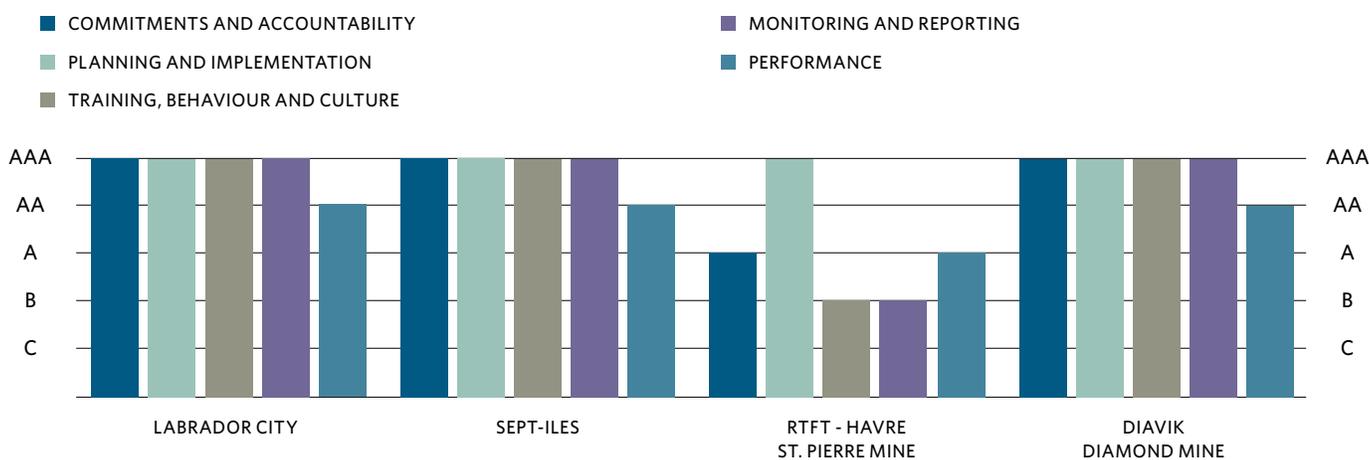
#### Crisis Management and Communications Planning Assessment

FACILITY	PREPAREDNESS	REVIEW	TRAINING
CORPORATE	✓	✓	✓
LABRADOR CITY	✓	✓	✓
SEPT-ILES	✓	✓	✓
RTFT - HAVRE ST. PIERRE MINE	✓	✓	✓
DIAVIK DIAMOND MINE	✓	✓	✓

#### Aboriginal and Community Outreach Assessment



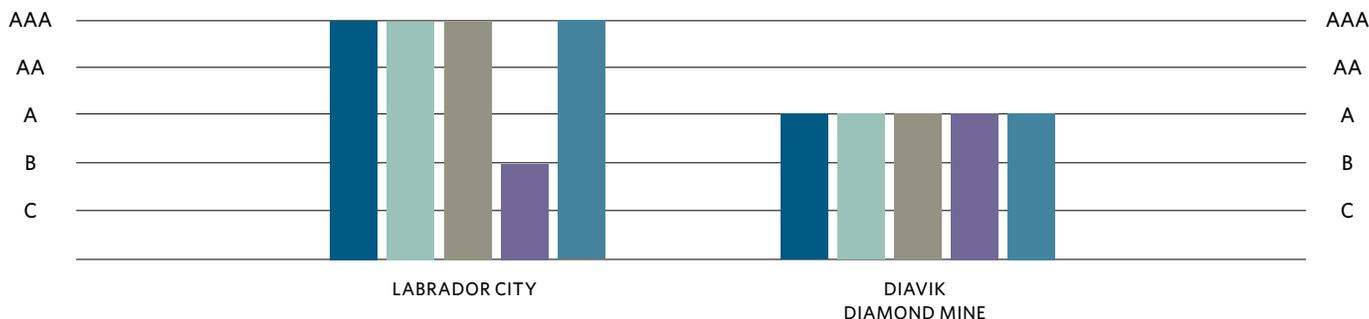
#### Safety and Health Assessment



## Tailings Management Assessment

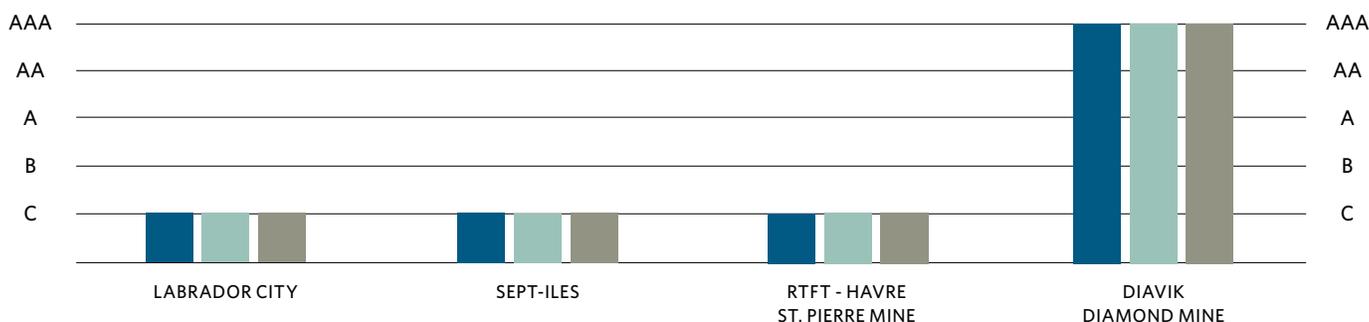
Externally Verified Results

- TAILINGS MANAGEMENT POLICY AND COMMITMENT
- TAILINGS MANAGEMENT SYSTEM
- ASSIGNED ACCOUNTABILITY AND RESPONSIBILITY FOR TAILINGS MANAGEMENT
- ANNUAL TAILINGS MANAGEMENT REVIEW
- OPERATION, MAINTENANCE AND SURVEILLANCE (OMS) MANUAL



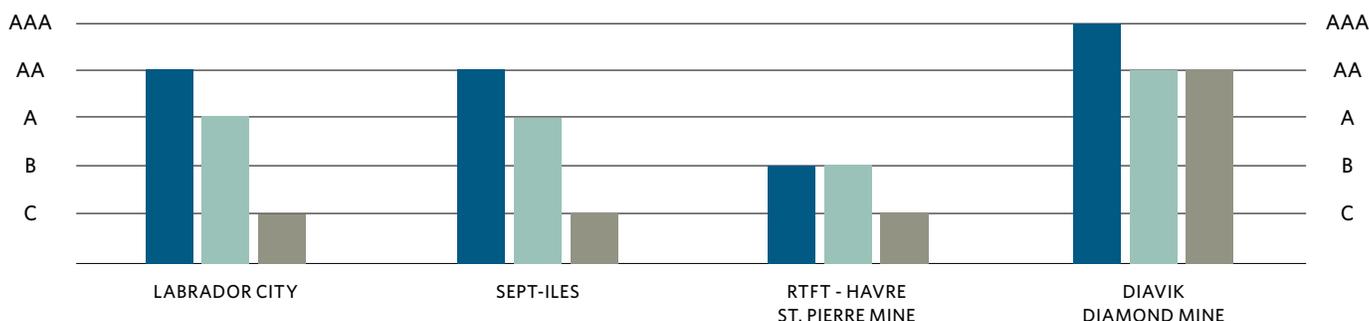
## Biodiversity Conservation Management Assessment

- CORPORATE BIODIVERSITY CONSERVATION POLICY, ACCOUNTABILITY AND COMMUNICATIONS
- FACILITY-LEVEL BIODIVERSITY CONSERVATION PLANNING AND IMPLEMENTATION
- BIODIVERSITY CONSERVATION REPORTING



## Energy Use and GHG Emissions Management Assessment

- ENERGY USE AND GHG EMISSIONS MANAGEMENT SYSTEMS
- ENERGY USE AND GHG EMISSIONS REPORTING SYSTEMS
- ENERGY AND GHG EMISSIONS PERFORMANCE TARGETS



## TSM Performance by Company

### Suncor Energy



Suncor Energy, Canada's largest integrated energy company, recovers bitumen from oil sands near Fort McMurray, Alberta, and upgrades it to refinery-ready feedstock and diesel fuel. Suncor holds one of the largest positions in the oil sands and is committed to delivering safe, reliable, low-cost production, while being a leader in growth, technical innovation and environmental sustainability.

Suncor's 2016 TSM results were internally assessed, and were largely consistent with the externally verified results from 2015.

#### CRISIS MANAGEMENT AND COMMUNICATIONS PLANNING

Suncor completed all requirements for this protocol and maintained a "yes" score for all indicators.

#### ENERGY USE AND GHG EMISSIONS MANAGEMENT

Suncor's oil sands mining operation maintained a Level AAA for the two indicators related to energy use and GHG emissions management systems and reporting systems. However, the operation's result for the energy and GHG emissions performance targets indicator changed to a Level B (from a Level A in 2015) as the 2016 targets were not met. A contributing factor was the extensive unplanned shutdown of all operations as a result of the Fort McMurray wildfire in 2016.

#### TAILINGS MANAGEMENT

Oil sands tailings ponds have come under increased public scrutiny in the past few years. Suncor has worked hard in this area to ensure compliance with the *TSM Tailings Management Protocol*, achieving a Level AAA for all indicators. Work continues to ensure that the company can continue to maintain a high level of compliance in the future, as guidelines, regulations and stakeholder expectations are revised to incorporate recommendations from recent industry incidents.

## ABORIGINAL AND COMMUNITY OUTREACH

Suncor has consistently performed well (Level AAA for all indicators) in this area, as external outreach has always been a key part of maintaining its social license to operate. Suncor regularly reviews its communities of interest (including several Aboriginal communities) and its interactions with them. Communities of interest have an important say in how the company conducts its business. Moreover, success depends on earning the trust and consent of residents in the communities where the company operates.

Suncor has a stakeholder relations framework that outlines the company's commitment to collaboration, transparency and respect for all views. The framework guides Suncor as it develops long-term relationships with those affected by its business, including employees, community members, shareholders, customers, organizations and governments.

## SAFETY AND HEALTH

Safety is a key aspect of Suncor's operations. The company's safety performance met all the requirements for a Level AAA rating for indicators 1 through 4, and a Level AA for Indicator 5 (performance), which reflects the impact of a fatality in 2014.

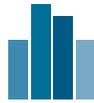
## BIODIVERSITY CONSERVATION MANAGEMENT

Biodiversity conservation management is a key part of Suncor's closure plans, and has been identified as an issue to be managed in the company's strategic issues management process. Through Suncor's continuous commitment to biodiversity, the facility was able to maintain its score this year and achieve a Level AAA for all three indicators.

🔗 For more information, please visit [www.suncor.com](http://www.suncor.com)



Suncor Energy's Nikanotee Fen near Fort McMurray, Alberta.



2016 TSM Results

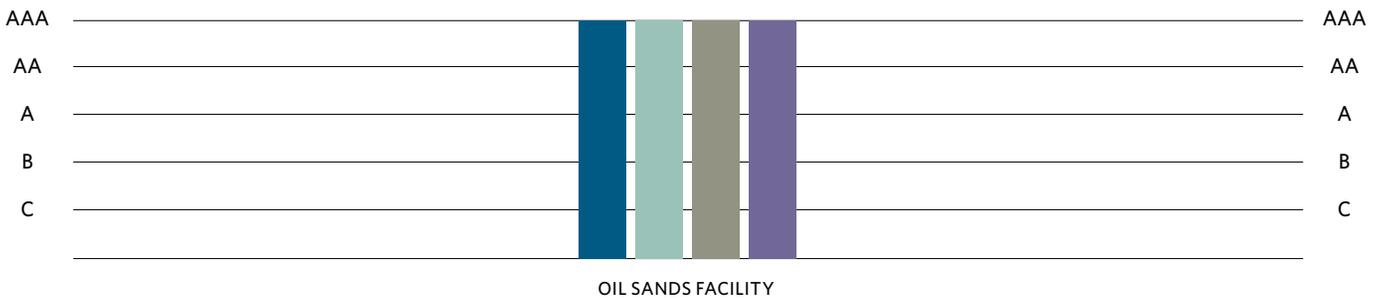
Suncor Energy

Crisis Management and Communications Planning Assessment

FACILITY	PREPAREDNESS	REVIEW	TRAINING
OIL SANDS FACILITY	✓	✓	✓

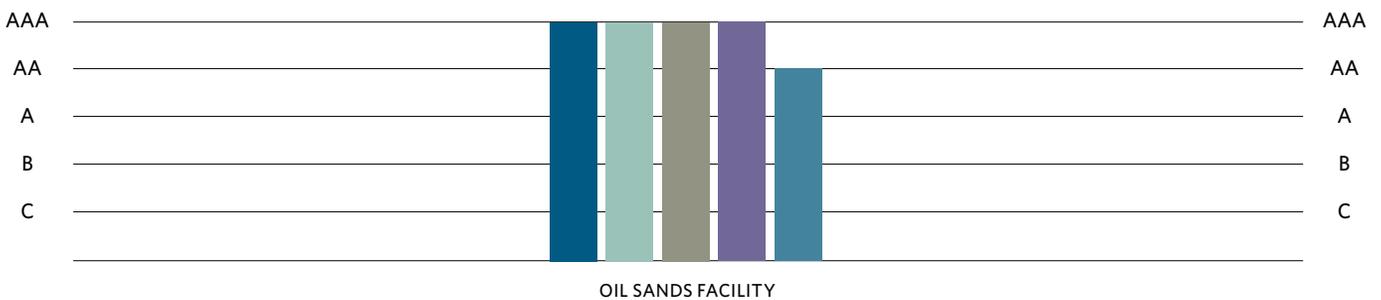
Aboriginal and Community Outreach Assessment

- COMMUNITY OF INTEREST (COI) IDENTIFICATION
- COI RESPONSE MECHANISM
- EFFECTIVE COI ENGAGEMENT AND DIALOGUE
- REPORTING



Safety and Health Assessment

- COMMITMENTS AND ACCOUNTABILITY
- TRAINING, BEHAVIOUR AND CULTURE
- PLANNING AND IMPLEMENTATION
- MONITORING AND REPORTING
- PERFORMANCE

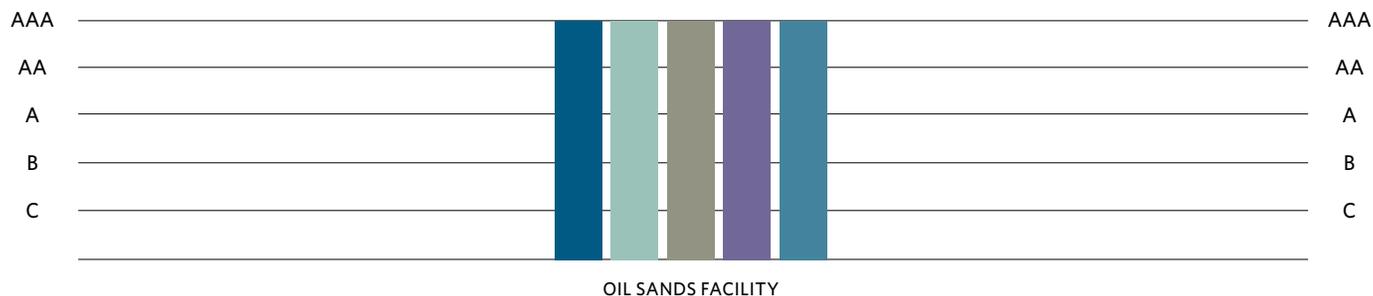


Self-assessed results; last external verification: 2015; next external verification: 2018.



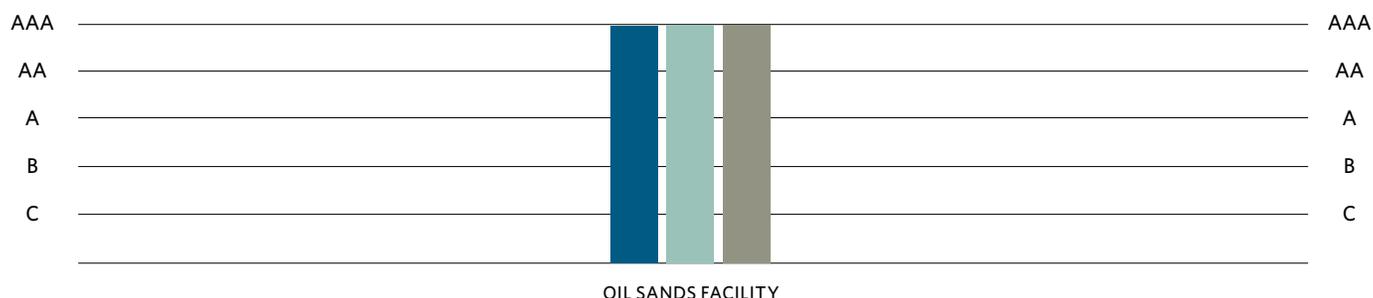
## Tailings Management Assessment

- TAILINGS MANAGEMENT POLICY AND COMMITMENT
- TAILINGS MANAGEMENT SYSTEM
- ASSIGNED ACCOUNTABILITY AND RESPONSIBILITY FOR TAILINGS MANAGEMENT
- ANNUAL TAILINGS MANAGEMENT REVIEW
- OPERATION, MAINTENANCE AND SURVEILLANCE (OMS) MANUAL



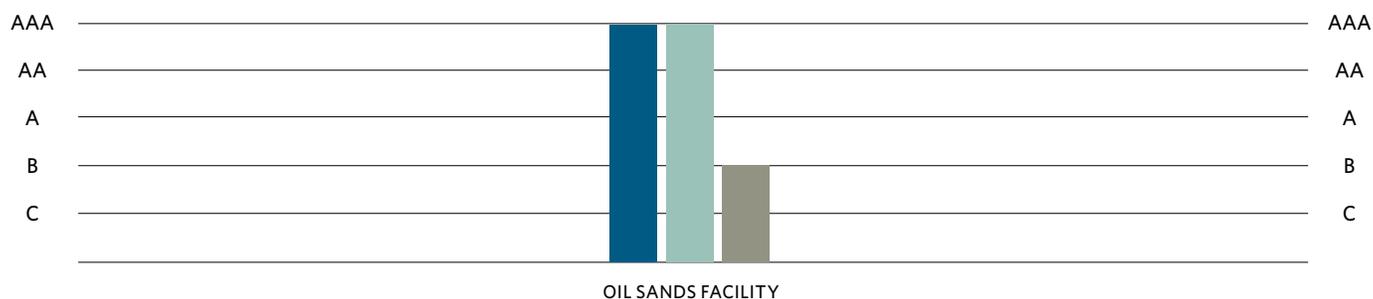
## Biodiversity Conservation Management Assessment

- CORPORATE BIODIVERSITY CONSERVATION POLICY, ACCOUNTABILITY AND COMMUNICATIONS
- FACILITY-LEVEL BIODIVERSITY CONSERVATION PLANNING AND IMPLEMENTATION
- BIODIVERSITY CONSERVATION REPORTING



## Energy Use and GHG Emissions Management Assessment

- ENERGY USE AND GHG EMISSIONS MANAGEMENT SYSTEMS
- ENERGY USE AND GHG EMISSIONS REPORTING SYSTEMS
- ENERGY AND GHG EMISSIONS PERFORMANCE TARGETS

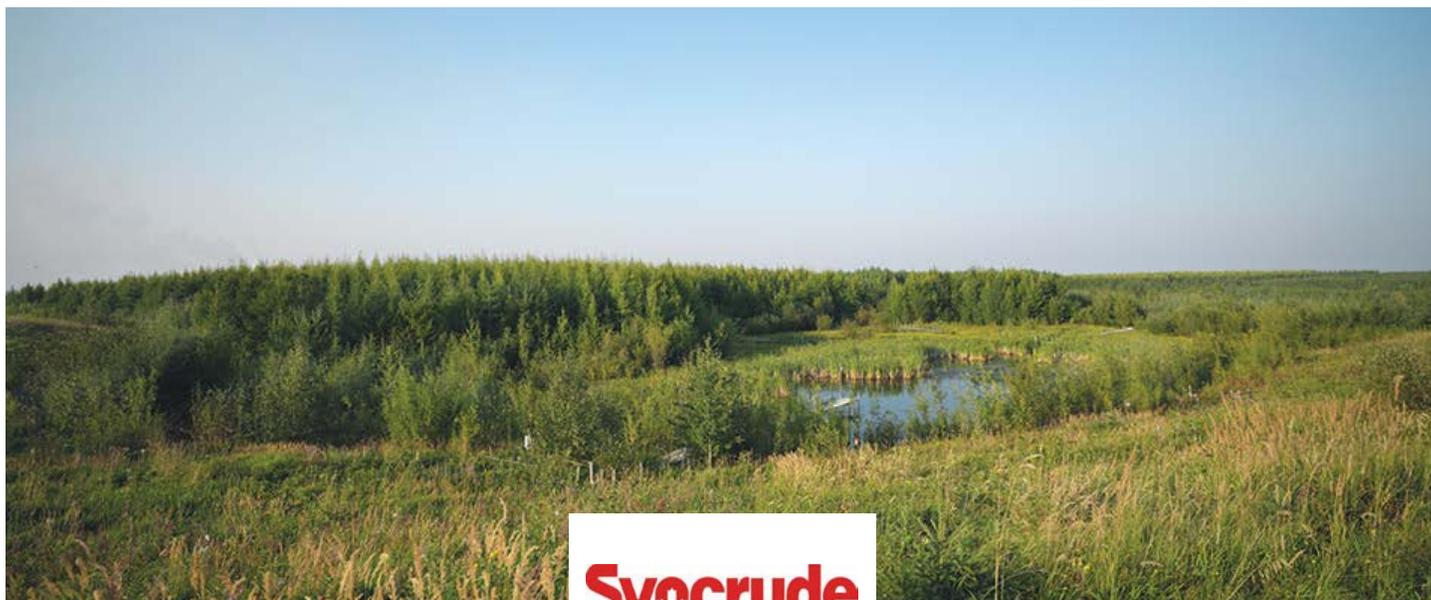


Self-assessed results; last external verification: 2015; next external verification: 2018.



## TSM Performance by Company

### Syncrude Canada Ltd.



**Syncrude**  
Securing Canada's Energy Future

For over 50 years, Syncrude's commitment to responsible development has been reflected by its support for local communities, continued improvement in environmental performance, and emphasis on a safe, healthy and respectful workplace.

The company operates technologically advanced oil sands mines, as well as extraction, upgrading and utilities facilities at its two sites north of Fort McMurray, Alberta. Current production capacity is 350,000 barrels of high-quality, light, low sulphur crude oil per day.

A culture of innovation drives continued progress throughout the organization, resulting in recent investments totalling over \$3 billion in tailings treatment processes, fen wetland reclamation and air emissions reductions. Syncrude consistently ranks among the top 50 research and development spenders in Canada and collaborates with industry partners through Canada's Oil Sands Innovation Alliance (COSIA).

Syncrude's 2016 TSM results were externally verified. Highlights include:

#### ABORIGINAL AND COMMUNITY OUTREACH

Verified at a Level AAA in all areas, Syncrude is one of the top employers of Indigenous people in Canada and to date has spent over \$2.5 billion with Indigenous-owned companies. The company champions Indigenous inclusion nationally through engagement with the Canadian Council for Aboriginal Business, Indigenous Works and Indspire. Its program has also been certified five times at the top level in the Progressive Aboriginal Relations (PAR) program.

#### BIODIVERSITY CONSERVATION MANAGEMENT

Syncrude achieved a Level AAA for all three indicators. The company's management of biodiversity includes extensive evaluation, monitoring and reporting programs aimed at avoiding or mitigating significant adverse effects to land and wildlife.

Syncrude's commitment to innovative and progressive reclamation practices has resulted in over 3,500 hectares of land being reclaimed from mining operations to date.

### CRISIS MANAGEMENT AND COMMUNICATIONS PLANNING

Syncrude scored "yes" for all indicators. The company regularly conducts emergency response simulations, including desktop and site-wide simulations, to ensure all personnel are properly trained and tested. Pre-plans exist for all medium- and high-level risks, and spokespeople are identified and trained.

### ENERGY USE AND GHG EMISSIONS MANAGEMENT

Syncrude's energy and GHG management and reporting systems achieved Level AAA ratings. Due to reliability issues within the upgrader and lower than anticipated production levels, the company met its targets only once over the last four years. This resulted in a Level A for the performance targets indicator.

### SAFETY AND HEALTH

Syncrude was verified at a Level AAA across four indicators, and a Level AA for the performance indicator. The company is committed to protecting and promoting the safety and well-being of employees, contractors, communities and the environment. With the integration of world-class management approaches, such as the Loss Prevention System (LPS), a safety culture is evident throughout its operations.

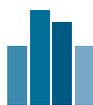
### TAILINGS MANAGEMENT

Syncrude achieved Level A ratings in all areas, reinforcing a commitment to ensure the responsible management of its tailings facilities. The review confirmed the activities that support this commitment are in place, including senior endorsement, accountabilities, budget allocation, annual reviews and formal reporting systems. The company is working towards a formal third-party assessment to improve its results in this protocol.

🔗 For more information, please visit [www.syncrude.ca](http://www.syncrude.ca)



Worker at Syncrude's oil sands facility near Fort McMurray, Alberta.



Externally  
Verified Results

2016 TSM Results

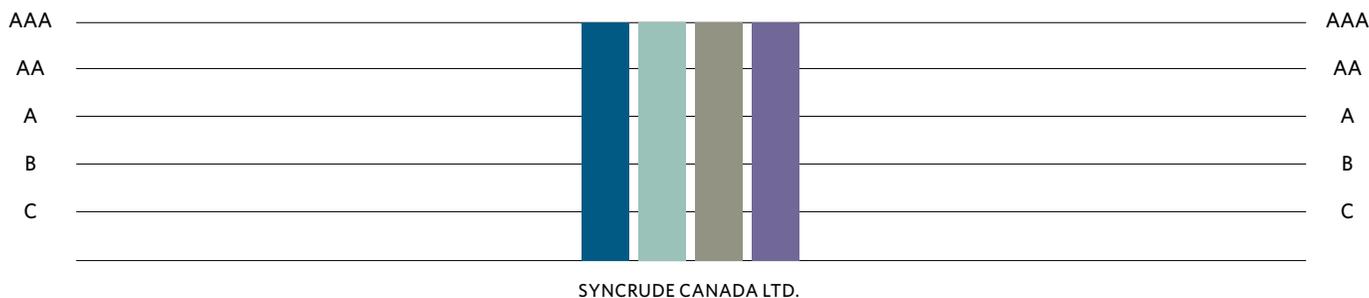
Syncrude Canada Ltd.

Crisis Management and Communications Planning Assessment

FACILITY	PREPAREDNESS	REVIEW	TRAINING
SYNCRUDE CANADA LTD.	✓	✓	✓

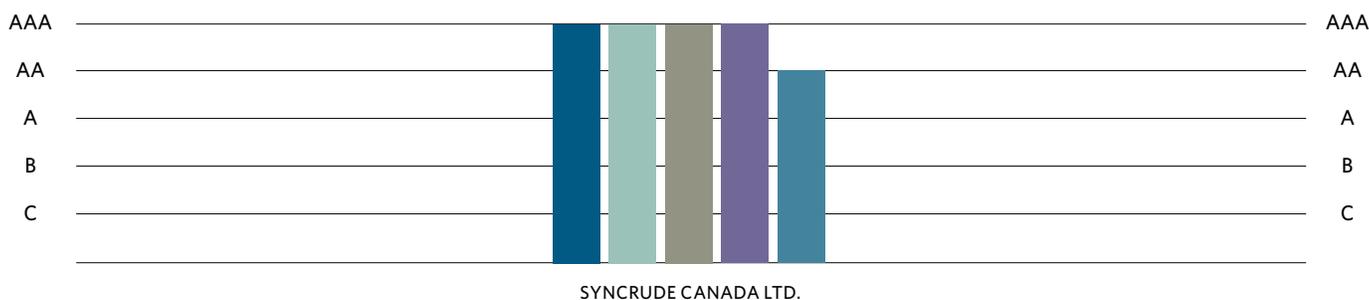
Aboriginal and Community Outreach Assessment

- COMMUNITY OF INTEREST (COI) IDENTIFICATION
- COI RESPONSE MECHANISM
- EFFECTIVE COI ENGAGEMENT AND DIALOGUE
- REPORTING



Safety and Health Assessment

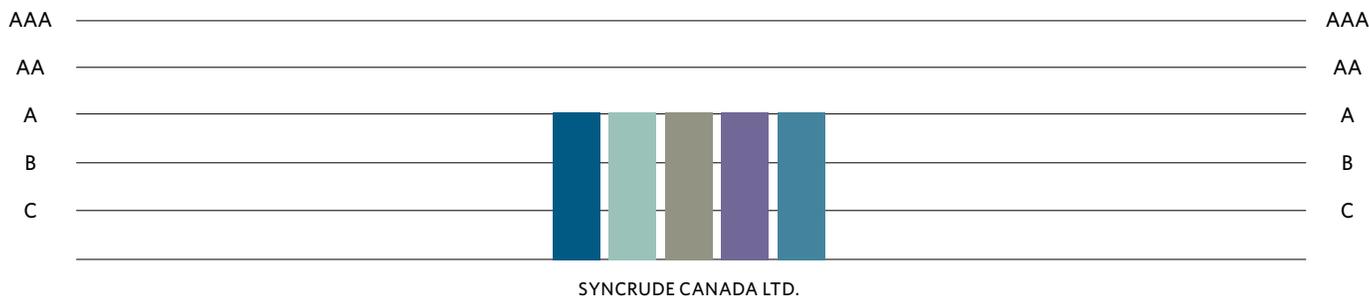
- COMMITMENTS AND ACCOUNTABILITY
- TRAINING, BEHAVIOUR AND CULTURE
- PLANNING AND IMPLEMENTATION
- MONITORING AND REPORTING
- PERFORMANCE



## Tailings Management Assessment

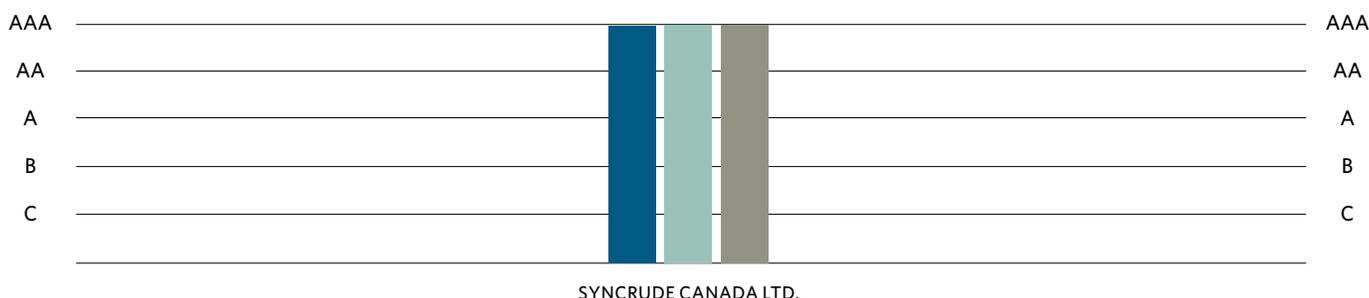
Externally  
Verified Results

- TAILINGS MANAGEMENT POLICY AND COMMITMENT
- TAILINGS MANAGEMENT SYSTEM
- ASSIGNED ACCOUNTABILITY AND RESPONSIBILITY FOR TAILINGS MANAGEMENT
- ANNUAL TAILINGS MANAGEMENT REVIEW
- OPERATION, MAINTENANCE AND SURVEILLANCE (OMS) MANUAL



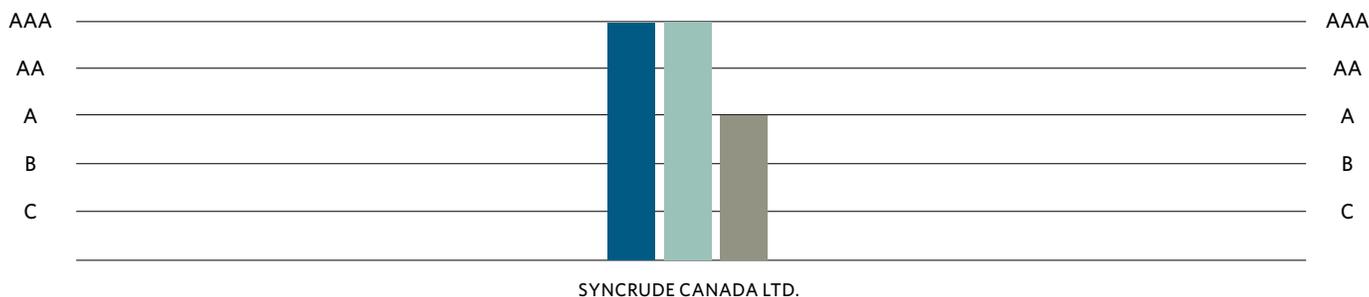
## Biodiversity Conservation Management Assessment

- CORPORATE BIODIVERSITY CONSERVATION POLICY, ACCOUNTABILITY AND COMMUNICATIONS
- FACILITY-LEVEL BIODIVERSITY CONSERVATION PLANNING AND IMPLEMENTATION
- BIODIVERSITY CONSERVATION REPORTING



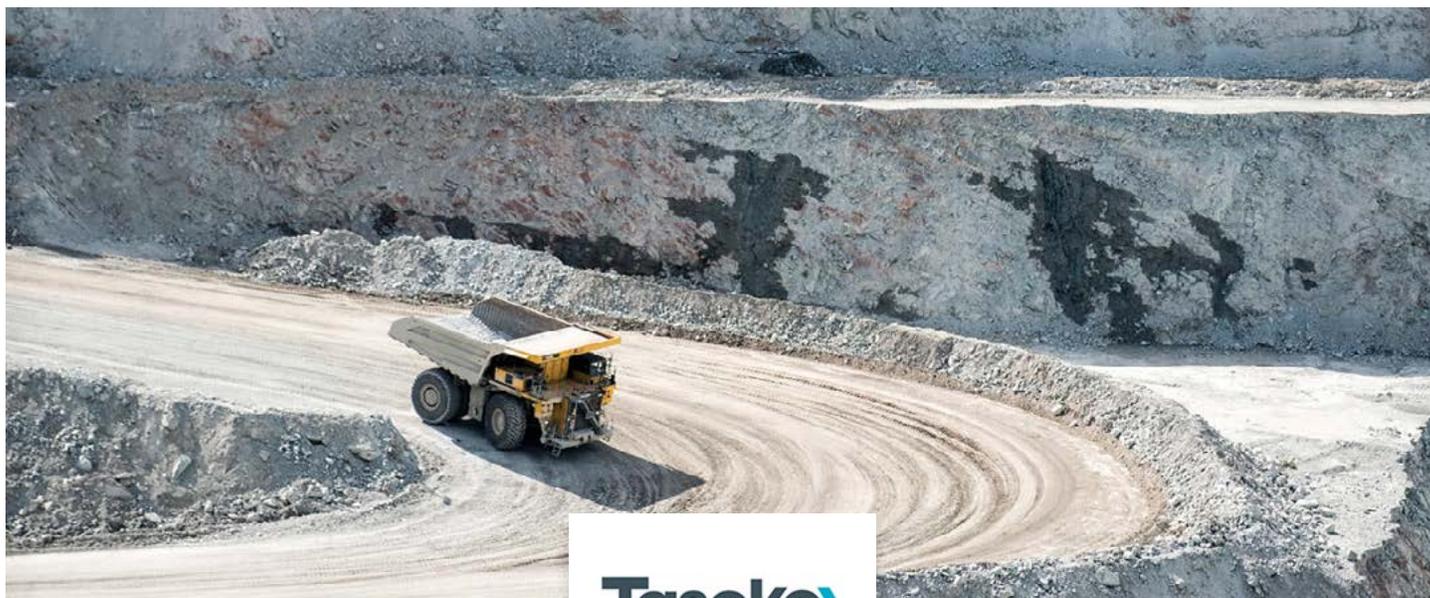
## Energy Use and GHG Emissions Management Assessment

- ENERGY USE AND GHG EMISSIONS MANAGEMENT SYSTEMS
- ENERGY USE AND GHG EMISSIONS REPORTING SYSTEMS
- ENERGY AND GHG EMISSIONS PERFORMANCE TARGETS



## TSM Performance by Company

### Taseko Mines Limited



Taseko is a mining company focused on the operation and development of mines in North America. Headquartered in Vancouver, British Columbia, Taseko is the owner (75%) and operator of the Gibraltar Mine, the second largest copper-molybdenum mine in Canada. Taseko's Aley Niobium Project in northern BC, Harmony Gold Project on Graham Island on the west coast of BC, and New Prosperity Gold-Copper Project in central BC are all advanced-stage projects that provide the company with a diverse commodity pipeline.

In 2016, the US Environmental Protection Agency issued the final required permit to construct and operate the Phase 1 Test Facility at the Florence Copper Project in Arizona. The comprehensive test facility will serve to optimize the in-situ copper recovery process and demonstrate its environmental integrity and reliability.

Taseko is committed to continual improvement in the protection of human health and stewardship of the natural environment. To fulfill this commitment, the company adheres to corporate policies that guide the conduct of all employees in the areas of environment, safety, health, and Aboriginal relations. The Gibraltar Mine has an environmental policy and an associated environmental management system (EMS) in place to uphold a high standard in meeting TSM requirements.

During 2016, activities were effective in achieving a Level A or better for all TSM indicators.

The following details Taseko's 2016 TSM ratings and continual improvement programs.

#### ABORIGINAL AND COMMUNITY OUTREACH

Aboriginal and community outreach continued to be exceptional in 2016. Taseko retained Level AAA ratings for COI identification, effective COI engagement and dialogue, and COI response mechanisms.



The StakeTracker™ system continued to facilitate COI identification and record-keeping, and was particularly useful in tracking stakeholder feedback at COI meetings, which resulted in environmental monitoring programs being jointly developed and implemented on the Fraser River.

A COI feedback mechanism on public reporting, which was used during the year at COI meetings and in the company's public newsletter, helped Taseko retain a Level A for reporting. The company remains committed to continuous improvement through First Nation educational initiatives and contract procurement in the Cariboo-Chilcotin region.

### BIODIVERSITY CONSERVATION MANAGEMENT

Biological diversity conservation management is a key component of activity at the Gibraltar Mine. The mine conducts annual mine reclamation programs, site monitoring of wildlife use (which included the use of motion sensitive cameras in 2016), and extensive COI engagement. Engagement often centres on the use of country foods and the health of salmon, which inform biological diversity monitoring and water management plans, and indicate which native species should be included in planting programs,

Taseko's biological diversity conservation plan is integrated into existing programs implemented at the mine. It also captures new initiatives with First Nations and local environmental groups that support biological diversity conservation. Taseko was successful in establishing formal linkages between the plan and the advancement of reclamation towards achieving approved end land use objectives. The program includes actionable targets related to significant biodiversity aspects in Gibraltar's EMS. Initiatives in biological diversity are reported publicly in newsletters, newspaper articles and in an annual report sent directly to First Nations and the public library, and resulted in a Level A ranking across all indicators in the protocol.

### CRISIS MANAGEMENT AND COMMUNICATIONS PLANNING

All of the requirements of this TSM protocol were met at both the corporate office and the Gibraltar Mine. In 2016, the Florence Copper Project Crisis team was integrated into the corporate crisis management system.

### ENERGY USE AND GHG EMISSIONS MANAGEMENT

Gibraltar's energy use and GHG emissions management performance continued to be excellent in 2016 and met the annual performance target, saving 79,000 kilowatt hours by using more energy-efficient agitator technologies. Gibraltar has also met its energy targets for the last three years. All energy use and GHG emissions management indicators were assessed at a Level A, reflecting that Gibraltar has a formal management system in place, an energy management team with assigned roles and responsibilities, and a rigorous data management system that tracks energy use and emissions.

As well, Gibraltar instills energy awareness in all employees through mandatory computer-based training and provides additional training for key operators in energy-intensive areas. The mine also promotes an employee awareness campaign on idling to reduce diesel consumption. Taseko provides energy and GHG emissions data to various government GHG reporting programs, and details Gibraltar's annual energy targets and site efficiency programs on the company's website.

### SAFETY AND HEALTH

Safety and health have always been a high-level commitment for Taseko and the Gibraltar Mine, with the credo that: *Nothing is more important to the Company than the safety, health and well-being of our workers and their families.* In recognition of this commitment and the achievements resulting from it, Taseko has received the provincial John Ash Award for safety performance for the last three years from the BC Ministry of Energy and Mines. The award recognizes a BC mining operation that has achieved the lowest lost time accident frequency for at least one million worker hours.

In 2016, Taseko maintained the following results for these indicators: a Level AA for policy, commitment and accountability, and for safety performance; a Level AAA in training, behaviour and culture; and a Level A for planning, implementation and operation, and monitoring and reporting. Taseko's health and safety policy and lost time statistics for the previous three years are publicly available on Taseko's website.

### TAILINGS MANAGEMENT

Responsible tailings management is a key priority for the Gibraltar Mine and, in 2016, the facility retained a Level AA for all five indicators.



The results of an internal tailings audit conducted in 2013 remained valid for 2016. The facility's ratings for policy and commitment, management systems, accountability and responsibility, COI engagement processes, and the operation, maintenance and surveillance (OMS) manual stayed the same or were improved. All indicators and tailings performance were discussed and confirmed at the annual 2016 corporate tailings management review.

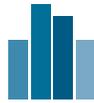
Taseko is committed to meeting the requirements of MAC's tailings guides, and has been fully engaged with the MAC *Tailings Working Group* to assist in incorporating the Independent *Tailings Task Force* recommendations into TSM.

Taseko's promise is to help realize collective potential and, consistent with that promise, promote public engagement. Comments or concerns can be emailed to [communityfeedback@tasekomines.com](mailto:communityfeedback@tasekomines.com).

🔗 For more information, please visit [www.tasekomines.com/our-commitment/environment](http://www.tasekomines.com/our-commitment/environment)



Workers entering Taseko's Gibraltar mine near Williams Lake, British Columbia.



2016 TSM Results

Taseko Mines Limited



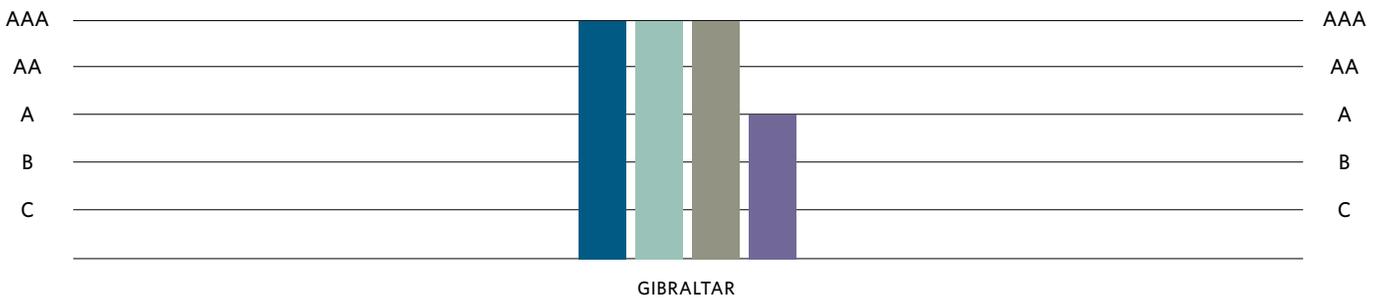
Crisis Management and Communications Planning Assessment

FACILITY	PREPAREDNESS	REVIEW	TRAINING
GIBRALTAR	✓	✓	✓
TASEKO MINES LIMITED	✓	✓	✓



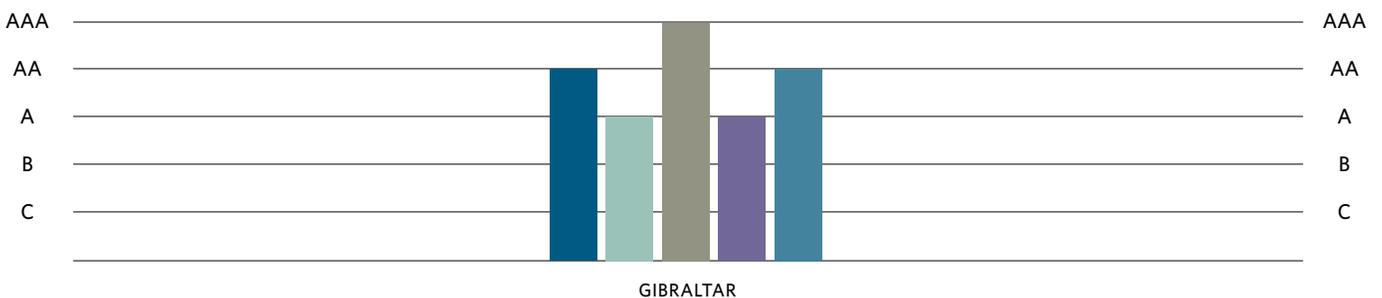
Aboriginal and Community Outreach Assessment

- COMMUNITY OF INTEREST (COI) IDENTIFICATION
- COI RESPONSE MECHANISM
- EFFECTIVE COI ENGAGEMENT AND DIALOGUE
- REPORTING



Safety and Health Assessment

- COMMITMENTS AND ACCOUNTABILITY
- PLANNING AND IMPLEMENTATION
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- PERFORMANCE

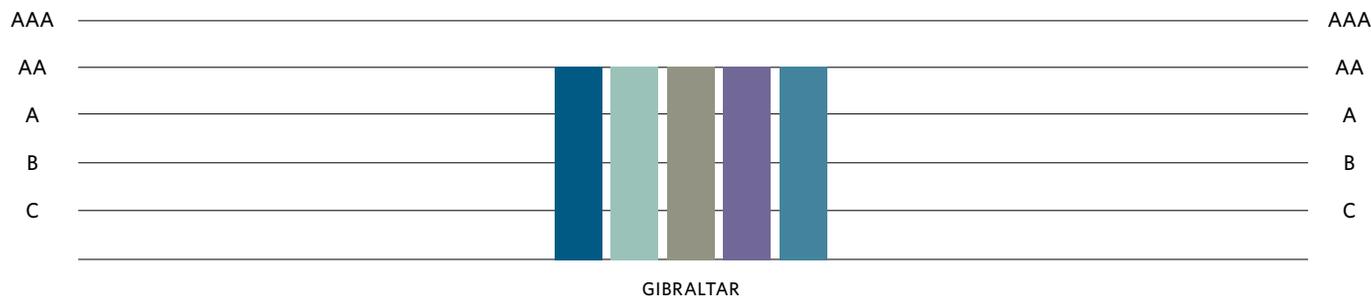


Self-assessed results; last external verification: 2014; next external verification: 2017.



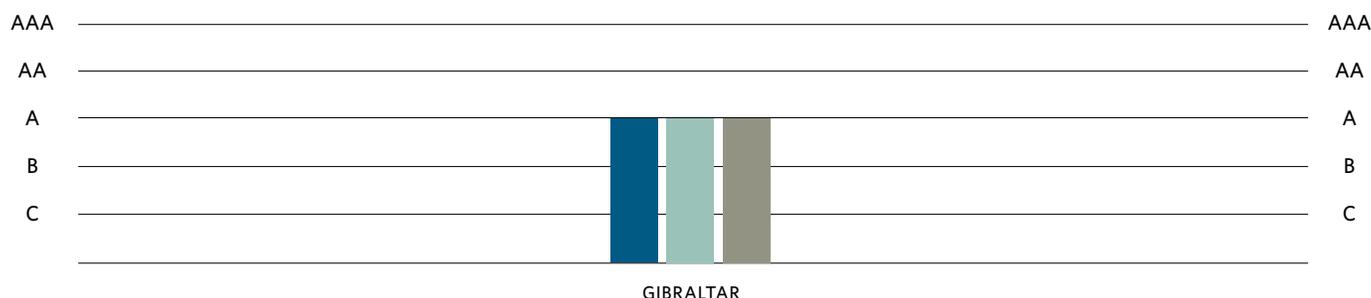
## Tailings Management Assessment

- TAILINGS MANAGEMENT POLICY AND COMMITMENT
- TAILINGS MANAGEMENT SYSTEM
- ASSIGNED ACCOUNTABILITY AND RESPONSIBILITY FOR TAILINGS MANAGEMENT
- ANNUAL TAILINGS MANAGEMENT REVIEW
- OPERATION, MAINTENANCE AND SURVEILLANCE (OMS) MANUAL



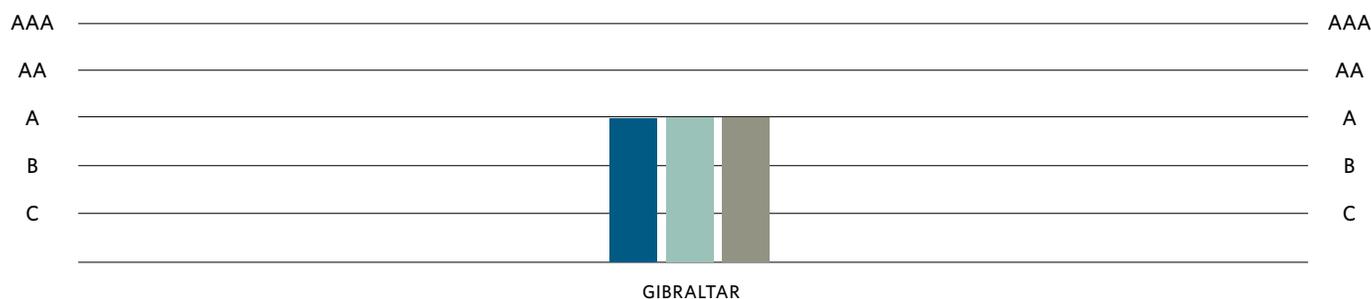
## Biodiversity Conservation Management Assessment

- CORPORATE BIODIVERSITY CONSERVATION POLICY, ACCOUNTABILITY AND COMMUNICATIONS
- FACILITY-LEVEL BIODIVERSITY CONSERVATION PLANNING AND IMPLEMENTATION
- BIODIVERSITY CONSERVATION REPORTING



## Energy Use and GHG Emissions Management Assessment

- ENERGY USE AND GHG EMISSIONS MANAGEMENT SYSTEMS
- ENERGY USE AND GHG EMISSIONS REPORTING SYSTEMS
- ENERGY AND GHG EMISSIONS PERFORMANCE TARGETS

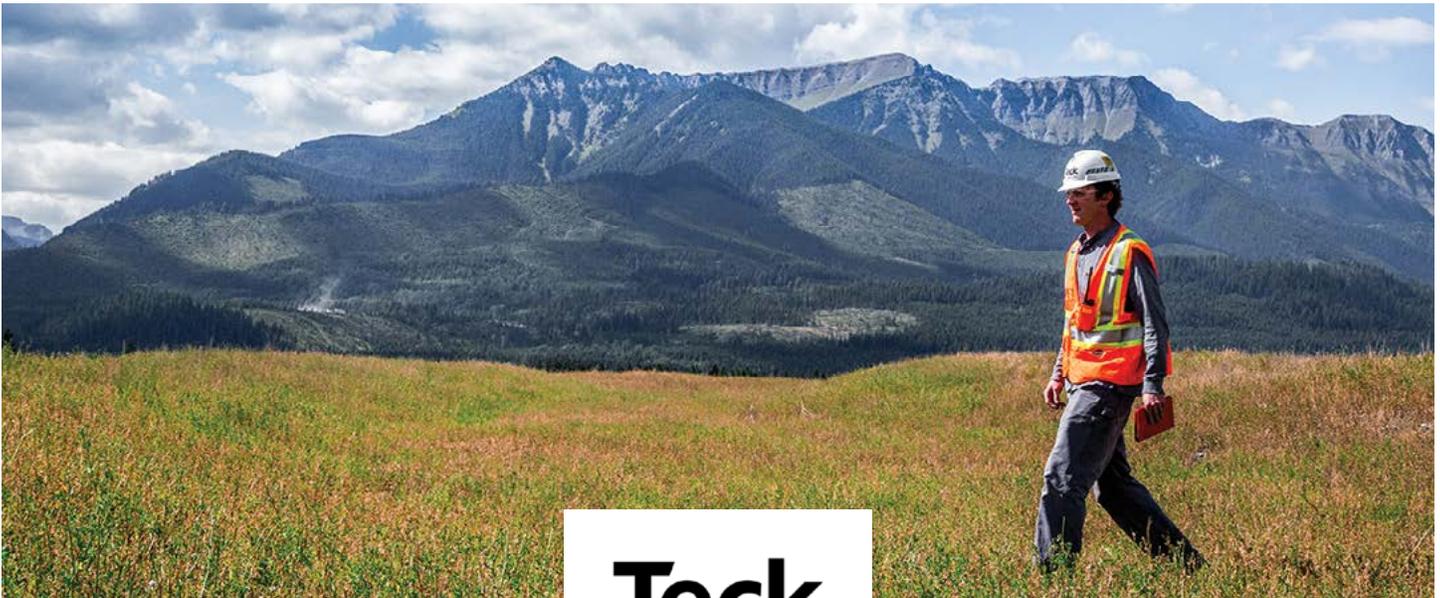


Self-assessed results; last external verification: 2014; next external verification: 2017.



## TSM Performance by Company

### Teck Resources Limited



# Teck

Teck is a diversified resource company committed to responsible mining and mineral development, with business units focused on copper, steelmaking coal, zinc and energy. Headquartered in Vancouver, British Columbia, Teck owns or has an interest in 12 mines in North and South America, as well as one large metallurgical complex in Canada. Teck has expertise across a wide range of activities related to exploration, development, mining and minerals processing, smelting and refining, safety, environmental protection, materials stewardship, recycling and research.

#### TSM RESULTS

All of Teck's operations apply *TSM*, and all Canadian operations publicly report their *TSM* results. Teck's Canadian operations include Highland Valley Copper and Trail operations in British Columbia as well as six steelmaking coal operations in British Columbia and Alberta: Cardinal River, Coal Mountain, Elkview, Fording River, Greenhills and Line Creek.

In 2016, three of Teck's operations, Cardinal River, Greenhills and Trail, underwent *TSM* verification. The verification process included either an external verification performed by PwC or an internal verification performed by Teck. The reviews assessed Teck's reported performance results for the year ending December 31, 2016, as measured against the requirements of the *TSM* performance indicators. The verifications confirmed that all three sites attained a Level AAA for all indicators across all protocols. As a result, Cardinal River, Greenhills and Trail all qualified for a *TSM Leadership Award*.

Teck's overall results for 2016 were strong, and the company achieved high levels of performance across all six *TSM* protocols. All eight of Teck's Canadian operations achieved a Level AAA for all indicators of the *Biodiversity Conservation Management, Energy Use and GHG Emissions Management, and Aboriginal and Community Outreach* protocols.

Teck's performance in *TSM* is part of their overall approach to sustainability and responsible resource development.

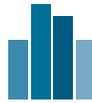


Through their sustainability strategy, Teck has identified six areas that represent the biggest challenges and opportunities for its work in sustainability: community, people, water, biodiversity, energy and climate change, and air. Within each area, Teck has set short-term (2020) and long-term (2030) goals and targets to continually enhance sustainability performance and assess progress, which the company reports on in its annual sustainability report.

🔗 For more information, please visit [www.teck.com](http://www.teck.com)



Haul truck at Teck Resources' Fording River Operations in southeastern British Columbia.



2016 TSM Results

Teck Resources Limited



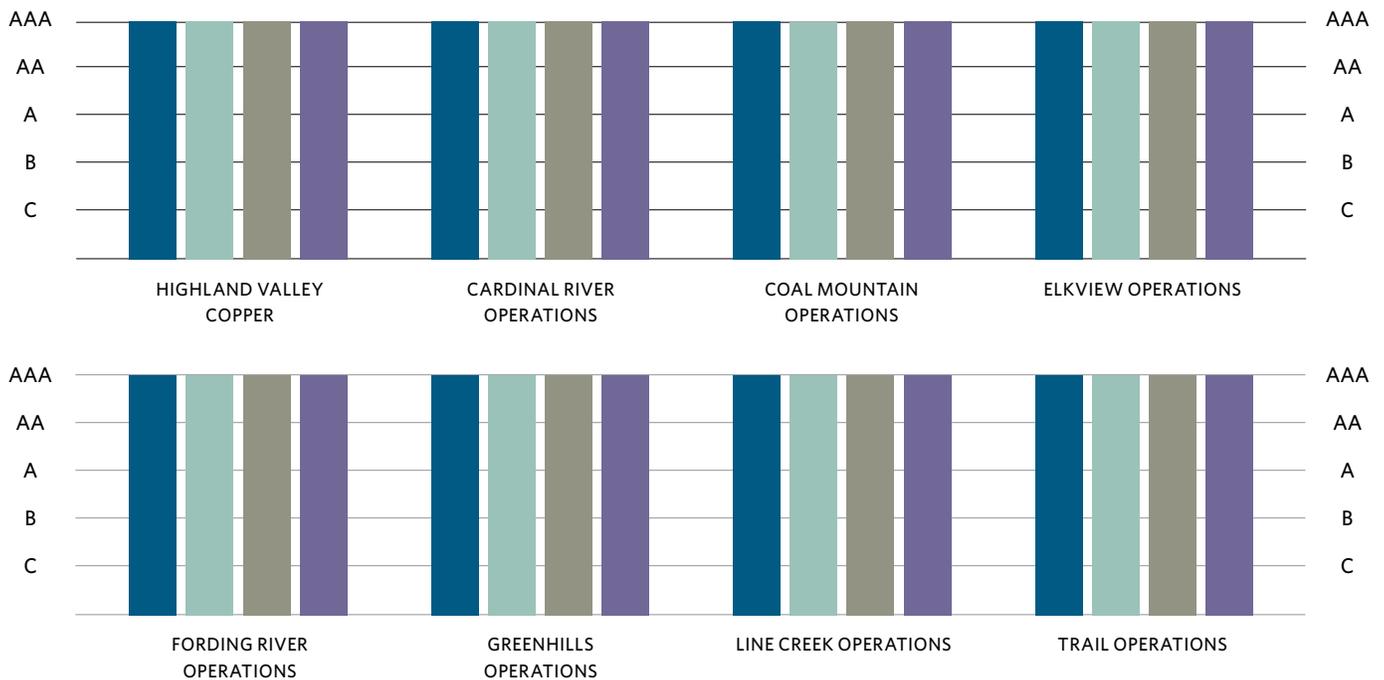
Crisis Management and Communications Planning Assessment

FACILITY	PREPAREDNESS	REVIEW	TRAINING
HIGHLAND VALLEY COPPER	✓	✓	✓
CARDINAL RIVER OPERATIONS	✓	✓	✓
COAL MOUNTAIN OPERATIONS	✓	✓	✗
ELKVIEW OPERATIONS	✓	✓	✓
FORDING RIVER OPERATIONS	✓	✓	✗
GREENHILLS OPERATIONS	✓	✓	✓
LINE CREEK OPERATIONS	✓	✓	✓
TRAIL OPERATIONS	✓	✓	✓
TECK RESOURCES LIMITED	✓	✓	✓



Aboriginal and Community Outreach Assessment

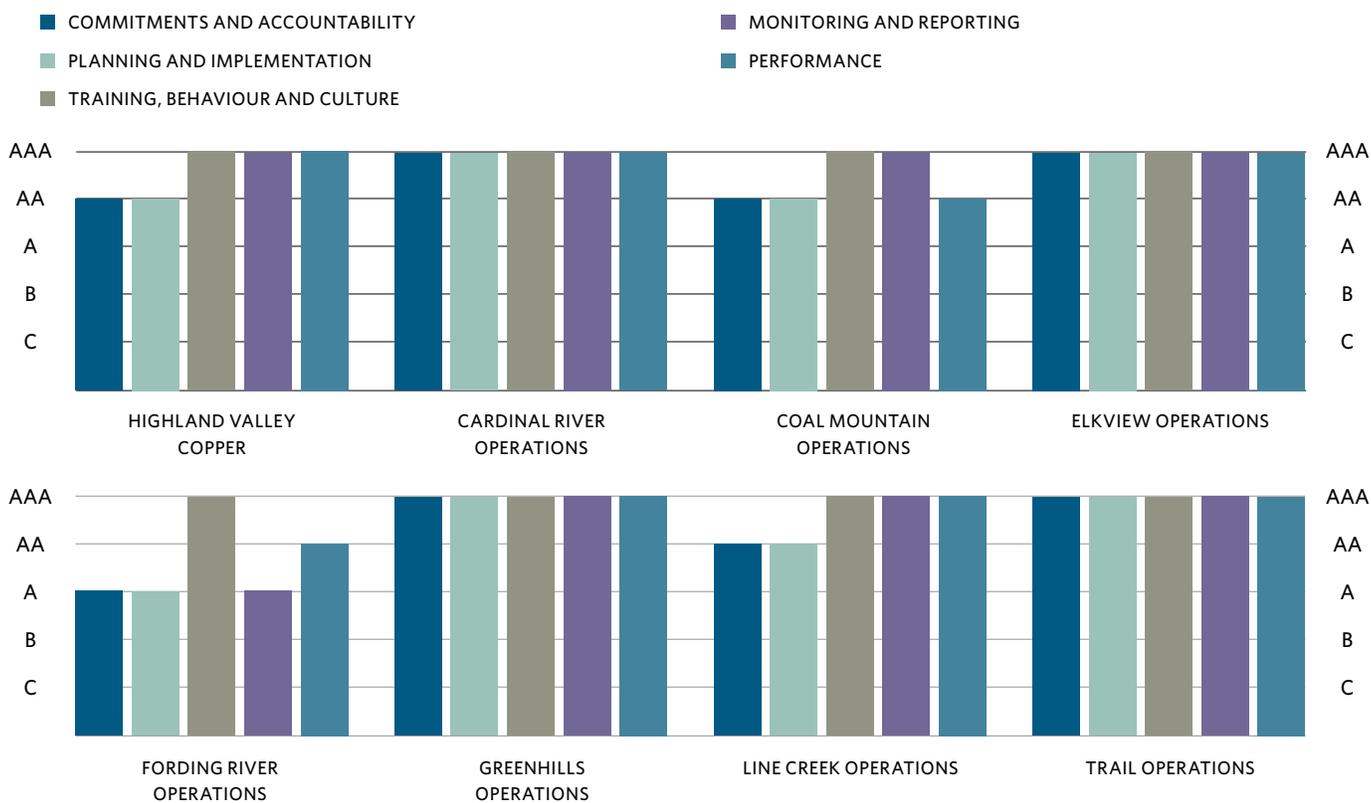
- COMMUNITY OF INTEREST (COI) IDENTIFICATION
- COI RESPONSE MECHANISM
- EFFECTIVE COI ENGAGEMENT AND DIALOGUE
- REPORTING



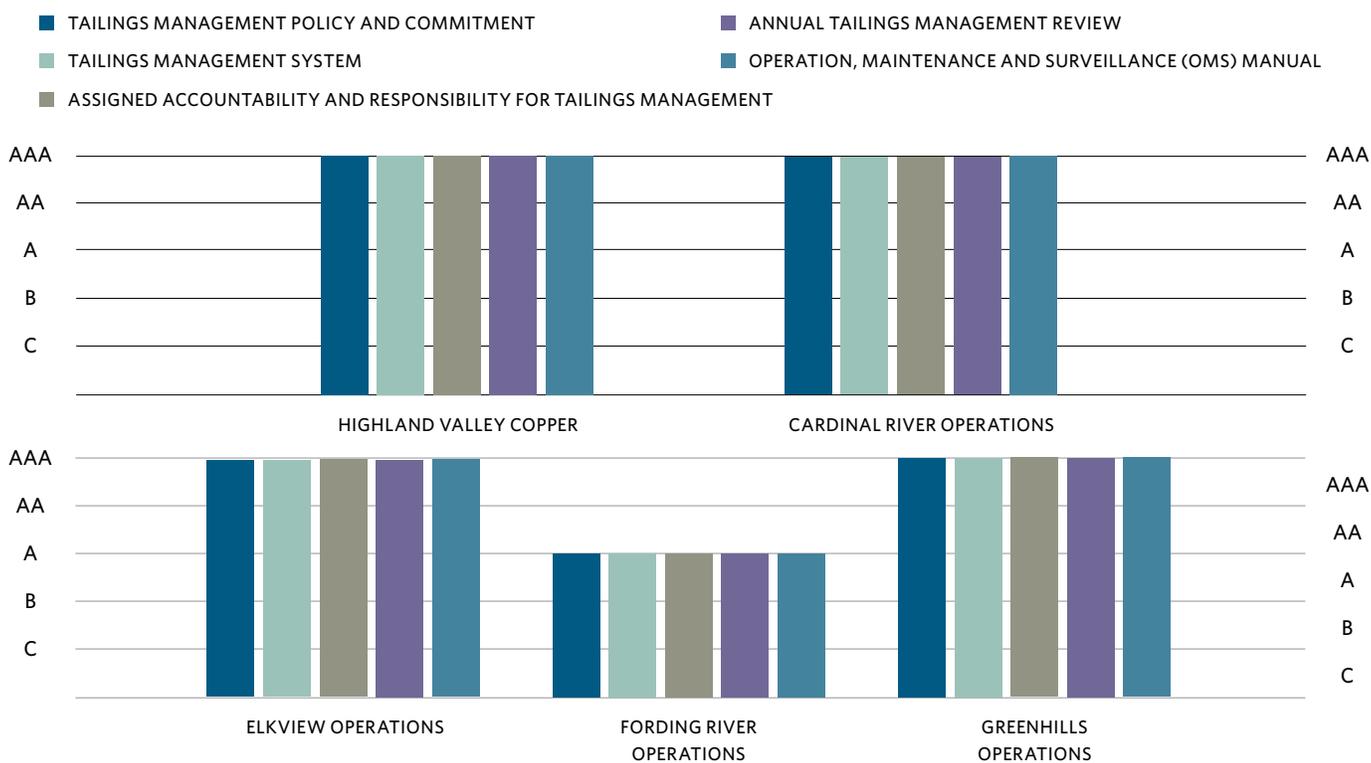
\*In 2016, Trail Operations, Greenhills Operations, Cardinal River Operations and Teck Resources' Corporate Office were externally verified.



## Safety and Health Assessment



## Tailings Management Assessment

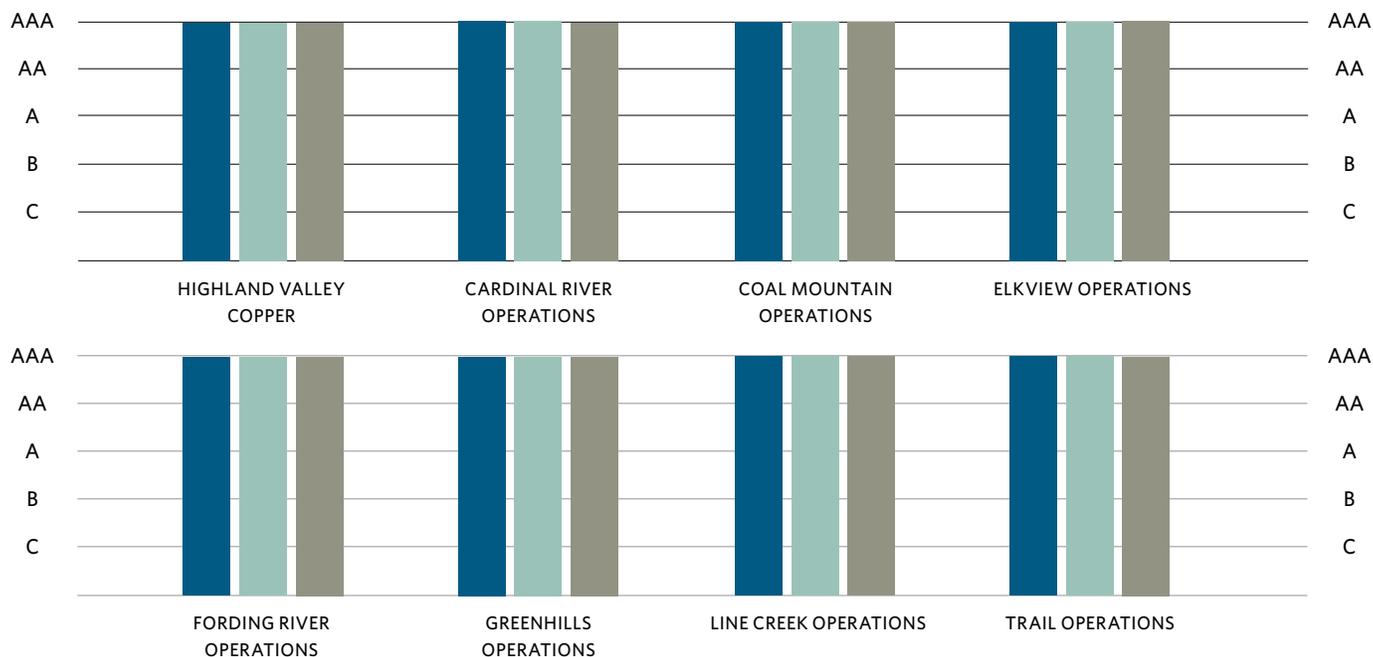


\*In 2016, Trail Operations, Greenhills Operations, Cardinal River Operations and Teck Resources' Corporate Office were externally verified.



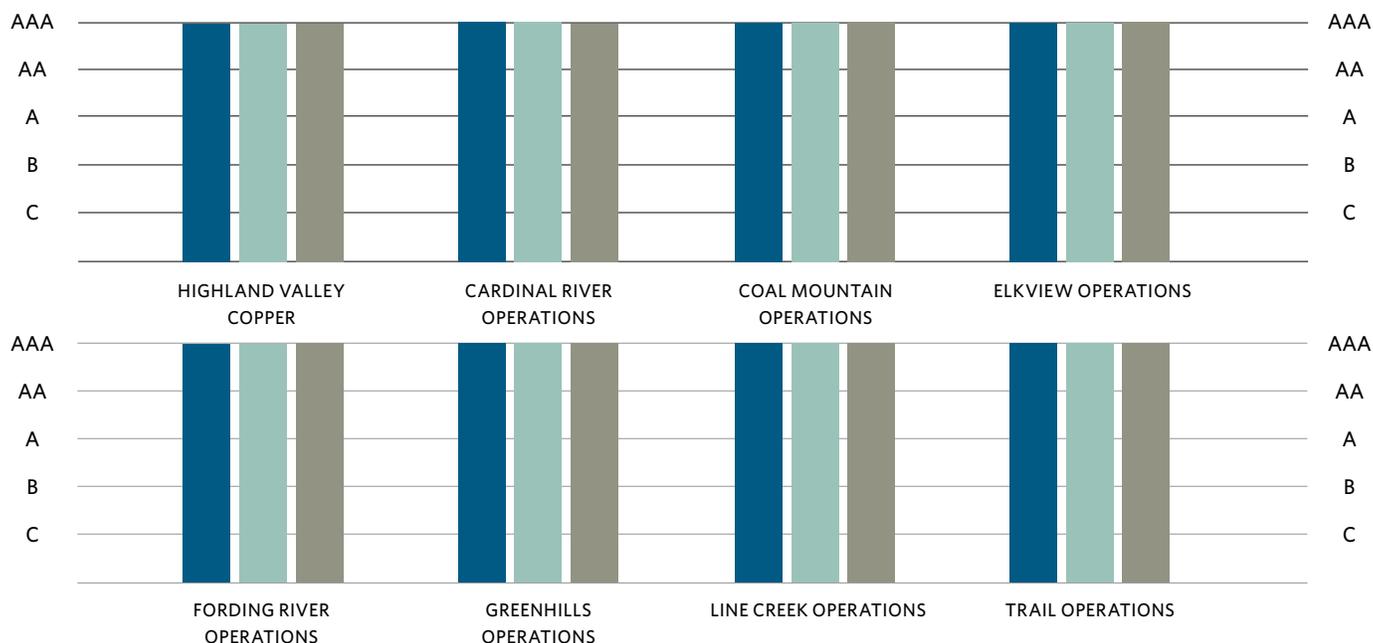
## Biodiversity Conservation Management Assessment

- CORPORATE BIODIVERSITY CONSERVATION POLICY, ACCOUNTABILITY AND COMMUNICATIONS
- FACILITY-LEVEL BIODIVERSITY CONSERVATION PLANNING AND IMPLEMENTATION
- BIODIVERSITY CONSERVATION REPORTING



## Energy Use and GHG Emissions Management Assessment

- ENERGY USE AND GHG EMISSIONS MANAGEMENT SYSTEMS
- ENERGY USE AND GHG EMISSIONS REPORTING SYSTEMS
- ENERGY AND GHG EMISSIONS PERFORMANCE TARGETS



\*In 2016, Trail Operations, Greenhills Operations, Cardinal River Operations and Teck Resources' Corporate Office were externally verified.



## TSM Performance by Company

### Vale



Vale is a global leader in the sustainable development of natural resources and is one of the world's largest and most diverse mining companies. Vale's Base Metals Division, headquartered in Toronto, is one of the industry's largest producers of nickel. Operating in Canada for more than 100 years, with more than 5,000 employees, Vale's goal is to continue its growth profitably, but only within a safe, environmentally respectful and sustainable environment.

Vale is committed to meeting or exceeding MAC's recommended *TSM* targets and is pleased to submit this summary of its 2016 performance.

#### ABORIGINAL AND COMMUNITY OUTREACH

Open and transparent communication, respectful engagement on concerns and issues, and diligent reporting to stakeholders are all firmly entrenched as the way in which Vale operates with Aboriginal communities. Vale proudly operates Aboriginal and community outreach activities and management programs that meet *TSM's* performance expectations in all its Canadian facilities, each tailored to the site and the neighbouring communities' requirements.

Vale's Thompson, Sudbury and Voisey's Bay sites have achieved a Level AAA for all indicators under the *TSM Aboriginal and Community Outreach Protocol*. The Port Colborne Refinery earned a Level AAA for three of the four indicators; and a Level A for Indicator 4. In addition, the Voisey's Bay site was proud to be awarded the *TSM Community Engagement Excellence Award* for its Winter Shipping Program, which ensures minimal interference with traditional Aboriginal lifestyles and enables residents to safely cross the tracks of the company's ships.

In Sudbury, Vale collaborated with local First Nations and Métis communities to identify traditional lands and treaty rights potentially affected by its operations. The company provides engagement, dialogue and cultural training to employees and seeks traditional Aboriginal knowledge to support decisions and inform practices such as environmental monitoring.

At Voisey's Bay, Vale's COI identification process involved extensive community consultations for the environmental assessment of the mine and concentrator project, and the negotiation of separate Innu and Inuit impact and benefit agreements.

In 2016, in Long Harbour-Mount Arlington Heights where Vale has a new nickel processing plant and port facility, a community liaison committee connects the company and local residents quarterly, and a fisheries and aquaculture liaison committee communicates regularly with local fisheries and aquaculture stakeholders.

In addition, Vale is committed to supporting national outreach programs that also operate within the communities in which it operates, including Skills Canada, the Advanced Coronary Treatment (ACT) Foundation and Threads of Life.

### ENERGY USE AND GHG EMISSIONS MANAGEMENT

Overall, Vale continues to improve its performance under the *TSM Energy Use and GHG Emissions Management Protocol*. All sites are at a Level A or higher, except Thompson, with two indicators below Level A, and Sudbury, with one below Level A.

Globally, Vale is committed to reducing its projected 2020 GHG emissions by 5% (its carbon target).

### TAILINGS MANAGEMENT

In Sudbury, Vale maintained its Level AAA performance under the *TSM Tailings Management Protocol* for all indicators as a result of work completed by the third-party expert Tailings Review Board. The company has reviewed all tailings management policies with its COI, and senior management has endorsed and implemented the policies within budget allocations.

As well, Manitoba and Newfoundland and Labrador, Vale maintained its performance under the *TSM Tailings Management Protocol*, averaging a Level A or higher across all indicators.

### CRISIS MANAGEMENT AND COMMUNICATIONS PLANNING

All sites as well as Vale's corporate offices satisfied the requirements of the *TSM Crisis Management and Communications Planning Protocol*. Crisis management planning and preparedness is a critical component of Vale's risk management activities. Vale's crisis management teams are well trained, and are willing to respond to internal emergencies and help the community when possible. Testing of the crisis management systems was conducted at all sites.

### SAFETY AND HEALTH

At Vale, life matters most, and the company's commitment to this core value is reflected in its *TSM Safety and Health Protocol* assessments, which confirm continued high performance at all sites. For Indicator 3, Vale achieved a Level AAA for all its mining operations, and a Level AA or higher for Indicator 5 across all sites.

For the third consecutive year, risk management efforts at Vale's Voisey's Bay Mine earned the company the John T. Ryan National Award, Select Mines, for the lowest lost time injury frequency in the previous calendar year. Voisey's Bay achieved zero lost time injuries in 2016.

In 2017, Vale committed to an additional three years of national-level support for Threads of Life, a charity dedicated to promoting workplace health and safety and helping families touched by a work-related fatality, injury or occupational disease.

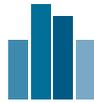
### BIODIVERSITY

Vale maintains its commitment to continuous improvements under the *TSM Biodiversity Conservation Management Protocol*. The company's performance is assessed at a Level A or higher in Port Colborne, Voisey's Bay and Long Harbour. Thompson has three indicators below Level A and Sudbury has two indicators below Level A.

Vale's biodiversity protection projects demonstrate how much the company prizes the planet. They include support for Manitoba's woodland caribou collaring program, the Vale Living with Lakes Centre and extensive biodiversity studies in Voisey's Bay.

🔗 For more information, please visit [www.vale.com/canada](http://www.vale.com/canada)





## 2016 TSM Results

Vale



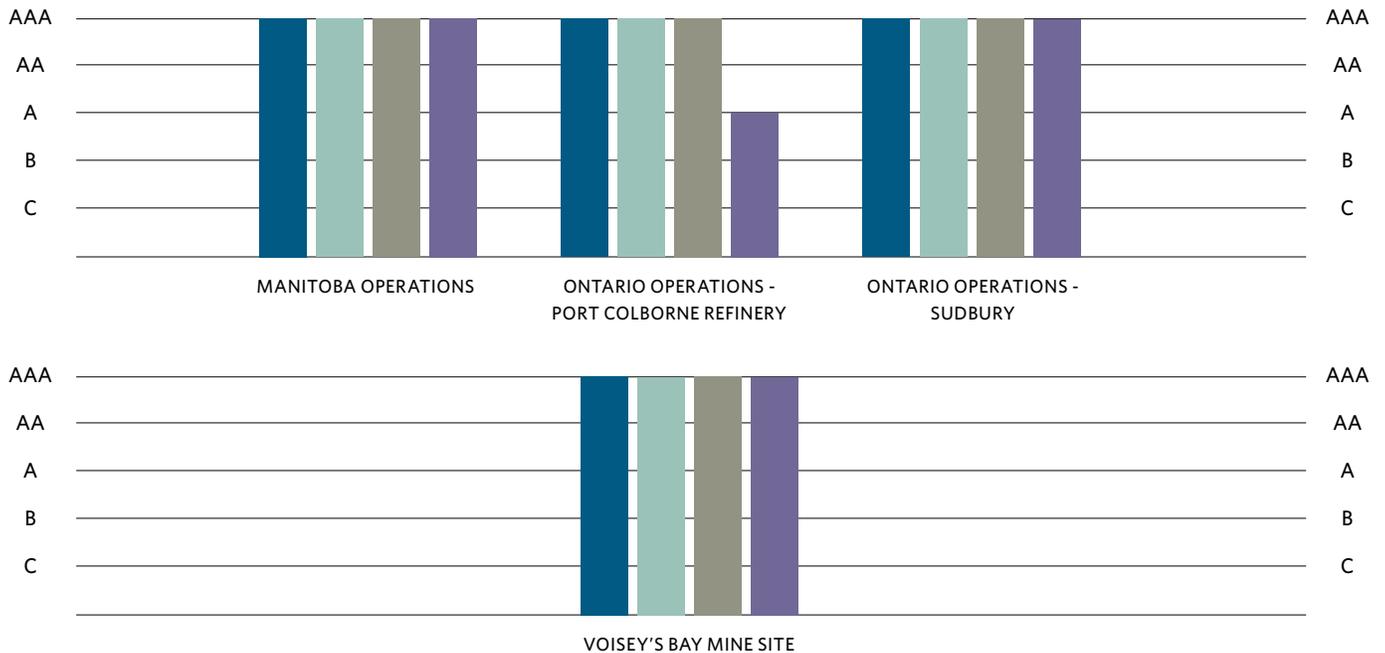
### Crisis Management and Communications Planning Assessment

FACILITY	PREPAREDNESS	REVIEW	TRAINING
MANITOBA OPERATIONS	✓	✓	✓
ONTARIO OPERATIONS - PORT COLBORNE	✓	✓	✓
ONTARIO OPERATIONS - SUDBURY	✓	✓	✓
CORPORATE OFFICE	✓	✓	✓
VOISEY'S BAY MINE SITE	✓	✓	✓



### Aboriginal and Community Outreach Assessment

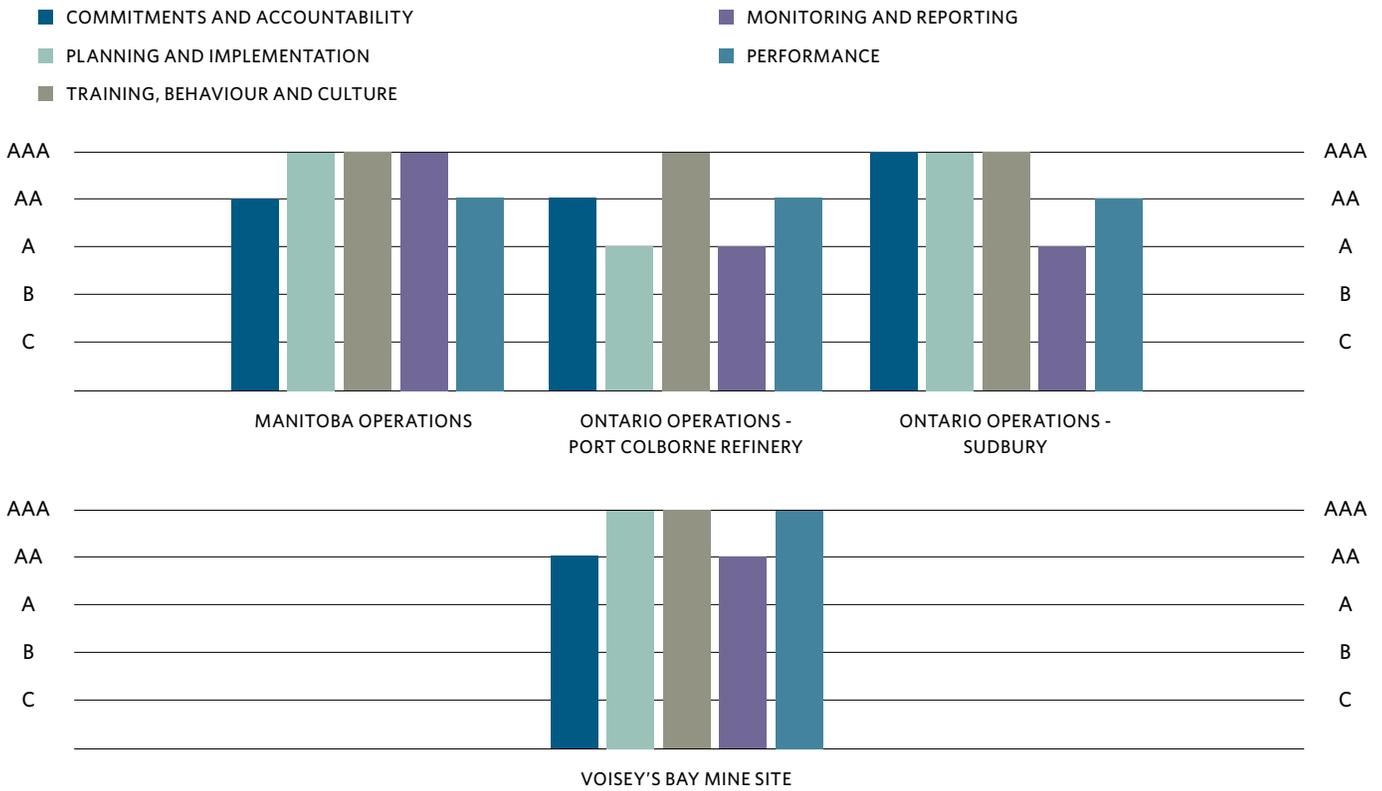
- COMMUNITY OF INTEREST (COI) IDENTIFICATION
- COI RESPONSE MECHANISM
- EFFECTIVE COI ENGAGEMENT AND DIALOGUE
- REPORTING



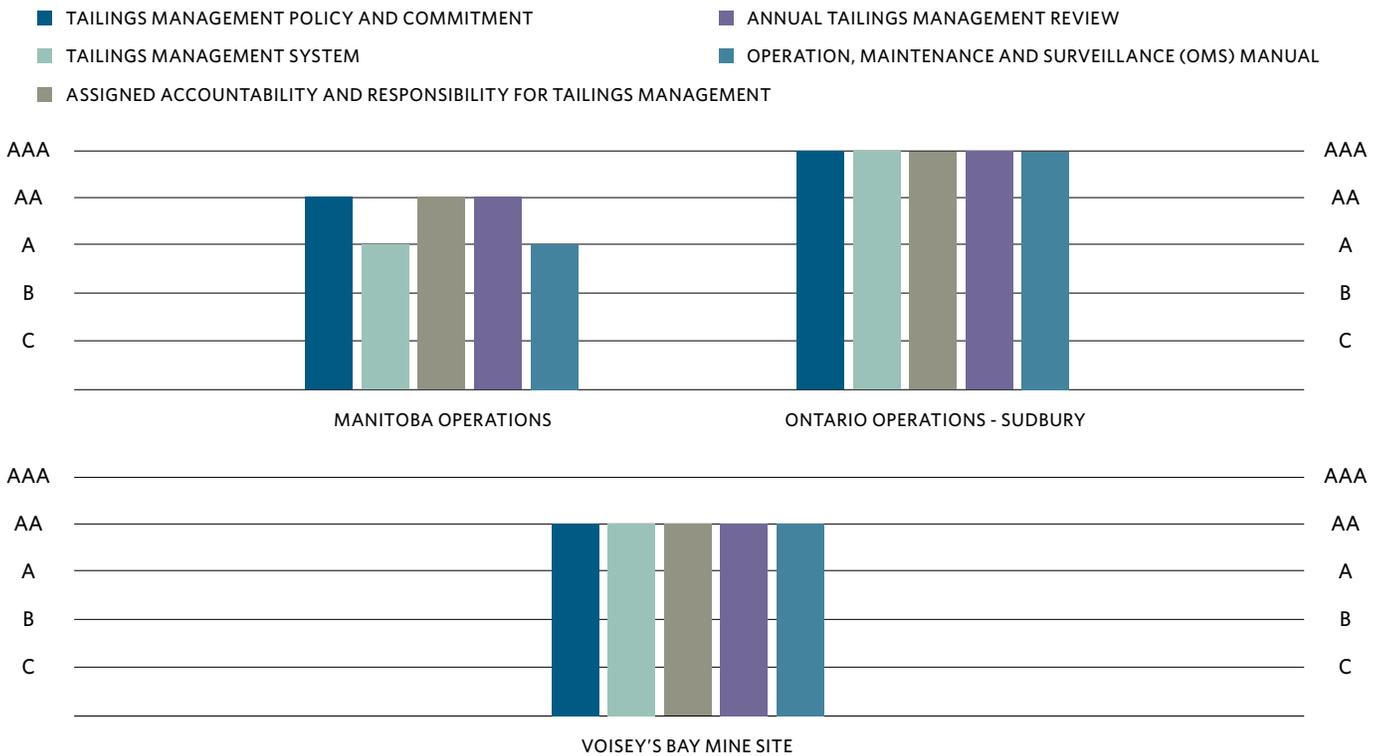
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## Safety and Health Assessment



## Tailings Management Assessment

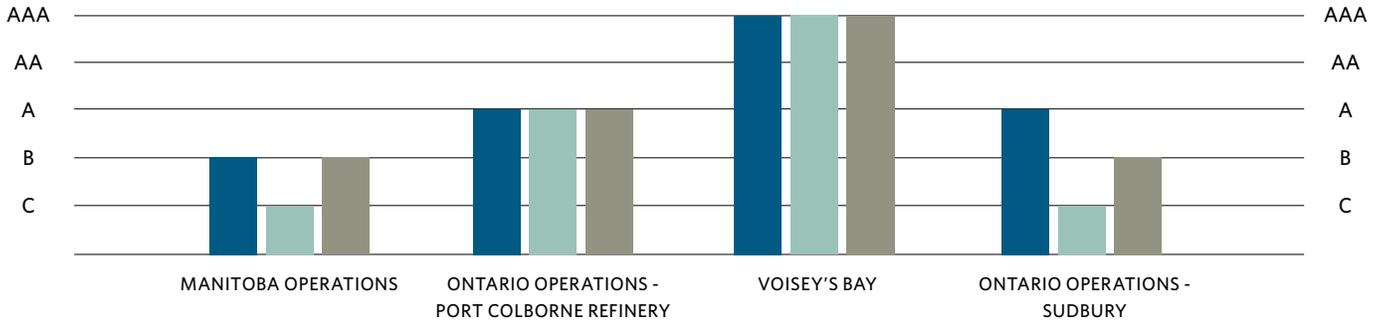


Externally verified in 2016; next external verification 2019.



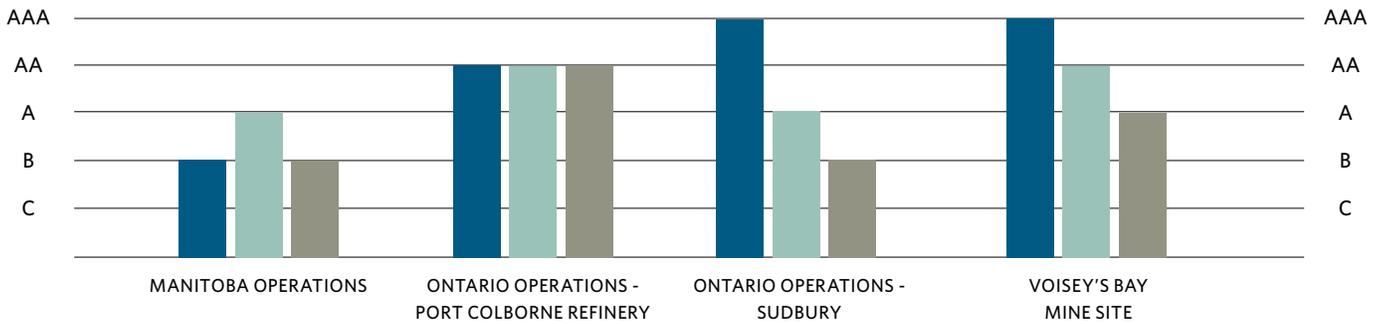
## Biodiversity Conservation Management Assessment

- CORPORATE BIODIVERSITY CONSERVATION POLICY, ACCOUNTABILITY AND COMMUNICATIONS
- FACILITY-LEVEL BIODIVERSITY CONSERVATION PLANNING AND IMPLEMENTATION
- BIODIVERSITY CONSERVATION REPORTING



## Energy Use and GHG Emissions Management Assessment

- ENERGY USE AND GHG EMISSIONS MANAGEMENT SYSTEMS
- ENERGY USE AND GHG EMISSIONS REPORTING SYSTEMS
- ENERGY AND GHG EMISSIONS PERFORMANCE TARGETS



Externally verified in 2016; next external verification 2019.





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