### GENERAL COMMENTARY AND IDENTIFICATION OF POTENTIAL ADDITIONS TO THE STANDARD

<table>
<thead>
<tr>
<th>Proposed Addition / Comment</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall the document is very well done and comprehensive. One key aspect that is not addressed is that any successful operation requires personnel with the appropriate education, training, experience, professionalism, honesty, integrity and moral and ethical values to make it successful.</td>
<td></td>
</tr>
<tr>
<td>The Global Tailings co-conveners will develop a standardized approach for self-governance and auditing. This approach may be similar to the CN Code <a href="https://www.cyanidecode.org/">https://www.cyanidecode.org/</a>, with signatories committing to follow the standards. Appropriate aspects or approaches of ISO 9000 or 14000 will be considered.</td>
<td>Need to develop a audit program, similar to the CN Code, to verify that the recommended standards are being properly applied, and to develop some level of consistency between operators. The standards call for “qualified” personnel, but fail to define what qualified is, or what the minimum qualifications are.</td>
</tr>
<tr>
<td>Signature organisations will contribute to university and industry training programs to increase the supply of qualified individuals.</td>
<td>Companies need to recognize that will likely be a shortage of qualified engineers to meet this standard.</td>
</tr>
<tr>
<td>Requirement xxx Develop a consistent and understandable risk-informed approach to designing, operating and closing tailings facilities. Work with State authorities to adopt or modify regulation to accommodate risk approaches.</td>
<td>Owners and design engineers need to utilize risk-informed decision making processes as a fundamental way to guide design, operation, and closure. This approach takes into account the natural variability of systems and loading conditions, unknowns, resiliency and redundancy, ability to monitor, past performance, and potential impacts.</td>
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<tr>
<td>Alternatives to wet or hydraulic deposition of tailings on the land surface should be considered in the initial planning.</td>
<td>Alternative methods of disposal may reduce the risk of tailings dam failures.</td>
</tr>
<tr>
<td>Check focus and wording of document to include non-failure impacts of TSF</td>
<td>Readers may focus on just the analysis and evaluation of TSF structural failure at the expense of other more common TSF impacts, such as leaks, solution spills, groundwater contamination, etc.</td>
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<tr>
<td>Understandably, the main concern of TSF safety is catastrophic failure. However, the standard we are reviewing states in the forward that tailings are complex systems, so the standard has been written to address the range of impacts that could be generated by a TSF during its construction, operation and closure. The Standard, as written, is overly focused on monitoring for failure as opposed to monitoring for potential impacts, including failure, e.g. Requirement 13.1 should emphasize that personnel education should cover TSF management, not just TSF failure. Principle 8 (Design, implement and operate monitoring systems) is good, but requirement 8.1 focuses on monitoring for failure as opposed to impacts.</td>
<td></td>
</tr>
<tr>
<td>This document, at some level, should be supportive of the third-party/ITRB review process. Does it make sense to establish verbiage that supports taking action concerning provided third party recommendations? Most companies certainly follow through with ITRB commentary. However, there may be situations where an operator may choose not to follow the recommendations, and the benefit of the review was lost. Does it make sense to provide some high-level support to the review process and responding to review commentary within this document?</td>
<td></td>
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<tr>
<td>It is generally acknowledged the industry has a limited number of suitably qualified professionals to fulfill the obligations outlined in the Standard. The GTR should acknowledge this limitation and encourage the mining industry (through the ICMM?) to place an emphasis on training and development of professionals to ensure the Standard can be implemented as intended.</td>
<td></td>
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</table>

### FOREWORD

<table>
<thead>
<tr>
<th>Page</th>
<th>Reference</th>
<th>Draft Standard wording</th>
<th>Comment, Question or Proposed Alternate wording</th>
<th>Rationale for the change</th>
</tr>
</thead>
<tbody>
<tr>
<td>ii</td>
<td>Last sentence</td>
<td>Ultimately, Operators are required to strive towards zero harm to people and the environment with zero tolerance for any human fatality. The mining industry is encouraged to invest in new technologies and safer mining methods to achieve this goal.</td>
<td>We already largely have the technology and what we need is the responsible professionals to be sure it is implemented properly.</td>
<td>If the industry is truly committed to this, the “External loading criteria required by the Standard” shown in Table 2, should be revised to reflect zero tolerance for the loss of human life by requiring use of the PMF and MCE for the High and Very High classifications, as well as, the Extreme classification. Put bluntly, it is OK to kill less than 100 people but not More Than 100 people. Or significantly disrupt the lives of 500 to 1,000 people or 1,000 to 5,000 people but not over 5,000 people. Best to remove the table as it is a design criteria that does not fit in a governance document.</td>
</tr>
</tbody>
</table>
The Standard makes clear that extreme consequences to people and the environment from catastrophic tailings facility failures are unacceptable. Operators must have zero tolerance for human fatalities and must strive for "zero harm" to people and the environment from the inception of project planning. Operators are also expected to innovate and apply new technologies and mining methods that reduce risks and minimize consequences should problems arise. The Standard recognizes that there is no one "best practice" that can be viewed as applying to every tailing facility. Instead, there are a range of "best practices" that can apply to safely manage tailing facilities. Once a tailings facility moves from concept to reality, it becomes a hazard that must be managed to minimize risk. The Standard anticipates that individuals in the highest positions of authority within the organizational hierarchy will be accountable for the Operator's decisions and will insist on actions that reduce the risk of tailings facility failure to the fullest extent possible. In addition, the Standard expects Operators to adopt best management practices and to apply rigorous technical controls. Zero harm is the goal at all stages of a tailings facility lifecycle.

A better word here, and in appropriate other places throughout the Standard, is to "control" risk rather than "minimize" risk to be in line with the goal of "zero harm" is the goal at all stages of a tailings facility lifecycle. There are generally more opportunities to reduce the risks than the consequences at an existing facility. Risk assessment and management through referenceable methods should be a foundation of the Standard, and therefore "control" or "address" the risk should be cited rather than "minimize" in the Requirements (and here) unless appropriate qualification or basis for "minimize" are provided. Monitoring and the Observational Method also applies to the closure phase of the lifecycle, and monitoring continues into post-closure.

OPERATIONAL GOVERNANCE

Topic Area 1: Corporate Governance and Decision Making

Topic Area 1 requires Operators to develop knowledge about the social, economic and environmental context of a proposed or existing tailings facility, and to conduct a detailed site characterization. Topic Area 1 requires Operators to develop knowledge about the social, economic and environmental context of a proposed or existing tailings facility, and to conduct a detailed site characterization of the site and the tailings. The qualification wording applies to each instance of the use of the term "best practice".

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2
Overview of the Standard 5th Paragraph
Topic Area 4 focuses on the ongoing management and governance of a tailings facility. This section elaborates the accountability for tailings facilities that would result in “Very High” or “Extreme” consequences in the event of failure, to the upper level of an organization’s hierarchy – the Board of Directors or a member of senior management, as appropriate to the Operator’s organizational structure. It also provides for the designation and assignment of responsibility to key roles in tailings facility management, including an Accountable Executive, an Engineer of Record, and a Responsible Tailings Facility Engineer. Further, it sets standards for critical systems and processes, such as the Tailings Management System and independent reviews, which are essential to upholding the integrity of a tailings facility during its entire lifecycle. Cross-functional collaboration and the development of a learning organizational culture that incorporates the identification of problems and protects whistleblowers are also included.

3
Role of the State, 1st Paragraph
The Standard guides the conduct of Operators but it also informs States about best practices for tailings facilities, and it affords them a framework for designing rules for managing such facilities, where required. This is a critical point because States are uniquely situated to provide independent oversight of the permitting, construction, operation, maintenance, monitoring, and closure of tailings facilities. They are likewise the most appropriate entity to set up an independent inspection and enforcement program capable of identifying problems early and making sure those problems are corrected promptly before they increase the risk of catastrophic failures.

3
The Role of the State 2nd Paragraph
Not all States currently have the capacity to carry out these tasks. Good oversight requires a comprehensive understanding of the planning and engineering necessary to build, operate, maintain, and ultimately close tailings facilities. Inspectors with the credibility and authority to issue citations and to mandate appropriate corrective actions must share an understanding of these issues and possess the capacity to identify solutions to reported problems. Moreover, developing a reliable and professional staff where one does not currently exist will require time and resources and these may be scarce. All States with tailings facilities should aspire to develop an effective and well-staffed regulatory program.

10
Implementation (5th bullet)

<table>
<thead>
<tr>
<th>Implementation (5th bullet)</th>
<th>Resources and procedures to conduct compliance monitoring</th>
</tr>
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<tbody>
<tr>
<td>Comment, Question or Proposed Alternate Wording</td>
<td>See comment below on DQP. You can have great resources, but the comprehensive approach to monitoring required procedures, trainings, equipment, data quality objectives, etc. requires a plan of action.</td>
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<table>
<thead>
<tr>
<th>Topic I: KNOWLEDGE BASE</th>
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</table>
6. **Requirement 2.2**

Prepare and regularly update detailed site characterization of the tailings facility site(s) that includes geomorphology, geology, geochemistry, hydrogeology, geotechnical, seismicity and hydrology. The physical and chemical properties of the tailings shall be determined and regularly updated.

Consider what is an appropriate confidence level for site characterization. For example, consider the approach taken by National Instrument (Canadian) 43-101 approach to resource definition. What triggers updates to the site characterization? Is it acceptable to "close" the characterization for a "discrete" project? Does this allow a staged characterization?

Inadequate site characterization and understanding of the geology and impacts on the TSF are often the underlying reason for dam failures.

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6. **Requirement 1.2**

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Updates are too often to be practically completed by qualified personnel available. Footnote 3 needs to be updated as "Updates should be carried out whenever there is a major change to the tailings facility, the social or environmental context or conditions, or at a minimum every 5 years for 'Very High' and 'Extreme' Consequence Classifications, and every 10 years for others."

---

6. **Requirement 1.3**

Where there is a potential for flow failure, conduct and regularly update an inundation study for the tailings facility using a methodology that considers credible hypothetical failure modes, site conditions, tailings facility conditions, hydraulic routing models of the slurry, and the amount of tailings and downstream materials entrained in the outflow. The results of the study should include estimates of the inundation area, flow arrival times, depth and velocities, duration of flooding, and depth of material deposition.

Where there is a potential for flow failure, conduct and regularly update an inundation study for the tailings facility using a methodology that considers credible hypothetical failure modes, site conditions, tailings facility conditions, hydraulic routing models of the slurry, and the amount of tailings and downstream materials entrained in the outflow. The results of the study should include estimates of the inundation area, flow arrival times, depth and velocities, duration of flooding, and depth of material deposition. Updates should be completed every 10 years or if and when downstream conditions greatly change. Methodology for the inundation studies should follow internally accepted guidelines.

Need to define update period. 3 years later on in document is too often. Also need to reference some method to be accepted.

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The use of a footnote isn’t ideal here. It is preferred to incorporate the need for and frequency of formal updates to the inundation study in this requirement. Suggest that a formal review be performed on the 3 or 5 year schedule as part of a "Design Criteria Review" or possibly the "Deviance Accountability Report (DAR)" similar defined in Topic III.

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The standard has been written to address the major issue of TSF failures, but also addresses potential environmental impacts of a TSF. Throughout the standard, there are references to TSF failure that overlook or play down the other potential impacts of a TSF, such as dust, groundwater contamination, acid drainage, metal leaching, and process fluid spills. If the objective of the standard is to develop a "global standard for the safe and secure management of mine tailings facilities" we need to ensure a balanced focused on managing the risk of ALL the potential TSF impacts, rather the focusing on failure.

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7. **Principle 2**

Integrate the social, economic, environmental and technical information to select the site and the technologies to minimize the risk of tailings facility failure.

...to minimize the risk of tailings facility failure or impacts.

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7. **Requirement 2.2**

Engage an Independent Tailings Review Board (ITRB) or an independent senior technical reviewer(s) with no conflicts of interest to assess and review the alternatives analysis for site and technology selection.

Define conflict of interest.

There appears to be 3 different applications of the term "independent senior technical reviewer". Suggest in Requirement 2.2 to use the term "independent expert technical reviewer (IETR) to avoid confusion. An independent expert who performs in lieu of a Board should have more extensive experience and qualifications than a "senior technical reviewer" who may perform Dam Safety Reviews or other review functions defined elsewhere in the standard. The minimum qualifications for ITRB as well as members of the ITRB should developed and defined in a separate, supporting document.

---

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### TOPIC II: AFFECTED COMMUNITIES

| Requirement 2.2 | Use the knowledge base to assess the social, economic and environmental impacts of the tailings facility and its potential failures. Develop impact mitigation and management plans, and meaningfully engage potentially affected communities in the process. | Comment: Ideally, the Engineer of Record (EOR) should be selected to prepare the alternative analyses. The EOR could be changed through project development, but it should be understood that the EOR role should ideally begin at the conceptual stage. |
| Requirement 2.3 | Update the assessment of the social, economic and environmental impact and update stakeholder identification and information for any material change to the tailings facility, the social or environmental context or conditions. If new data indicates that the impacts from the tailings facility differ significantly from those assumed in the original assessments, the management of the facility shall be adjusted to reflect the new data using adaptive management best practices. | Need to define change as major and significant, not just any change in the TFS. |
| Requirement 2.4 | The amount of financial assurance shall be reviewed periodically and updated based on estimated closure and post-closure costs. | Define major change and maximum time period |
| Requirement 2.5 | Taking into account actions to mitigate risks, the Operator will consider obtaining appropriate insurance to the extent commercially reasonable or providing other forms of financial assurance if appropriate to address risks relating to the construction, operation, maintenance, and/or closure of a tailings facility. | |
| Requirement 2.6 | Respect the rights of project-affected people and meaningfully engage them at all stages of the tailings facility lifecycle. | First call out in the text. |

#### Draft Standard Wording

<table>
<thead>
<tr>
<th>Page #</th>
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<th>Rationale for the change</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Principle 3</td>
<td>Respect the rights of project-affected people and meaningfully engage them at all stages of the tailings facility lifecycle.</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Footnote 12</td>
<td>As defined in the United Nations Guiding Principles on Business and Human Rights (UNGPs).</td>
<td>Add year of the document for reference</td>
</tr>
<tr>
<td>9</td>
<td>Footnote 12</td>
<td>Demonstrating respect for indigenous peoples rights may involve obtaining their “free prior and informed consent” (FPIC), as outlined in the ICOM.</td>
<td>Add year of document for reference</td>
</tr>
<tr>
<td>9</td>
<td>Footnote 12</td>
<td>Demonstrate respect for human rights by conducting human rights due diligence to understand how a tailings facility failure may cause or contribute to adverse human rights impacts, including impacts on the individual and collective rights of indigenous peoples and tribal peoples.</td>
<td>Not sure what human rights due diligence means even after reading the footnote.</td>
</tr>
<tr>
<td>9</td>
<td>Requirement 3.1</td>
<td>Demonstrate respect for human rights by conducting human rights due diligence to understand how a tailings facility failure may cause or contribute to adverse human rights impacts, including impacts on the individual and collective rights of indigenous peoples and tribal peoples.</td>
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<tr>
<td>9</td>
<td>Requirement 3.2</td>
<td>Where the risks of a potential tailings facility failure could result in loss of life or sudden physical and/or economic displacement of people, the Operator shall consider in good faith additional measures to minimize those risks or implement resettlement following international standards.</td>
<td>In good faith: Vague term – what does it really mean? May just want to delete.</td>
</tr>
<tr>
<td>9</td>
<td>Requirement 3.3</td>
<td>Establish an effective operational-level, non-judicial grievance mechanism that addresses the concerns, complaints and grievances of project-affected people that relate to the tailings facility 19.</td>
<td></td>
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<tr>
<td>9</td>
<td>Requirement 3.4</td>
<td>The Operator shall communicate these decisions to those affected.</td>
<td>Assume that the communication would happen prior to construction and that the PAP should be understood that the EOR role should ideally begin at the conceptual stage.</td>
</tr>
<tr>
<td>9</td>
<td>Requirement 3.5</td>
<td>The reference to economic displacement should make it clear that this also applies in cases of dam failures (the definition only refers to land acquisition).</td>
<td>Language can mirror that of the physical displacement definition. Also, should there be a time limit or method of communication specified? The language requiring the operator to communicate is vague as written.</td>
</tr>
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<tr>
<td>Footnote 17 and 18</td>
<td>Such as the IFC’s Social and Environmental Performance Standards. FIC is not defined here or in Annex 1.</td>
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<tr>
<td>Footnote 19</td>
<td>This process may be part of an existing operational-level grievance mechanism, which may involve a mixture of the mine-wide ESMS.</td>
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**Rationale for the change**

- Rebutal of Consequence Classification of "Extreme" should be broadened to also include a potential Failure Modes Analysis with additional failure modes, including ones involving water management. Presuming that the intent of "no potential for impactful flow failures" is that if flow failure (defined as loss of shear strength with increasing stress) can occur, it does not impact downstream conditions beyond the proposed Consequence Classification, then recommend such analysis be based on site specific information and testing and complemented with published information on the same or similar tailings materials, and supported by performing a Potential Failure Modes Analysis. Note also proposed revisions to Footnote 20 on closure. The requirement to move to landform for all facilities is a major step-change. We recommend that the decision to a final disposition be based on the PFAA. As an alternative to an "upgrade", could some form of mitigation to prevent or mitigate "extreme" consequences be proposed – e.g., purchasing land within the inundation area or relocating impacted facilities? |

**Comment, Question or Proposed Alternate wording**

- Requirement 4.1

  - Presume the consequence of failure classification of all new tailings facilities as being "Extreme" (see Annex 2, Table 1: Consequence Classification Matrix) and design, construct, operate and manage the facility accordingly. This presumption can be rebutted if the following three conditions are met: a) The knowledge base demonstrates that a lower classification can be applied for the near future, including no potential for impactful flow failures; and b) A design of the upgrade of the facility to meet the requirements of an 'Extreme' consequence of failure classification in the future, if required, is prepared and the upgrade is demonstrated to be feasible; and c) The consequence of failure classification is reviewed every 3 years, or sooner if there is a material change in any of the categories in the Consequence Classification Matrix, and the tailings facility is upgraded to the new classification within 3 years. This review should proceed until the facility has been safely closed (20) and achieved a confirmed "landform" status or similar permanent non-creditable flow failure state. |

- Requirement 4.2

  - The decision to rebut the requirement to design for 'Extreme' Consequence Classification shall be taken by the Accountable Executive or the Board of Directors (the 'Board'), with input from an independent senior technical reviewer or the ITRB. The Accountable Executive or Board shall give written reasons for their decision. |

- Requirement 4.3

  - Existing facilities shall comply with Requirements 4.1 and 4.2. Where the required upgrade is not feasible, the Board, or senior management (as appropriate based on the Operator’s organizational structure), with input from the ITRB, shall approve the implementation of measures to reduce the risks of a potential failure to the greatest extent possible. |

- Requirement 5.1

  - Consider implementation of alternative options, including but not limited to in-pit disposal and underground tailings placement, and application of the technologies selected according to Requirement 2.1, to minimize the amount of tailings and water placed in external(21) tailings facilities. Consider implementation of alternative options, including but not limited to in-pit disposal and underground tailings placement, and application of the technologies selected according to Requirement 2.1, to minimize the amount of tailings and water placed in external(21) tailings facilities as supported by alternative and impact analysis consistent with Requirements 2.1 and 2.3. |

**Binding Arbitration? How does this non-judicial mechanism tie into the legal options available?**

- This is a great idea, if practical and adopted. Needs more detail. |

**TOC III: DESIGN, CONSTRUCTION, OPERATION AND MONITORING OF THE TAILINGS FACILITY**

<table>
<thead>
<tr>
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<tr>
<td>10</td>
<td>Requirement 4.1</td>
<td>Presume the consequence of failure classification of all new tailings facilities as being &quot;Extreme&quot; (see Annex 2, Table 1: Consequence Classification Matrix) and design, construct, operate and manage the facility accordingly. This presumption can be rebutted if the following three conditions are met: a) The knowledge base demonstrates that a lower classification can be applied for the near future, including no potential for impactful flow failures; and b) A design of the upgrade of the facility to meet the requirements of a 'Extreme' consequence of failure classification in the future, if required, is prepared and the upgrade is demonstrated to be feasible; and c) The consequence of failure classification is reviewed every 3 years, or sooner if there is a material change in any of the categories in the Consequence Classification Matrix, and the tailings facility is upgraded to the new classification within 3 years. This review should proceed until the facility has been safely closed (20) and achieved a confirmed &quot;landform&quot; status or similar permanent non-creditable flow failure state.</td>
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| 10 | Requirement 4.2 | The decision to rebut the requirement to design for 'Extreme' Consequence Classification shall be taken by the Accountable Executive or the Board of Directors (the 'Board'), with input from an independent senior technical reviewer or the ITRB. The Accountable Executive or Board shall give written reasons for their decision. |

| 10 | Requirement 4.3 | Existing facilities shall comply with Requirements 4.1 and 4.2. Where the required upgrade is not feasible, the Board, or senior management (as appropriate based on the Operator’s organizational structure), with input from the ITRB, shall approve the implementation of measures to reduce the risks of a potential failure to the greatest extent possible. |

| 10 | Requirement 5.1 | Consider implementation of alternative options, including but not limited to in-pit disposal and underground tailings placement, and application of the technologies selected according to Requirement 2.1, to minimize the amount of tailings and water placed in external(21) tailings facilities. Consider implementation of alternative options, including but not limited to in-pit disposal and underground tailings placement, and application of the technologies selected according to Requirement 2.1, to minimize the amount of tailings and water placed in external(21) tailings facilities as supported by alternative and impact analysis consistent with Requirements 2.1 and 2.3. |

| 10 | Footnote 17 and 18 | Such as the IFC’s Social and Environmental Performance Standards. FIC is not defined here or in Annex 1. Reader may not be familiar with IFC. |

| 10 | Footnote 19 | This process may be part of an existing operational-level grievance mechanism, which may involve a mixture of the mine-wide ESMS. ESMS is not defined here and not easy to look up in Annex 1. Reader may not be familiar with ESMS. |

| 10 | Requirement 4.1 | Presume the consequence of failure classification of all new tailings facilities as being "Extreme" (see Annex 2, Table 1: Consequence Classification Matrix) and design, construct, operate and manage the facility accordingly. This presumption can be rebutted if the following three conditions are met: a) The knowledge base demonstrates that a lower classification can be applied for the near future, including no potential for impactful flow failures; and b) A design of the upgrade of the facility to meet the requirements of a 'Extreme' consequence of failure classification in the future, if required, is prepared and the upgrade is demonstrated to be feasible; and c) The consequence of failure classification is reviewed every 3 years, or sooner if there is a material change in any of the categories in the Consequence Classification Matrix, and the tailings facility is upgraded to the new classification within 3 years. This review should proceed until the facility has been safely closed (20) and achieved a confirmed "landform" status or similar permanent non-creditable flow failure state. |

| 10 | Requirement 4.2 | The decision to rebut the requirement to design for 'Extreme' Consequence Classification shall be taken by the Accountable Executive or the Board of Directors (the 'Board'), with input from the ITRB or an Independent Expert Technical Reviewer (IETR), and the Engineer of Record (EOR), based on the Potential Failure Modes Analysis. The Accountable Executive or Board shall give written reasons for their decision. |

| 10 | Requirement 4.3 | Existing facilities shall comply with Requirements 4.1 and 4.2. Where the required upgrade is not feasible, the Board, or senior management (as appropriate based on the Operator’s organizational structure), with input from the ITRB, shall approve the implementation of measures to reduce the risks associated with identified potential failure modes. Until compliance with the Requirements 4.1 and 4.2 has been achieved, the Board shall review and approve, at least every 3 years, additional risk reduction measures based on input from the ITRB/IETR and EOR, with update of the Potential Failure Modes Analysis and full assessment. A timeline should be developed to identify the target timeframe to meet Requirements 4.1 and 4.2. |

| 10 | Requirement 5.1 | Consider implementation of alternative options, including but not limited to in-pit disposal and underground tailings placement, and application of the technologies selected according to Requirement 2.1, to minimize the amount of tailings and water placed in external(21) tailings facilities. Consider implementation of alternative options, including but not limited to in-pit disposal and underground tailings placement, and application of the technologies selected according to Requirement 2.1, to minimize the amount of tailings and water placed in external(21) tailings facilities as supported by alternative and impact analysis consistent with Requirements 2.1 and 2.3. |

| 10 | Footnote 17 and 18 | Such as the IFC’s Social and Environmental Performance Standards. FIC is not defined here or in Annex 1. Reader may not be familiar with IFC. |

| 10 | Footnote 19 | This process may be part of an existing operational-level grievance mechanism, which may involve a mixture of the mine-wide ESMS. ESMS is not defined here and not easy to look up in Annex 1. Reader may not be familiar with ESMS. |
11 Requirement 5.3
Develop a robust design that considers the social, economic and environmental context, the tailings facility Consequence Classification, site conditions, water management, mine plant operations, tailings operational issues, and the construction, operation and closure of the tailings facility.

See recommended revisions to definition of "robust design" below.

11 Requirement 5.4
Address all credible failure modes of the structure, its foundation, abutments, reservoir (tailings deposit and pond), reservoir rim and appurtenant structures to minimize risk. Risk assessments must be used to inform the design.

Avoid term "credible failure modes" without definition. Recommend conducting a Potential Failure Modes Analysis, and evaluate risks.

11 Requirement 5.6
Design the closure stage in a manner that meets all the Requirements of the Standard with sufficient detail to demonstrate the feasibility of the closure scenario and allows immediate implementation of elements of the design, as required. The design should include, where possible, progressive closure and reclamation during operations.

Include construction cost estimate for closure to demonstrate feasibility, and timeline for closure. The design needs to address post-closure status, and based on a well crafted definition, and relinquishment would be aimed at meeting the requirements of a landform that averts potential failure modes including flow failures that impact downstream conditions.

11 PRINCIPLE 6
Adopt design criteria that minimize risk.22
Adopt design criteria that minimize risk to people, environment and the Operator.

In the Draft Standard, risk is sometimes qualified to include people and environment, without reference to Operator. In Principle 6, risk should be clearly expressed without reference to the footnote.

11 Requirement 6.1
Select and clearly identify design criteria that are appropriate to reduce risk for the adopted Consequence Classification for all stages of the tailings facility lifecycle and for all credible failure modes.

Select and clearly identify design criteria that are appropriate to reduce risk for the adopted Consequence Classification for all stages of the tailings facility lifecycle and based on Potential Failure Modes Analysis.

Consistent with comment on Requirement 5.4, recommend citing PFMA rather than credible failure modes.

11 Requirement 6.2
Apply factors of safety that consider the variability and uncertainty of geologic and construction materials and of the data on their properties, the parameters selection approach, the mobilized shear strength with time and loading conditions, the sensitivity of the failure modes and the strain compatibility issues, and the quality of the implementation of risk management systems.

Apply factors of safety or probability against failure modes that consider the variability and uncertainty of geologic and construction materials and of the data on their properties, the parameters selection approach, the mobilized shear strength with time and loading conditions, the sensitivity of the failure modes and the strain compatibility issues, and the capability of the monitoring and risk management systems.

Encourage probability analysis; recommend clarify with reference to "capability" rather than "quality" and the "monitoring systems" as well as risk management system.

11 Requirement 6.3
Identify and address brittle failure mechanisms with conservative design criteria and factors of safety to minimize the likelihood of their occurrence, independent of trigger mechanisms.

Identify and address brittle failure mechanisms with conservative design criteria to avert a risk in potential failure modes, independent of trigger mechanisms. Whenever practical, construct tailings retaining structures to achieve dilative conditions and avoid the use of brittle materials.

Design criteria include factors of safety, such that recommend eliminating the reference as in some situations designing to limit deformation may be a more direct approach. Revise reference to minimize", by substituting reference to averting its role in potential failure modes.

11 Requirement 6.3
Identify and address brittle failure mechanisms with conservative design criteria and factors of safety to minimize the likelihood of their occurrence, independent of trigger mechanisms.

How does one identify this in the design phase without access to deposited tailings?

11 Requirement 6.4
The EOR shall prepare a Design Basis Report (DBR) that details the design criteria, including operating constraints, and that provides the basis for the design of all stages of the tailings facility lifecycle. The DBR must be reviewed by the ITRB or senior independent technical reviewer.

The EOR shall prepare a Design Basis Report (DBR) that details the design criteria, including operating constraints, and that provides the basis for the design of all stages of the tailings facility lifecycle. The DBR must be reviewed by the ITRB or IETR.

See comment on Principle 6.
12 Requirement 7.1 Build, raise, operate, monitor and close the tailings facility according to the design intent of all stages of the tailings facility lifecycle, using qualified personnel and appropriate methodology, equipment, procedures, data acquisition, the TMS and the environmental and social management system (ESMS). Add reference to reviews under Principle 11, including EOR, independent senior technical reviewer, and ITBR reviews.

If the EOR is to be accountable for certification of the TSF they need to be involved in every aspect of the structure. See recent failures for examples.

12 Requirement 7.2 Manage the quality and adequacy of the construction and operation process by implementing Quality Control, Quality Assurance and Construction vs Design Intent Verification (CDIV). CDIV shall be used to ensure that the design intent is implemented and is still being met if the site conditions vary from the design assumptions.

Implement a formal Construction Operations, Maintenance and Surveillance (OMS) Manual that supports effective risk management as part of the TMS. The OMS Manual should be prepared or approved by the EOR to ensure it is consistent with the design intent. Training of all personnel involved with the TMS, including contractors building the structure, should be aware of project risks and risk management practices. I agree with this, and suggest education gets it's own call-out.

The terms in BOLD need to be added to the glossary. These programs should include implementation plans and reports of results.

Note that QC, QA and CDIV are AFTER THE FACT and verify or validate, but do not make it so. Yes, they provide, when done properly, a valuable, essential, record of what is there, and a defect might be found and addressed. But these are spot-checks and might miss something. We trust the builder and operator. See suggested additions above.

12 Requirement 7.3 Prepare a detailed Construction Records Report at least annually or whenever there is any change to the tailings facility, its infrastructure or its monitoring system. The EOR shall sign this report.

Develop, implement and annually update an Operations, Maintenance and Surveillance (OMS) Manual that supports effective risk management as part of the TMS. The OMS Manual should follow best practices, clearly provide the context and critical controls for safe operations, and be reviewed for effectiveness. The EOR and RTFE shall provide access to the OMS Manual and training to all personnel involved in the TMS.

If it is a certificate it needs to be not just signed - we saw where that gets us.

The OMS Manual should be prepared or approved by the EOR to ensure it is consistent with the design intent. Training of all personnel involved with the TMS, including contractors building the structure, should be aware of project risks and risk management practices. I agree with this, and suggest education gets it's own call-out.

12 Requirement 7.4 Implement a formal change management system that triggers the evaluation, review, approval and documentation of all changes to design, construction, operation and monitoring during the tailings facility lifecycle. The change management system shall also include the requirement for a periodic Deviance Accountability Report (DAR), prepared by the EOR, that provides an assessment of the cumulative impact of the changes on the risk level of as-constructed facility. The DAR shall provide any resulting requirements for updates to the design, DBR, OMS and the monitoring program.

Implement a formal change management system that triggers the evaluation, review, approval and documentation of all changes to tailings production rates, water storage, and design, construction, operation and monitoring during the tailings facility lifecycle. The change management system shall also include the requirement for a periodic Deviance Accountability Report (DAR), prepared by the EOR, that provides an assessment of the cumulative impact of the changes on the risk level of as-constructed facility. The DAR shall provide any resulting requirements for updates to the design, DBR, OMS and the monitoring program. Changes in tailings production or water storage for the mine can affect the tailings facility and lend to the need for associated changes in design, construction, operation and monitoring. Consider adding a minimum frequency for the DAR to Requirement 7.5

12 Requirement 7.5 Define the design, construction and operation throughout the tailings facility lifecycle by considering the lessons learned from ongoing work and the evolving knowledge base, and by using opportunities for the inclusion of new and emerging technologies and techniques.

Refine the design, construction and operation throughout the tailings facility lifecycle by considering the lessons learned from ongoing work and the evolving knowledge base, changes in tailings production, characteristics and water storage, and by using opportunities for the inclusion of new and emerging technologies and techniques. See comment on Requirement 7.5.

12 Requirement 7.6 Ensure that the ESMS is designed and implemented to align decisions about the tailings facility with the changing environmental and social context as identified in the knowledge base, in accordance with the principles of adaptive management.

Ensure that the ESMS is designed and implemented to align decisions about the tailings facility with the changing environmental and social context as identified in the knowledge base, in accordance with the principles of adaptive management.

This seems to be a different use of "Senior Technical Reviewer" than previously applied (prior to my suggestion of IETR). I suggest that this terminology is ok in this section. Like 8.2 below, this requirement is open to the question of who are the relevant stakeholders? This reads like the Cyanide Code, perhaps? Many miners already conduct this type of review through stewardship programs and Dam Safety Inspections as described by CDA, for example. But the results are for their own use.
**New Requirement 7.X**

Establish the constructor and the tailings management team with respect to the CRITERIA and DESIGN BASIS and the HAZARD CLASSIFICATION so that the TSF is built and operated in accordance with the established criteria and specifications with the hazard it represents always in mind. Establish construction methods and operating procedures that will result in the properties, configuration and attributes described in the design. This is important because the characteristics of the TSF and it's resulting degree of hazard are dependent upon the actions of these people, not those performing periodic inspections.

**New Requirement 7.X**

Validate during the construction and operation phase the conclusions drawn from the knowledge Base and assumptions made by the designer, particularly with respect to the foundation conditions, material properties and performance of key elements of the containment system.

This is in accordance with the ADAPTIVE APPROACH referred to later and has been key to several failures while, fortunately far more often, allowing implementation of modifications during construction that addressed surprises encountered. One does not blindly implement the design.

**Requirement 8.1**

Design, implement and operate a comprehensive performance monitoring program for the tailings facility that allows full implementation of the Observational Method and covers all potential failure modes.

This requirement introduces the Observational Method that is defined on Page 25.

From another paper by R. B. Peck, Advantages and Limitations of the Observational Method in Applied Soil Mechanics, the following quote "Can the conditions for the successful use of the method be defined? Are there conditions under which the observational method cannot and should not be used? To the last question at least one categorical answer can be given. If the character of the project is such that the design cannot be altered during construction, the method is inapplicable. Otherwise it may have the potential for great savings in time and money. Or providing needed assurance for complete safety."

For tailing facilities, the observational approach should be used with great care. While the approach is being used the initial design and construction must provide a safe structure for the worst-case conditions. Then and only then, after construction has proceeded to the point that there is assurance through observation, and appropriate testing and monitoring that conditions are going to be better than those initially assumed can a less conservative design be incorporated in the construction.

If less than the worst-case conditions are assumed as a basis for the initial design and construction has proceeded and observations indicate poorer conditions than assumed the engineer is faced with dealing with a structure that does not meet appropriate standards and in the worst case may fail.

The tailings facility lifecycle, with reference to the TSF Manual and Potential Failure Mode Analysis, and in the worst case may fail. This is in accordance with the ADAPTIVE APPROACH referred to later and has been key to several failures while, fortunately far more often, allowing implementation of modifications during construction that addressed surprises encountered. One does not blindly implement the design.

Does the term "publish" mean they are to be made freely available to the public? I'd prefer different wording than "publish". REPORT has a similar obligation...to WHOM shall we report?

Recommend citing the OMS Manual and Potential Failure Mode Analysis to ensure they provide a basis for the monitoring program.

**Requirement 8.2**

Establish performance objectives, indicators, criteria, and performance parameters and include them in the design a monitoring program that measures performance at all stages of the tailings facility lifecycle. Record, evaluate and communicate the results at appropriate frequencies. Based on the data obtained, update the monitoring program throughout the tailings facility lifecycle to confirm that it remains effective.

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This is important because the characteristics of the TSF and its resulting degree of hazard are dependent upon the actions of these people, not those performing periodic inspections.

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If less than the worst-case conditions are assumed as a basis for the initial design and construction has proceeded and observations indicate poorer conditions than assumed the engineer is faced with dealing with a structure that does not meet appropriate standards and in the worst case may fail.
<table>
<thead>
<tr>
<th>Requirement</th>
<th>Description</th>
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<tbody>
<tr>
<td>9.1</td>
<td>For a proposed new facility where a potential credible failure could have “Very High” or “Extreme” consequences, the Board or senior management (as appropriate based on the Operator’s organizational structure) shall be responsible for approving the proposal, after deciding what additional steps shall be taken to minimize the consequences. For a proposed new facility where a potential credible failure could have “Very High” or “Extreme” consequences, the Board shall be responsible for approving the proposal, after deciding what additional steps shall be taken to reduce critical risks and (reduce likelihood and the consequences) considering input from the EoR, Independent Technical Review Board (ITRB) or Independent Expert Technical Reviewer (IETR). Rather than unqualified reference to “minimize the consequences,” the Board should be presented with steps to control risk and reduce consequences based on independent expert review either through the ITRB or equivalent. Use of the role IETR to distinguish between other portions of the Standard that specify an independent senior technical reviewer who does not necessarily need to be an expert in TSFs. Removed “other senior management...” according to comment in Requirement 4.2 and Introductory Paragraph No. 5. IETR is included here, if Requirement 11.5 is changed to allow a single expert for some facilities. If an ITRB is required for all Very High and Extreme facilities, then IETR should be removed here. The EoR should be engaged at this phase and with sufficient project definition and before the ITRB, or the IETR is engaged.</td>
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<tr>
<td>9.2</td>
<td>For an existing facility, where a potential credible failure could have “Very High” or “Extreme” consequences, the Board or senior management (as appropriate based on the Operator’s organizational structure) shall mandate additional steps to minimize the consequences and publish reasons for its decision. This process is to be repeated at the time of every Dam Safety Review (DSR). For an existing facility, where a potential credible failure could have “Very High” or “Extreme” consequences, the Board shall mandate the completion of a PFMA (or FMEA) and preparation of a report, prepared in coordination with the EoR and the ITRB/IETR, recommending additional steps to control (or minimize and mitigate? or reduce?) risks, by reducing either the potential consequences or likelihood of failure (or both), to the degree feasible. The Board shall either mandate the implementation of the recommended additional measures or provide justification for the decision not implement recommended measures, and shall document clearly the published reasons for its decision. This process is to be repeated at the time of every Dam Safety Review (DSR). There are generally more opportunities to reduce the risks (i.e., the likelihood) than the consequences at an existing facility. The DSR includes potential failure modes analysis, and evaluation of risks and risk reduction measures, and with review by the ITRB it should ensure that feasible measures are identified to achieve significant risk reduction. This also avoids using the term “minimize”. Removed “other senior management...” according to comment in Requirement ... The “publish reason for its decision” is broad term and publishing implies a larger audience with the decision subject to interpretation of a technical approach by non-tailing professionals who lack the necessary expertise and experience.</td>
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<tr>
<td>10.1</td>
<td>The Board of the parent corporation shall adopt and publish a policy on or commitment to the safe operation of tailings facilities, to emergency preparedness and response, and to recovery after failure that is mandatory for all its subsidiaries and joint ventures. The commitment shall require the Operator to establish a Tailings Management System (TMS), and a governance framework to assure the effective implementation and continuous improvement of the TMS. Is there scope for a staged implementation of the requirements?</td>
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<tr>
<td>10.2</td>
<td>A member of senior management shall be accountable for the safety of tailings facilities and for minimizing the social and environmental consequences of a tailings facility failure. This Accountable Executive will also be accountable for a program of tailings management training, for emergency preparedness and response, and for recovery after failure. The Board or senior management (as appropriate based on the Operator’s organizational structure) shall mandate additional steps to minimize the consequences and publish reasons for its decision. This process is to be repeated at the time of every Dam Safety Review (DSR). A member of senior management (“Accountable Executive”) shall be accountable for the safety of tailings facilities and for minimizing the social and environmental consequences of a tailings facility failure. This Accountable Executive will also be accountable for a program of tailings management training, for emergency preparedness and response, and for recovery after failure. The Accountable Executive or delegate must have regular scheduled communication with the Engineer of Record (EoR). The responsible tailing facility engineer (RTFE) should have direct communication with the accountable executive. Internal communication with the EoR should be facilitated. It is likely that the accountable executive will lack the necessary qualifications and will require technical support from the RTFE. Reporting between the account executive and the RTFE is best described in 10.3 below. Consistency between 10.2 and 10.3 should be maintained.</td>
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<td>10.4</td>
<td>For employees who have a role in the TMS, consider implementing a performance incentive program to include a component linked to the integrity of tailings facilities. Strike Paragraph 10.4 The requirement (consider implementing) for implementation of a performance incentive program is not appropriate for this type of guidance. The adherence to governance should be addressed by the individual operation and work within their culture and incentive programs.</td>
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<tr>
<td>10.5</td>
<td>Identify appropriate qualifications and experience requirements for all personnel who play safety-critical roles in the operation of a tailings facility, in particular, for the RTFE, the EoR and the Accountable Executive. Ensure that occupants of these roles have the identified qualifications and experience, and develop success plans for these personnel. Identify appropriate qualifications and experience requirements for all personnel who play safety-critical roles in the operation of a tailings facility, in particular, for the RTFE, the EoR and the Accountable Executive. Ensure that occupants of these roles have the identified qualifications, qualifications and experience, and develop success plans for these personnel. The recommendation is broad and nonspecific. It is open for interpretation and potentially creates a condition where poorly qualified individuals are placed in responsible positions such as the RTFE, the EoR or account executive. What about establishing similar qualifications for outside reviewers, including regulatory agencies, and NGOs?</td>
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<tr>
<td>11.1</td>
<td>Conduct and regularly update risk assessments with a qualified multidisciplinary team using best practice methodologies. Transmit risk assessments to the ITRB for review, and address with urgency all risks considered unacceptable. Conduct and regularly update risk assessments with a qualified multidisciplinary team using best practice methodologies. Transmit risk assessments to the ITRB or IETR for review, and address with urgency all risks considered unacceptable.</td>
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15 Requirement 11.3 The EOR or a senior independent technical reviewer shall conduct annual tailings facility construction and performance reviews.

The EOR or an independent senior technical reviewer shall conduct and document annual tailings facility construction and performance reviews. In the rare occasions where the EOR is an employee of the company, the annual tailings facility construction and performance reviews shall be conducted and documented by an independent senior technical reviewer and the EOR.

Note that in this case, the term “senior independent technical reviewer” is appropriate since the person performing the annual review does not need to rise to the same level of experience and expertise as an IETR (who functions in lieu of a Board).

Add “Independent senior technical reviewer” to the glossary.

Develop minimum qualifications for the independent senior technical reviewer in a separate document – suggest they should be similar to the requirements for an EOR.

The responsibility of annual tailing facility construction of performance reviews should be placed directly on the EoR. We are placing significant expectations and responsibilities on the EoR. It would not be unreasonable to have the EoR engaged in the annual review process if no other jurisdictional requirements exist. If the EoR is a company employee, the annual review should be completed by an ISTR to maintain arms length independence from non engineering influences.

15 Requirement 11.4 A senior independent technical reviewer shall conduct an independent DSR periodically (every 3 to 10 years, depending on performance and complexity, and the consequence classification of the tailings facility). The DSR shall include technical, operational and governance aspects of the tailings facility and shall be done according to best practices. The DSR contractor cannot conduct a subsequent DSR on the same facility.

An independent senior technical reviewer (IETR) shall conduct an independent DSR periodically (every 3 to 10 years, depending on complexity and performance, and the consequence classification of the tailings facility). The DSR shall include technical, operational and governance aspects of the tailings facility and shall be done according to best practices. The DSR shall include review and update of the Potential Failure Modes Analysis with evaluation of risks and potential risk reduction measures. The DSR contractor cannot conduct a subsequent DSR on the same facility.

Again, in this case, the term “independent senior technical reviewer” is appropriate for the same reason as 11.3. Also, require that the DSR not only reviews the potential failure modes analysis, but performs an update with evaluation of risks and potential risk reduction measures. Requirement 9.2 then ensures that risks and risk reduction measures for existing facilities are conveyed to the Board.

The requirement, although noble, lacks an understanding of the available industry resources. The requirement that rotating firms or individuals complete DSR’s places additional pressure on a system that already lacks necessary resources and the associated ability to deliver these resources. There are clear technical and operational aspects to any dam review, but the governance aspects are not as well defined. It will useful to have guidance on this issue.

15 Requirement 11.5 For tailings facilities with ‘Very High’ or ‘Extreme’ Consequence Classification, the ITRB, reporting to the Accountable Executive and/or the Board, shall provide ongoing senior independent review of the planning, siting, design, construction, operation, maintenance, monitoring, performance and risk management at appropriate intervals across all stages of the tailings facility lifecycle. For facilities with other consequence classifications, the ongoing senior independent review can be done by a single person.

For tailings facilities with ‘Very High’ or ‘Extreme’ Consequence Classification, the ITRB or IETR, reporting to the Accountable Executive and/or the Board, shall provide ongoing independent expert review of the planning, siting, design, construction, operation, maintenance, monitoring, performance and risk management at appropriate intervals across all stages of the tailings facility lifecycle. For facilities with other consequence classifications, the ongoing independent review can be done by a single person (i.e., an IETR).

This requirement should be clarified. It appears the intent is to allow an ITR only for facilities with consequence classification less than Very High, which isn’t evident in Requirement 2.2. Given the number of tailings dams with Very High or Extreme classification, it may be difficult to find properly qualified Boards members. Perhaps the requirement for an ITR could be applied to only the Extreme classification and allow IETRs for Very High consequence.

16 Requirement 12.1 Engage an engineering firm with expertise and experience in design and construction of tailings facilities of comparable complexity to provide EOR services for the tailings facility. Require that the firm nominate an individual to represent the firm as the EOR, in accordance with the Operator, and verify that the individual has the necessary experience, skills and time to fulfill this role. Alternatively, the Operator may appoint an employee with expertise and experience in comparable facilities as the EOR. In this instance, the EOR may delegate the design to a firm ("Designer of Record") but shall remain thoroughly familiar with the design in executing their responsibilities as EOR.

Engage an engineering firm with expertise and experience in design and construction of tailings facilities of comparable complexity to provide EOR services for the tailings facility. Require that the firm nominate an individual to represent the firm as the EOR, in accordance with the Operator, and verify that the individual has the necessary experience, skills and time to fulfill this role. Alternatively, the Operator may appoint an employee with expertise and experience in comparable facilities as the EOR. In this instance, the EOR may delegate the design to a firm ("Designer of Record") but shall remain thoroughly familiar with the design in executing their responsibilities as EOR.

The situation where the Operator appoints an employee as the Engineer of Record should be clarified. How does the employee maintain independence in these cases? Aren’t they potentially subject to cost or other pressures from senior management if they are internal to Operator or Owner? This specific scenario should have additional requirements to make sure that independence and integrity is maintained.

Clear definition of the EoR, qualifications and operating battery limits should be provided by this document. It is the opinion of the review team that the EoR be an external firm. However, if the EoR is an internal delegate then the guidance should be adjusted accordingly. An external EoR provides a level of independence and quality that an internal delegate may not be able to afforded. Therefore, specific guidance that addresses internal EoRs should be added throughout this document.

An internal delegate assigned as EoR is potentially in direct conflict with the RTFE. The interaction between the RTFE and the EoR is also in question for an internal delegate.

16 Requirement 12.2 Establish and implement a system to manage the quality of all engineering work, the interactions between the EOR, the RTFE and the Accountable Executive, and their involvement in the tailings facility lifecycle as necessary to confirm that both the implementation of the design and the design intent are met in all cases.

Considering establishing performance reviews for the EOR and RTFE to be implemented or overseen by the Accountable Executive. Performance of the Accountable Executive should be reviewed by the Board of Directors?
16 Requirement 12.4
Given its potential impact on the risks associated with a tailings facility, the selection of the EOR shall be decided by the Accountable Executive and not influenced or decided by procurement personnel.

This requirement is effectively part of our requirement of 12.1 and can be combined for consistency.

16 Requirement 12.5
Where it becomes necessary to change the EOR firm, develop a detailed plan for the comprehensive transfer of data, information, knowledge and experience with the construction procedures and materials.

Where it becomes necessary to change the EOR firm, jointly develop at initial engagement a detailed success for the EOR that includes the comprehensive transfer of data, information, knowledge and experience with the construction procedures and materials.

As written, the plan is reactive and not proactive. The plan should be proactive and appropriate succession planning should be built into established governance documentation. It should be expected and is prudent to assume that the EOR would change with time.

16 Requirement 13.1
Educate personnel who have a role in the TMS about the reason for and importance of their job procedures for the prevention of a tailings facility failure.

This requirement is vague. The education of personnel is inherent to the tailing stewardship process and the tailing management plans. Specific guidance and requirements should be included.

16 Requirement 13.2
Incorporate workers’ experience-based knowledge into planning for all stages of the tailings facility lifecycle.

Incorporate experience-based, construction, operation and maintenance experience-based knowledge into planning, and design for all stages of the tailings facility lifecycle.

This is a crucial and significant point. Many of the mining companies incorporate a skid management system. The skid structure does not lend itself well to the inherent demands created by proper tailing management practices and the observational approach. The engagement of construction experience, operations personnel experience, and maintenance experience is critically beneficial to the design process.

16 Requirement 13.3
Establish mechanisms that promote cross-functional collaboration to ensure data and knowledge integration and communication across the TMS and the ESMs.

Strike Paragraph 13.3

This requirement does not make sense. If integration and communication between the ESMs and TMS is required the requirement should be built into each of the definitions.

TOPIC V: EMERGENCY RESPONSE AND LONG-TERM RECOVERY

Page # Reference Draft Standard Wording Comment, Question or Proposed Alternate Wording Rationale for the change
18 Requirement 15.1 Prepare and implement a site-specific Emergency Response Plan (ERP) based on credible tailings facility failure scenarios and the assessment of potential consequences, using the knowledge base. Update regularly, including during closure.

Prepare and implement a site-specific Emergency Response Plan (ERP) based on credible tailings facility failure scenarios and the assessment of potential consequences, using the knowledge base. Update regularly, or after any significant changes, throughout the operation and closure periods.

ERP may need to be update after major changes to the TSF or downstream potential impact zone.

18 Requirement 15.4 Maintain a state of readiness at the mine site and within at-risk communities by training all appropriate personnel, public sector agencies, first responders and at-risk communities and by testing emergency response plans and procedures with all involved stakeholders.

Include language for annual drills. Also consider early-warning systems, and evaluation of critical lifelines.

Inundation mapping should be conducted at an appropriate level, to determine potentially impacted persons or communities. Companies should develop internal standards for conducting inundation mapping, consistent with international standards.

Inundation mapping is very inconsistent between countries and between mining companies. CDA has been working on developing a reasonable methodology, based on the stage of the project (e.g. initial planning, final design, operations, etc.). This should be done periodically, particularly if the downstream impact zone become encroached upon (developed).

18 Requirement 15.5 (new) Establish mechanisms that promote cross-functional collaboration to ensure data and knowledge integration and communication across the TMS and the ESMs.

Inundation mapping should be conducted at an appropriate level, to determine potentially impacted persons or communities. Companies should develop internal standards for conducting inundation mapping, consistent with international standards.

Inundation mapping is very inconsistent between countries and between mining companies. CDA has been working on developing a reasonable methodology, based on the stage of the project (e.g. initial planning, final design, operations, etc.). This should be done periodically, particularly if the downstream impact zone become encroached upon (developed).

18 Requirement 15.6 (new) Prepare for long term recovery in the event of catastrophic failure.

Prepare for post-emergency recovery in the event of catastrophic failure.

Prepare for post-emergency recovery in the event of catastrophic failure.

Prepare Post-Emergency Disaster Recovery Strategies that include Operator commitments following a tailings dam failure, including: measures to assess social, economic and environmental impacts; potential reconstruction and recovery actions; and monitoring and reporting responsibilities. Meaningfully engage with public sector agencies and other organizations that would participate in post-emergency response strategies.

Wording change to be more consistent with other sections.

19 Requirement 16.1 Meaningfully engage with public sector agencies and other organizations that would participate in medium- and long-term social and environmental post-failure response strategies.

Prepare Post-Emergency Disaster Recovery Strategies that include Operator commitments following a tailings dam failure, including: measures to assess social, economic and environmental impacts; potential reconstruction and recovery actions; and monitoring and reporting responsibilities. Meaningfully engage with public sector agencies and other organizations that would participate in post-emergency response strategies.

Prepare Post-Emergency Disaster Recovery Strategies that include Operator commitments following a tailings dam failure, including: measures to assess social, economic and environmental impacts; potential reconstruction and recovery actions; and monitoring and reporting responsibilities. Meaningfully engage with public sector agencies and other organizations that would participate in post-emergency response strategies.


19 Requirement 16.2 In the event of tailings facility disaster, assess social, economic and environmental disaster impacts as soon as possible after people are safe and short-term survival needs have been met.

Eliminate, as the proposed change to 16.1 (including Post-emergency recovery strategies in the ERP) can address this requirement.

Evaluating long term impacts from the failure is potentially complex. Reference US Natural Resources Assessment (Department of Interior, NOAA, EPA) for comparison. This may be a larger can of worms than was intended.

19 Requirement 16.3 Work with public sector agencies and other stakeholders to facilitate the development of a Reconstruction and Recovery Plan that addresses medium- and long-term social, economic and environmental impacts of a tailings facility disaster.

Develop medium- and long-term plans to mitigate and/or restore impacted areas, working with downstream impacted persons, communities, and governmental authorities.

Develop medium- and long-term plans to mitigate and/or restore impacted areas, working with downstream impacted persons, communities, and governmental authorities.

TOPIC VI: PUBLIC DISCLOSURE AND ACCESS TO INFORMATION

Page # Reference Draft Standard Wording Comment, Question or Proposed Alternate Wording Rationale for the change
20 Principle 17 Provide public access to information on tailings facility decisions, risks and impacts, management and mitigation plans, and performance monitoring.

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Provide public access to information on tailings facility decisions, risks and impacts, management and mitigation plans, and performance monitoring.

20 Requirement 17.1 Publicly disclose relevant data and information about the tailings facility and its consequence classification in order to fairly inform interested stakeholders.

This requirement is effectively part of our requirement of 12.1 and can be combined for consistency.

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Responsible Tailings Facility
Engineer of Record

Engineer of Record

Construction Records Report

Best Practices

Reference
Footnote 36

Requirement 17.2
Respond in a systematic and timely manner to all reasonable stakeholder requests for information about the tailings facility, to the fullest extent possible and to fairly inform the interested party making the request.

Requirement 17.3
Commit to transparency and participate in credible global initiatives led by qualified independent organizations to create standardized, independent, industry-wide and publicly accessible databases, inventories or other information repositories about tailings facilities.

Footnote 36
A fundamental principle that underlies the Standard is that the public is entitled to timely access to information relating to the tailings facility. This information must be made available at no charge, as soon as possible, and in one or more languages as necessary to afford adequate access to interested stakeholders.

ANEX I: GLOSSARY AND NOTES

<table>
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<tr>
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<th>Reference Draft Standard Wording</th>
<th>Comment, Question or Proposed Alternate Wording</th>
<th>Rationale for the change</th>
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<tr>
<td>21</td>
<td>Best Practices A procedure that has been shown by research and experience to produce optimal results and that is established or proposed as a standard suitable for widespread adoption. Merriam-Webster Unabridged Dictionary, available at <a href="https://www.merriam-webster.com/dictionary/best%20practice">https://www.merriam-webster.com/dictionary/best%20practice</a>.</td>
<td>Procedures that are recognized by leaders in the profession, and preferably shown by research and experience to produce optimal results for conditions or parameters under consideration, and that are established or proposed as a standard suitable for widespread adoption. The Standard recognizes that there is no one &quot;best practice&quot; that can be viewed as applying to all tailings facilities. Instead, there are a range of &quot;best practices&quot; that can apply to safely manage tailings facilities.</td>
<td>Need to recognize that some best practices tend to be endorsed by leaders in the profession, without documented research or experience, and produce &quot;optimal&quot; results for a range of conditions or parameters. The qualification wording presented in Footnote 2 applies to each instance of the use of the term &quot;best practice&quot;.</td>
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<td>22</td>
<td>Construction Records Report Describes all aspects of the 'as-built' product, including all geometrical information, materials, laboratory and field test results, construction equipment and procedures, changes, non-conformances and their resolution, and construction photographs, amongst others.</td>
<td>Suggest adding: Procedures that are recognized by leaders in the profession, and preferably shown by research and experience to produce optimal results for conditions or parameters under consideration, and that are established or proposed as a standard suitable for widespread adoption. The Standard recognizes that there is no one &quot;best practice&quot; that can be viewed as applying to all tailings facilities. Instead, there are a range of &quot;best practices&quot; that can apply to safely manage tailings facilities.</td>
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<td>Engineer of Record The qualified engineer who responsible for confirming that the tailings facility is designed, constructed, operated, and decommissioned with appropriate concern for health, safety and the environment, and that it aligns with and meets applicable regulations, statutes, guidelines, codes, and standards (after Site Characterization for Dam Foundations in BC, EGBC, 2016). For more information, please refer to PRINCIPLE 12: Appoint and empower an Engineer of Record.</td>
<td>The qualified engineer who is responsible for confirming that the tailings facility is designed, constructed, operated, and closed with appropriate concern for health, safety and the environment, and that it aligns with and meets applicable regulations, statutes, guidelines, codes, and standards (after Site Characterization for Dam Foundations in BC, EGBC, 2016). For more information, please refer to PRINCIPLE 12: Appoint and empower an Engineer of Record.</td>
<td>For consistency replace &quot;decommissioned&quot; with &quot;closed&quot;</td>
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<td>For consistency replace &quot;decommissioned&quot; with &quot;closed&quot;</td>
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<tr>
<td>26</td>
<td>Robust Design The robustness of a tailings facility depends on each particular situation and it may be associated with various aspects, for example, the factor of safety against each of the potential failure modes, the presence or absence of materials with brittle behaviour, the degree of brittleness of these materials, the degree of variability of the materials, the potential of thresholds of deformation that significantly affect the facility performance. The degree of brittleness is related to the facility maintaining its overall integrity despite less than ideal performance of one or more of its components.</td>
<td>The robustness of a tailings facility depends on each particular situation and it may be associated with various aspects, for example, the factor of safety against each of the potential failure modes, the presence or absence of materials with brittle behaviour, the degree of brittleness of these materials, the sensitivity of stability analyses to variability of the materials and tailings production/deposition rate, the potential for thresholds of deformation that significantly affect the facility performance. The degree of brittleness is related to the facility maintaining its overall integrity despite less than ideal performance of one or more of its components.</td>
<td>Encourage probability analysis, and recognize the sensitivity of stability analysis to material variability and tailings production/deposition rate. This section needs to consider OVERTOPPING as a credible mode of failure in addition to the geotechnical discussion. For example, the incorporation of a spillway, even when undersized, would avert catastrophic failure and permit a perhaps more &quot;elegant&quot; failure with adequate risk mitigation.</td>
</tr>
<tr>
<td>26</td>
<td>Responsible Tailings Facility Engineer An engineer appointed by the Operator to be responsible for the tailings facility. The RTFE must be available at all times during construction, operations and closure. The RTFE has clearly defined, delegated responsibilities for management of the tailings facility and has appropriate qualifications compatible with the level of complexity of the tailings facility. The RTFE is responsible for the scope of work and budget requirements for the tailings facility, including risk management. The RTFE may delegate specific tasks and responsibilities for aspects of tailings management to qualified personnel.</td>
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<td>Suggest adding a description of the necessary qualifications including but not necessarily limited to demonstrated capability by education, training and experience. Consider developing a tailing certification program for the RTFE. Does the RTFE necessarily require it be a degree engineer? Could the requirements differ for differing size projects?</td>
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<tr>
<td>Table 2 Reference</td>
<td>Draft Standard Wording</td>
<td>Comment, Question or Proposed Alternate Wording</td>
<td>Rationale for the change</td>
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<td>22</td>
<td>Table 2</td>
<td>Draft Standard Wording</td>
<td>Annex 2: Consequence Classification</td>
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<td></td>
<td>External loading criteria required by the Standard - Dam Failure Consequence Classification - Design Flood - Design Ground Motion</td>
<td>Table 2</td>
<td>Consider limitations in establishing these criteria for a Standard applicable to all regions and conditions, this document should indicate that appropriate and referenceable design criteria shall be adopted considering the Consequence Classification, without citing specific values.</td>
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<tr>
<td></td>
<td>High - 1/5000 - 1/5000</td>
<td></td>
<td>In other words, we do not recommend including the flood and earthquake design criteria in this document, but rather including them in a supporting technical guidance document.</td>
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</tbody>
</table>
SME Additional Commentary of the Draft Tailings Standard, 23 December 2019

General

There should be a structure or avenue for periodically reassessing and/or amending the Standard when realities change, or its wording is being misinterpreted or misused by any group.

Topic I: KNOWLEDGE BASE

Requirement 1.1 (Page 6): refers to knowledge aligned with international best practice. As noted in the comments on the Glossary, the notion of international “best practice” is vague and the Standard will benefit from a more precise definition.

TOPIC III: DESIGN, CONSTRUCTION, OPERATION AND MONITORING OF THE TAILINGS FACILITY

Requirement 7.3 (Page 12): “Prepare a detailed Construction Records Report at least annually or whenever there is any material change to the tailings facility, its infrastructure or its monitoring system.”

TOPIC V: EMERGENCY RESPONSE AND LONG-TERM RECOVERY

Requirement 15.2 provides for meaningful engagement with the public and at-risk communities for emergency planning and implementation. Consistent with our comments regarding public disclosure, the section should be qualified noting disclosure should not include material that would present a risk to operational or physical security.

TOPIC VI: PUBLIC DISCLOSURE AND ACCESS TO INFORMATION

Public disclosure of certain information may be contrary to the overall goal of eliminating catastrophic dam failures. As expressed in a report to Congress entitled “Dam Safety Overview and the Federal Role” (Oct. 24, 2019): “Following terrorist attacks on September 11, 2001, the Federal Government focused on dam security and the potential for acts of terrorism at major dam sites ... As a consequence of the September 11, 2001, terrorist attacks, current federal policy and practices restrict public access to most information related to the condition assessment of dams and consequences of dam or component failure. For example, according to USACE, dams in the NID meet the definition of critical infrastructure as defined by the Uniting and Strengthening America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism (USA PATRIOT) Act of 2001 (P.L. 107-56). Vulnerability assessments of critical infrastructure are restricted from public access.” See p. 36.

It is important for the Standard to recognize that catastrophic failures of tailings dams may also be caused by intentional actions, and public access to certain information could do more harm than good. Footnote 38 in
the Standard recognizes: “Public disclosure should exclude confidential financial and business information or where disclosure would present a risk to operational or physical security.”

In the U.S., government agencies play an important role as a gatekeeper for potentially sensitive information regarding dam vulnerabilities and impacts. There are established processes for obtaining information available to the public and processes for protecting information when disclosure is not in the public interest.

**Footnote 36** (Page 20): “A fundamental principle that underlies the Standard is that the public is entitled to timely access to information relating to the tailings facility. This information must be made available at no charge, as soon as possible, and in one or more languages as necessary to afford adequate access to interested stakeholders. Sensitive information for which public disclosure may present a risk to operational or physical security may be submitted to a government agency with a process for establishing whether disclosure of the information is in the public interest.”

**Requirement 17.2** (Page 20): “Respond in a systematic and timely manner to all reasonable stakeholder requests for information about the tailings facility, including, where appropriate, directing stakeholders to regulatory agencies where such information is kept and disseminated in accordance with the public interest.”

**Requirement 17.3** requires a commitment to global initiatives to make tailings information publicly accessible. We are concerned that this bypasses the important role that government agencies serve in protecting the public interest in the U.S., including restricting access where disclosure would present a risk to operational or physical security. Therefore, we suggest that the Standard delete Requirement 17.3.

We are concerned about the breadth of **Footnote 37** that requires disclosure of a minimum of information by citing to multiple other requirements throughout the draft Standard. The minimum information should exclude any sections that may generate information excluded under Footnote 38. We suggest that this Footnote exclude sections 1.3; 4.3; 11.1; 11.4 and perhaps others that may contain information the disclosure of which is contrary to the public interest.

**ANNEX 1: Glossary**

“**Best practices**” In the United States, regulatory agencies with jurisdiction over tailings facilities have an obligation to protect the public interest. They are in a unique position to collect information across multiple facilities from which best practices can be distilled. These agencies also have rule-making processes designed to collect stakeholder perspectives through public comment and generate reasoned decisions regarding the best practices that are necessary and appropriate to protect the public. For the Global Tailings Standard, “best practices” should be defined as the best of the practices adopted by regulatory agencies with the resources and knowledge to identify, and periodically review, industry practices for operating tailings facilities to protect the public interest.