



December 31st, 2019

Dr. Bruno Oberle, Chair

Members of the Expert Panel, Advisory Group

The Global Tailings Review, a co-convened initiative by the International Council on Mining and Metals (ICMM), the United Nations Environment Programme (UNEP) and the Principles for Responsible Investment (PRI), consultation@globaltailingsreview.org

Re. Global Tailings Standard

Dear Dr. Oberle, members of the Expert Panel, Advisory Group,

Hereby, MiningWatch Canada would like to share some of its main comments, concerns and recommendations regarding the draft Global Tailings Standard.¹

About MiningWatch Canada

Founded in 1999, MiningWatch Canada is a non-governmental organization created as a public interest response to the threats to public health, the environment, human rights, and community interests posed by some irresponsible Canadian mineral policies and practices in Canada and around the world. With over 50% of global mining companies registered in the country,² Canada has a major responsibility in the way mining is conducted globally. Over the last twenty years, MiningWatch Canada has intervened and supported affected communities in over 170 mine-related cases around the world, published over 90 reports and research papers, and supported more than 20 legal actions. Its mission includes to hold corporations to account, seek justice for mining-related abuses, and make governments act to protect Indigenous rights and communities.

In Canada, MiningWatch participates in provincial, territorial and federal government advisory committees to promote mining practices and policies that effectively protect the environment and communities. MiningWatch is a long-standing active steering committee member of the Mine Environment Neutral Drainage (MEND) and of the National Orphaned & Abandoned Mine Initiative (NOAMI), both government and multi-stakeholder initiatives³ concerned about mine waste liabilities and mine water pollution issues. Until recently, MiningWatch was an alternate member to the multi-stakeholder advisory committee to the Canadian Ombudsperson for Responsible Enterprise (CORE). MiningWatch regularly participates to international efforts to address mining-related abuses, such as at the Inter-American Commission on Human Rights and in various U.N. lead commissions and initiatives.

Specific to catastrophic mine waste spills, MiningWatch Canada has been particularly active in recent years following the 2014 Mount Polley Mine disaster in British Columbia and other international cases involving Canadian corporations.⁴ It played a leading role in advocating for safer tailings policies within

¹ <https://globaltailingsreview.org/consultation/> and https://globaltailingsreview.org/wp-content/uploads/2019/11/EN-Global-Tailings-Standard_CONSULTATION-DRAFT.pdf

² <https://www.nrcan.gc.ca/our-natural-resources/minerals-mining/minerals-metals-facts/minerals-and-economy/20529>

³ <http://mend-nedem.org/default/> et <http://www.abandoned-mines.org/en/>

⁴ E.g. <https://www.theglobeandmail.com/news/british-columbia/non-profit-group-pursues-legal-action-over-mount-polley-mine-disaster/article32406543/>, https://miningwatch.ca/sites/default/files/the_lawsuit_0.pdf, and <https://miningwatch.ca/blog/2019/2/4/three-canadian-mining-companies-brazil-silent-tailings-dam-structures-following>

Canada, including through the Canadian Energy and Mines Ministers Conferences.⁵ MiningWatch Canada contributed to the UNEP-GRID-Arendal special report “Mine Tailings Storage: Safety Is No Accident,” published in 2017.⁶ It also participated in important international forums on tailings safety issues, such as the Tailings and Mine Waste Conference in 2017 and the ICOLD Symposium in 2019.⁷ The following comments and recommendations draw on MiningWatch Canada’s extensive work, knowledge, and network of experts on tailings safety issues, as well as on social, environmental, technical, financial, and policy experience related to the mining sector.

Towards a Global Tailings Standard

MiningWatch Canada welcomes the initiative of establishing a global standard for mine waste and mine tailings safety. While the current draft Global Tailings Standard is clearly a step in the right direction, it remains insufficient. Just like the Mining Association of Canada’s Tailings Guide—also an important guiding document, the Global Tailings Standard falls short of addressing important technical and financial criteria, as well as important considerations for effective accountability and enforceability at a global scale. ***MiningWatch Canada urges the Global Tailings Review to do more and fully support, integrate and implement the “Top 12 Asks for Mine Tailings Safety” developed by civil society organizations and various independent experts (see attached document).*** Those, in combination to additional measures included below and in the attached document, would help address the gaps of the current draft standard and ensure that the tens of thousands of mine waste sites and dams worldwide no longer fail and destroy significant ecosystems, livelihoods, and human lives.

Specifically, MiningWatch Canada is concerned that the current standard remains ineffective at curbing the trend of catastrophic mine waste failures worldwide if it does not address squarely the following fundamental issues that continue to undermine tailings safety in Canada and globally:

- 1) the lack of clear and mandatory **technical guidelines** to move away, like it is done for other industries, from technologies and practices that present more risks or leave too much space for human error;
- 2) the lack of guidelines to ensure that **cost considerations do not pre-empt safety considerations**, including financial criteria to flag and vet-out operators and projects that are too risky financially, or economically marginal, to be allowed to operate without putting the environment, communities, and the public safety at risk;
- 3) the lack of **accountability and enforceable mechanisms** to ensure that operators have a clear incentive to implement, and comply with the standard, and conversely, clear deterrents or sanctions if they fail to comply with the standard;
- 4) the lack of an **independent global oversight body** that can ensure effective implementation of the standard at a global scale.

Implementation at a Global Scale

MiningWatch Canada remains concerned that the current standard will be ineffective if, as seen for other global standard initiatives before, it remains poorly implemented, or is voluntarily implemented in only a limited number of mine sites, or by only a limited number of mine operators and States. At this juncture, it is crucial that as much, if not more efforts and resources be put to address the question of *‘how to effectively implement’* a safety standard at a global scale as to defining *‘what the standard should be.’* We direct the Global Tailings Review to pay attention to recommendation #12 (attached), which calls for an **independent study** to investigate options about which type of global oversight governance body would be best suited to achieve this objective and effect change at a global scale. This study requires expertise in system change and global governance models which few, if none of the current Expert Panel and Advisory Group members fully possess. It would also be appropriate to

⁵ E.g. https://miningwatch.ca/sites/default/files/2015-07-20_mines_ministers_letter.pdf, <https://miningwatch.ca/news/2015/7/21/canada-s-mines-ministers-open-taking-action-prevent-future-mine-waste-disasters>, <https://miningwatch.ca/news/2017/8/14/canadian-energy-mines-ministers-conference-no-clean-growth-without-clean-mining>

⁶ <http://www.grida.no/publications/383>

⁷ <https://sites.google.com/a/uaberta.ca/tmw-17/home> and <http://www.icold-ciqb2019.ca/>

plan for an additional consultation period to seek the input of external experts and the public regarding a global oversight governance model to be adopted.

The Importance of Accountability and Enforceability

As Norbert Morgenstern points out in its 2018 Victor de Mello Lecture: *“the underlying principle for the tailings management system advocated here... is accountability. This is achieved by multiple layers of review, recurrent risk assessment, and performance-based validation from construction through closure” (emphasis added).*⁸ Morgenstern, like many of its contemporary engineering peers, puts an emphasis on the need to improve global tailings engineering culture and practices in order to resolve what he calls *“a crisis in terms of a loss of confidence and trust associated with... tailings storage facilities.”*⁹ While we agree with Morgenstern and others that accountability is achieved, in part, by proper engineering practices and proper engineering checks and balances, which the current draft Global Tailings Standard aims to achieve, this alone is not enough.

Proper engineering culture and practices do not happen in a vacuum, or through pure ethical and moral motivations. As stated above, accountability also needs to be achieved through enforceable mechanisms, including clear incentives to do the right thing, and conversely, clear deterrents and sanctions to avoid doing the wrong thing. In practice, such incentives or deterrents/sanctions can be achieved through regulations¹⁰ and through financial mechanisms¹¹, amongst others.

Morgenstern also recognizes the crucial role of regulations: *“The regulator also has a vital role. It is the responsibility of the regulator to review the proposed waste management plan and indicate how it is to be validated. This will involve some combination of inspections concentrating on quantified performance objectives, receiving review board reports, and other measures deemed necessary.”*¹² In regard to Best Available Technologies (BAT) and Best Available Practices (BAP), Morgenstern adds: *“It is evident that both BAT and BAP need formalized response and that regulation needs to be more prescriptive than in the past to minimize recurrence of the failures that are being encountered.”* However, Morgenstern fails to address the crucial role of enforceable mechanisms to effect change.

Morgenstern is an engineer. A brilliant one. But he is not an expert in policy making and governance systems, nor on how best to effect cultural and systemic change at a large scale, or how to implement best technologies and best practices at a global scale. Again, we urge the Global Tailings Review to integrate enforceable mechanisms in the standard and investigate global governance models to determine which one is best suited to effect change at a global scale.

The Safest Tailings Facility Is The One That Isn't Built

In closing, MiningWatch Canada urges the Global Tailings Review partners to send a signal, in line with current scientific predictions and calls by international agencies, that we must also look at ways to reducing the overall demand for primary raw minerals to avoid the long term liability of mine waste sites, as well as various social and environmental impacts associated with them.

Since the 1980 (40 years), world production has already increased 2- to 10-fold for various minerals.¹³ During the same period, ore grades have declined on average by half ($\frac{1}{2}$) for many of those minerals, effectively doubling the volume of mine waste tailings generated for each unit of mineral produced.¹⁴ Current trends of population growth, urbanization, consumerism and mineral-intense energy transition technologies predict an additional 2- to 10-fold increase in mineral extraction and uses by

⁸ http://www.victorfbdemello.com.br/arquivos/Lectures/6TH_VICTOR_DE_MELLO_LECTURE.pdf

⁹ Ibid.

¹⁰ e.g. national and sub-national regulations, international law through multinational agreements, professional licenses, etc.

¹¹ e.g. critical mass of banks, investors, insurance companies agreeing to a set of international standards to meet as a pre-requirement for any investment

¹² http://www.victorfbdemello.com.br/arquivos/Lectures/6TH_VICTOR_DE_MELLO_LECTURE.pdf

¹³ <https://miningwatch.ca/sites/default/files/muddpresentationmining-v-mine-waste.pdf>

¹⁴ Ibid

2060, also with degrading ores.¹⁵ Clearly, these trends are not sustainable, nor compatible with the goal of reversing global ecological crises, including the climate crisis, as a result of a 2-fold increase in yearly carbon emission since 1970, and the biodiversity crisis, with a 60% biodiversity loss over the same period.¹⁶ In the latest Global Environmental Outlook by UNEP in 2019, Achim Steiner, UN Under-Secretary-General and Executive Director of UNEP, states the urgency of probing our current global trajectory: “*We must ask ourselves what the consequences of current consumption patterns and trajectory of population growth-forecasted to reach nine billion by 2050-will be.*”¹⁷

We need to continue to mine minerals forward, including to support the energy transition technologies. We need the best standards and practices to do so. But we also need to actively find ways to reduce the overall demand for raw minerals and shift away from some of the current mineral uses. Recent research indicates that we could curb raw mineral mining by as much of 30 to 40% for certain minerals by proactively putting in place effective recycling and circular economy public policies.¹⁸ Other research indicates we could avoid large volumes of mine waste by reducing or shifting away from coal mining (about 11% of tailings generated globally) and gold mining (about 20% of tailings generated globally, mostly for luxury and financial markets).¹⁹ Rethinking urban design and urban transportation systems towards dual low-carbon and low-material solutions²⁰ is also a crucial avenue: over 55% of the current global population lives in urban areas, a proportion predicted to increase to 68% by 2050.²¹

These questions may appear out of scope with the Global Tailings Review mandate, but they don't. Ensuring the goal of “zero failure” and of “zero harm” also include the need to consider ‘no-go options,’ as *the safest tailings facility will always be the one that isn't build*. The Global Tailings Standard should explicitly integrate this important principle in its introduction and preamble.

Thank you for the opportunity to share our views on this important matter,



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¹⁵ Ibid., OECD 2018 <http://www.oecd.org/environment/waste/highlights-global-material-resources-outlook-to-2060.pdf>, World Bank 2017 <http://documents.worldbank.org/curated/en/207371500386458722/pdf/117581-WP-P159838-PUBLIC-ClimateSmartMiningJuly.pdf>

¹⁶ UNEP 2019 https://wedocs.unep.org/bitstream/handle/20.500.11822/27652/GEO6SPM_EN.pdf?sequence=1&isAllowed=y and IPCC 2018 https://ar5-syr.ipcc.ch/topic_summary.php

¹⁷ UNEP 2019 https://wedocs.unep.org/bitstream/handle/20.500.11822/27652/GEO6SPM_EN.pdf?sequence=1&isAllowed=y

¹⁸ ISF 2019 <https://earthworks.org/publications/responsible-minerals-sourcing-for-renewable-energy/>; UNEP 2013 <http://wedocs.unep.org/bitstream/handle/20.500.11822/8850/Metal-recycling-opportunities-limited-infrastructure-Summary.pdf?sequence=1&isAllowed=y>

¹⁹ In 2014, coal mining generated about 11% of tailings and 67% of waste rocks worldwide, while gold mining generated about 20% of tailings and 8% of waste rocks (Mudd 2019: slide 16, <https://miningwatch.ca/sites/default/files/muddpresentationmining-v-mine-waste.pdf>). About 1 in every 5 mines worldwide is a gold mine (or 1 in 4 in Canada). See also <https://miningwatch.ca/blog/2019/2/5/behind-glitter-gold-facts>.

²⁰ Lavolette 2019 <https://miningwatch.ca/sites/default/files/lavolettepresentationfinal.pdf>. See also other resource material presented at the international conference “Turning Down the Heat: Can We Mine Our Way Out of the Climate Crisis?” hosted by MiningWatch Canada in November 2019: <https://miningwatch.ca/turning-down-the-heat>

²¹ UN DESA 2018 <https://population.un.org/wup/Publications/Files/WUP2018-Report.pdf>

GLOBAL TAILINGS STANDARD REVIEW: TOP 12 ASKS FOR MINE TAILINGS SAFETY

Developed by independent experts and civil society organizations, including Earthworks and MiningWatch Canada, and submitted to the Global Tailings Review in December 2019 (<https://globaltailingsreview.org/consultation/>). See additional comments submitted by MiningWatch Canada in its letter submitted to the Global Tailings Review and below in between brackets “[...]”.

1. Make safety the guiding principle in design, construction, operation, and closure.

Given the hazardous nature of mine tailings, **safety** must be the central design factor guiding decision-making. Operators and regulators should make an affirmative commitment to make safety the **primary** consideration in mine waste site and tailings dam design, construction, operation, and closure. Without this commitment, cost will continue to drive the process, putting people and the environment at risk. Taking lessons from the Mount Polley Mine disaster in Canada in 2014, and citing the Expert Panel [review](#), the recent UNEP-GRID Arendal [special report](#) on mine waste storage also made safety its first recommendation: “*safety attributes should be evaluated separately from economic considerations, and cost should not be the determining factor*” (UNEP-GRID Arendal, 2017). We recommend making safety the overarching principle of the Global Tailings Standard, and integrating into Principles 2 & 4 of the current draft Standard.

[See below for further comments on safety and financial risk criteria for the Global Tailings Standard]

2. Design for ‘Probable Maximum Flood’ and ‘Maximum Credible Earthquake:’ Any potential loss of life is an “Extreme Event.”

Safety measures required in the draft Global Tailings Standard currently largely hinge on a ‘Consequence Classification’ of potential harms resulting from failures ([Annex 1](#)). This Consequence Classification is inadequate and must be reviewed to align with the clearly-stated objective of the Standard: “This Standard strives towards the ultimate goal of **zero harm** to people and the environment and **zero tolerance for human fatality**.” (emphasis added) As currently proposed, only the loss of 100 or more lives would be classified as an ‘Extreme Event’ in the Consequence Classification. The potential loss of a single human life should be treated as an Extreme Event, thus requiring more protective measures in the design, construction, operation and closure of mine tailings dams.

For example, the U.S. Federal Emergency Management Agency (FEMA) has only three Hazard Potential Classifications, which are Low, Significant and High. High Hazard Potential means “probable loss of life due to dam failure or misoperation” ([FEMA 2013](#)). FEMA also clarifies that “probable loss of life” means “one or more expected.” When the failure of a tailings facility would be an ‘Extreme Event’ (the potential loss of one life), the facility should be designed to withstand the Probable Maximum Flood (PMF) and the Maximum Credible Earthquake (MCE). The PMF must take climate change predictions into account. The PMF and the MCE are the largest flood and the largest earthquake, respectively, that are theoretically possible at a given location. This recommendation would also bring the Standard into alignment with the recommendations of the U.S. governmental agencies that regulate dams ([Federal Emergency Management Agency](#), [U.S. Army Corps of Engineers](#), and [U.S. Bureau of Reclamation](#)).

The corporate Board of Directors shall give written reasons for any decision to design a tailings dam for other than an Extreme event classification. These written reasons should be filed with a governmental agency and should be publicly available.

3. Ban new mine tailings facilities, and the expansion or raising of existing facilities, immediately upstream from and in inhabited areas.

The most effective way to minimize risk to people is to prevent the construction of new mine waste facilities and the raising or expansion of existing mine waste facilities where there is a population living close by and downstream from the facility. Our recommendation is that no new mine waste facilities should be constructed, and existing mine waste facilities should be not expanded or elevated, where there is a population residing 25 kilometers downstream from the downstream edge of a mine waste facility or within the zone that could be reached by the mine waste within 60 minutes of failure. At the same time, this must not result in involuntary resettlement of existing populations.

The recent mining legislation passed by the Legislative Assembly of Minas Gerais, Brazil ([Law 23291, 2019](#)), introduced the concept of the “self-rescue zone,” within which a person must rescue him or herself because no rescue from the outside is possible. The law defined the “self-rescue zone” as the zone of 10 kilometers, which can be increased to 25 kilometers, at the discretion of a governmental agency in populated and sensitive areas, along the course of the valley downstream from the tailings dam or the portion of the valley that could be reached by the tailings flood within 30 minutes, whichever is greater. According to the legislation, it is prohibited to construct a new tailings dam or to elevate or expand an existing tailings dam where there is a population residing in the “self-rescue zone.”

4. Ban upstream dams at new mines.

Because of the demonstrated risk associated with upstream-type dam construction, upstream dams should not be considered at any new facilities. Upstream construction is especially problematic in areas with moderate or higher seismic risk, or in wet climate areas with net-precipitation (more precipitation than evaporation). Upstream dams leave too much space for human and engineering errors. Center-line and downstream dams have proven much more robust and resilient. Construction of new upstream tailings dams has already been banned in all circumstances in [Brazil](#), [Chile](#), [Peru](#), and [Ecuador](#). For existing upstream tailings dams, a transparent, independent, risk assessment must be conducted for each site, and the results shared with the public and affected communities. Such an assessment must include thorough emergency action plans in case of catastrophic failures.

[MiningWatch Canada’s Added Comment – Increasing number of engineering experts and bodies call for banning or limiting upstream dams worldwide. Discussions at ICOLD in 2019, where MiningWatch Canada was an observer, concluded that upstream dams were not suitable in regions of high seismic activity or of high precipitation / low evaporation rates, nor for the retention of large supernatant pond/reservoir of waters. Discussions also concluded that the two other types of conventional tailings dams (centreline and downstream) have proven reliable technologies since the mid-1960s; they can be built from cycloned sand (from the tailings), mine rocks, or borrow material. Similar comments and conclusions were shared by top tailings engineers at the Tailings & Mine Waste, as well as the Canadian Dams Association conferences in recent years. The Global Tailings Standard ought to reflect those best practices and integrate them to ban or limit upstream dams. There is a large consensus in the engineering community: while upstream dams can be built safely in certain limited conditions, they can’t in most conditions, as leaving too much space for human and engineering errors, and not resilient enough to unpredicted events. According to Garbarino et. al 2018, tailings dams fail at approximately 10 to 100 times the rate of water retention dams, and the majority of tailings dams are upstream-type dams.²²]

5. Towards zero failure before and after mine closure: mandatory dry closure in a “permanent non-credible flow failure state.”

The reference in the current Global Tailings Standard to closure of a tailings facility as a “landform” is not adequate or sufficient. The fact that a tailings facility has been converted into something resembling a natural landform does not mean that it cannot fail by landsliding, which would release hundreds of millions of tons of toxic material. Tailings facilities should be reviewed, inspected, monitored, and maintained until they achieve a “permanent non-credible flow failure state,” a state left undefined in the current draft Standard. This state should be defined as one in which a closed tailings facility can withstand the Probable Maximum Flood (PMF) and the Maximum Credible Earthquake (MCF) without failure, and can remain in that state indefinitely.

²² Garbarino et. al. 2018 <https://ec.europa.eu/irc/en/publication/eur-scientific-and-technical-research-reports/best-available-techniques-bat-reference-document-management-waste-extractive-industries>, referenced into Chambers’ 2019 CDA Conference Paper (in press).

The eventual achievement of a “permanent non-credible flow failure state” requires, at a minimum, the desaturation of tailings upon closure of the facility (what we call “dry closure”). The desaturation of tailings upon closure is facilitated by the initial storage of filtered, or “dry tailings.” As such, all new tailings facilities should favour filtered tailings, unless proven unsafe or environmentally unsound. The use of dry tailings disposal methods reduces both the probability of failure and the consequences of failure through the facility lifecycle.

[MiningWatch Canada’s Added Comment – Discussions at ICOLD in 2019, where MiningWatch Canada was an observer, clearly recommended ‘dry closure’ as a best practice for all sites, including for existing upstream dams if possible, to increase the long-term stability of the site and to reduce any consequences in case of failure (and thus reduce the overall long term public liability of those sites). Discussions also insisted on the need to plan for closure at the outset, including planning for “the largest dam” scenario (e.g. in the event of future possible expansions, even if those are not considered at the outset in the economic models), and to plan for proper dry covers with redundancy designs to effectively prevent wind erosion and ML/ARD chemical seepage. Other best technologies and best practices discussed at ICOLD 2019 and Tailings & Mine Waste 2017 that should be integrated in the Global Tailings Standard include minimal dam slopes of 2:1 (or flatter), minimal beach width of 1.5 X height of dam crest, detailed in-situ understanding of the dam foundation (using BC’s APEG 2016 Guidelines), detailed understanding of the tailings material properties (clay content in particular and liquefaction potential). Many engineers and practitioners also recommended a minimal safety factor of 1.5, although this parameter is less critical, and in fact misleading, if there is no detailed understanding of site and material conditions].

6. Human rights due diligence and FPIC protocols must be achieved during all stages of planning, design, and implementation.

The engagement, participation and consent of affected communities is essential. While Principle 3 of the draft Standard outlines the importance of human rights due diligence and free and prior informed consent (FPIC), it does not detail how mining companies will prove those standards have been reached. As a 2018 report from Equitable Origin and the Roundtable on Sustainable Biomaterials states the [“assurance of FPIC processes \[goes\] beyond verifying the existence of management systems, to verify the legitimacy and credibility of the process itself.”](#) The Global Tailings Standard should ensure that companies are carrying out a legitimate and credible process by requiring mining companies to document and report all steps taken towards meaningful engagement, human rights due diligence and FPIC for indigenous peoples. That report should be made publicly available and filed with government agencies. The [Initiative for Responsible Mining Assurance Standard](#) chapters 1.3. on HRDD and 2.2 on FPIC could serve as guidance for GTR’s Standard in this area.

We support the Standard’s inclusion of an independent grievance mechanism. In addition: 1) the operational-level grievance mechanism should be functionally independent in all of its procedures from the project’s operator; 2) complainants must have access to independent forms of support (for e.g. legal, technical or medical) in all phases of engagement with the mechanism; and 3) a settlement through the operational level grievance mechanism should not require the complainant(s) to sign legal waivers prohibiting them from civil legal action at a future date. (Sources: International Commission on Jurists, [“Effective Operational-Level Grievance Mechanisms,”](#) November 2019; Acacia Mining, [North Mara Mine Grievance Process.](#))

7. Mandatory financial assurance for closure and insurance for accidents.

Financial assurance means the money or other form of financial instrument (e.g., surety bonds, trust funds, etc.) required of the operator. This is to ensure that the functions of the closure plan, and/or reimbursements for economic damages suffered by non-mine entities due to catastrophic accidents, are achieved and maintained over the long term. Mine operators must purchase insurance to cover economic and environmental damages suffered by non-mine entities affected by a catastrophic tailings dam failure. Assessments of previous catastrophic tailings dam failures ([Bowker and Chambers 2015](#)) indicate that these figures can exceed US\$1 billion. Oil tankers in Canada have approximately \$1.4 billion available per accident, and the financial assurance required for large pipeline failures in British Columbia is \$1 billion ([Allan 2016, FNEMC 2019](#)). The nuclear industry in the US is required by the Price-Anderson Act to carry

pool insurance for \$10 billion, and there are similar requirements for Canada ([Heal and Kunreuther 2010](#)). It is time the mining industry also be required to provide a financial insurance for accidents.

8. Accountability for risk assessments, minimizing consequences, preventing failure, and the consequences of failure must primarily rest with the Board of Directors. This cannot fall to the Engineer of Record or employees alone.

The corporate Board of Directors, as the body that is ultimately responsible for the well being of the corporation, must bear the prime responsibility for the safety and liability of mine waste sites and tailings dams, including the consequences of dam failures and mine waste spills, and as such, face proper financial sanctions, and if warranted, criminal sanctions. A culture of safety must be upheld at the highest level within a corporation; this can only be achieved if the Board of Directors is held accountable for its actions (or lack thereof) and its operations. This affects the requirements throughout Topic IV.

9. Expand the ‘Emergency Preparedness and Response’ requirements.

Emergency preparedness and response plans or emergency action plans related to catastrophic failure of mine waste facilities shall be discussed and prepared in consultation with potentially affected communities and workers, and in collaboration with first responders and relevant government agencies. Worst-case mine waste flow scenarios must be modeled and made public prior to permitting, and regularly updated throughout the facility lifecycles. Emergency and evacuation drills related to catastrophic failure of mine waste facilities shall be held on a regular basis. The operating company shall report to stakeholders on mine waste facility management actions, monitoring and surveillance results, independent reviews and the effectiveness of management strategies (sources: [IRMA Standard](#) 2018, chapter 4.1 and [APELL 2001](#)). Adjust and expand the requirements throughout Topic IV.

10. Ensure the independence of reviewers in Independent Tailings Review Boards and audits.

The independence of those performing reviews is essential for safety. A reviewer, as an individual or an organization, should not have a financial conflict with the mine being reviewed. For example, a financial conflict would occur if a reviewer has been contracted to review more than 5 mines at any one time for any one operating company. A requirement must be added to prevent a scenario in which a company turns to the same audit firm to review all or most of its mines. The definition for the ‘Independent Tailings Review Board’ (ITRB) should specify qualifications, composition, role and process for appointing the ITRB. We support requirements 7.8 and 11.4 stating that Independent senior technical reviewers: (i) “shall carry out a full review of the ESMS (*Environmental and Social Management System*) and monitoring results every 3 years, with annual summary reports provided to relevant stakeholders; and (ii) “conduct an independent DSR (*Dam Safety Review*) periodically.” DSR should be conducted yearly, unless justified otherwise. The DSR contractor cannot conduct a subsequent DSR on the same facility.

11. Conduct independent risk assessments and make reviews publicly available in a transparent, independent Global Tailings Database.

It is urgent that a transparent, independent risk assessment of the thousands of tailings dams be conducted worldwide and make the results publicly available into a Global Tailings Database. Ecosystems, livelihoods, and human lives are at stake. An independent international agency, such as a UN-based agency, in collaboration with responsible States, operators, and civil society, must drive this process, collect the information, and share it with affected communities in order to de-risk these sites and put in place proper emergency action plans in case of catastrophic failures, particularly for the most at-risk mines. This global inventory should also collect information about mine waste dams failures and their consequences. It is essential to better understand what, how, why each failure occurs to prevent them in the future. At the present time, no entity in the world possesses this information and communities at risk remain in the dark (the closest, yet incomplete, being the [World Tailings Failure Database](#) run by volunteered experts and individuals). The current standard does not address the implementation requirements for such a database.

We support Requirement 17.1 to “Publicly disclose relevant data and information about the tailings facility and its consequence classification in order to fairly inform interested stakeholders.” This Requirement should explicitly include dam safety reviews (DSRs) and reports that are required by and filed with governmental agencies. But this requirement alone is not sufficient. The Global Tailings Standard must require States and corporations to collaborate for the establishment of a detailed, centralized, and transparent global database, accessible to the public and affected communities, with a risk profile for each mine waste dam.

12. Global tailings standards development and implementation must be overseen by a transparent, independent international agency that is capable to effect change worldwide and that is accountable to the public and affected communities.

It is crucial that UN agencies and international partners, including States, industry, civil society organizations, and independent experts, establish a credible, transparent, and independent international agency capable to ensure safe tailings worldwide. Even the best standards remain useless if they are not implemented, or if implemented in only a limited number of operations. Worldwide, there are many thousands of tailings storage facilities and dams, some under the responsibility of private corporations, others under the responsibility of States. The challenge to effect change at this scale should not be underestimated, nor the importance of establishing a well-resourced agency capable to efficiently update the standards and ensure their implementation.

We recommend that an independent study be conducted about which governance model would be more appropriate for this task. This study should look at the [International Civil Aviation Organization](#) (ICAO) as a potential model. ICAO is a UN specialized agency and as proven being effective at improving the safety of the aviation industry for decades by working with the 193 Member States and industry groups, with the collaboration of the public and independent experts, to reach consensus on international civil aviation standards, which are then used by ICAO Member States to ensure that their local industry, authorities and regulations conform to global norms. ICAO also coordinates assistance and capacity building for States in support of the industry’s safety; monitors and reports on performance metrics; and audits States’ industry oversight capabilities in the areas of safety and security. The [International Cyanide Management Code](#) (ICMC) model differs from the ICAO in the following ways: 1) its standards remain implemented in a relatively limited number of operating mines (about 100 mines according to the last ICMC census, which corresponds to about 10% of the 1044 active and operating gold mines worldwide); also, 2) ICMC is governed by a relatively small Board of Directors, composed of eight members, primarily with industry experience and appointed by their peers, without broad State or civil society engagement.

**MAKING SAFETY FIRST:
ADDITIONAL COMMENTS ON FINANCIAL RISK CRITERIA**

*As state in recommendation #1 above, safety should be the **primary** consideration in mine waste site and tailings dam design, construction, operation, and closure. The current draft Global Tailings Standard is not explicit about the necessity to put safety considerations before cost considerations. Further to the above, we recommend that the Global Tailings Standard explicitly refer the recommendation of the 2014 Mount Polley [Expert Panel](#) and cited in the 2017 UNEP-GRID Arendal [report](#) to support its overarching recommendation: “safety attributes should be evaluated separately from economic considerations, and cost should not be the determining factor.”*

*The Global Tailings Standard should also integrate recommendation #3 of the Mount Polley Expert Panel report, stating that: “all new tailings storage facility be based on a **bankable feasibility** that would have considered **all technical, environmental, social and economic aspects** of the project in sufficient detail to support an investment decision, which might have an accuracy of ±10%–15%. More explicitly, it should contain the following: a) a detailed evaluation of all potential failure modes and a management scheme for all residual risk; b) **detailed cost/benefit analyses of BAT tailings and closure options so that economic effects can be understood, recognizing that the results of the cost/benefit analyses should not supersede BAT safety considerations**; c) a detailed declaration of Quantitative Performance Objectives (QPOs)” (Mount Polley Expert Panel [report](#), 2014, our emphasis added)*

This would require the Global Tailings Standard to more clearly define what best available safety technologies and practices are, and avoid definitions that dilute safety consideration with economic considerations; this is still too often the case in tailings safety guidelines and regulations²³ (see below for more discussions on BAT & BAP). Specifically, **financially risky operations and economically marginal projects** must be identified and fully considered as part of the safety risk assessment prior to permitting and throughout the mining lifecycle. Safety and failure risks are not independent from financial risks. It is of paramount importance that operators be able to pay for the safest technologies and practices. The Global Tailings Review should develop and integrate financial risk criteria as part of the standard, including a **robust bankable feasibility** that meet the following financial criteria, as a minimum:

- an **internal rate of return (IRR)** on investments higher than 15-20% and a **payback period (PP)** less than 3-4 years, both before taxes, for minerals sold on the market (e.g. daily to yearly spot price contracts), or an IRR of at least 8-12% and a PP of less than 5-8 years for minerals with long-term contracts;
- a significant and positive **net present value (NPV)**, corresponding to at least 30% of the total initial capital expenditures, before taxes, after accounting for all major expenses, including costs of best available technologies and practices, financial assurances for site closure, and insurance for potentially major accidents;
- be based on **prudent (conservative)** technical and financial assumptions/predictions, including commodity prices and exchange rates, mineral recovery rates, discount rates, and mineral reserve confidence level (exclude resources as defined by the Canadian securities standard NI 43-101);
- good **financial resiliency** with sensitivity analyses showing that a project can sustain a 20-30% fluctuation for each of the main financial indicators, taken independently (e.g. IRR, NPV, commodity price, exchange rate, capital costs, operating costs).

Regarding BAT & BAP, we recommend the Global Tailings Standard to adopt the Mount Polley Expert Review's definitions, as summarized by Morgenstern in its 2018 Victor de Mello lecture: "BAT argued for an emphasis on technologies that minimize the **consequence** of failure by reducing fluidity and/or provide more positive containment. BAP included a number of recommendations to reduce the **probability** of failure by improved governance, expanded sensitivity to risk assessment in design, the introduction of Quantitative Performance Objectives in the declared design, the increased utilization of independent tailings review boards, and other related aspects of professional practice" (Morgenstern 2018 [lecture](#), our emphasis added)

The Mount Polley Expert Panel defines BAP & BAT as follow: "While best practices [BAP] focus on the **performance** of the tailings dam, best available technology (BAT) concerns the tailings deposit itself. The goal of BAT for tailings management is to assure **physical stability of the tailings deposit**. This is achieved by preventing release of impoundment contents, independent of the integrity of any containment structures. In accomplishing this objective, BAT has three components that derive from first principles of soil mechanics: 1. Eliminate surface water from the impoundment; 2. Promote unsaturated conditions in the tailings with drainage provisions; 3. Achieve dilatant conditions throughout the tailings deposit by compaction." (Mount Polley Expert Panel [report](#) 2014, our emphasis added)

The BC Mining Code [Guidance Document](#) also offers some useful considerations and objectives for BAT and BAP (when taking out the economic objectives), including:

- Physical stability is of paramount importance, and options that require a compromise to physical stability should be discarded,
- Facilities should be chemically and biologically stable, or be designed to mitigate transport of contaminants into the receiving environment,
- Footprint areas of the facility should be minimized,
- In-pit or underground backfill should be maximized,
- Impacts to receiving environments should be minimized,
- Effort to reduce and remove water from containment within tailings facilities should be made.

²³ E.g. the BC Mining Code, [section 3.1](#), and the Mining Association of Canada's Tailings Dam [Guide](#)