STANDARD-SETTING PROJECT

Tailings Management in Extractives

UPDATES TO THE SASB METALS & MINING AND COAL OPERATIONS STANDARDS

Issued: December 6, 2021
Effective Date: January 1, 2022

Prepared by the SASB Standards Board
Notice of Updates to the SASB Metals & Mining and Coal Operations Standards

In December 2021, the SASB Standards Board voted to issue updates to the SASB Metals & Mining and Coal Operations Standards. The updated Standards (Version 2021-12) supersede the previous Standards (Version 2018-10).

Effective Date

Version 2021-12 of the SASB Metals & Mining and Coal Operations Standards is effective for all entities for annual periods beginning on or after January 1, 2022.

Early adoption is permitted for all entities. If an entity applies the updates for an annual period beginning before the effective date, it shall disclose that fact.

If an entity chooses to not use the effective version of a Standard, it shall disclose the omission(s), as well as the rationale for the omission(s), consistent with guidance provided in the SASB Standards Application Guidance, Version 2018-10.
# Table of Contents

**Overview** ........................................................................................................................................... 4

**Basis for Conclusions on Updates to the Metals & Mining and Coal Operations Standards** ........ 5
   Introduction ............................................................................................................................................. 6
   Summary of updates to the Standards .................................................................................................. 6
   How did the Board develop the updated Standards? ....................................................................... 8
   Why was the project undertaken? ......................................................................................................... 9
   What is the basis for the updated disclosure topics? ....................................................................... 11
   What is the basis for the updated metrics? ......................................................................................... 14
   Updates to the Standards .................................................................................................................. 24
   Effective date of the updates ............................................................................................................. 24

**Redline Version of Updates to the Metals & Mining and Coal Operations Standards** ............. 26
   Metals & Mining Standard ................................................................................................................ 27
   Coal Operations Standard ................................................................................................................ 38
Overview
This document was produced as part of the Tailings Management in Extractives standard-setting project, overseen by the SASB Standards Board (the Board). It contains the following sections:

- Basis for Conclusions on Updates to the Metals & Mining and Coal Operations Standards
- Redline Version of Updates to the Metals & Mining and Coal Operations Standards

The Basis for Conclusions summarizes the considerations of the Board to arrive at the updates to the Standards, including how the updates were guided by the SASB Conceptual Framework.

The Tailings Management in Extractives project page on the Value Reporting Foundation website contains further information on the standard-setting project.
Basis for Conclusions on Updates to the Metals & Mining and Coal Operations Standards
Introduction

The Basis for Conclusions describes the updates to the Metals & Mining and Coal Operations Standards, including the considerations and rationale of the SASB Standards Board in developing and approving updates to the Standards.

The Basis for Conclusions is organized as follows:

- a) Summary of updates to the Standards
- b) How did the Board develop the updates to the Standards?
- c) Why was the project undertaken?
- d) What is the basis for the updated disclosure topics?
- e) What is the basis for the updated metrics?
- f) Updates to the Standards
- g) Effective date of the updates

Summary of updates to the Standards

The Metals & Mining and Coal Operations Standards have been updated through (1) the addition of a disclosure topic, Tailings Storage Facilities Management, and three corresponding metrics to more completely capture risks associated with the management of tailings storage facilities (TSFs); and (2) a revised scope of the Waste & Hazardous Materials Management disclosure topic in the Metals & Mining Standard and the Waste Management disclosure topic in the Coal Operations Standard to focus on the risks related to waste generation, including tailings and the management and handling of hazardous waste (and hazardous materials in Metals & Mining Industry).

Table 1. Updated Disclosure Topic Scope

<table>
<thead>
<tr>
<th>Sustainability Angle</th>
<th>Previous Standards</th>
<th>Updated Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental contamination</td>
<td>Waste &amp; Hazardous Materials Management disclosure topic</td>
<td>Tailings Storage Facilities Management disclosure topic</td>
</tr>
<tr>
<td>Tailings storage facilities management</td>
<td>Tailings Storage Facilities Management disclosure topic</td>
<td></td>
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<tr>
<td>Failure of tailings storage facilities</td>
<td></td>
<td></td>
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<tr>
<td>Lack of appropriate failure preparedness and response plans</td>
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</tr>
</tbody>
</table>
New disclosure topic: Tailings Storage Facilities Management

The new Tailings Storage Facilities Management disclosure topic captures risks associated with the management of TSFs, specifically with maintaining safe operations of facilities, developing failure-prevention strategies, and having in place emergency preparedness and response plans (EPRPs) to mitigate implications from catastrophic failures, should they occur.

The establishment of the Tailings Storage Facilities Management disclosure topic involves the following metric changes:

a) Removal of metric **EM-MM-150a.3.** *Number of tailings impoundments, broken down by MSHA hazard potential,* in the Waste & Hazardous Materials Management disclosure topic

b) Addition of new metrics
   
i. **EM-MM-540a.1.** *Tailings storage facilities inventory table*
   
ii. **EM-MM-540a.2.** *Summary of tailings management systems and governance structure used to monitor and maintain stability of tailings storage facilities*
   
iii. **EM-MM-540a.3.** *Approach to development of Emergency Preparedness and Response Plans (EPRPs) for tailings storage facilities*

Revised disclosure topic: Waste & Hazardous Materials Management

The revised Waste & Hazardous Materials Management disclosure topic will continue to focus on the risks related to the management of the generation and handling of waste, including tailings, but will not include the management of tailings storage facilities. The topic scope will also include the management and handling of hazardous materials for the Metals & Mining industry.

The updated Metals & Mining Standard contains the following revisions to the corresponding metrics of the Waste & Hazardous Materials Management disclosure topic:

a) Removal of metrics:
   
i. **EM-MM-150a.1.** *Total weight of tailings waste, percentage recycled*
   
ii. **EM-MM-150a.2.** *Total weight of mineral processing waste, percentage recycled*

b) Addition of new metrics:
   
i. **EM-MM-150a.4.** *Total weight of non-mineral waste generated*
   
ii. **EM-MM-150a.5.** *Total weight of tailings produced*
   
iii. **EM-MM-150a.6.** *Total weight of waste rock generated*
   
iv. **EM-MM-150a.7.** *Total weight of hazardous waste generated*
   
v. **EM-MM-150a.8.** *Total weight of hazardous waste recycled*

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1 The disclosure topic is Waste Management in the Coal Operations Standard. All subsequent references to the disclosure topic are intended to reflect the differences between the two industry standards even if not explicitly stated.
vi. **EM-MM-150a.9.** *Number of significant incidents associated with hazardous materials and waste management*

vii. **EM-MM-150a.10.** *Description of waste and hazardous materials management policies and procedures for active and inactive operations*

8 The Coal Operations Standard has been updated to reflect the same changes to the Waste Management disclosure topic, with the following two exceptions:

   a) **EM-CO-150a.7.** *Number of significant incidents associated with hazardous waste management* instead of *Number of significant incidents associated with hazardous materials and waste management*

   b) **EM-CO-150a.8.** *Description of waste management policies and procedures for active and inactive operations* instead of *Description of waste and hazardous materials management policies and procedures for active and inactive operations*

9 See page 26 for the redline version of the updates to the metrics and topic summaries.

How did the Board develop the updated Standards?

10 The Board and technical staff actively monitored the evolving issue of tailings facility failures after the previous Standards were codified in October 2018. This included assessing corporate disclosures and the effectiveness of the relevant Standards at capturing performance on the issue, monitoring developments in the industry, soliciting input from market participants, and deliberating the need for standard setting.

11 After the project was added to the agenda in December 2019, the technical staff conducted extensive research and engaged in consultations with stakeholders and subject-matter experts, including the SASB Standards Advisory Group, in support of the development of two exposure drafts. An expansive set of companies that conduct mining activities were consulted and provided input, including companies of all sizes from across the world’s major mining regions (Asia, Australia, Canada, Latin America, South Africa, and the United States). Numerous investors representing a diverse range of institutions, experiences, and perspectives provided input as well, including fundamental industry analysts (equity and credit analysts), corporate governance experts, and environmental, social, and governance (ESG) specialists. In addition to companies and investors, other relevant organizations and subject-matter experts provided feedback, including industry associations, investor groups, non-governmental organizations (NGOs), academics, and consultants.

12 In December 2020, the Board approved the release of exposure drafts for a 90-day public comment period, which closed on March 17, 2021. The Board received 15 public comment letters, including from nine companies, one industry association, three investors, and two subject-matter experts. All public comment letters can be found on the [project page](#).
The Board and technical staff reviewed feedback provided during the public comment period, and the technical staff conducted additional research and consultations to better understand the provided feedback. These additional inputs were considered in the total mix of information received through the life of the project. The Board further deliberated the public comment letters and additional input at the May and October 2021 public Board meetings.

Additional information related to the standard-setting process that the Board follows to maintain and update the SASB Standards can be found on the SASB website, in the Rules of Procedure, and/or in the Conceptual Framework. Additional project-specific information can be found on the Tailings Management in Extractives project page on the SASB website.

Why was the project undertaken?

Investor interest in risks related to tailings storage facilities increased after high-profile catastrophic tailings facility failures, especially the collapse of a high-hazard-potential TSF in Brumadinho, Brazil, in January 2019 that resulted in more than 250 fatalities. Financial losses from these incidents resulted in significant costs and liabilities for companies, including remediation costs, loss of assets, and litigation costs, alongside significant reputational damages. Historically, company disclosures on TSFs management focused on the design, location, and consequences of facility failure. The recent incidents have led to a significant increase in public and investor interest for more disclosure on management practices around failure prevention and emergency response.

The Board unanimously decided to initiate a standard-setting project in December 2019 to evaluate the Metals & Mining and Coal Operations Standards to ensure that the set of disclosures fully captures the risks associated with company management of TSFs. The three main areas of evidence the Board considered are outlined below: the evolution of industry disclosure on the issue with increasing investor interest and engagement around TSFs management practices; the establishment of the Global Tailings Review, a co-convened investor, industry, and United Nations working group with the goal of standardizing and improving TSFs management practices; and the lack of global applicability of the existing metric.

Investor interest in disclosures on tailings storage facilities management

Following the Brumadinho catastrophe, a coalition of investors, including major asset owners and asset managers in the extractives industries, initiated an investor-led engagement, the Investor

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2 Examples of recent facilities failures include but are not limited to the November 2015 Samarco Mineração SA mining dam collapse in Brazil, which released 50 million cubic meters of toxic iron ore residue; and the August 2014 Mount Polley tailings pond failure in Canada, which released 10 million cubic meters of water and 4.5 million cubic meters of mine waste slurry.

Mining and Tailings Safety Initiative, to enhance disclosure on the management of TSFs. The group issued a request to 726 publicly listed mining companies to publicly disclose information about each of their TSFs. The requested disclosure included 20 questions on the characteristics of the dams (e.g., height, type, and capacity), construction methods, and safety checks.

As of May 2020, 45 of the top 50 mining companies had responded to the request by publicly disclosing on their company websites the requested information on thousands of TSFs. This represented more than 86 percent of the mining industry by market capitalization, and 100 percent of the 23 publicly owned companies that are members of the International Council on Mining and Metals (ICMM). While the investor request for increased disclosure was successful in getting a high rate of corporate responses, the initiative noted that “a key outcome of the survey is the need to refine the disclosure request to enable standardisation of responses/terminology etc. across industry.”

Additionally, in July 2020, the United Nations Environment Programme (UNEP) published the report Sustainability Reporting in the Mining Sector: Current Status and Future Trends. One of the report’s key messages is that “the management of environmental and social aspects, and sustainability reporting of mining companies is currently not meeting the expectations of interested stakeholders, notably communities affected by mining operations and investors.” The updates to the SASB Standards aim to improve the completeness, the comparability, and, therefore, the decision-usefulness of disclosure on TSFs management for investors.

### Initiative to establish a global standard

Building on the Investor Mining and Tailings Safety Initiative engagement, the ICMM, comprising 26 of the world’s leading mining and metals companies and 35 industry associations, along with UNEP and Principles for Responsible Investment (PRI), committed to develop and drive adoption of a set of global best practices on TSFs management. Collectively, they convened the Global Tailings Review to establish a global standard for the safer management of TSFs. The final Global Industry Standard on Tailings Management (GISTM) was published in August 2020 and organized around six topics, 15 principles, and 77 auditable requirements. Principle 15, which contains three requirements, specifically addresses disclosure expectations. The technical staff has engaged multiple times during this standard-setting project with the working group participants.

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and individuals involved in developing the GISTM, including ICMM and PRI, to seek alignment among efforts.

**Lack of global applicability of the existing metric**

An additional element the Board considered for this project is the global nature of the issue compared with the US-centric nature of the existing metric *Number of tailings impoundments, broken down by MSHA hazard potential* (EM-MM-150a.3 and EM-CO-150a.1). Mining operations occur in more than 100 countries, and globally applicable guidance is critical to provide investors with information that is comparable across companies operating in various geographic regions. The technical protocol for the previous metric (i.e., the guidance on definitions, scope, implementation, compilation, and presentation for the metric) provides guidance that mining operators in locations under the auspices of the Mine Safety and Health Administration (MSHA) should refer to the MSHA hazard potential classification system, and operators in locations not under the auspices of the MSHA should use a third party to determine hazard potential while following MSHA guidance. This may not be feasible or cost-effective for companies operating outside the United States. As a result, the Board concluded that an objective of the project was to improve the global applicability of the existing metric, *Number of tailings impoundments, broken down by MSHA hazard potential*.

**What is the basis for the updated disclosure topics?**

The Board deliberated the appropriate disclosure topic scope and structure to reflect the different nature of sustainability issues and management approaches for hazardous materials versus TSFs. The Board updated the Standards to (1) contain a new disclosure topic, Tailings Storage Facilities Management, to capture risks associated with the management of TSFs; and (2) maintain the Waste & Hazardous Materials Management disclosure topic with a revised scope to focus on the risks related to waste generation and the management and handling of hazardous waste (and hazardous materials for the Metals & Mining Standard).

The Board considered the evidence discussed below from staff research and consultations on the different sustainability risks, management approaches, level of investor interest, and channels of financial impact for the two issues of waste management and TSFs management.

There are two central types of risks related to waste management in the Metals & Mining and Coal Operations industries: pervasive risks from managing and handling industrial waste and hazardous materials, and tail risks (i.e., low probability and high impact) associated with possible catastrophic dam failures of TSFs and the implications of such failures if they occur. While the sustainability risks associated with the management of waste and hazardous materials generally center on mitigating environmental risks, the Board recognized that there is a broader and different set of environmental, social, and governance risks related to the management of TSFs.

**Impacts and industry management of mining waste and hazardous materials**

Mining waste, including industrial non-mineral waste, waste rock, tailings, and smelting waste, may be chemically reactive or hazardous and pose high environmental risks. Improper storage or
disposal of hazardous materials or mining waste can present a significant long-term threat to human health and ecosystems through potential contamination of land, groundwater, and surface water. Additionally, some waste rock may be acid-forming and pose biodiversity impacts.\textsuperscript{10}

Management of hazardous and non-hazardous waste, as well as hazardous materials used in the mining process, focuses on environmental risks associated with the treatment, handling, storage, disposal, or regulatory compliance related to such waste and materials. SASB Standards Advisory Group members, both companies and investors, as well as industry experts outside of the advisory group have affirmed during multiple rounds of consultation that these risks are usually well understood and that management strategies are usually well developed, although not always adhered to at the same degree across the industry. The nature of environmental risks depends on the method of mining, the grade of ore that is mined, and the type of products that a company manufactures. Companies choose appropriate waste management strategies to address the environmental risks most pertinent for their operations to lower associated regulatory and litigation risks, remediation liabilities, and costs. Furthermore, companies that reduce their hazardous materials usage through recycling or choosing alternative materials, implement strict safety protocols, and take corrective measures in case of incidents can minimize financial impacts and reduce reputational risks should a waste-related incident occur.

**Impacts and industry management of tailings storage facilities**

TSFs are commonly large impoundments that contain slurry, composed of water and tailings solids. Catastrophic failure of such facilities (e.g., a dam failure) can release significant volumes of waste that may have high-consequence impacts on ecosystems, human livelihood, local economies, and communities. If a failure does occur, the consequences of the failure could be reduced if a company can effectively respond to the emergency and limit (to the extent possible) resulting damages.

Companies use a range of strategies and practices to maintain the safety of TSFs. While the probability of catastrophic failure is low, one incident can bear extremely high consequences with significant financial implications and may jeopardize a company’s reputation, brand, and social license to operate. Investors affirmed in consultation that this often represents a financially impactful topic. Multiple consultation participants—including academics, industry association members, SASB Standards Advisory Group members, and engineering firms involved in the design, construction, and maintenance of TSFs—have assured that this kind of tail risk varies tremendously by site, as do management strategies to mitigate this risk. Companies adopt robust management strategies, including establishing internal governance structures that ensure high-level executive accountability, a strong company safety culture, frequent external independent technical safety reviews, transparent engagement with the public and local communities on risks and how to manage such risks, and well-established EPRPs. In consultations, investors expressed

\textsuperscript{10} Biodiversity impacts are covered by the Biodiversity Impacts disclosure topic of the Metals & Mining and Coal Operations Standards.
an interest in more disclosure to understand the risks around mismanagement of tailings facilities.

**Rationale for the updated disclosure topic scope and structure**

As indicated in the evidence above, the Board recognized foremost that management of tailings facilities involves a different set of sustainability risks and management considerations than the management of tailings and other waste products. The sustainability issues associated with the management of waste, including tailings, are narrower in scope (environment focused) than those associated with the management of storage facilities (environmental, social, and governance). The Board deliberated the tradeoffs of having all the information associated with TSFs management under one disclosure topic versus splitting it between several disclosure topics, such as Waste & Hazardous Materials Management and Critical Incident Risk Management as well as a potential new Emergency Preparedness & Response disclosure topic.

The Board considered staff research and consultations of how companies and investors in the industry typically manage and disclose these issues. Research indicated that companies typically manage and disclose TSFs management strategies separately from waste management strategies. Companies consider TSFs as systems and manage them accordingly throughout their lifecycle. On the other side, tailings, the waste product itself, are a part of waste management. A technical staff review of company disclosures indicated that large companies with multiple TSFs place waste management and TSFs management in different quadrants of their materiality assessment, often giving higher materiality rating to the TSFs management issue. Furthermore, companies usually disclose the amount of tailings produced within waste-related topics in their sustainability reports. The Board acknowledged that this still varies across companies in the industry.\(^{11}\)

When it comes to the emergency response topic, companies often provide aggregate—not site-by-site specific—disclosure on a broad range of emergencies, including dam failure, which is not always sufficient for investors’ understanding of risks associated with a potential dam failure. Disclosure analysis and consultation feedback indicated that investors analyzed TSFs management as a critical risk issue separately from risks associated with the handling and management of waste, including tailings; and separately from emergencies such as fires and earthquakes.

The Board decided that an approach of a separate single disclosure topic on TSFs management is more aligned with industry practices and project scope, and in turn would be more decision-useful for investors and more cost-effective for companies to prepare the disclosure. The new Tailings Facilities Management disclosure topic is mapped to the Critical Incident Risk Management general issue category\(^{12}\) to reflect the more holistic environmental, social, and

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\(^{11}\) For example, a smaller company stated in consultation that its environmental department, which reports to its board, manages both tailings facilities and waste management, and it did not identify tailings storage facilities risks as high for the company’s operations.

\(^{12}\) The Critical Incident Risk Management general issue category addresses a company’s use of management systems and scenario planning to identify, understand, and prevent or minimize the occurrence of low-probability, high-impact accidents and emergencies with significant potential environmental and social externalities. It is a general issue category under the Leadership & Governance sustainability dimension, which
governance issues related to TSFs management. Meanwhile, the Waste & Hazardous Materials Management disclosure topic is maintained, though revised to clarify its focus on the risks related to the management of generating and handling waste, including tailings.

What is the basis for the updated metrics?

The Board considered a set of metrics for the Tailings Storage Facilities Management and Waste & Hazardous Materials Management disclosure topics to help users understand and interpret performance on the risk exposure and risk likelihood associated with each disclosure topic. Tables 2.a and 2.b summarize the sustainability angles, sustainability impact, and key concepts to be measured that the Board considered for the two disclosure topics discussed above. To assess the magnitude of sustainability impact (i.e., risk exposure), the Board considered and proposed metrics that measure total potential harm. To assess the probability or likelihood of the risk, the Board recommended metrics that provide historical data on incidents coupled with forward-looking qualitative metrics focused on a management approach to prevent incidents from occurring.

Table 2.a. Key concepts to measure: Tailings Storage Facilities Management disclosure topic

<table>
<thead>
<tr>
<th>Topic</th>
<th>Sustainability angle</th>
<th>Sustainability impact</th>
<th>Concept to be measured</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tailings Storage Facilities</td>
<td>Structural integrity of tailings storage facilities *Note: Facility failure is not</td>
<td>Long-term chronic impacts on the environment from failed facilities* resulting in seepage and leakage</td>
<td>Risk exposure: (1) number of facilities and their characteristics (e.g., construction method, failure consequence classification, operational status, etc.)</td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td></td>
<td>Risk likelihood:* Risk likelihood:* (2) management approach to maintain the structural integrity of facilities and to mitigate possible accidents/failures (3) management approach to minimize consequences of an accident/failure</td>
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<tr>
<td></td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td>Physical dam collapse leading to catastrophic environmental damage and loss of life</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lack of proper accident preparedness and emergency response plan</td>
<td></td>
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</tbody>
</table>

Table 2.b. Key concepts to measure: Waste & Hazardous Materials Management disclosure topic for the Metals & Mining Standard (Waste Management disclosure topic for the Coal Operations Standard)

13 The Board acknowledges that the concept of “risk likelihood” for the failure of TSFs may be also driven by external factors such as seismicity and rainfall, as noted by an investor and a subject-matter expert in respective public comment letters.
<table>
<thead>
<tr>
<th>Topic</th>
<th>Sustainability angle</th>
<th>Sustainability impact</th>
<th>Concept to be measured</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste &amp; Hazardous Materials Management*</td>
<td>Environmental contamination</td>
<td>Non-mineral waste: improper disposal of industrial (non-mineral) hazardous waste</td>
<td>Risk exposure: (1) amount of waste produced</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mineral waste: accidental releases of heavy metals and hazardous waste from mining activities (seepage of heavy metals from tailings)</td>
<td>Risk likelihood: (2) prior history of related incidents (3) management approach to minimize risk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hazardous raw materials (cyanide, sulfuric acid, etc.):* accidental releases and spills</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>*Note: Does not apply to Coal Operations Standard.</td>
<td></td>
</tr>
</tbody>
</table>

Waste generation and management are inextricably linked with tailings risks. As a result, the updated metrics for both the Tailings Storage Facilities Management disclosure topic and the Waste & Hazardous Materials Management disclosure topic have been developed with an intent for clear connectivity between them.

**Updated metrics for the Waste & Hazardous Materials Management disclosure topic**

The Board proposes the following revisions to the metrics of the Waste & Hazardous Materials Management disclosure topic for the Metals & Mining Standard.

a) Remove metrics:

   i.  **EM-MM-150a.1.** Total weight of tailings waste, percentage recycled
   ii. **EM-MM-150a.2.** Total weight of mineral processing waste, percentage recycled.

b) Add new metrics:

   i.  **EM-MM-150a.4.** Total weight of non-mineral waste generated
   ii. **EM-MM-150a.5.** Total weight of tailings produced
   iii. **EM-MM-150a.6.** Total weight of waste rock generated
   iv.  **EM-MM-150a.7.** Total weight of hazardous waste generated
   v.   **EM-MM-150a.8.** Total weight of hazardous waste recycled
   vi.  **EM-MM-150a.9.** Number of significant incidents associated with hazardous materials and waste management
vii. **EM-MM-150a.10. Description of waste and hazardous materials management policies and procedures for active and inactive operations**

The rationale for these revisions is included below.

Rationale to remove Total weight of tailings waste, percentage recycled and add Total weight of tailings produced

The new metric, **EM-MM-150a.5. Total weight of tailings produced**, no longer includes the sub-metric “percentage recycled,” as in the previous metric **EM-MM-150a.1. Total weight of tailings waste, percentage recycled**. Multiple mining waste experts noted in consultations that operators do not recycle tailings to manage the generation or handling of waste. Some companies reprocess tailings to perform secondary extraction of ore, but such processes reduce the volume of tailings by a small amount. Additionally, if the tailings generated are not chemically reactive, some companies may reuse or repurpose these tailings to backfill voids or old mines in order to avoid purchasing materials for these needs, while others may utilize tailings to manufacture construction materials. However, recycling tailings is not perceived as a common practice or as a substantial strategy to reduce risks associated with the generation or handling of tailings. Therefore, the recycling of tailings is not a representationally faithful indicator of performance.

Rationale to remove Total weight of mineral processing waste, percentage recycled

The updated Standard no longer includes metric **EM-MM-150a.2. Total weight of mineral processing waste, percentage recycled**, given additional evidence indicating that mineral processing waste does not have a significant impact on financial performance, nor is it a measurement of significant interest to investors. The previous metric defines “mineral processing waste” to include “waste generated during metals processing (e.g., smelting and refining), such as slags, dusts, sludges, and spent solvents,” as well as “scrap metal, reject coal, used oil, and other solid wastes and excludes gaseous wastes.” An analysis of industry disclosures indicates that the amount of mineral processing waste is usually insignificant in comparison with other types of waste. It is not a commonly reported metric by companies in the industry, nor a data point indicated by investors to be of interest. Furthermore, this metric has been misinterpreted in a few company disclosures as “amount of industrial waste” or “amount of non-mineral waste” since the previous definitions in the metric were unclear.

Rationale to add new metrics

The updated Standard includes seven new metrics intended to more completely capture the risk exposure and risk likelihood associated with waste management.

1. **Total weight of non-mineral waste generated**
2. **Total weight of tailings produced**
3. **Total weight of waste rock generated**
4. **Total weight of hazardous waste generated**
5. **Total weight of hazardous waste recycled**
6. **Number of significant incidents associated with hazardous materials and waste management**
vii. Description of waste and hazardous materials management policies and procedures for active and inactive operations

Although the new set of metrics increases the number of metrics from three to seven, the Board expects the updated Standard to clarify and improve the usefulness of disclosures for investors by providing information that is set up for year-over-year comparability, and to be more cost-effective for companies to prepare, given closer alignment with the format of other reporting frameworks such as the 2020 GRI Waste Standard.

Rationale for new metrics to measure risk exposure

The following five new quantitative metrics correspond to the most common types of waste produced in mining to measure operational exposure to risks associated with waste generation and disposal:

i. Total weight of non-mineral waste generated
ii. Total weight of tailings produced
iii. Total weight of waste rock generated
iv. Total weight of hazardous waste generated
v. Total weight of hazardous waste recycled

Even though the amount of each type of waste greatly depends on the type of mining that companies conduct, in the Board’s view, the updated set of metrics will apply to most companies within the industry and, combined with activity metrics, will provide investors with a set of complete, comparable, and representationally faithful disclosures.

Rationale for new metrics on non-mineral waste and hazardous waste

Large amounts of potentially hazardous non-mineral waste are generated during mineral extraction and processing. Non-mineral waste includes items such as batteries, tires, antifreeze, oil, paint, and solvent. Non-mineral waste is usually highly controlled, and investors are interested in the regulatory risks that companies face associated with the generation and disposal of such waste. The previous Standard includes non-mineral waste as part of the “amount of mineral processing waste” metric that has been removed. As discussed above, differing company interpretations of the previous mineral processing waste metric have resulted in less comparable disclosures that are not decision-useful for investors. To improve the understandability and usability of the disclosure and to align with industry disclosure practices, the updated Standard contains three separate metrics: EM-MM-150a.4, Total weight of non-mineral waste generated; EM-MM-150a.7, Total weight of hazardous waste generated; and EM-MM-150a.8, Total weight of hazardous waste recycled. These are the three most reported metrics related to non-mineral waste by all mining companies and would deliver comparable, year-over-year information on environmental risks that are of interest to investors.

Rationale for metrics on mineral waste

Tailings and waste rock are two main types of mineral waste from extractive activities and present different sustainability risks. Waste rock, depending on its geochemical composition, may contain remnants of naturally occurring heavy metals. The environmental risks posed by toxic
heavy metals have not been previously covered by the Standard. Several investors expressed interest in the ratio between waste rock generation and tailings production, as it indicates different company risk profiles. Furthermore, investors indicated that they normalize the weight of tailings produced and waste rock generated, respectively, by the amount of product to evaluate a company’s financial performance and profitability. The Board decided to add two separate metrics to align with common industry practices, as companies generally report the amount of waste rock and tailings separately, and to help ensure the metrics produce understandable and verifiable disclosures.

Rationale for new metrics to measure risk likelihood

Additionally, the updated Standard contains two new metrics to assess risk likelihood:

i. **EM-MM-150a.9. Number of significant incidents associated with hazardous materials and waste management**

ii. **EM-MM-150a.10. Description of waste and hazardous materials management policies and practices for active and inactive operations**

The metric *Number of significant incidents associated with hazardous materials and waste management* provides historical data on how well a company has managed operational risks associated with hazardous inputs and outputs. The accidental release into the environment (air, soil, and water) of hazardous raw materials used in mineral processing and its outputs can lead to fines and remediation costs and present a potential liability in the form of health-related monetary claims from affected parties. Multiple investors expressed interest in disclosures on the number of significant incidents companies had that related to handling hazardous materials and resulted in operational safety or an environmental impact. This type of data is generally recorded and reported by companies, and therefore, it would provide verifiable information to users.

The same metric is also intended to provide disclosure on hazardous-waste-related incidents, which is aggregated with hazardous materials incidents in the Metals & Mining Standard. In addition to hazardous materials’ post-process outputs, other types of discarded materials, such as tires and batteries, can be classified as hazardous waste on the basis of their biological, chemical, and physical properties.

As a separate issue, the Board specifically discussed the benefits of disclosure on the amount of hazardous materials generated versus disclosure on the number of incidents that occurred to measure the magnitude of potential risk. Feedback from both investors and companies indicated that disclosures on volume and/or weight of hazardous materials is not likely to result in comparable or useful data to assess the probability of risk. Potential risk from hazardous materials, mainly chemicals used in mining processes, is highly dependent on other

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14 Biodiversity impacts from heavy metals is covered by the Biodiversity Impacts disclosure topic of the Metals & Mining and Coal Operations Standards.

15 The Metals & Mining Standard contains the activity metric “Production of (1) metal ores and (2) finished metal products” (EE-MM-000.A). The Coal Operations Standard contains the activity metrics “Production of thermal coal” and “Production of metallurgical coal” (EM-CO-000.A and EM-CO-000.B).
characteristics beyond volume or weight, such as the concentration and toxicity level of the chemical. Instead, the number of incidents provides a more comparable, verifiable, and useful indicator of historical company performance around management of hazardous materials. The Board ultimately decided that the combination of this quantitative metric combined with a qualitative metric on the description of waste and the hazardous materials’ handling policy will provide a more complete and useful assessment of a company’s performance year over year.

Rationale for differences in the Coal Operations Standard

The previous Coal Operations Standard did not place as significant an emphasis on waste management as did the Metals & Mining Standard. The single metric associated with the disclosure topic in the previous Coal Operations Standard was focused on tailings storage facilities, and there were no direct metrics on the management of waste generation and handling in the previous disclosure topic. In executing this project, the Board did not seek to reassess the financial materiality of waste management within the Coal Operations Standard, as the focus of the project is on risks related to tailings storage facilities.

The disclosure topic in the Coal Operations Standard is Waste Management, as opposed to Waste & Hazardous Materials Management in the Metals & Mining Standard. Coal is processed by means of crushing, screening, and beneficiation; it does not involve processes such as leaching or flotation, which require hazardous raw materials and are commonly used for metals processing. Therefore, hazardous raw materials are not included within the scope of the Coal Operations Standard.

The updated Coal Operations Standard contains the same set of five metrics measuring risk exposure as the Metals & Mining Standard, and slight modifications on the two new metrics on measuring risk likelihood:

i. **EM-CO-150a.7.** Number of significant incidents associated with hazardous waste management instead of Number of significant incidents associated with hazardous materials and waste management

ii. **EM-CO-150a.8.** Description of waste management policies and procedures for active and inactive operations instead of Description of waste and hazardous materials management policies and procedures for active and inactive operations

Metrics for the Tailings Storage Facilities Management disclosure topic

The updated Metals & Mining and Coal Operations Standards both contain three corresponding metrics for the new Tailings Storage Facilities Management topic:

i. **EM-MM-540a.1.** Tailing storage facility inventory table

ii. **EM-MM-540a.2.** Summary of tailings management systems and governance structure used to monitor and maintain stability of tailings storage facilities

iii. **EM-MM-540a.3.** Approach to development of emergency preparedness and response plans (EPRPs) for tailings storage facilities
Rationale for the *Tailings storage facility inventory table* metric

The previous metric *Number of tailings impoundments, broken down by MSHA hazard potential (EM-MM150a.3 and EM-CO-150a.1)* has been replaced with a more comprehensive *Tailings storage facility inventory table* metric in the new Tailings Facilities Management disclosure topic for both the Metals & Mining and Coal Operations Standards. The new metric includes disclosures on (a) name of the facility, (b) facility location, (c) ownership status, (d) operational status, (e) construction method, (f) maximum permitted facility storage capacity, (g) current amount of tailings stored, (h) consequence classification, (i) date of most recent independent technical review, (j) material findings, (k) mitigation measures, and (l) site-specific emergency preparedness and response plan (EPRP).

The Board views data points (a)–(l) as a more complete set of disclosures that reflects the most indicated points of interest for investors. The data points, as well as the technical protocols to this metric, are closely aligned with the requirements of the GISTM and disclosure request from the Investor Mining and Tailings Safety Initiative, which the Board therefore views as a more cost-effective means of communicating this information. Most importantly, the Board believes this format of disclosure provides a more representationally faithful and comparable view on overall company performance on the topic than the previous Standards.

Data points (a)–(h) are intended to provide a complete and verifiable set of measurements on each facility’s risk exposure. These data points provide a snapshot of the risk exposure and may indicate changes over time in a facility’s risk profile to investors (e.g., changes in operational status or consequence classification).

Meanwhile, data points (i)–(l) provide qualitative data on risk likelihood in the reporting year and would provide year-over-year management performance measurements. Investors noted, and companies agreed during consultations, that design-related information alone is not sufficient for decision-making. Investors conveyed that aspects concerning facility operations and stability should also be disclosed and be verifiable. Therefore, the Board has included data point (j) on the date of the most recent independent technical review. Finally, to provide decision-useful information on community engagement and the appropriate level of emergency preparedness on a facility-by-facility basis, the Board proposes the EPRP data point, which would indicate to investors whether a site-specific plan has been put in place by the operator.

The Board’s deliberations and considerations on the overall approach for this metric and on specific data points are discussed further below.

*Facility-by-facility versus aggregate disclosure approach*

The Board considered another overall approach for this metric, aggregate disclosure, rather than a detailed facility-by-facility disclosure in a form of a table. The Board ultimately saw greater value in approaching the presentation of data through a table that calls for individual facility disclosures, as opposed to an aggregate disclosure at the company level. Due to the variability in the size of operations of different companies and the variability of a risk profile from facility to...
facility, aggregating such data at a company level could be misleading and could misrepresent the risk. The tailings storage facility inventory table is guided by and largely aligned with the GISTM requirements and focuses on the most decision-useful data, which may vary year over year on a facility-by-facility basis that could be missed if the data were reported in aggregate. Although some large companies in the industry currently complement an aggregate disclosure with separate, non-standardized disclosures on specific facilities, investors indicated in consultations that this approach is not the most effective nor understandable for their investment-decision needs.

The Board put forward an accompanying question in the exposure draft during the public comment period to gauge market views on the facility-by-facility approach to the tailings storage facility metric. This approach was broadly supported by market participants, including companies, in their public comment letters. This is consistent with the Board’s view that the inventory table would not likely require additional data collection by the reporting entity and that using the table would be more aligned with what some companies have already provided in response to the disclosure request by the Investor Mining and Tailings Safety Initiative.

Rationale for specific data points

Investors stated in consultations that they were interested in disclosures on the stability and safety considerations for each facility. Details on the Board’s rationale and deliberations regarding specific data points are included below.

(a) Name of the facility, (b) facility location, (c) ownership status, and (d) operational status:
These data points are intended to provide identifying information for each facility in the inventory table, information regarding whether companies are the owners of the facility, and the current stage of the facility in its lifecycle. The Board views these data points as a baseline from which investors can begin their analysis of a company’s TSF inventory.

(e) Construction method: While the December 2020 exposure draft of proposed changes included construction year as a new data point in the inventory table, companies responded in public comments that they did not believe this data point would be useful because tailings storage facilities are built in stages, and the initial year of construction would not be indicative of a facility’s stability or risk profile. Instead, at the suggestion of an investor and a subject-matter expert in public comment letters, the updated Standards include (e) construction method, since different methods (e.g., downstream and upstream) are associated with differing levels of risk exposure.

(f) Maximum permitted storage capacity and (g) current amount of tailings stored: Data points (f) and (g) were added in response to investors’ desire for forward-looking metrics, as stated in public comments and consultations. These metrics will help investors assess where TSFs are in their planned lifecycle and how the risk profile of a TSF may develop over time.
(h) **Consequence classification**: The MSHA hazard potential classification in the current metric EM-MM-150a.3 has been replaced with the data point (h) consequence classification, defined in accordance with the GISTM.\(^\text{16}\) The consequence classification matrix is at the foundation of multiple recommendations of the GISTM for an annual evaluation of risks and measures required to mitigate such risks. Although the Board received feedback from investors that they would like to see remediation costs for each site disclosed if a failure does occur, companies noted that such costs would be extremely difficult to estimate and would require multiple assumptions. Consequence classification takes this element into account to a degree, and the Board decided not to include a separate data point on remediation costs.

(i) **Date of most recent independent technical review**: During consultations, investors stated a desire to understand the results from the most recent technical review of the facility conducted by an independent party. While the GISTM requirements include reviews with varying frequencies and degrees of comprehensiveness, investors indicated they were most interested in learning the results of independent reviews (i.e., reviews not conducted by the operator of the facility). The Board believes this data point is a way to meet investor need in a manner consistent with the GISTM.

(j) **Material findings and (k) mitigation measures**: Board members also considered feedback in comment letters and follow-up consultations regarding data points (j) material findings and (k) mitigation measures in the tailings storage facility inventory table. These data points request that preparers state whether there were material findings from the most recent independent review of the facility and whether any mitigation measures were implemented in response to such findings. These data points are based on one of the disclosure requirements of the GISTM, which states that the criteria for what is “material” shall be determined by the operator. In discussions with companies, some expressed concerns that an overly prescriptive definition of “material findings” may deter disclosures. An investor, meanwhile, contended that allowing companies to make such a determination would hinder the comparability of disclosures. Ultimately, the Board decided to maintain the approach from the exposure draft (which states that companies shall determine which findings are material), given the alignment in approach with GISTM and consistency with the SASB Conceptual Framework.

Rationale for qualitative metrics

The updated Standards include two discussion & analysis metrics to facilitate disclosure of additional context around the management approach of TSFs and improve completeness of disclosure: **EM-MM-540a.2. Summary of tailings management systems and governance structure used to monitor and maintain the stability of tailings storage facilities** and **EM-MM-540a.3. Approach to development of Emergency Preparedness and Response Plans (EPRPs) for tailings**.

storage facilities. The corresponding technical protocols are aligned with the GISTM to enhance cost-effectiveness for preparers.

67 The Board deliberated the extent that EPRPs should be part of public disclosures. While the set of metrics associated with the Tailings Storage Facilities disclosure topic would be incomplete without a metric on emergency preparedness, multiple companies expressed concerns that detailed EPRPs contain confidential information. Investors expressed interest only in whether companies are testing their plans at an appropriate frequency, in addition to knowing whether companies have site-specific EPRPs in place for their TSFs. The Board believes that the resulting disclosure balances complete and decision-useful disclosures for investor use with consideration of company concerns.

68 The new metric aims to produce comparable and representationally faithful disclosures by focusing on specific elements of emergency preparedness and accident response plans that are of interest to investors and aligned with the GISTM requirements, as opposed to general, open-ended descriptions. While one company raised concerns that some elements of these metrics differ slightly from the requirements of the GISTM, the Board ultimately determined that the approach taken appropriately balanced investors’ need for useful information with preparers’ need for cost-effectiveness.

Rationale for a similar approach taken for both industries

69 Although tailings produced in coal operations have slightly different physical characteristics from those produced during metals mining, the sustainability issues around the management of TSFs are similar, and investors expressed interest in disclosures on the management of TSFs for both industries. The amount of fine coal refuse produced is typically less than that of tailings in metals mining, and coal impoundments are generally smaller and have lower flowability. Although all these factors generally reduce consequences of a facility failure, similar risks still apply for the Coal Operations industry. In turn, the Board had the same considerations and included the same metrics for both industries.

Alignment with GISTM

70 While respondents were broadly supportive of the proposed changes to the Standards in the December 2020 exposure draft, two companies in their public comment letters raised concerns that the Tailings Storage Facilities Management disclosure topic and associated metrics did not fully align with the disclosure requirements of the GISTM. One company stated that the new Standards would be “subjecting companies to the administratively burdensome task of managing two separate-but-substantially-overlapping sets of disclosure obligations.” Another company cited the GISTM and Investor Mining and Tailings Safety Initiative, stating that “additional materials in this space will only confuse and distract key personnel.” Conversely, a third company noted that the requirements of the GISTM wouldn’t be in full effect until 2025, and thus the SASB Standards’ alignment in this area was premature.
At the May 2021 Board meeting, Board members discussed this issue and decided that some areas of divergence—such as with the tailings storage facility inventory table metric—were necessary to fulfill the objective of SASB Standards to provide investors with decision-useful information. Board members acknowledged the different objectives of the SASB Standards and the GISTM, and likewise remained generally supportive of a continued alignment with the GISTM and cautioned against unnecessary divergence. The updated Standards reflect additional changes to the exposure draft to improve further terminology alignment with the GISTM.

Updates to the Standards

After considering the research and analysis done by the technical staff, market feedback received through consultations conducted in 2020 and 2021, and the public comments received on the exposure draft during the public comment period ending on March 17, 2021, the Board approved the updates to the Metals & Mining and Coal Operations Standards. The Board conducted its final deliberations on this matter at the public Standards Board meeting held on October 1, 2021, and proceeded to ballot the vote, which concluded on November 30, 2021, with the unanimous approval by all 11 Board members.

Effective date of the updates

The updates to the Standards outlined above are reflected in Version 2021-12 of the SASB Metals & Mining Standard and Coal Operations Standard, issued on December 6, 2021. Version 2021-12 supersedes Version 2018-10 of these Standards.

All entities shall apply Version 2021-12 of the Standards for reports covering annual periods beginning on or after January 1, 2022. Early adoption is permitted for all entities. If an entity applies the updates for an annual period beginning before the effective date, it shall disclose that fact.

The Board concluded that the expected costs of implementation are reasonable based on the alignment between the Standards and the GISTM, which took effect in August 2020 and the requirements of which become binding from 2023 or 2025, depending on the consequence classification for the TSF in question. The Board recognizes that the updated Standards require significantly more disclosure than the previous Standards and that complying with certain elements of the GISTM disclosure requirements, including the implementation of the consequence classification system for TSFs, may require companies to gather additional data. Nonetheless, based on consultations and the technical staff’s review of current disclosures, including those provided by companies in response to the Investor Mining and Tailings Safety Initiative, the Board believes that the effective date for implementation is reasonable in light of the information already being collected and reported by companies in the sector.

The Board acknowledges that companies that have implemented processes to disclose in accordance with a Standard, or are in the process of implementing a Standard, will likely incur additional costs to address the updated version.
If an entity chooses to not use the effective version of a Standard, it shall disclose the omission(s), as well as the rationale for the omission(s), consistent with guidance provided in the SASB Standards Application Guidance, Version 2018-10.
Redline Version of Updates to the Metals & Mining and Coal Operations Standards

The following is a redline version of the updates to the Metals & Mining and Coal Operations Standards. The redline includes the following for each Standard:

(a) Table of sustainability disclosure topics and accounting metrics
(b) Disclosure topic summaries
(c) Accounting metrics and technical protocols

The updated Version 2021-12 of the Metals & Mining and Coal Operations Standards are available for download at https://www.sasb.org/standards/download/.
# Metals & Mining Standard

## SUSTAINABILITY DISCLOSURE TOPICS & ACCOUNTING METRICS

<table>
<thead>
<tr>
<th>TOPIC</th>
<th>ACCOUNTING METRIC</th>
<th>CATEGORY</th>
<th>UNIT OF MEASURE</th>
<th>CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Greenhouse Gas Emissions</strong></td>
<td>Gross global Scope 1 emissions, percentage covered under emissions-limiting regulations</td>
<td>Quantitative</td>
<td>Metric tons (t), Percentage (%)</td>
<td>EM-MM-110a.1</td>
</tr>
<tr>
<td></td>
<td>Discussion of long-term and short-term strategy or plan to manage Scope 1 emissions, emissions reduction targets, and an analysis of performance against those targets</td>
<td>Discussion and Analysis</td>
<td>n/a</td>
<td>EM-MM-110a.2</td>
</tr>
<tr>
<td><strong>Air Quality</strong></td>
<td>Air emissions of the following pollutants: (1) CO, (2) NOx (excluding N2O), (3) SOx, (4) particulate matter (PM10), (5) mercury (Hg), (6) lead (Pb), and (7) volatile organic compounds (VOCs)</td>
<td>Quantitative</td>
<td>Metric tons (t)</td>
<td>EM-MM-120a.1</td>
</tr>
<tr>
<td><strong>Energy Management</strong></td>
<td>(1) Total energy consumed, (2) percentage grid electricity, (3) percentage renewable</td>
<td>Quantitative</td>
<td>Gigajoules (GJ), Percentage (%)</td>
<td>EM-MM-130a.1</td>
</tr>
<tr>
<td><strong>Water Management</strong></td>
<td>(1) Total fresh water withdrawn, (2) total fresh water consumed, percentage of each in regions with High or Extremely High Baseline Water Stress</td>
<td>Quantitative</td>
<td>Thousand cubic meters (m³), Percentage (%)</td>
<td>EM-MM-140a.1</td>
</tr>
<tr>
<td></td>
<td>Number of incidents of non-compliance associated with water quality permits, standards, and regulations</td>
<td>Quantitative</td>
<td>Number</td>
<td>EM-MM-140a.2</td>
</tr>
<tr>
<td><strong>Waste &amp; Hazardous Materials Management</strong></td>
<td>Total weight of tailings waste, percentage recycled</td>
<td>Quantitative</td>
<td>Metric tons (t), Percentage (%)</td>
<td>EM-MM-150a.1</td>
</tr>
<tr>
<td></td>
<td>Total weight of mineral processing waste, percentage recycled</td>
<td>Quantitative</td>
<td>Metric tons (t), Percentage (%)</td>
<td>EM-MM-150a.2</td>
</tr>
<tr>
<td></td>
<td>Number of tailings impoundments, broken down by MSHA hazard potential</td>
<td>Quantitative</td>
<td>Number</td>
<td>EM-MM-150a.3</td>
</tr>
<tr>
<td></td>
<td>Total weight of non-mineral waste generated</td>
<td>Quantitative</td>
<td>Metric tons (t)</td>
<td>EM-MM-150a.4</td>
</tr>
<tr>
<td></td>
<td>Total weight of tailings produced</td>
<td>Quantitative</td>
<td>Metric tons (t)</td>
<td>EM-MM-150a.5</td>
</tr>
<tr>
<td></td>
<td>Total weight of waste rock generated</td>
<td>Quantitative</td>
<td>Metric tons (t)</td>
<td>EM-MM-150a.6</td>
</tr>
<tr>
<td></td>
<td>Total weight of hazardous waste generated</td>
<td>Quantitative</td>
<td>Metric tons (t)</td>
<td>EM-MM-150a.7</td>
</tr>
<tr>
<td></td>
<td>Total weight of hazardous waste recycled</td>
<td>Quantitative</td>
<td>Metric tons (t)</td>
<td>EM-MM-150a.8</td>
</tr>
<tr>
<td></td>
<td>Number of significant incidents associated with hazardous materials and waste management</td>
<td>Quantitative</td>
<td>Number</td>
<td>EM-MM-150a.9</td>
</tr>
<tr>
<td></td>
<td>Description of waste and hazardous materials management policies and procedures for active and inactive operations</td>
<td>Discussion and Analysis</td>
<td>n/a</td>
<td>EM-MM-150a.10</td>
</tr>
<tr>
<td>TOPIC</td>
<td>ACCOUNTING METRIC</td>
<td>CATEGORY</td>
<td>UNIT OF MEASURE</td>
<td>CODE</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>-----------------------------------------------------------------------------------</td>
<td>------------------------</td>
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<td>---------------</td>
</tr>
<tr>
<td><strong>Biodiversity Impacts</strong></td>
<td>Description of environmental management policies and practices for active sites</td>
<td>Discussion and Analysis</td>
<td>n/a</td>
<td>EM-MM-160a.1</td>
</tr>
<tr>
<td></td>
<td>Percentage of mine sites where acid rock drainage is: (1) predicted to occur, (2) actively mitigated, and (3) under treatment or remediation</td>
<td>Quantitative</td>
<td>Percentage (%)</td>
<td>EM-MM-160a.2</td>
</tr>
<tr>
<td></td>
<td>Percentage of (1) proved and (2) probable reserves in or near sites with protected conservation status or endangered species habitat</td>
<td>Quantitative</td>
<td>Percentage (%)</td>
<td>EM-MM-160a.3</td>
</tr>
<tr>
<td><strong>Security, Human Rights &amp; Rights of Indigenous Peoples</strong></td>
<td>Percentage of (1) proved and (2) probable reserves in or near areas of conflict</td>
<td>Quantitative</td>
<td>Percentage (%)</td>
<td>EM-MM-210a.1</td>
</tr>
<tr>
<td></td>
<td>Percentage of (1) proved and (2) probable reserves in or near indigenous land</td>
<td>Quantitative</td>
<td>Percentage (%)</td>
<td>EM-MM-210a.2</td>
</tr>
<tr>
<td></td>
<td>Discussion of engagement processes and due diligence practices with respect to human rights, indigenous rights, and operation in areas of conflict</td>
<td>Discussion and Analysis</td>
<td>n/a</td>
<td>EM-MM-210a.3</td>
</tr>
<tr>
<td><strong>Community Relations</strong></td>
<td>Discussion of process to manage risks and opportunities associated with community rights and interests</td>
<td>Discussion and Analysis</td>
<td>n/a</td>
<td>EM-MM-210b.1</td>
</tr>
<tr>
<td></td>
<td>Number and duration of non-technical delays</td>
<td>Quantitative</td>
<td>Number, Days</td>
<td>EM-MM-210b.2</td>
</tr>
<tr>
<td><strong>Labor Relations</strong></td>
<td>Percentage of active workforce covered under collective bargaining agreements, broken down by U.S. and foreign employees</td>
<td>Quantitative</td>
<td>Percentage (%)</td>
<td>EM-MM-310a.1</td>
</tr>
<tr>
<td></td>
<td>Number and duration of strikes and lockouts[^17]</td>
<td>Quantitative</td>
<td>Number, Days</td>
<td>EM-MM-310a.2</td>
</tr>
<tr>
<td><strong>Workforce Health &amp; Safety</strong></td>
<td>(1) MSHA all-incidence rate, (2) fatality rate, (3) near miss frequency rate (NMFR) and (4) average hours of health, safety, and emergency response training for (a) full-time employees and (b) contract employees</td>
<td>Quantitative</td>
<td>Rate</td>
<td>EM-MM-320a.1</td>
</tr>
<tr>
<td><strong>Business Ethics &amp; Transparency</strong></td>
<td>Description of the management system for prevention of corruption and bribery throughout the value chain</td>
<td>Discussion and Analysis</td>
<td>n/a</td>
<td>EM-MM-510a.1</td>
</tr>
<tr>
<td></td>
<td>Production in countries that have the 20 lowest rankings in Transparency International’s Corruption Perception Index</td>
<td>Quantitative</td>
<td>Metric tons (t) saleable</td>
<td>EM-MM-510a.2</td>
</tr>
<tr>
<td><strong>Tailings Storage Facilities Management</strong></td>
<td>Tailings storage facility inventory table, (1) facility name, (2) location, (3) ownership status, (4) operational status, (5) construction method, (6) maximum permitted storage capacity, (7) current amount of tailings stored, (8) consequence classification, (9) date of most recent independent technical review, (10) material findings, (11) mitigation measures, (12) site-specific EPRP</td>
<td>Quantitative</td>
<td>Various</td>
<td>EM-MM-540a.1</td>
</tr>
</tbody>
</table>

[^17]: Note to EM-MM-310a.2 – Disclosure shall include the number, duration, and reason for the stoppage
Waste & Hazardous Materials Management

Topic Summary

The Metals & Mining industry generates large volumes of non-mineral and mineral processing and smelting wastes, including waste rock, tailings, slurries, slags, sludges, smelting, and industrial wastes and tailings, some of which may contain substances that are toxic, hazardous, or chemically reactive. Mineral processing sometimes also requires the use of hazardous materials for metal extraction. Waste produced during mining operations, depending on its type, can be treated, disposed of, or stored in on- or off-site impoundments or old mine pits. Improper storage or disposal of hazardous materials used in operations or mining waste can present a significant long-term threat to human health and ecosystems through potential contamination of groundwater or surface water that is used for drinking and agricultural purposes. Impoundments for tailings can cover large areas of land. This can present a significant threat if the impoundments burst, collapse, or leak, leading to the loss of life or damage to property and ecosystems. Mineral wastes are also often stored in-pit, using abandoned open pit surface mines. Such storage can create the potential for groundwater contamination and could affect the stability of active mines in the area.

Companies that reduce and recycle waste streams while implementing policies to manage risks related to handling hazardous materials may enjoy lower regulatory and litigation risks, remediation liabilities, and costs. The integrity of tailings facilities may enjoy lower regulatory and litigation risks, remediation liabilities, and costs. Additionally, tailings can contain hazardous chemical residues from extraction and processing operations. Companies’ ability to manage the sourcing, transport, use, and disposal of mining and metal processing chemicals and by-products can reduce associated risks.

Accounting Metrics

EM-MM-150a.4. Total weight of non-mineral waste generated

1. The entity shall disclose the total amount, in metric tons, of non-mineral waste it generated.

1.1 Non-mineral waste is defined as anything for which the entity has no further use and which is discarded, intended to be discarded, or released into the environment.

1.2 The scope of disclosure includes non-mineral waste generated from all activities.
1.2.1 The scope of non-mineral waste includes scrap metal, reject coal, used oil, tires, batteries, and other solid wastes.

1.3 The scope of non-mineral waste excludes overburden, waste rock, tailings, and gaseous wastes.

**EM-MM-150a.5. Total weight of tailings produced**

1 The entity shall disclose the total weight, in metric tons, of tailings it produced.

1.1 The definition of tailings shall be consistent with that provided in the Global Industry Standard on Tailings Management (GISTM).

**EM-MM-150a.6. Total weight of waste rock generated**

1 The entity shall disclose the total amount, in metric tons, of waste rock it generated.

1.1 Waste rock is defined as mineral materials and low-grade ore with no economic interest at the time of mining.

**EM-MM-150a.7. Total weight of hazardous waste generated**

1 The entity shall disclose the total weight, in metric tons, of waste it generated that was hazardous.

1.1 Hazardous wastes are defined per the legal or regulatory framework(s) applicable within the jurisdiction(s) where the waste is generated.


**EM-MM-150a.8. Total weight of hazardous waste recycled**

1 The entity shall disclose the total weight, in metric tons, of hazardous waste it generated that was recycled.

1.1 Hazardous wastes are defined per the legal or regulatory framework(s) applicable within the jurisdiction(s) where the waste is generated.


1.2 Recycled materials are defined as waste materials that have been reprocessed or treated by means of production or manufacturing process and made into a final product or a component for incorporation into a product.

1.2.1 This definition is based on the UNEP Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, 1989.

1.3 Materials incinerated, including for energy recovery, shall not be considered within the scope of recycled waste.
1.3.1 Energy recovery is defined as the use of combustible waste as a means to generate energy through direct incineration, with or without other waste, but with recovery of the heat.

EM-MM-150a.9. Number of significant incidents associated with hazardous materials and waste management

1. The entity shall disclose the total number of significant incidents associated with handling, storage, transportation, or disposal of hazardous materials used in mineral processing activities and hazardous waste generated.

1.1 The scope of disclosure includes incidents of seepage from tailings facilities that contain a meaningful concentration of hazardous raw materials, or significant spills or releases that occurred during handling, storage, transportation, use, and/or disposal of raw hazardous materials that had impacts on the environment, employees, and/or surrounding communities.

1.1.1 A meaningful concentration is defined as a concentration that exceeds the concentration limits of applicable local regulatory requirements or industry-wide accepted codes such as International Cyanide Management Code in regard to cyanide.

1.1.2 Impacts on the environment, employees, or surrounding communities include, but are not limited to, surface water and ground water contamination and land contamination that required response and remediation, caused adverse impacts on biodiversity, or caused personal injury or death to employees or community members.

1.2 A significant incident is defined as an incident that exceeds volume and concentration limits of local regulatory requirements or industry-accepted codes, or is otherwise included in the entity’s financial statements (e.g., due to resulting liabilities) or recorded by the entity as an incident required to be reported by local jurisdictions; or is an event that is significant in the judgment of the operator, even though it did not meet the criteria above.

1.2.1 The entity may disclose its criteria for establishing the threshold in volume and concentration for which it considers an incident significant.

1.3 Hazardous materials and wastes are defined per the legal or regulatory framework(s) applicable within the jurisdiction(s) where materials are used and wastes generated.

1.3.1 Hazardous materials used in direct mineral processing may include, but are not limited to, cyanides, sulfuric acid, hydrochloric acid, nitric acid, ammonia, mercury, and lead.

1.4 Hazardous wastes are defined per the legal or regulatory framework(s) applicable within the jurisdiction(s) where the waste is generated.

1.5 Mineral processing is defined as the process through which commercially valuable minerals are separated from their ores.

1.5.1 Examples of mineral processing include, but are not limited to, leaching and flotation.

EM-MM-150a.10. Description of waste and hazardous materials management policies and procedures for active and inactive operations

1 The entity shall describe the policies and procedures that are set forth by its waste and hazardous materials management strategy.

1.1 The scope of disclosure shall include policies and procedures for the entity’s active and inactive operations.

1.2 The scope of waste includes mineral and non-mineral waste.

1.2.1 Mineral waste is defined as wastes generated during the extraction and beneficiation of ores and minerals.

1.2.2 Non-mineral waste is defined as all other waste (excluding mineral waste) for which the entity has no further use and which is discarded, intended to be discarded, or released into the environment.

1.3 The scope of hazardous raw materials includes chemicals and materials used for procedures such as leaching and flotation, including, but not limited to, cyanides, sulfuric acid, hydrochloric acid, and nitric acid.

2 The entity shall describe how its policies and procedures compare with those required by local jurisdictions that apply to the entity.

2.1 The entity shall discuss whether and how its policies and procedures exceed the requirements of local jurisdictions.

2.2 The entity shall discuss how its policies and procedures vary by region.

3 The entity shall describe its approach to waste management during entire project life cycle.

3.1 The scope of disclosure shall include, but is not limited to, a discussion of the entity’s:

3.1.1 Approach to assessment of potential environmental impacts associated with waste streams;

3.1.2 Policies and procedures related to waste avoidance;

3.1.3 Approach to identification, assessment, and application of recycling, reuse, and repurposing as waste management strategies;

3.1.4 Policies and procedures related to waste disposal or incineration;
3.1.5 Policies and procedures related to remediation of environmental or social impacts of incidents associated with the mishandling of hazardous waste disposal; and

3.1.6 Approach to decommissioning waste facilities.

4 The entity shall describe its approach to the management of hazardous materials used in processing. The scope of disclosure shall include, but is not limited to:

4.1 Process through which the entity determines which materials are hazardous, including applicable entity-specific policies or applicable regulations;

4.2 Approach to risk assessment of potential impacts associated with handling and use of hazardous materials;

4.3 Policies and procedures related to avoiding and mitigating the risk of spills, seepage, poisoning, accidents, and incidents that could have catastrophic impacts on human health, local communities, and the environment; and

4.4 Policies and procedures related to remediation of consequences of spills, seepage, poisoning, accidents, and incidents that could have catastrophic impacts on human health, local communities, and the environment.

5 The entity shall include a description of how waste and hazardous materials management efforts are coordinated among business partners (e.g., contractors and subcontractors).

6 The entity shall describe how it ensures compliance and conformance with waste and hazardous material management policies and procedures.
Tailings Storage Facilities Management

Topic Summary

The Metals & Mining industry faces significant operational hazards, particularly those associated with the structural integrity of tailings storage facilities (TSFs). A catastrophic failure of such facilities (e.g., a dam failure) can release significant volumes of waste streams and potentially harmful materials into the environment, leading to high-consequence impacts on ecosystems, human livelihood, local economies, and communities. Such catastrophic incidents may result in significant financial losses for companies and may erode their reputation and social license to operate. Robust approaches to tailings facilities design, management, operation, and closure, as well as appropriate management of associated risks, can help prevent such incidents from occurring. Companies that adopt comprehensive practices to maintain the integrity and safety of TSFs may do so through assigning accountability for tailings management at the highest levels of the company, conducting frequent internal and external independent technical reviews of TSFs, and ensuring that mitigation measures are implemented in a timely manner in case of a safety concern. Additionally, a strong safety culture and well-established emergency preparedness and response plans can mitigate the impacts and financial implications of such events should they occur. Company obligations related to long-term remediation and compensation for damages may result in additional financial impacts in case of a failure. The ability for companies to meet such obligations after an incident occurs is an additional component of emergency preparedness.

Accounting Metrics

EM-MM-540a.1. Tailings storage facility inventory table: (1) facility name, (2) location, (3) ownership status, (4) operational status, (5) construction method, (6) maximum permitted storage capacity, (7) current amount of tailings stored, (8) consequence classification, (9) date of most recent independent technical review, (10) material findings, (11) mitigation measures, (12) site-specific emergency preparedness plan (EPRP).

1 The entity shall disclose an inventory of its tailings storage facilities.

1.1 The definition of tailings facilities shall be consistent with that provided in the Global Industry Standard on Tailings Management (GISTM).

2 For each tailings facility, the entity shall disclose (a) the facility name, (b) its location, (c) ownership status, (d) operational status, (e) construction method, (f) maximum permitted storage capacity, (g) current amount of tailings stored, (h) consequence classification, (i) date of the most recent independent technical review, (j) material findings, (k) mitigation measures, and (l) site-specific emergency preparedness and response plan (EPRP).

2.1 The entity shall provide the name or other identifier used by the entity for the facility.

2.2 Location shall include country.

2.3 Ownership status shall indicate whether the entity is the operator of the facility.
2.3.1 The definition of an operator shall be consistent with that provided in the GISTM.

2.4 The entity shall disclose the operational status of its facilities (e.g., active, inactive—under maintenance, closed, etc.).

2.5 The entity shall disclose the construction method of the facility.

2.5.1 The entity shall disclose the construction method as "downstream", "upstream", or "centreline", consistent with the definitions provided by the International Council on Mining and Metals (ICMM).

2.5.2 If the construction method does not match any of these definitions, the entity shall disclose "other" and provide a brief description.

2.6 The entity shall disclose the maximum permitted storage capacity of the facility, in metric tons.

2.7 The entity shall disclose the amount of tailings stored in the facility as of the end of the reporting period, in metric tons.

2.8 The entity shall disclose the consequence classification of the facility in accordance with Requirement 4.1 of the GISTM.

2.9 The entity shall disclose the date of the most recent independent technical review of the facility conducted in accordance with Requirement 10.6 of the GISTM.

2.9.1 A review is considered independent when conducted by third parties who are not and have not been directly involved with the design or operation of the facility.

2.10 The entity shall disclose whether the most recent independent technical review resulted in material findings related to safety of the facility.

2.10.1 The definition of material findings shall be consistent with that provided in the GISTM, where the criteria for what is material is to be defined by the entity, subject to the provisions of local regulations, and evaluated as part of any audit or external assessment that may be conducted on implementation.

2.10.2 The entity shall state either "Yes" or "No."

2.10.3 For facilities where the entity has responded "Yes", the entity may provide a summary of the material findings in addition to the inventory table.

2.10.4 For facilities where an independent technical review was not conducted, the entity shall state "N/A."

2.11 If the entity has disclosed "Yes" regarding material findings, the entity shall disclose whether mitigation measures have been implemented to reduce risk to a level as low as reasonably practicable (ALARP).

2.11.1 The definition of ALARP shall be consistent with that provided in the GISTM.
2.11.2 The entity shall state either “Yes” or “No.”

2.11.3 For facilities where the entity has responded "Yes", the entity may provide a summary of the relevant mitigation measures in addition to the inventory table.

2.12 The entity shall disclose whether a site-specific EPRP is in place in accordance with Requirements 13.1 and 13.2 of the GISTM.

2.12.1 The definition of EPRP shall be consistent with that provided in the GISTM.

2.12.2 The entity shall state either “Yes” or “No.”

3 The entity should disclose this inventory in the following table format:

<table>
<thead>
<tr>
<th>(a) Facility name</th>
<th>(b) Location</th>
<th>(c) Ownership status</th>
<th>(d) Operational status</th>
<th>(e) Construction method</th>
<th>(f) Maximum permitted storage capacity</th>
<th>(g) Current amount of tailings stored</th>
<th>(h) Consequence classification</th>
<th>(i) Date of most recent independent technical review</th>
<th>(j) Material findings</th>
<th>(k) Mitigation measures</th>
<th>(l) Site-specific EPRP</th>
</tr>
</thead>
</table>

---

EM-MM-540a.2. Summary of tailings management systems and governance structure used to monitor and maintain the stability of tailings storage facilities

1 The entity shall provide a summary of the tailings management systems used to monitor and maintain the structural integrity of tailings facilities and to minimize the risk of a catastrophic failure.

1.1 The scope of disclosure shall include a summary of the policies and procedures for the entity’s active and inactive tailings facilities for all phases of their life cycle, including closure and post-closure.

1.2 The definitions of tailings facilities and tailings management systems shall be consistent with those provided in the Global Industry Standard on Tailings Management (GISTM).

2 The disclosure shall include concepts outlined in Principles 7–11 of the GISTM and include, but not be limited to:

2.1 A summary of the performance monitoring program for tailings facilities and their appurtenant structures;

2.2 A summary of the engineering monitoring systems that verify design assumptions and monitor potential failure modes;

2.3 The frequency of risk assessments consistent with Requirement 10.1 of the GISTM;
2.4 Frequency of Engineer of Record or senior independent technical reviewer construction and performance reviews;

2.4.1 The definition of Engineer of Record shall be consistent with that provided in the GISTM.

2.5 A summary of the governance framework that outlines the accountability from management from the site level through to executive leadership and the board of directors; and

2.6 Frequency of reviews to confirm that adequate financial capacity (including insurance, to the extent commercially reasonable) is available for planned closure, early closure, reclamation, and post-closure of tailings facilities and their appurtenant structures.

EM-MM-540a.3. Approach to development of Emergency Preparedness and Response Plans (EPRPs) for tailings storage facilities

1 The entity shall disclose its approach to the development of Emergency Preparedness and Response Plans (EPRPs).

1.1 The definition of EPRP shall be consistent with that provided in the Global Industry Standard on Tailings Management (GISTM).

1.2 The scope of disclosure shall include a summary of plans, procedures, and policies for the entity’s active and inactive tailings storage facilities for all phases of the life cycle, including closure and post-closure.

1.2.1 The definition of tailings facility shall be consistent with that provided in the GISTM.

2 The entity shall disclose its approach to engagement concerning EPRPs at its facilities, including the preparedness of local stakeholders.

2.1 Disclosure shall include, but not be limited to:

2.1.1 The entity’s approach to engaging with employees, contractors, public sector agencies, first responders, and local authorities and institutions in accordance with Requirements 13.1 and 13.2 of the GISTM; and

2.1.2 The entity’s frequency of emergency response plan tests and evacuation exercises to minimize consequences of a potential failure.
## SUSTAINABILITY DISCLOSURE TOPICS & ACCOUNTING METRICS

<table>
<thead>
<tr>
<th>TOPIC</th>
<th>ACCOUNTING METRIC</th>
<th>CATEGORY</th>
<th>UNIT OF MEASURE</th>
<th>CODE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Greenhouse Gas Emissions</strong></td>
<td>Gross global Scope 1 emissions, percentage covered under emissions-limiting regulations</td>
<td>Quantitative</td>
<td>Metric tons CO₂-e, Percentage (%)</td>
<td>EM-CO-110a.1</td>
</tr>
<tr>
<td></td>
<td>Discussion of long-term and short-term strategy or plan to manage Scope 1 emissions, emissions reduction targets, and an analysis of performance against those targets</td>
<td>Discussion and Analysis</td>
<td>n/a</td>
<td>EM-CO-110a.2</td>
</tr>
<tr>
<td><strong>Water Management</strong></td>
<td>Total fresh water withdrawn, percentage recycled, percentage in regions with High or Extremely High Baseline Water Stress</td>
<td>Quantitative</td>
<td>Cubic meters (m³), Percentage (%)</td>
<td>EM-CO-140a.1</td>
</tr>
<tr>
<td></td>
<td>Number of incidents of non-compliance with water-quality permits, standards, and regulations</td>
<td>Quantitative</td>
<td>Number</td>
<td>EM-CO-140a.2</td>
</tr>
<tr>
<td><strong>Waste Management</strong></td>
<td>Number of tailings impoundments by MSHA hazard potential</td>
<td>Quantitative</td>
<td>Number</td>
<td>EM-CO-150a.1</td>
</tr>
<tr>
<td></td>
<td>Total weight of non-mineral waste generated</td>
<td>Quantitative</td>
<td>Metric tons (t)</td>
<td>EM-CO-150a.2</td>
</tr>
<tr>
<td></td>
<td>Total weight of tailings produced</td>
<td>Quantitative</td>
<td>Metric tons (t)</td>
<td>EM-CO-150a.3</td>
</tr>
<tr>
<td></td>
<td>Total weight of waste rock generated</td>
<td>Quantitative</td>
<td>Metric tons (t)</td>
<td>EM-CO-150a.4</td>
</tr>
<tr>
<td></td>
<td>Total weight of hazardous waste generated</td>
<td>Quantitative</td>
<td>Metric tons (t)</td>
<td>EM-CO-150a.5</td>
</tr>
<tr>
<td></td>
<td>Total weight of hazardous waste recycled</td>
<td>Quantitative</td>
<td>Metric tons (t)</td>
<td>EM-CO-150a.6</td>
</tr>
<tr>
<td></td>
<td>Number of significant incidents associated with hazardous waste management</td>
<td>Quantitative</td>
<td>Number</td>
<td>EM-CO-150a.7</td>
</tr>
<tr>
<td></td>
<td>Description of waste management policies and procedures for active and inactive operations</td>
<td>Discussion and Analysis</td>
<td>n/a</td>
<td>EM-CO-150a.8</td>
</tr>
<tr>
<td><strong>Biodiversity Impacts</strong></td>
<td>Description of environmental management policies and practices for active sites</td>
<td>Discussion and Analysis</td>
<td>n/a</td>
<td>EM-CO-160a.1</td>
</tr>
<tr>
<td></td>
<td>Percentage of mine sites where acid rock drainage is: (1) predicted to occur, (2) actively mitigated, (3) under treatment or remediation</td>
<td>Quantitative</td>
<td>Percentage (%)</td>
<td>EM-CO-160a.2</td>
</tr>
<tr>
<td></td>
<td>Percentage of (1) proven and (2) probable reserves in or near sites with protected conservation status or endangered species habitat</td>
<td>Quantitative</td>
<td>Percentage (%)</td>
<td>EM-CO-160a.3</td>
</tr>
<tr>
<td>TOPIC</td>
<td>ACCOUNTING METRIC</td>
<td>CATEGORY</td>
<td>UNIT OF MEASURE</td>
<td>CODE</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>------------------------------------------------------------------------------------</td>
<td>---------------------------------</td>
<td>-----------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Rights of Indigenous Peoples</td>
<td>Percentage of (1) proved and (2) probable reserves in or near indigenous land</td>
<td>Quantitative</td>
<td>Percentage (%)</td>
<td>EM-CO-210a.1</td>
</tr>
<tr>
<td></td>
<td>Discussion of engagement processes and due diligence practices with respect to the management of indigenous rights</td>
<td>Discussion and Analysis</td>
<td>n/a</td>
<td>EM-CO-210a.2</td>
</tr>
<tr>
<td>Community Relations</td>
<td>Discussion of process to manage risks and opportunities associated with community rights and interests</td>
<td>Discussion and Analysis</td>
<td>n/a</td>
<td>EM-CO-210b.1</td>
</tr>
<tr>
<td></td>
<td>Number and duration of non-technical delays</td>
<td>Quantitative</td>
<td>Numbers, Days</td>
<td>EM-CO-210b.2</td>
</tr>
<tr>
<td>Labor Relations</td>
<td>Percentage of active workforce covered under collective-bargaining agreements, broken down by U.S. and foreign employees</td>
<td>Quantitative</td>
<td>Percentage (%)</td>
<td>EM-CO-310a.1</td>
</tr>
<tr>
<td></td>
<td>Number and duration of strikes and lockouts(^\text{16})</td>
<td>Quantitative</td>
<td>Number, Days</td>
<td>EM-CO-310a.2</td>
</tr>
<tr>
<td>Workforce Health &amp; Safety</td>
<td>(1) MSHA All-Incidence Rate, (2) fatality rate, and (3) near-miss frequency rate (NMFR)</td>
<td>Quantitative</td>
<td>Rate</td>
<td>EM-CO-320a.1</td>
</tr>
<tr>
<td></td>
<td>Discussion of management of accident and safety risks and long-term health and safety risks</td>
<td>Discussion and Analysis</td>
<td>n/a</td>
<td>EM-CO-320a.2</td>
</tr>
<tr>
<td>Reserves Valuation &amp; Capital Expenditures</td>
<td>Sensitivity of coal reserve levels to future price projection scenarios that account for a price on carbon emissions</td>
<td>Quantitative</td>
<td>Million metric tons (Mt)</td>
<td>EM-CO-420a.1</td>
</tr>
<tr>
<td></td>
<td>Estimated carbon dioxide emissions embedded in proven coal reserves</td>
<td>Quantitative</td>
<td>Metric tons (t) CO(_2)-e</td>
<td>EM-CO-420a.2</td>
</tr>
<tr>
<td></td>
<td>Discussion of how price and demand for coal and/or climate regulation influence the capital expenditure strategy for exploration, acquisition, and development of assets</td>
<td>Discussion &amp; Analysis</td>
<td>n/a</td>
<td>EM-CO-420a.3</td>
</tr>
<tr>
<td>Tailings Storage Facilities Management</td>
<td>Tailings storage facility inventory table: (1) facility name, (2) location, (3) ownership status, (4) operational status, (5) construction method, (6) maximum permitted storage capacity, (7) current amount of tailings stored, (8) consequence classification, (9) date of most recent independent technical review, (10) material findings, (11) mitigation measures, (12) site-specific EPRP</td>
<td>Quantitative</td>
<td>Various</td>
<td>EM-CO-540a.1</td>
</tr>
<tr>
<td></td>
<td>Summary of tailings management systems and governance structure used to monitor and maintain stability of tailings storage facilities</td>
<td>Discussion &amp; Analysis</td>
<td>n/a</td>
<td>EM-CO-540a.2</td>
</tr>
</tbody>
</table>

\(^{16}\) Note to EM-CO-310a.2 – Disclosure shall include the number, duration, and reason for the stoppage
Waste Management

Topic Summary

The Coal Operations industry generates large volumes of non-mineral and mineral waste, including solid rock and clay waste, process refuse, and liquid coal waste, which may contain toxic elements such as mercury, arsenic, or cadmium. Waste produced during coal mining and processing operations, depending on its type, can be treated, disposed of, or stored off- or on-site—in impoundments or old mine pits. Improper disposal or storage of hazardous materials or mining waste can present a significant long-term threat to human health and ecosystems through potential contamination of groundwater or surface water that is used for drinking or agriculture purposes. This poses operational and regulatory challenges for coal operations companies. Companies that reduce waste streams while implementing policies to manage risks related to waste containing heavy metals and that have rigorous hazardous waste disposal practices may see lower regulatory and litigation risks, remediation liabilities, and costs.

Handling of solid rock and clay waste, process refuse, and liquid coal waste containing hazardous substances like mercury, arsenic, and cadmium poses operational and regulatory challenges for coal operations companies. Coal slurry or tailings ponds can present a significant threat if the impoundments burst, collapse, or leak, leading to destruction of lives, property, and ecosystems, with associated financial impacts that may include regulatory penalties, compensation payments, and remediation or compliance obligations. Permitting of mining operations may be affected, lowering a company’s revenue or requiring additional expenditures prior to approval. Companies’ ability to lower the number and size of tailings ponds and ensure the structural integrity of impoundments can help minimize such impacts.

Accounting Metrics

EM-CO-150a.2. Total weight of non-mineral waste generated

1 The entity shall disclose the total amount, in metric tons, of non-mineral waste it generated.

1.1 Non-mineral waste is defined as anything for which the entity has no further use and which is discarded, intended to be discarded, or released into the environment.

1.2 The scope of disclosure includes non-mineral waste generated from all activities.
1.2.1 The scope of non-mineral waste includes scrap metal, reject coal, used oil, tires, batteries, and other solid wastes.

1.3 The scope of non-mineral waste excludes overburden, waste rock, tailings, and gaseous wastes.

EM-CO-150a.3. Total weight of tailings produced
1 The entity shall disclose the total weight, in metric tons, of tailings it produced.

1.1 The definition of tailings shall be consistent with that provided in the Global Industry Standard on Tailings Management (GISTM).

EM-CO-150a.4. Total weight of waste rock generated
1 The entity shall disclose the total amount, in metric tons, of waste rock it generated.

1.1 Waste rock is defined as mineral materials and low-grade ore with no economic interest at the time of mining.

EM-CO-150a.5. Total weight of hazardous waste generated
1 The entity shall disclose the total weight, in metric tons, of waste it generated that was hazardous.

1.1 Hazardous wastes are defined per the legal or regulatory framework(s) applicable within the jurisdiction(s) where the waste is generated.


EM-CO-150a.6. Total weight of hazardous waste recycled
1 The entity shall disclose the total weight, in metric tons, of hazardous waste it generated that was recycled.

1.1 Hazardous wastes are defined per the legal or regulatory framework(s) applicable within the jurisdiction(s) where the waste is generated.


1.2 Recycled materials are defined as waste materials that have been reprocessed or treated by means of production or manufacturing process and made into a final product or a component for incorporation into a product.

1.2.1 This definition is based on the UNEP Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, 1989.

1.3 Materials incinerated, including for energy recovery, shall not be considered within the scope of recycled waste.
1.3.1 Energy recovery is defined as the use of combustible waste as a means to generate energy through direct incineration, with or without other waste, but with recovery of the heat.

**EM-CO-150a.7. Number of significant incidents associated with hazardous waste management**

1 The entity shall disclose the total number of significant incidents associated with the handling, storage, transportation, or disposal of hazardous waste.

1.1 The scope of disclosure includes incidents of mishandling and improper disposal of hazardous waste that are significant or have impacts on the environment, employees, and/or surrounding communities.

1.1.1 Impacts on the environment, employees, or surrounding communities include, but are not limited to, surface water and ground water contamination and land contamination that required response and remediation, caused adverse impacts on biodiversity, or caused personal injury or death to employees or community members.

1.2 A significant incident is defined as an incident that exceeds the volume and concentration limits of local regulatory requirements or industry-accepted codes, or is otherwise included in the entity’s financial statements (e.g., due to resulting liabilities) or recorded by the entity as an incident required to be reported by local jurisdictions; or is an event that is significant in the judgment of the operator, even though it did not meet the criteria above.

1.2.1 The entity may disclose its criteria for establishing the threshold in volume and concentration for which it considers an incident significant.

1.3 Hazardous wastes are defined per the legal or regulatory framework(s) applicable within the jurisdiction(s) where the waste is generated.


**EM-CO-150a.8. Description of waste management policies and procedures for active and inactive operations**

1 The entity shall describe the policies and procedures that are set forth by its waste management strategy.

1.1 The scope of disclosure shall include policies and procedures for the entity’s active and inactive operations.

1.2 The scope of waste includes mineral and non-mineral waste.

1.2.1 Mineral waste is defined as wastes generated during the extraction and beneficiation of ores and minerals.

1.2.2 Non-mineral waste is defined as all other waste (excluding mineral waste) for which the entity has no further use and which is discarded, intended to be discarded, or released into the environment.
2 The entity shall describe how its policies and procedures compare with those required by local jurisdictions that apply to the entity.

2.1 The entity shall discuss whether and how its policies and procedures exceed the requirements of local jurisdictions.

2.2 The entity shall discuss how its policies and procedures vary by region.

3 The entity shall describe its approach to waste management during entire project life cycle.

3.1 The scope of disclosure shall include, but is not limited to, a discussion of the entity’s:

3.1.1 Approach to assessment of potential environmental impacts associated with waste streams;

3.1.2 Policies and procedures related to waste avoidance;

3.1.3 Approach to identification, assessment, and application of recycling, reuse, and repurposing as waste management strategies;

3.1.4 Policies and procedures related to waste disposal or incineration;

3.1.5 Policies and procedures related to remediation of environmental or social impacts of incidents associated with the mishandling of hazardous waste; and

3.1.6 Approach to decommissioning waste facilities.

4 The entity shall include a description of how waste management efforts are coordinated among business partners (e.g., contractors and subcontractors).

5 The entity shall describe how it ensures compliance and conformance with its waste management policies and procedures.
Tailings Storage Facilities Management

Topic Summary

Coal waste impoundments or fine coal refuse ponds, also called tailings storage facilities (TSFs), can leak and contaminate water supplies when mismanaged, potentially leading to adverse impacts to the environment or human health. These impacts may carry financial implications such as regulatory penalties, compensation payments, and remediation or compliance obligations. Companies’ ability to lower the number and size of fine coal refuse ponds and ensure the structural integrity of impoundments can help minimize such impacts. Even though the type of materials stored in coal refuse impoundments are characterized with lower flowability than those in the Metals & Mining industry, a catastrophic failure of such facilities (e.g., a dam failure) can still release significant volumes of waste and materials that are potentially harmful to the environment, leading to high-consequence impacts on ecosystems, human livelihood, local economies, and communities. Such catastrophic incidents may result in significant financial losses for companies and may erode their social license to operate. Robust processes and approaches to tailings facilities design, management, operation, and closure, as well as appropriate management of associated risks, can help prevent such incidents from occurring. Companies that adopt robust practices to maintain the safety of TSFs may do so through assigning accountability for tailings management at the highest levels of the company, conducting frequent internal and external independent technical reviews of TSFs, and ensuring that mitigation measures are implemented in a timely manner in case of a safety concern. Additionally, a strong safety culture and well-established emergency preparedness and response plans can mitigate the impacts and financial implications of such events should they occur. Company obligations related to long-term remediation and compensation for damages may result in additional financial impacts in case of a failure. A company’s ability to meet such obligations after an incident occurs is an additional component of emergency preparedness.

Accounting Metrics

EM-CO-540a.1. Tailings storage facility inventory table: (1) facility name, (2) location, (3) ownership status, (4) operational status, (5) construction method, (6) maximum permitted storage capacity, (7) current amount of tailings stored, (8) consequence classification, (9) date of most recent independent technical review, (10) material findings, (11) mitigation measures, (12) site-specific EPRP

1 The entity shall disclose an inventory of its tailings storage facilities.

1.1 The definition of tailings facilities shall be consistent with that provided in the Global Industry Standard on Tailings Management (GISTM).

2 For each tailings facility, the entity shall disclose (a) the facility name, (b) its location, (c) ownership status, (d) operational status, (e) construction method, (f) maximum permitted storage capacity, (g) current amount of tailings stored, (h)
consequence classification, (i) date of the most recent independent technical review, (j) material findings, (k) mitigation
measures, and (l) site-specific emergency preparedness and response plan (EPRP).

2.1 The entity shall provide the name or other identifier used by the entity for the facility.

2.2 Location shall include country.

2.3 Ownership status shall indicate whether the entity is the operator of the facility.

2.3.1 The definition of an operator shall be consistent with that provided in the GISTM.

2.4 The entity shall disclose the operational status of its facilities (e.g., active, inactive—under maintenance, closed, etc.).

2.5 The entity shall disclose the construction method of the facility.

2.5.1 The entity shall disclose the construction method as "downstream", "upstream", or "centreline", consistent
with the definitions provided by the International Council on Mining and Metals (ICMM).

2.5.2 If the construction method does not match any of these definitions, the entity shall disclose "other" and
provide a brief description.

2.6 The entity shall disclose the maximum permitted storage capacity of the facility, in metric tons.

2.7 The entity shall disclose the amount of tailings stored in the facility as of the end of the reporting period, in metric
tons.

2.8 The entity shall disclose the consequence classification of the facility in accordance with Requirement 4.1 of the
GISTM.

2.9 The entity shall disclose the date of the most recent independent technical review of the facility conducted in
accordance with Requirement 10.6 of the GISTM.

2.9.1 A review is considered independent when conducted by third parties who are not and have not been directly
involved with the design or operation of the facility.

2.10 The entity shall disclose whether the most recent independent technical review resulted in material findings related
to safety of the facility.

2.10.1 The definition of material findings shall be consistent with that provided in the GISTM, where the criteria for
what is material is to be defined by the entity, subject to the provisions of local regulations, and evaluated as
part of any audit or external assessment that may be conducted on implementation.

2.10.2 The entity shall state either “Yes” or “No.”
2.10.3 For facilities where the entity has responded "Yes", the entity may provide a summary of the material findings in addition to the inventory table.

2.10.4 For facilities where an independent technical review was not conducted, the entity shall state “N/A.”

2.11 If the entity has disclosed "Yes" regarding material findings, the entity shall disclose whether mitigation measures have been implemented to reduce risk to a level as low as reasonably practicable (ALARP).

2.11.1 The definition of ALARP shall be consistent that provided in the GISTM.

2.11.2 The entity shall state either “Yes” or “No.”

2.11.3 For facilities where the entity has responded “Yes”, the entity may provide a summary of the relevant mitigation measures in addition to the inventory table.

2.12 The entity shall disclose whether a site-specific EPRP is in place in accordance with Requirements 13.1 and 13.2 of the GISTM.

2.12.1 The definition of EPRP shall be consistent with that provided in the GISTM.

2.12.2 The entity shall state either “Yes” or “No.”

3 The entity should disclose this inventory in the following table format:

<table>
<thead>
<tr>
<th>(a) Facility name</th>
<th>(b) Location</th>
<th>(c) Ownership status</th>
<th>(d) Operational status</th>
<th>(e) Construction method</th>
<th>(f) Maximum permitted storage capacity</th>
<th>(g) Current amount of tailings stored</th>
<th>(h) Consequence classification</th>
<th>(i) Date of most recent independent technical review</th>
<th>(j) Material findings</th>
<th>(k) Mitigation measures</th>
<th>(l) Site-specific EPRP</th>
</tr>
</thead>
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</tbody>
</table>

EM-CO-540a.2. Summary of tailings management systems and governance structure used to monitor and maintain the stability of tailings storage facilities

1 The entity shall provide a summary of the tailings management systems used to monitor and maintain the structural integrity of tailings facilities and to minimize the risk of a catastrophic failure.

1.1 The scope of disclosure shall include a summary of the policies and procedures for the entity’s active and inactive tailings facilities for all phases of their life cycle, including closure and post-closure.

1.2 The definitions of tailings facilities and tailings management systems shall be consistent with those provided in the Global Industry Standard on Tailings Management (GISTM).
The disclosure shall include concepts outlined in Principles 7–11 of the GISTM and include, but not be limited to:

2.1 A summary of the performance monitoring program for tailings facilities and their appurtenant structures;

2.2 A summary of the engineering monitoring systems that verify design assumptions and monitor potential failure modes;

2.3 The frequency of risk assessments consistent with Requirement 10.1 of the GISTM;

2.4 Frequency of Engineer of Record or senior independent technical reviewer construction and performance reviews;

2.4.1 The definition of Engineer of Record shall be consistent with that provided in the GISTM.

2.5 A summary of the governance framework that outlines the accountability from management from the site level through to executive leadership and the board of directors; and

2.6 Frequency of reviews to confirm that adequate financial capacity (including insurance, to the extent commercially reasonable) is available for planned closure, early closure, reclamation, and post-closure of tailings facilities and their appurtenant structures.

EM-CO-540a.3. Approach to development of Emergency Preparedness and Response Plans (EPRPs) for tailings storage facilities

1. The entity shall disclose its approach to the development of Emergency Preparedness and Response Plans (EPRPs).

1.1 The definition of EPRP shall be consistent with that provided in the Global Industry Standard on Tailings Management (GISTM).

1.2 The scope of disclosure shall include a summary of plans, procedures, and policies for the entity’s active and inactive tailings storage facilities for all phases of the life cycle, including closure and post-closure.

1.2.1 The definition of tailings facility shall be consistent with that provided in the GISTM.

2. The entity shall disclose its approach to engagement concerning EPRPs at its facilities, including the preparedness of local stakeholders.

2.1 Disclosure shall include, but not be limited to:

2.1.1 The entity’s approach to engaging with employees, contractors, public sector agencies, first responders, and local authorities and institutions in accordance with Requirements 13.1 and 13.2 of the GISTM; and

2.1.2 The entity’s frequency of emergency response plan tests and evacuation exercises to minimize consequences of a potential failure.