Tailings Management and Towards Sustainable Mining

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The Mining Association of Canada
So why are we here?
The Beginning

Why Towards Sustainable Mining?

- The status quo simply wasn’t sustainable
- Our social license was at risk
- The bar keeps rising
  - We must improve our performance, both operational and social
  - We must improve stakeholder judgment of our industry by taking action collectively
Implementing TSM 2004

- TSM Guiding Principles
- Performance Elements and Indicators
  - Tailings management
  - Energy management
  - Crisis communications
  - External outreach
- Performance manuals, guides
- Reporting
- Communities of Interest Advisory Panel
TSM Guiding Principles

- Involving communities
- Engaging in dialogue
- Leadership for responsible resource stewardship
- Conduct operations with excellence, transparency, accountability
- Environmentally responsible metal prod’n, use, recycle.
- Min. impact on env+biod at all stages (exploration to closure)
- Continuous improvement
- Health & Safety of Employees & Communities
- Work to address legacy issues (e.g. abandoned mines)
- Respect human rights + treat fairly
- Respect cultures, customs
- Recognize and respect aboriginal peoples
- Ethical conduct
- Comply w/ laws + adhere to GP standards and best practices
- Support community capabilities
- Responsive to community priorities at all stages
- Provide lasting benefits
In addressing the TSM Guiding Principles, MAC developed performance indicators to:

- respond to critical performance areas
- demonstrate performance;
- facilitate continuous improvement toward recognized best practices; and,
- build credibility and trust with communities of interest.
TSM Elements and Indicators

- Corporate Crisis Communications (Yes/No)
  - Corporate crisis management preparedness
  - Annual review
  - Training

- Corporate External Outreach
  - COI identification process
  - Effective COI communications and engagement process
  - COI response mechanisms
  - Reporting on external outreach
TSM Elements and Indicators (cont.)

- Energy and GHG Management
  - Energy use and GHG management systems
  - Energy use and GHG emissions reporting systems
  - Energy intensity performance
  - GHG intensity performance

- Tailings Management
  - Tailings management policy and statement of commitments
  - Tailings management system
  - Responsibility for tailings management
  - Annual senior management review
  - OMS manual
Tailings are a business risk

- Tailings are a business risk which needs to be managed.
- Failures cost money. Direct cost of a tailings dam failure averages $70 to $150 Million USD.
- Overall cost to company & shareholders can be many times more than the direct costs.

Graph showing share value ($/sh) with arrows pointing to April 98 Dam failure and Sept 2000 spill.
Notes from international incidents mid-1990’s

- **Merriespnuitt**, South Africa
  death of 17 people, no management framework to ensure safe operation of tailings dams in the long term

- **OMAI** tailings dam, Guyana
  $11M cleanup + $10M lost production, failure preventable if existing design and construction technology applied

- **MarCopper**, Philippines
  $70M cleanup, unclear identification of roles and inadequate inspection procedures

- **Las Frailes**, Spain
  $100 M+ cleanup, foundation failure
The MAC Guides

  - “How to” Guides – for managing and operating tailings and water management facilities safely and responsibly
    - Practice continual improvement
    - Demonstrate due diligence
  - Implement effective management controls and oversight
## Tailings Management

### Indicator 1 – Tailings Policy and Statement of Commitments

<table>
<thead>
<tr>
<th>Level</th>
<th>Criteria</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td><strong>Recognition, but little or no action:</strong> no formal policy; perhaps addressed by overall site management policies, but which do not specifically address requirements for tailings.</td>
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<tr>
<td>2</td>
<td><strong>Documentation prepared, or in preparation:</strong> need identified; guiding policy and commitments prepared; or formal plans to develop such made, funded and in progress.</td>
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<tr>
<td>3</td>
<td><strong>Effective implementation:</strong> formal documentation of corporate policy and commitments, developed in consultation with COI and consistent with the MAC tailings management framework as presented in <em>A Guide to the Management of Tailings Facilities</em>, endorsed by senior management and effectively implemented with budget allocation.</td>
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<td>4</td>
<td><strong>Formal verification:</strong> company has implemented an audit and management system assessment protocol consistent with the MAC <em>Guide to Verification of Tailings Facility Management</em> and can demonstrate implementation of corporate policy and commitments consistent with the MAC tailings management framework.</td>
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<tr>
<td>5</td>
<td><strong>Validation by external verification:</strong> company has implemented formal external verification of corporate policy and commitments as consistent with the MAC tailings management framework.</td>
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MAC TSM Public Reporting

- Public reporting of MAC member responses on tailings and other performance indicators
  - Began in 2004
  - Through MAC’s TSM report (formerly the MAC Environmental Progress Report), released in January 2005

- Audit protocols developed for each indicator

- External verification to start in 2006
The Results -- Tailings

- Most members level 3 or better except for OMS
- Area of focused activity for 9 years (since Omai)
- Serious impacts of tailings failure means highest standards required
TSM Verification System

Key Characteristics

- Building on the internal audit and verification systems that MAC members already have in place,
- Using a phased approach that recognizes it takes time for TSM to be fully implemented
- Needs to evolve into an effective and comprehensive approach that will meet the full range of MAC members’ needs and stakeholders’ expectations
Work in Progress

- Completion of TSM Verification Program
  - Framework completed
  - Audit protocols completed

- Additional performance indicators
  - Community Development and Aboriginal Relations
  - Biodiversity Guidelines
  - Environmental Management Systems
  - Closure and Reclamation
MAC Tailings Working Group has developed a Tailings Management Verification Protocol

- Builds on
  - The Tailings Management Framework
  - The *Guide to the Management of Tailings Facilities*
  - *Developing an OMS Manual for Tailings and Water Management Facilities*

- To measure the tailings management performance against the best practices contained in the *Guides*
  - Site specific
  - Step-by-step process

- Initially targeted to internal verification and benchmarking
- Ultimately will provide for external verification
COI Advisory Panel

- **ToR**
  - Help MAC members, COIs improve industry performance
  - Two-way dialogue
  - Input to and support for TSM goals
- **Report on issues, recommendations to MAC Board and COI’s**
- **Participation**
  - 14 external interests
  - 5 MAC Board Members
  - 1 junior mining industry representative
- **Meets twice per year (March, September)**
- **Work of panel posted on MAC web site (summary minutes, etc.)**
Benefits of TSM Performance Measurement

- Driving performance
- Refocusing and stimulating activity on performance gaps
- Drawing attention to goals and targets
- Creating a culture of achievement
- Identifying trends and comparing with others (peer pressure)
- Transparency
- Earning our social license
For more information…

www.mining.ca
ICMM

International Council on Mining and Metals

Tailings

Good Practice Website
Good Practice Website - Tailings Section

www.goodpracticemining.com/tailings

- Jointly developed by
- Part of the Good Practice website
- Provides access to a library of good practice references on tailings including guidelines, standards, case studies, and other relevant material which provide leading examples.
This website has been jointly developed by the International Council on Mining and Metals (ICMM) and the International Commission on Large Dams (ICOLD) to provide access to a library of good practice references on tailings. The site is a subset of the Good Practice website and provides guidelines, standards, case studies, legislation and other relevant material, which are specifically relevant to tailings, and leading examples of their kind globally.

What's New

The Tailings Good Practice website was launched in October 2005 by the International Council on Mining and Metals (ICMM) and the International Commission on Large Dams (ICOLD). The website was developed to provide a resource on all aspects of tailings in the context of good practice in the mining and metals sector. The Tailings Good Practice site is a part of the broader Good Practice one.

The references on the site are not meant to represent a definitive framework for tailings management. They provide a comprehensive number of references on tailings which will be reviewed following the launch, and updated on a regular basis.
Browse The Library

Enter the keyword(s) you wish to search for. You may also filter search results by the relevant lifecycle, topics, organisation types and regions.

Keywords: [ ] Sorted By: [Relevancy] [ ] In: [Ascending Order]

And/or, Refine search results by selecting the required attributes below:

**Life Cycle:**
- [ ] Exploration & Planning
- [ ] Recycling & Disposal
- [ ] Processing & Fabricating
- [ ] Mining
- [ ] Materials & Minerals in Use
- [ ] Rehabilitation & Post Closure

**Topics - Management References:**
- [ ] Overarching principles and policies
- [ ] External Communications/ Reporting
- [ ] Emergency Preparedness & Response
- [ ] Financial Assurance
- [ ] Operations, Maintenance and Surveillance
- [ ] Training
- [ ] Reviews/Audits

**Topics - Technical References:**
- [ ] Risk Assessment
- [ ] Tailings characterisation
- [ ] Conceptual design - Dam & Appurtenant structures
- [ ] Water Management
- [ ] Contaminant Migration
- [ ] Cyanide Management
- [ ] Re-treatment of wastes
- [ ] Site Selection
- [ ] Disposal techniques
- [ ] Waste Minimisation & Recycling
- [ ] Acid and poor quality drainage from tailings
- [ ] Monitoring
- [ ] Decommissioning, Closure & Aftercare
- [ ] Wildlife management and ecosystem indicators
www.goodpracticemining.com/tailings

Please e-mail comments to:

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