



STANDARDS RESEARCH

Socio-Economic Transition for Mine Closure in Canada—Investigating Standards-based Solutions

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Executive Summary

Within Canada and globally, demand and attention is increasing for minerals and metals sourced in both an environmentally and socially responsible way. Mining companies are subsequently under increasing pressure to take more responsibility for their impact on communities and to go beyond their regulatory obligations, including leaving a positive economic and social legacy beyond the life of mine. In Canada, this work also, importantly, needs to respect Indigenous rights and offers opportunities for Indigenous peoples to work in partnership on mining development. This context provides an opportunity for governments, Indigenous rightsholders, industry, and others in the sector to reflect on successes and challenges and respond to these opportunities and expectations in a way that improves outcomes for communities and builds Canada's mining leadership and expertise.

In 2020, CSA Group published a research report that identified and characterized the needs and gaps related to expectations and requirements for mining in Canada in the areas of environmental protection and management, mining innovation, and sustainability. The report discussed several areas where standards could potentially address gaps and needs, including socio-economic transition for mine closure (also referred to as social closure or social transition), an area that encompasses the steps taken to address socio-economic impacts of mine closure on workers, communities, rightsholders, and other stakeholders, and to maximize opportunities to build or sustain positive socio-economic legacies post-closure.

This research report seeks to advance two objectives from the 2020 CSA Group report:

1. Conduct an analysis of the socio-economic transition landscape through a review of both the literature and practical experiences to identify the needs, benefits, potential stakeholders, and leading best practices in this area; and
2. Provide recommendations on the need for and potential content of a standard or guideline to help Canadian communities, mining companies, and governments better plan for and address the socio-economic transition of a closed mine site.

The research conducted for this report included a review of published documents and articles related to socio-economic transition, and interviews with key informants from industry, government (federal, territorial, Indigenous, and municipal), academia, and social practitioners.

The results show that there is a growing need to plan for socio-economic transition for mine closure, which should be driven by community and mining shareholder expectations to deliver value throughout the mine cycle and to adopt integrated closure practices. Key informants highlighted deficiencies in current practice and outlined a range of barriers and challenges, mostly brought about by the complex nature of the topic itself and the need for multi-stakeholder involvement. There was broad agreement that the practice of socio-economic transition for mine closure would benefit from better definition, structure, and guidance, especially around supporting collaborative transition strategies with communities and government, resourcing internal closure teams, and doing early engagement on socio-economic transition.

Challenges to developing and implementing a standard or guideline in this area include the highly contextual nature of socio-economic transition and the limited body of practice, documented experiences, and examples of success on which to base guidance. The consensus among key informants was that a guideline incorporating best practice and lessons learned would be most beneficial in addressing needs and driving performance in this area.

In terms of potential content, findings from the research suggest that any guidance developed for socio-economic transition for mine closure in Canada should be framed by the following considerations:

- ensuring relevance in the Canadian context;
- being flexible and complementary to existing requirements and plans;
- allowing for continuous improvement and evolution; and
- being process-focused.

In addition, key informant observations suggest that the following high-level process elements could inform the development of a potential guideline or standard to address socio-economic transition for mine closure:

1. Early and ongoing engagement;
2. Multi-stakeholder collaboration;
3. Alignment with community and other external plans; and
4. Internal governance and expertise.

These process elements could be further validated, refined, and elaborated as part of a collaborative standard or guideline development process involving industry, government, community organizations, Indigenous rightsholders, and other mining stakeholders.



"Issues related to sustainability, environmental, and social aspects of mining, including gaining the social license to operate, are consistently ranked as one of the sector's top risks, both in Canada and abroad."

1 Introduction

The Canadian mining sector plays an important role in mineral and metals production in Canada and around the world. According to Natural Resources Canada, Canada produces 60 types of minerals and metals and ranks among the top five global producers of 13 major commodities. The minerals and metals sector directly represents 3.3% of Canada's total GDP, with the total contribution of the sector at over \$100 billion. Canada's mineral exports represent almost 20% of total merchandise exports [1]. As a global producer and exporter of minerals and metals that support clean technology, Canada's mining sector also has the opportunity to play a key role in the transition to a low carbon economy [2].

The global demand for minerals and metals that support clean technology is expected to grow significantly in the coming decades [3]. Canada's exploration sector, public policies, mine finance and expertise, and resource endowments (including rare earth elements) provide a foundation for attracting investment and expanding output to supply clean energy materials and products [4].

Issues related to sustainability, environmental, and social aspects of mining, including gaining the *social license to operate*¹, are consistently ranked as one of the

sector's top risks, both in Canada and abroad [5], [6]. According to the Government of Canada's Minerals and Metals Policy, Canada's vision is to be a global leader in sustainable and responsible minerals development, with a focus in environmental and social practices [2]. Canada's "Minerals and Metals Plan," specifically, outlines key strategies needed to support this vision, including enhancing mine closure planning, advancing participation of Indigenous peoples in mining, and optimizing social benefits for communities [2].

In 2020, CSA Group conducted research to identify and characterize needs and gaps related to the expectations and requirements for mining in Canada in the areas of environmental protection and management, mining innovation, and sustainability [7]. The research identified several areas where standards development could potentially address gaps and needs, including *social closure*, or *socio-economic transition*² for mine closure, as it is referred to in this report.

The socio-economic transition of a mine encompasses the steps taken to address the socio-economic impacts of mine closure on workers, communities, rightsholders, and other stakeholders (e.g., local businesses). Socio-economic transition following mine closure is one form of socio-economic disruption that communities can experience [7]. In Canada, there

1 Social license to operate is a term used in the mining industry to describe the necessary support and ongoing acceptance that communities and stakeholders have for a mining operation [8]. See Section 3.1.1 for more detail.

2 While social closure is the term commonly used and understood by the mining industry to describe socio-economic considerations of mine closure, the term can potentially limit the practice of considering social impacts of mine closure to a point in time [9], [8]. There is a growing trend to replace social closure with *social impacts of closure*, *social transition*, or *socio-economic transition* to recognize the broader implications of closure from a community lens.

are other emerging examples of the need for properly managed community transitions, such as ensuring just transition for communities during the phase out of coal.

Over the past two decades, improvements in mine closure practice have largely focused on environmental aspects [10], [11]. More recently, attention has shifted to integrating social or socio-economic components within closure planning to address the growing expectations for mining development to support strong and long-term socio-economic value, including beyond the life of the operation of the mine site.

1.1 Objectives and Intended Audience

This research report seeks to advance two objectives:

1. Conduct an analysis of the socio-economic transition landscape through a review of both the literature and practical experiences to identify the needs, benefits, potential stakeholders, and leading best practices in this area; and
2. Provide recommendations on the need for and potential content of a standard or guideline (see Section 1.2) to help mining companies, governments, and Canadian communities better plan for and address the socio-economic transition of a closed mine site.

This report should be of interest to the Canadian mining industry, including companies and industry associations, relevant regulators and policy makers, affected communities and regions, various levels of non-Indigenous and Indigenous governments, and other sector stakeholders and rightsholders, including service providers and non-governmental organizations working on environmental and sustainability issues.

1.2 An Introduction to Standards and Guidelines

Standards and guidelines come in a variety of different forms depending on the topic area and desired outcomes. They can be generally characterized as tools to support improvement of management practices and performance. Standards and guidelines can have far-reaching societal benefits, especially in the areas of health and safety, environmental protection, and community engagement.

Standards, which tend to be more prescriptive than guidelines, contain voluntary or mandatory requirements and recommendations, minimum specifications, performance levels, and technical specifications. Standards are developed to reflect agreed-upon best practices in an area of practice or field, and work to help raise practice and performance to an established benchmark. Standards, both voluntary and mandatory, can enable companies within Canada's mining sector to help improve and make their environmental, health and safety, and sustainability management practices consistent; it can also demonstrate their commitment to a high standard of practice to external stakeholders and investors. Standards are also often incorporated by reference into regulations as well as in policy enacted by federal, provincial, and territorial governments.

Guidelines, alternatively, contain information, examples of how to accomplish an objective or process, and best practices to support an area of work. Guidelines can help to support continuous improvement in an area where desired outcomes are known but best practices are not yet established. Guidelines are often used by mining companies to inform their practices and internal standards development.

2 Methodology

2.1 Scope

The scope of this report focuses on identifying best practices, needs, gaps, and opportunities related to the planning and implementation of socio-economic transitions for mine closure within Canada. While some research and findings may apply to other types of natural resources development (e.g., forestry) or activities related to contaminated sites remediation or management of abandoned mines, other sectors were not explicitly considered.

The research was structured to cover a range of Canadian mining jurisdictions to account for some of the variations in regulatory requirements and stakeholder contexts across Canada. However, it did not include a full review or comparison of relevant mining laws or regulatory requirements at the provincial, territorial, or federal levels, nor was a full scan of Canadian mine closure plans conducted.

Although some research was conducted to consider practices in other comparable countries (e.g., Australia), a more comprehensive review of practices or requirements outside of Canada was not undertaken.

The research focused on planned closure rather than unplanned (temporary or permanent) closure scenarios. However, the research findings on improving socio-economic transition for planned closure may also be applied to, and benefit, the management of temporary or unplanned mine closure.

2.2 Information Sources

The research included both a literature review and key informant interviews.

2.2.1 Literature Review

The research team reviewed a range of published documents and articles related to socio-economic transition, including:

- Frameworks, protocols, guidelines, and other related guidance on mine closure published by mining industry associations or assurance organizations;
- Toolkits and reports on closure practices from mining companies;
- Handbooks and studies on community transitions for governments;
- Toolboxes and checklists for governments on mine closure practices and policies published by economic forums and financial institutions; and
- Academic publications and conference proceedings focused on integrated mine closure and the social aspects of mine closure.

2.2.2 Key Informant Interviews

Fifteen (15) key informants with relevant knowledge and experience in socio-economic transition and mine closure were interviewed. Key informants were drawn from across Canada and from the following categories:

- **Industry**, including mining companies and an industry association;
- **Government**, including federal, territorial, Indigenous, and municipal levels of government, and covering both policy and regulatory dimensions;

- **Social practitioners** who work in the field;
- **Academia**; and
- **Non-governmental organizations** with interest or knowledge of socio-economic transition planning and implementation.

Appendix A: Interviewed Organizations provides a breakdown of the number of key informants interviewed from each of the categories above.

Interviews were conducted using a standard interview guide (see Appendix B: Interview Guide) designed to collect information on existing best practices and guidance on socio-economic transition planning and implementation, emerging expectations and needs in this area, and the potential benefits of a standard guideline for socio-economic transition.

2.3 Analysis

Information collected through both the literature review and the key informant interviews was analyzed to better understand the external drivers contributing to the emerging needs and the current state of practice, including what existing guidance is being used. Analysis was then done to characterize what is needed to improve practice in socio-economic transition planning and implementation. The results of this analysis are presented in Sections 3.3 and 4.

Following the analysis, challenges and opportunities were further characterized for how Canada might improve socio-economic transition planning and implementation through development of a dedicated guideline or standard. The results are presented in Sections 5 and 6.

3 Background and Context

3.1 What is Socio-Economic Transition for Mine Closure?

3.1.1 General

Socio-economic transition is the transition that a community undergoes during and after experiencing a disruption. The way a community experiences transition depends on a range of factors, including the type of disruption and the community's capacity

to manage the related consequences or opportunities [12], [13]. While disruptions can take many forms, communities often face socio-economic transitions due to significant changes in the local economy.

The closure of a mine operation has historically resulted in a period of socio-economic transition for communities, especially for those that rely on the mine for employment and services [12]. Within the mining industry, planning and implementing socio-economic transition encompasses the efforts associated with transitioning a community, including its workforce, towards closure of an operation [8].

A fundamental goal of socio-economic transition for mine closure is to mitigate or minimize the negative social and economic impacts on communities, stakeholders, and rightsholders. A parallel goal is to maximize socio-economic opportunities throughout the life of the mine operations and during closure to support positive post-closure futures.

Like socio-economic transition planning, objectives for socio-economic transition for mine closure are context-specific and vary depending on the characteristics and objectives of the workers and communities involved. There are, however, some typical high-level socio-economic transition objectives for society, government,

and industry, as shown in Table 1. While this list is not exhaustive, it provides a range of objectives, some of which are shared by all parties and others that are more specific to one stakeholder group.

3.1.2 Social License to Operate

Social license to operate is a term used in the mining industry to describe the support and ongoing acceptance from communities and other stakeholders that is required for a mine to operate [10]. Although there are various and competing definitions in the literature [15], this term has been popular with industry as it mirrors the familiar language used in licensing and permitting (e.g., environmental license to operate). However, it is less tangible, in that it cannot be issued by a governing authority but is instead something that is earned and needs to be maintained through ongoing support from communities, rightsholders, and stakeholders [15]. Gaining and maintaining the social license to operate means considering the range of environmental and socio-economic concerns that communities, stakeholders, and rightsholders raise in the context of supporting mine development, both within and outside the regulatory process. Some mechanisms, such as impact benefit agreements, act as ways to demonstrate, as least in part, that the social license to operate has been established.

Table 1: Typical socio-economic transition objectives [9], [14], [12]

Government/Society	Industry
<ul style="list-style-type: none"> ▪ Maintaining local businesses and employment levels and/or establishing and supporting new opportunities through economic diversification ▪ Avoiding the need for social support to former employees and local businesses who relied on the mine ▪ Avoiding further loss of land use and/or regaining some use of lands ▪ Avoiding out-migration and redistributing local labour to support new economic opportunities ▪ Maintaining and/or repurposing infrastructure and institutions ▪ Reducing required interventions to communities (e.g., services) 	<ul style="list-style-type: none"> ▪ Supporting and maintaining the social license to operate (see Section 3.1.1) ▪ Reducing additional liability associated with closure activities ▪ Protecting or building reputation of the company in the eyes of stakeholders, rightsholders, investors, and public ▪ Securing continued or future access to land for exploration or development

Supporting or maintaining the social license to operate is often cited as a key reason for properly managing closure and socio-economic transition. Having a track record of successful closure can help build support for current and future development [14]. As local communities are typically the group most impacted by mine closure, ensuring that socio-economic dimensions of closure are properly managed and meet community needs is an important component in maintaining acceptance to operate [16].

3.2 History of Socio-Economic Transition

Social aspects of natural resource development, including socio-economic impacts, have always presented challenges to industry, particularly at closure when production rates decline and the company is under tighter financial constraints [9]. Closure of mines is historically associated with negative impacts for communities, especially in regions where the economy is not diversified or when the closure is unplanned or unexpected [10], [12]. Without mitigation, socio-economic benefits of the mine, such as employment and business opportunities, as well as other associated direct and indirect social benefits enjoyed by communities during the operations, come to a halt [10]. Potential effects can range from loss of individual livelihoods and well-being, to loss of infrastructure and community services, to out-migration [10], [11], [17].

In Canada, mine closure regulations are heavily shaped by the nation's legacy of abandoned mine sites, particularly in Canada's North. These abandoned mine sites continue to represent substantial environmental and financial liability to the Canadian government [18]. Regulations across Canada have subsequently evolved such that provinces and territories across Canada now require some level of closure planning and associated securities (financial assurance held for all or part of costs associated with reclamation activities) to be submitted prior to the approval of a mining operation and to be updated on a regular basis during the operation [10].

Although mine closure regulations have become more rigorous, environmental and biophysical aspects of closure remain the primary focus of closure planning both around the world and in Canada, with less focus on the social aspects of closure, including economic and cultural impacts [10], [11], [19]. Part of the reason

is that social aspects of mine closure are not well understood and there are few examples or case studies after which to model effective socio-economic transition [10], [20]. Planning for socio-economic transition for mine closure is also complex because the social environment is not only constantly changing over the course of the mine life, but managing socio-economic transition requires interventions and support from other parties, such as the government [21].

In the mid-2000s, the mining industry saw a shift towards the practice of *integrated mine closure*, which the International Council on Mining and Metals (ICMM) defines as “a dynamic and iterative process that considers environmental, social and economic factors at an early stage of mine development [considering] closure as an integral part of the mine operation's core business” [8]. Some purported benefits of integrated mine closure include early risk identification, improved closure management through the mine life cycle, more accurate closure cost estimates, and better closure outcomes [8], [14].

In 2008, two notable documents on integrated mine closure were published to guide practice in this area: the ICMM's “Integrated Mine Closure Toolkit” and Anglo American's “Mine Closure Toolbox.” Both organizations have since produced updated guidance and tools to keep pace with the growing field of practice, including on topics like closure governance, progressive closure practices, and social considerations [8]. Similarly, in 2008, the Mining Association of Canada (MAC) produced a framework on mine closure through its *Toward Sustainable Mining* program, which establishes member commitments to managing mine closure and incorporates integrated mine closure practices such as updating mine closure plans throughout the mine life [22].

3.3 Existing Requirements and Guidelines

3.3.1 Regulatory Requirements

In Canada, provinces and territories have jurisdiction over mining, which is generally administered through a series of legislation, primarily mining acts and environmental assessment or protection acts. These legislative documents contain a range of procedures and enforcement mechanisms around closure [23].



"Historically, socio-economic considerations have been unevenly considered across environmental assessment regimes in Canada."

Although procedures vary across jurisdictions, closure planning, even at a conceptual level, is part of the mining development's submission at the environmental impact assessment stage [10], [23].

Historically, socio-economic considerations have been unevenly considered across environmental assessment regimes in Canada [10], [24]. The introduction of Bill C-69 in 2019 and the federal Impact Assessment Act changed this by specifically including changes to health, social, or economic conditions in the scope of the assessment [25]. Despite this, the consideration and integration of socio-economic aspects within the closure planning process is generally considered inadequate and inconsistent across regulatory regimes [10], [23]. For example, in a study reviewing and comparing mine closure planning and practices in Canada and Australia, none of the mine closure plans reviewed³ had separate sections dedicated to the social impacts of mine closure [23]. The study noted that unlike Australia, Canada does not require development of a dedicated social impact management plan to address social or economic impacts of mine closure. Another study noted that in the Northwest Territories and Nunavut, closure plans are more likely to encompass a broader range of socio-economic considerations due to guidance and policy documents developed by their respective impact review and water boards, but other jurisdictions in Canada provide less guidance, definition, or criteria around the socio-economic aspects in closure planning [10].

3.3.2 Industry Standards or Guidelines

From a global perspective, ICMM's "Integrated Mine Closure Good Practice Guide" is a leading and often-cited industry guideline for mine closure. The guide was recently updated to include more details regarding social transition. ICMM has also developed tools to support the recommendations outlined in the guide [12]. To reduce the negative socio-economic impacts and capture the benefits associated with mine closure for dependent communities, the guide highlights three key elements of social transition and provides general guidance on how to approach implementation. Table 2 summarizes these elements and associated guidance.

While other industry guidelines or standards to support socio-economic transition activities exist, their connection to socio-economic transition planning for mine closure tends to be less direct. The Initiative for Responsible Mining Assurance (IRMA) maintains the *Standard for Responsible Mining*, IRMA-STD-001, which includes some requirements that support socio-economic transition. Principle 2 includes processes to plan for and manage positive mining legacies and requirements to consider social impacts within environmental impact assessments and to plan and deliver community benefits that last beyond the life of the operation [26]. However, IRMA-STD-001 does not consider social aspects of closure within its requirements around planning and financing closure [27]. The MAC's Towards Sustainable Mining initiative

³ Canadian mine closure plans reviewed included projects located in the Northwest Territories, Ontario, Yukon, and Nunavut.

Table 2: ICMM key elements of social transition [8]

ICMM Key Elements	Summary of Guidance
<p>Planning for social transition</p>	<p>Incorporate social transition planning within the overarching mine closure plan, either through a social transition plan or through integrated closure planning. Similar to other closure planning, apply an iterative approach to continually revise and update the plan. This key element includes the integration of risks and associated mitigation measures into the earliest phases of mine planning and includes specialists, stakeholders, and rightsholders early and throughout the planning.</p> <p>ICMM provides two tools to support planning and engagement that include recommendations for activities and key messages at different stages of the mine life cycle.</p>
<p>Social investment for closure</p>	<p>Conduct strategic, planned, and coordinated social investment that aligns with the shared vision of the post-closure future and focuses on building community resilience throughout the life of mine.</p> <p>ICMM provides a self-assessment questionnaire to understand the efficacy of social investment strategies to support social transition for closure.</p>
<p>Social transition costs</p>	<p>Assess potential costs of social transition (e.g., conducting community-level studies to provide information to support socio-economic transition, employee training or reskilling programs, and social investment implementation).</p> <p>ICMM acknowledges that this is a complex exercise with much variability, depending on context and a lack of experience-based unit costs on which to base estimates.</p>

has developed a “Mine Closure Framework” that outlines members’ commitments to responsible mine closure beyond legal compliance, including mitigation of the socio-economic impacts and commitment to work with communities to plan for long-term economic development [22]. However, the framework does not provide specific direction on how to do so. The World Gold Council’s “Responsible Gold Mining Principles,” an international framework to address key environmental, social, and governance issues for the gold mining sector, also includes requirements around closure, such as a commitment to plan for the social aspects of mine closure in consultation with rightsholders and stakeholders, and to work to obtain free, prior, and informed consent (FPIC) with Indigenous peoples where adverse impacts may occur, including during closure and around the delivery of sustainable benefits [28].

Some international guidelines have also been developed specifically for governments and policy makers. The World Bank’s “Mine Closure: A Toolbox for Governments” and the Asia-Pacific Economic Cooperation Secretariat (APEC) “Mine Closure: Checklist for Governments” both provide information to assist governments in developing governance frameworks to ensure successful mine closure.

They include a broad range of information on socio-economic aspects of closure, including a review of good practices and considerations for legislation and policy [19], [29].

A level of corporate commitment is needed to successfully implement integrated closure planning [14]. Although it is difficult to know how the socio-economic aspects of closure are being addressed at the governance level in Canadian mining companies, because this is still a developing area in the mining industry, it is likely that these aspects have not yet been widely adopted [14], [30]. In one scan of corporate closure practices across seven mining companies, Worden found that the main instruments used to govern integrated closure planning were risk-based approaches, company closure standards, business closure strategies, and mine closure plans. More common governance instruments such as board oversight or policy were used less often [30]. Where mining companies develop and implement guidance around closure, it may still be difficult to determine effectiveness. For example, Worden could not determine the extent to which the integration of the social aspects of closure compared to the environmental aspects among the seven companies [30]. Additionally, because the participating mining companies

included mainly larger, multinational companies with large market capitalization,⁴ internal closure governance for smaller companies may not be as robust or may not exist. Even when companies develop governance that is based on internationally recognized benchmarks, corporate closure standards are rarely tested because major operators often divest from complex projects before entering the closure phase [9].

Anglo American's "Mine Closure Toolbox"⁵ is likely the most prevalent example of company closure governance. The toolbox, which was first launched in 2008, is publicly available and provides guidance and examples to Anglo American companies to assist in the development of mine closure plans. It includes the development of a social transition plan using a risk-based approach, and integrates social transition with the physical, biophysical, and financial components of the mine life [31].

3.4 Emerging Expectations and Drivers

In previous research on gaps and opportunities for standards to support the Canadian mining sector, key informants highlighted the challenges associated with the social, economic, and cultural transition a community or region undergoes upon mine closure [7]. With the expected closure of multiple Canadian mines in the next few years, key informants identified socio-economic transition as a topic of growing focus and an area with potential need for additional guidance. Specifically, key informants felt that more information and guidance was needed to understand the following questions:

- What is socio-economic transition?
- What should be included in a socio-economic transition plan, including for partial and full closure?
- How do you measure success?
- What are the roles for the mining company, governments, community, and other businesses in planning and implementing socio-economic transition for mine closure?

During the interviews conducted for this report, there was consensus that socio-economic transition is an important and emerging issue. This is being driven largely by growing expectations of stakeholders and rightsholders for industry to demonstrate sustained long-term socio-economic value of mining for communities. Increased focus of investors on environmental, social, and governance (ESG) performance, as well as the call for more integrated mine closure approaches within industry and regulation further bolster the need for improved approaches to socio-economic transition.

Communities, along with Indigenous, local, and regional governments, are increasingly demanding that industry demonstrate strong, long-term socio-economic value beyond the life of the mine, in order to secure social license to operate. A few key informants noted that enhanced legislation and regulation, and specifically the need to secure FPIC, are further empowering stakeholders and rightsholders in decision-making around development. This contributes to the growing focus on social responsibility, including around closure. Indigenous rightsholder organizations and communities are also becoming more discerning about the actual benefits provided through development and are starting to include specific provisions in impact benefit agreements related to closure [32].⁶

Mining companies are also increasingly vying to demonstrate enhanced management of the social aspects of their businesses to gain access to capital. Investors have consistently ranked social license to operate as a top risk for the mining industry, and there are growing expectations for companies to enhance integration, transparency, and disclosure of ESG factors into planning, decision-making, and strategy [5], [6].

Competition for investment capital extends to the national scale as well. The minerals and metals industry continues to be a key contributor to the Canadian economy, for which it competes with other markets,

4 The companies included in the scan were Anglo American, BHP, Newcrest, Newmont, OceanaGold, Rio Tinto, and Teck Resources.

5 Anglo American's Mine Closure Toolbox, version 3 incorporates the Integrated Closure Planning System (ICPS) that was developed in 2015 [31].

6 One key informant stated that even in established mining regions, there appears to be greater resistance to expansion of mining. Another noted that post-mining is an area of particular concern for communities who are considering or have already accepted development.

including Australia [33]. As noted by one key informant in previous research on gaps and opportunities for the sector, Canada may be falling behind other major mining jurisdictions, including in closure management [7]. For example, an Australian industry-university research collaboration was established in 2019 to better understand the social dimensions of mine closure and to identify strategies for improving post-closure outcomes [34].

There is also continued movement towards the use of integrated closure approaches as best practice, and this is increasingly incorporated into regulatory requirements. Key informants noted that mining companies are aware of the growing expectation around environmental closure management and associated liabilities. Integrated closure planning provides a better understanding of the true costs of the closure and long-term management requirements [6], [2].

Key informants noted that there is a lack of consensus or understanding around what best practice in socio-economic transition implementation is, and that there are few examples of successful closure to use as models. This makes it challenging for both industry and regulators to assess quality of closure planning for social aspects and to meet stakeholder expectations. Key informants noted that socio-economic transition is an emerging area of focus, and while there is some high-level guidance available (e.g., ICMM), it does not account for the Canadian context, including jurisdictional considerations, Indigenous rights, and the prevalence of impact benefit agreements.

4 Current Practices, Challenges, and Needs

4.1 Current Practices and Performance

When asked what is currently done well or not done well, most key informants stated that socio-economic transition planning is generally not done well. Several key informants also stated that because socio-economic transition planning addresses a broad set of context-specific issues and perspectives, it may be difficult to define specific good practices that are broadly applicable.

Key informants described a range of **deficiencies** in current practices:

- Socio-economic transition is not considered early enough in the mine life planning cycle to allow for the time needed to plan, fund, and build capacity for a community to transition to another economic sector or otherwise prepare for the social impacts of closure.
- Operators are not engaging with communities early enough on closure. Some key informants suggested this could be out of fear of sending mixed messages, potentially leading to premature departure of employees; others disputed that as a valid risk, with one stating, “People who know don’t panic—they plan.”
- Operators are not dedicating the necessary resources within the closure planning process to account for socio-economic transition planning needs. There is a tendency to lean on community relations teams to do socio-economic transition, but that does not invoke the necessary technical expertise from areas such as procurement or human resources (e.g., for supplier and workforce transition), and community relations employees are not typically integrated within mine closure teams.
- Current closure planning often does not consider, or align with, other planning initiatives that could be leveraged, such as regional economic planning or community planning.

Key informants also described the following **barriers** to conducting socio-economic transition planning and doing it well:

- Communities and governments can be reluctant to discuss closure, especially early in the project when there is a desire to focus on the benefits of building and operating the mine, such as employment and local business development. The longer life of some mine developments can mean closure becomes an intangible concept; even those involved in the planning may not see closure within their professional lifetime. A few key informants also suggested that there is reluctance or inability of governments to forward-plan beyond the closure of the mine and diversify accordingly.

- Stakeholders have difficulty internalizing messages around closure. There is a lack of understanding about how mining interacts with the community (e.g., rotation schedule, worker housing, sourcing of goods and services) and what the impacts of closure could therefore be. Some stakeholders simply do not believe or do not want to believe that closure is coming.
- Socio-economic transition planning is inherently a multi-stakeholder endeavour, which can make planning complex, especially when roles and responsibilities are not well-defined or understood. It is generally agreed that for socio-economic transition to be successful, communities should be leading or driving planning, but they may lack capacity as well as the broader regional perspective needed to connect to other retraining or reinvestment opportunities. Power imbalances, especially between the communities and the mines, can also lead to distrust.
- The Raglan Mine Closure Plan Subcommittee for Glencore's Raglan Mine in Nunavik (northern Quebec) is a multi-stakeholder partnership managed within the Raglan socio-economic agreement that works to collaboratively develop a plan for closure and remediation of the mine.
- Teck's Sullivan Mine in Kimberley, British Columbia, ceased operations in 2001. The company worked with the Sullivan Public Liaison Committee and others to transition the city from a mining community to a tourist and retirement community.
- More generally, impact benefit agreements or socio-economic agreements (between mining companies and Indigenous rights holders) and collective agreements (between mining companies and unions) were mentioned as mechanisms through which some aspects of socio-economic transition are already being planned or managed with success.

Key informants also discussed **challenges** in relation to socio-economic transition as an area of practice:

- Socio-economic transition does not have a one-size-fits-all approach and must consider a range of contextual factors, including but not limited to the jurisdiction of the operation (e.g., traditional mining regions vs. remote areas), community proximity or dependence on mining, socio-economic status of impacted communities, existence of socio-economic agreements with Indigenous governments, and the anticipated socio-economic impacts and benefits of the operation.
- There is a lack of an established knowledge base on what socio-economic closure should be or look like; socio-economic transition in mining regions is not a well-researched area and there is often a lack of successful examples in comparable contexts.

A few key informants mentioned **examples** where socio-economic transition planning was undertaken and from which good practices could be gleaned:

- The Thompson Economic Diversification Working Group (TEDWG) was a multi-stakeholder collaborative working group established when Vale announced that it would be closing its smelter and refinery in Thompson, Manitoba in 2015 and looked to transition its operations to mining and milling.

Findings from the literature review aligned with many of the perspectives shared by key informants:

- Mine closure teams should cover all disciplines, including social and community expertise, to ensure the full range of issues, including social, physical, biophysical, and financial aspects, is integrated into the closure plan [14], [30], [9].
- A key challenge related to socio-economic transition is the length of time needed to establish sustainable socio-economic opportunities that sufficiently reduce residual risk of post-closure impacts [11].
- The planning horizon of closure, including uncertainty of closure dates, is a barrier to having meaningful conversations with stakeholders on closure during early or operational phases of the mine [30].
- There is a general lack of research on issues around mine closure, as well as around collaborative approaches to community and regional development, which makes it challenging to understand key issues around which to establish policy [35]. Most literature on community-engaged closure focuses on the documentation of past failures rather than successes [10].
- Operators can be reluctant to actively address socio-economic transition planning, as it is far removed from the traditional core business expertise of mining companies [20].

4.2 Key Stakeholders and Roles

The importance of involving a broad range of stakeholders in the planning for socio-economic transition was a conclusive theme heard from key informants, who suggested including mining companies, local, provincial, territorial, and Indigenous governments, unions, land users, the business community, economic groups in other sectors such as energy and tourism, education and post-secondary institutions, and community and social agencies, to name a few. Several key informants stressed the importance of Indigenous

governments and groups being actively involved or partnered with in the planning and implementation of socio-economic transition.

When asked to describe what roles stakeholders should play in socio-economic transition, key informant feedback centred on the roles of three key stakeholder categories: communities/local government, mining companies, and provincial/territorial governments. Table 3 summarizes the suggested roles for these stakeholder categories.

Table 3: Key stakeholders and suggested roles

Stakeholder/ Rightsholder	Suggested Role	Considerations
Communities/ Local Governments	Lead	<ul style="list-style-type: none"> Communities, especially Indigenous communities, should lead or drive planning according to their community vision, goals, and plans. This means that mining plans and community plans, with distinct and overlapping objectives and timelines, will require interaction to support each other’s success. As with environmental closure, communities should identify specific goals for socio-economic transition for mine closure according to their needs and objectives for a post-mining future. Some communities may require representation or support from higher levels of government or regional bodies to enable effective participation.
Mining Companies	Support	<ul style="list-style-type: none"> Companies should facilitate and create space for socio-economic transition planning, including coordinating involvement, project management, and dedicating time, human resources, and financial support. Companies should ensure that participants have capacity to participate and a baseline understanding of the mine plan, how the mine interacts with the community (e.g., rotation schedule, worker housing, sourcing of goods and services), and anticipated closure impacts. Several key informants noted the importance of managing power dynamics within the planning process, and suggested mining companies utilize and pay for a neutral third party to facilitate the planning process when planning with a multi-stakeholder group.
Provincial/ Territorial Governments	Actively participate	<ul style="list-style-type: none"> Provincial and territorial governments are already involved in the regulatory process and responsible for oversight, including reviewing mine monitoring, management, and closure plans; they should also actively participate and be involved in closure planning and oversight. In cases where there are multiple operations, or small communities with very limited capacity, it may make sense for provincial and territorial governments to drive the socio-economic transition planning process or to delegate it to a regional body. Provincial and territorial governments should bring a long-term economic development planning perspective and provide guidance on how mining and other economic sectors can interact and help sustain socio-economic well-being past closure.

The literature review confirmed several themes around the importance of multi-stakeholder collaboration and the roles each party plays in socio-economic transition planning and implementation:

- To achieve the goal of sustainable socio-economic transition from mining to a post-mining economy, governments, communities, and other parties (such as private parties in alternative economic sectors) have roles and responsibilities in the process [19], [32], [13]. Planning and objectives for post-closure futures should be aligned with relevant government or other local, regional, and national plans and objectives, and government should be involved in the review of socio-economic transition plans and participate in planning, especially where a mine contributes to social services, facilities, and infrastructure [19], [13].
- The benefits of using a co-production or collaborative approach includes the development of a sense of ownership, the opportunity to develop a plan that is tailored to the community, encouraging innovation to establish alternate economic opportunities, and increased community capacity and resiliency [20]. As indicated in the Thompson, Sullivan, and Raglan examples described in Section 4.1, co-production and collaboration can be achieved through a multi-stakeholder body that leads and coordinates the socio-economic transition plan.

5 Needs and Opportunities for Better Guidance

Key informants broadly agreed that the practice of socio-economic transition for mine closure would benefit from better definition, structure, and guidance. However, as noted in Section 4.1, some key informants also identified two challenges to establishing better guidance: first, the highly contextual nature of socio-economic transition planning, and second, the limited body of practice in this area in Canada on which to base guidance. These key informants recommended gathering additional details on past and ongoing examples of socio-economic transition, including good practices and lessons learned.

Key informants identified a range of specific aspects of socio-economic transition planning that are currently not well-defined or that would benefit from additional guidance:

- How to transition local employees and local suppliers in collaboration with local communities and relevant levels of government.
- How to compose and resource interdisciplinary internal closure teams, with the appropriate range of technical expertise.
- When and how to engage with stakeholders, especially communities, including the following considerations:
 - How to engage early, including coordination with the environmental and socio-economic aspects of the impact assessment process;
 - How to ensure transparency; and
 - How to scope topics that are pertinent and of interest to communities and government.

Many key informants stated the importance of promoting planning on a broader scale, beyond the mine or community boundary, to identify and realize opportunities through regional economic development plans and other broader scale initiatives.

Other specific needs and considerations mentioned by individual key informants included:

- The need for funding mechanisms (i.e., legacy funds) to support economic diversification for future generations and act as a tool for economic transition.
- The need for socio-economic transition planning to depart from environmental closure planning in process and approach where appropriate, recognizing that there are differences between the two, including a less clear allocation of responsibility for post-closure socio-economic impacts.
- The need for modelling or visualization tools to help stakeholders see and understand potential socio-economic transition scenarios.

When asked how a standard or guideline could complement other related activities in the Canadian mining sector, several key informants identified



"Key informants broadly agreed that the practice of socio-economic transition for mine closure would benefit from better definition, structure, and guidance."

potential opportunities. If well-aligned with the Canadian context, a standard or guideline could complement Canada's existing regimes and practices in environmental closure and encourage greater leadership in this area. There may also be an opportunity to develop guidance that demonstrably links to the social license to operate and efforts to obtaining FPIC, so it serves as a benchmark for companies rather than an additional imposed requirement.

5.1 Benefits and Risks of Standardization

Given that most key informants broadly agreed that better definition, structure, and guidance is needed to improve the practice of socio-economic transition for mine closure, they saw a range of potential benefits for developing a standard or guideline for both Canadian society and the Canadian mining sector.

If incorporated or considered in impact assessment guidance, a standard or guideline could support better integration of socio-economic transition into impact assessments and therefore trigger engagement and planning earlier in the mine development process, where they are acknowledged as being the most beneficial [17]. One key informant suggested that a standard or guideline could help inform parties negotiating other agreements (e.g., impact benefit agreements) and thereby help communities or Indigenous governments—especially those with less capacity and expertise—achieve more robust agreements. A standard could also establish minimum

requirements for mining companies to include socio-economic transition considerations within internal closure governance and to support understanding and implementation of best practices [8], which could lead to benefits such as reduced liability risk, improved access to capital and land, and improved social license to operate.

Because most of the existing guidance in this area is international, several key informants saw potential benefit in a Canadian standard or guideline that translates global best practice for the Canadian context, including considerations specific to rights of Indigenous peoples and operations in the North, and that meets Canadian societal expectations.

In terms of risks, several key informants stated that if a standard or guideline was too prescriptive, long, onerous, or otherwise not suitable to the topic, there is a risk that it might not be adopted or that it could potentially hinder development. One key informant also warned that standardization could stifle creativity and innovation if too specific or could potentially set the bar too low if it is too broad. Furthermore, as best practices are still being tested and will likely change over time, a standard or guideline could potentially become outdated or of less value over time.

5.2 Form, Scope, and Application

Key informants were asked for their ideas on the suitable form, scope, and application of a potential standard or guideline on socio-economic transition for

mine closure, recognizing that these can be designed to different levels of detail and prescriptiveness and can be implemented in different ways.

In keeping with the benefits and risks they identified, the consensus among key informants was that a guideline incorporating best practice and lessons learned would be more suitable than a more prescriptive standard that lays out requirements. One key informant noted that the broad and context-specific nature of socio-economic transition planning may not lend itself to measurability and audit.

It was also noted that a standard or guideline could be used and applied by mining companies, as well as local, regional, and Indigenous governments, given that socio-economic transition is inherently a multi-stakeholder endeavour. Clearly, not all actions related to socio-economic transition are under the control of mining companies, and a standard or guideline would need to consider the realistic boundaries of responsibility or influence of each party.

A few key informants cautioned that a standard or guideline must not be viewed as infringing upon, or otherwise impacting, the rights of Indigenous peoples, particularly their right and ability to negotiate socio-economic transition measures as part of socio-economic agreement or impact benefits agreements.

As there is already some established international guidance (e.g., ICMM) and other leading sustainability frameworks within Canada, a standard or guideline on socio-economic transition for mine closure would need to avoid duplication or be complementary by demonstrating linkages or concordance with other guidance.

6 Next Steps

A synthesis of the findings from the literature and interviews indicated four considerations that should inform the development of further guidance for socio-economic transition for mine closure in Canada. Table 4 describes these considerations.

Table 4 : Key considerations to inform development of guidance for socio-economic transition for mine closure in Canada

Relevance in Canadian Context	Flexible and Complementary
<ul style="list-style-type: none"> Recognizes and builds upon existing leadership in mine closure practice in Canada Builds upon existing regulatory requirements regarding socio-economic impacts and benefits in mining Considers unique aspects of the Canadian context, including the North and the jurisdiction, rights, and Treaty rights of Indigenous peoples and nations 	<ul style="list-style-type: none"> Recognizes the highly contextual nature of socio-economic transition planning by accommodating variability across jurisdictions, types of mining development, and communities Provides opportunities to align with or build upon existing guidance Accounts for potential interactions with other socio-economic agreements and initiatives, such as impact benefit agreements
Continuous Improvement and Evolution	Process Focused
<ul style="list-style-type: none"> Provides space for state of practice to continue to evolve, recognizing lack of consensus in certain areas of practice Recognizes current lack of experience and established practitioners in socio-economic transition Includes a mechanism to enable updates to reflect improved understanding and evolution of experience 	<ul style="list-style-type: none"> Accommodates the highly contextual and multi-stakeholder nature of socio-economic transition by focusing on key process elements and fundamentals (e.g., early engagement, planning, community-driven) (see Section 6.1)

6.1 Key Process Elements

Regarding what is needed to address socio-economic transition for mine closure, key informants suggested four high-level process elements that could inform the development of a potential guideline or standard:

1. Early and ongoing engagement;
2. Multi-stakeholder collaboration;
3. Alignment with community and other external plans; and
4. Internal governance and expertise.

These elements, which are described in more detail in the following sections, are consistent with many of the practices and themes identified in the literature [30], [8], [17], [21]. While there is general agreement on the importance of these process elements, there are barriers to their implementation, and there is uncertainty on how to carry out the process.

6.1.1 Early and Ongoing Engagement

Engagement on socio-economic transition planning for mine closure needs to be early (e.g., during the construction phase or before) and ongoing. Early engagement needs to be normalized and appropriate to the stage of planning. Early and ongoing engagement and planning enable proactive approaches, akin to progressive reclamation for environmental closure, instead of more reactive measures when the mine is already in a phase of decline and when closure is imminent.

Both the key informants and the literature identified early engagement around socio-economic transition as a desirable objective but also as a common challenge due to a range of factors:

- Lack of understanding of how mining works (e.g., the lifespan of the asset and other general business factors) and of the nature of socio-economic impacts, especially if dependencies are created.
- Reluctance of mining companies and governments to engage on closure during the regulatory or operational phase when there is a desire to focus on the benefits the mining development brings rather than the benefits or opportunities post-closure.

- How stakeholders receive or interpret messaging around closure (e.g., as a negotiation tactic or as good long-term planning) and their capacity or general interest in talking about it at early stages of development when closure may seem intangible or non-urgent.

6.1.2 Multi-Stakeholder Collaboration

There was broad consensus about the importance of multi-stakeholder collaboration, including the following:

- A wide net should be cast in terms of the range of stakeholders involved in the process, including both organizations (e.g., community social services, academic institutions, business communities) and individuals. Gathering input from key representative groups (e.g., Elders, youth, women, immigrants, etc.) and applying a gender lens is also important to developing measures that are tailored to the individuals' experience with transition [36].
- A mining company's role in planning should include providing support and resources to stakeholders, as required, to ensure they have the information and capacity to effectively participate in planning.
- Communities, including Indigenous communities, should lead or drive planning that is informed by their own vision, goals, and plans. However, some communities (especially small and/or remote communities) may require representation and support from higher levels of government or regional bodies to enable effective participation.
- Power dynamics within the multi-stakeholder group need to be explicitly acknowledged and, preferably, actively managed by a neutral third party.

6.1.3 Alignment with Community and Other External Plans

Socio-economic transition planning for mine closure usually occurs within a broader context that includes other plans, strategies, and agreements with socio-economic goals and objectives. Local, regional, territorial, and provincial governments are engaged in economic and social development planning. Mining companies and Indigenous organizations enter into socio-economic agreements or impact benefit agreements that may include commitments

related to transition at closure. Mining companies and unionized workers enter into collective agreements that may include specific aspects related to closure and transitioning workers.

Several key informants expressed the importance of aligning socio-economic transition planning for mine closure with broader economic development planning, which underscores the importance of the government's role in the planning process. Due to their existing role in regulatory processes and oversight, government needs to be involved if not driving the process itself.

While many key informants stated that socio-economic transition planning should be aligned with the vision, goals, and plans of affected communities, some also noted that the levers for socio-economic transition exist at various levels of government and the impacts or opportunities can be felt on a broad scale. Therefore, alignment with regional and higher-level government socio-economic planning is likely also needed and may be most beneficial where the government has a long-term vision and understands how mining fits within it.

6.1.4 Internal Governance and Expertise

Although the requirement to do integrated closure is embedded in some of Canada's regulatory requirements, governance and expertise within mining companies still reflects a strong focus on the environmental aspects of closure planning. Several key informants identified internal governance and expertise as an area where guidance should be provided. Specific aspects could include:

- A formalized company commitment (policy or goal statement) related to integrated closure and corresponding senior-level accountability; and
- Appropriate internal resources and expertise to support transition planning, such as community relations specialists, anthropological experts, community/economic development specialists, as well as capacity from relevant functional areas, including procurement and human resources.

These four key process elements described in Sections 6.1.1 to 6.1.4 require further definition, validation, and development to inform a potential guideline or standard.

7 Conclusions

Previous research on gaps and opportunity areas for the Canadian mining sector highlighted challenges and growing focus on the practice of planning and implementing socio-economic transition in the context of a closed mining operation. This is driven by several emerging expectations and drivers, including:

- Increased expectations of communities and governments for industry to demonstrate strong and long-term socio-economic value to secure social license to operate;
- Sustained growing expectations from investors for enhanced performance, integration, and disclosure on social issues, and their impact on Canada's relative position in the global market for investment capital; and
- Continued movement towards use of integrated closure approaches as best practice, and their incorporation into regulatory requirements.

In interviews with key informants to understand current practices, challenges, and needs related to socio-economic transition, most key informants noted a range of deficiencies in current socio-economic transition practices, including planning and engaging on closure too late in the mine life cycle and inadequate resourcing of mine closure teams. Key informants talked about a range of barriers and challenges that socio-economic transition planning presents due to complexities introduced by the length of time involved, multi-stakeholder involvement, and the need for a highly contextualized approach.

Key informants agreed that a broad range of stakeholders needs to be involved in socio-economic transition and provided input on the relative roles and responsibilities of key groups in planning and implementation. Although scope of responsibility for key stakeholders would still ultimately depend on the context (e.g., existence of regional government, capacity of local government, etc.), key informants suggested that for transition to be successful, communities should drive the process, with the mining industry providing resources and support. Several key

informants also stressed the key role of higher levels of government in providing necessary capacity and expertise (especially where affected communities are small or remote) and the appropriate scale of measures and support, including alignment or integration with broader regional economic development planning.

Key informants also indicated that certain aspects of socio-economic transition would benefit from better definition, structure, and guidance, especially in supporting collaborative transition strategies with communities and government, resourcing internal closure teams, and doing early engagement on socio-economic transition. While some key informants felt guidelines or standards could complement related activities within the Canadian mining sector to support social license to operate and efforts to obtain FPIC, others noted that with the limited body of practice in this area, there is first a need to gather detail on good practices and lessons learned from past and ongoing examples of socio-economic transition.

In analyzing opportunities for standardization, the research conducted for this report (supported through key informant feedback) illustrated several potential risks and challenges to standardizing in this topic, especially if the form of standard was one that set requirements or rules. Given this, key informants recommended that whatever form a guideline or standard in this area might take, it should be less prescriptive, such as a guideline assembling best practices and lessons learned. Feedback also suggested considering the way a guideline or standard could be used and applied in a multi-stakeholder process and ensuring that it does not impact the rights of Indigenous peoples to separately negotiate transition measures in impact benefit agreements.

Findings from the literature and interviews indicated four considerations that should inform the development of further guidance for socio-economic transition for mine closure in Canada:

- Having relevance in the Canadian context, considering existing practice, regulatory requirements, and unique aspects such as the North and Treaty rights;
- Being flexible for different contexts and complementary to existing guidance;
- Providing space for the state of practice to continue to evolve and allowing for continuous improvement; and
- Focusing on key process elements and fundamentals.

Observations from the key informant interviews and the literature review suggested four key process elements that could form the foundation of a potential guideline or standard:

- Early and ongoing engagement;
- Multi-stakeholder collaboration;
- Building alignment with community and other external plans; and
- Enhancing internal governance and expertise.

These process elements could be further validated, refined, and elaborated as part of a collaborative standard or guideline development process involving industry, government, community organizations, Indigenous rightsholders, and other mining stakeholders.

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Appendix A – Interviewed Organizations

Category	Number of Key Informants
Industry (Association)	1
Industry (Company)	3
Government (Provincial/Territorial)	1
Government (Indigenous)	2
Municipality/Regional Planners/Economic Development Specialists	2
Regulator	1
Academia	1
Consulting	2
Non-Governmental Organization	1
Labour Union	1

Appendix B – Interview Guide

The following questions were asked in the interviews:

1. Please describe your experience and/or interest in the area of community socio-economic transitions.
2. In terms of planning and implementation of socio-economic transition, what do you consider to be the major challenges to achieving desired outcomes?
 - a. What is often done well?
 - b. What often isn't done well?
3. Who are the key stakeholders that need to be involved in socio-economic transition planning? Broadly speaking, what roles do you think these key stakeholders should play?
4. Are there existing best practices or requirements you know of, either in Canada or internationally, on socio-economic transition planning (particularly for mines)?
5. What aspects of socio-economic transition post-mining would benefit from better definition, structure, and guidance? (i.e., what are the key elements and topics that would need to be covered?)
6. Do you think a standard in this area would meet a demand and provide benefits for Canadian society and for the Canadian mining sector? Please elaborate.
 - a. If yes, do you have ideas or input on the scope and application of a standard in this area?
7. Do you see any risks or challenges in having a standard in this area?
8. How could such a standard complement other related activities in the Canadian mining sector?
9. Do you have any closing thoughts, suggestions, or references to share?

CSA Group Research

In order to encourage the use of consensus-based standards solutions to promote safety and encourage innovation, CSA Group supports and conducts research in areas that address new or emerging industries, as well as topics and issues that impact a broad base of current and potential stakeholders. The output of our research programs will support the development of future standards solutions, provide interim guidance to industries on the development and adoption of new technologies, and help to demonstrate our on-going commitment to building a better, safer, more sustainable world.