Update on Implementation of Recommendations
from the Expert Panel Report and the Chief Inspector of Mines Investigation Report

Recommendation by Expert Panel	Implementation	Status
1. Implement Best Available Technologies (BAT) using a phased approach. • **For existing tailings impoundments.** Rely on best practices for the remaining active life. • **For new tailings facilities (TSF).** BAT should be actively encouraged for new tailings facilities at existing and proposed mines. • **For closure.** BAT principles should be applied to closure of active impoundments so that they are progressively removed from the inventory by attrition.	Changes made to the tailings portion of the Health, Safety and Reclamation Code for Mines in BC (Code): • Added a definition of Best Available Technology (BAT) and the requirement of an alternatives assessment that considers BAT in future Mines Permit applications • Environmental Assessment Office (EAO) requires new mine projects to assess BAT for tailings management	Completed
2. Improve corporate governance: • Corporations proposing to operate a tailings storage facility (TSF) should be required to be a member of the Mining Association of Canada (MAC) or be obliged to commit to an equivalent program for tailings management, including the audit function.	Changes made to the tailings portion of the code: Mines with one or more tailings storage facilities shall develop and maintain a Tailings Management System that includes regular system audits • The Mining Association of Canada (MAC) established independent expert task force to review its tailings management requirements under its Towards Sustainable Mining (TSM) program. Recommendations were released in December 2015	Completed

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3. Expand corporate design commitments:
• Future permit applications for a new TSF should be based on a bankable feasibility that would have considered all technical, environmental, social and economic aspects of the project in sufficient detail to support an investment decision, which might have an accuracy of +/- 10-15%. More explicitly it should contain the following:
  • A detailed evaluation of all potential failure modes and a management scheme for all residual risk
  • Detailed cost/benefit analyses of BAT tailings and closure options so that economic effects can be understood, recognizing that the results of the cost/benefit analyses should not supersede BAT safety considerations
  • A detailed declaration of Quantitative Performance Objectives (QPOs).
	Changes made to the tailings portion of the code:
	
	New permit application requirements for alternatives assessment of BAT, declaration of QPOs, and proposed program for prediction, identification and management of physical, chemical, and other risks associated with tailings storage facilities and dams.
	
	The alternatives assessment for TSFs will consider BAT and will provide a comparative analysis of options considering the following sustainability factors:
	• Environment
	• Society
	• Economics
		Completed

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4. Enhance validation of safety and regulation of all phases of a TSF:
• Increase utilization of Independent Tailings Review Boards.
• Utilize the concept of Quantitative Performance Objectives (QPOs) to improve regulator evaluation of ongoing facilities.
	Changes made to the tailings portion of the code:
	• All existing mines in British Columbia with TSFs must establish an Independent Tailings Review Board by Dec. 31, 2016.
	• The Terms of Reference and the proposed membership of the Independent Tailings Review Boards must be approved by the Chief Inspector of Mines.
	• Mines must submit an annual report to the Chief Inspector of Mines that include details on the activities of the mine's independent tailings review board including:
	  • a summary of the reviews conducted that year;
	  • whether the work reviewed that year by the ITRB meets the Board's expectations of reasonably good practice;
	  • any conditions that compromise Tailings Storage Facility integrity or occurrences of non-compliance with recommendations from the engineer of record; and,
	  • a signed acknowledgement by the members of the Independent Tailings Review Board, confirming that the report is a true and accurate representation of their reviews.
		Completed

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5. **Strengthen current regulatory operations:** • Utilize the recent inspections of TSFs in the province to ascertain whether they may be at risk due to the following potential failure modes and take appropriate actions o Filter adequacy o Water balance adequacy o Undrained shear failure of silt and clay foundations	Final submissions received June 2015. More information available here: https://www2.gov.bc.ca/gov/content/industry/mineral-exploration-mining/permitting/geotechnical-information/dam-safety-inspections-2014	Completed
6. Improve professional practice: • Encourage the Engineers and Geoscientists BC to develop guidelines that would lead to improved site characterization for tailings dams with respect to the geological, geomorphological, hydrogeological and possibly seismotectonic characteristics.	Engineers and Geoscientists BC professional practice guidelines for dam site characterization assessments https://www.egbc.ca/getmedia/13381165-a596-48c2-bc31-2c7f89966d0d/2016_Site-Characterization-for-Dam-Foundations_WEB_V1-2.pdf.aspx	Completed
7. Improve dam safety guidelines: • Recognizing the limitations of the current Canadian Dam Association (CDA) guidelines incorporated as a statutory requirement, develop improved guidelines that are tailored to the conditions encountered with TSFs in British Columbia and that emphasize protecting public safety.	Changes made to the tailings portion of the code: The mining code now includes design standards for TSFs that are tailored to the conditions encountered in British Columbia and that emphasize protecting the public and environment including: • TSF design requirements for the steepness of downstream slopes. • A minimum static factor of safety. • New seismic and flood design criteria.	Completed

Recommendation by Investigation Report from Chief Inspector of Mines	Implementation	
1-1 Mine Dam Safety Manager • Any mine with tailings storage facilities (TSFs) should have a qualified individual designated as a mine dam safety manager responsible for oversight of planning, design, operation, construction	Changes made to the tailings portion of the code: • Mines with one or more tailings storage facilities shall designate a TSF Qualified Person for safe management of the Tailings Storage Facility	Completed
1-2 Water Balance Management • Water management and water balance issues for mining projects must be designed by a qualified professional. These issues require the integration of relevant mine departments.	Changes made to the tailings portion of the code: • Impoundments, tailings storage facilities and water management facilities and dams shall be designed by a Professional Engineer • Tailings storage facilities must have a water balance and water management plan for the permitted life of mine that is prepared by a qualified person • Water balance and water management plans shall be reconciled annually and updated as required, after the commencement of operations	Completed

Recommendation by Investigation Report from Chief Inspector of Mines	Implementation	
1-3 TSF Operations, Maintenance and Surveillance Manual • The mine manager should ensure the Operation, Maintenance and Surveillance manual (OMS) required by the Code for all impoundments adheres to applicable CDA and MAC guidelines. Additional guidance for the OMS should include incorporation of an annual risk assessment/risk management plan and relevant findings of an independent technical review board.	Changes made to the tailings portion of the code: • An Operations, Maintenance and Surveillance (OMS) manual shall be prepared by one or more qualified person and submitted to the chief inspector prior to operation of the facilities • The OMS manual must be reviewed annually and revised regularly during operations, decommissioning and closure of a tailings storage facility or dam and the risk assessment for all tailings storage facilities and associated dams must also be reviewed annually to ensure that the quantifiable performance objectives and operating controls are current and manage the facility risks • QPOs and operating controls are included as part of the OMS	Completed

Recommendation by Investigation Report from Chief Inspector of Mines	Implementation	
1-4 Mine Emergency Response Plan • The mine manager must ensure that the Mine Emergency Response Plan (MERP) adheres to applicable regulations, is maintained on a regular basis for currency, incorporates appropriate response measures to emergencies including those involving the TSF, and is written and distributed in such format as to serve as a procedural guide during an emergency or other event.	Changes made to **the Health and Safety portion of** the Code (**Part 3.7.1)**: • The manager shall develop a Mine Emergency Response Plan (MERP), which shall be kept up to date and followed in the event of an emergency; this plan must be tested annually and filed with the Chief Inspector. • The Mine Emergency Response Plan must • outline the response procedures, • contain all of the elements required in the "Mine Emergency Response Plan Guidelines for the Mining Industry" • include the emergency preparedness and response plans regarding tailings storage facilities, and • include affected communities and First Nations in the identification of potential hazards, emergency communications and responses	Completed

Recommendation by Investigation Report from Chief Inspector of Mines	Implementation	
1-5 Risk Recognition and Communication • All mine personnel have a role to play in recognizing and reporting risk conditions, especially those that could affect health, safety and environmental protection; and should be educated in the recognition of conditions and events that could impact TSF safety or contravene applicable permit conditions and regulations.	Changes made to Part 10 of the code: • The engineer of record shall immediately notify the manager in writing of any unresolved safety issue that compromises the integrity of a tailings storage facility • The OMS sets out information on QPOs, and performance goals for the mine and TSF. Ensuring employees have been trained in the use of the manual and its operational controls will provide the means for them to determine who to notify and will provide the education to know when an event or conditions occur that could impact TSF safety or integrity.	Completed
2-1 Design Objectives • Tailings storage and water management systems and structures should be designed for worker and public safety and the protection of the environment. TSF design should incorporate a comprehensive feasibility assessment that considers technical, environmental, social, and economic aspects of the mining project in sufficient detail to support the submitted design.	Changes made to Part 10 of the code: The alternatives assessment for TSFs will consider BAT and will provide a comparative analysis of options considering the following sustainability factors: • Environment • Society • Economics Minimums have been outlined for Seismic and Flood Design Criteria, Design Slopes (2:1), Static Factor of Safety (1.5), Beach and Inundation Study and Failure Runout Assessments	Completed

Recommendation by Investigation Report from Chief Inspector of Mines	Implementation	
2-2 Independent Technical Review Board • Mines with impoundments should each develop independent technical review boards (ITRB) to provide additional perspectives on site investigation, site selection, design, construction, maintenance, operations, surveillance, water management and closure.	Changes made to Part 10 of the code: • All existing mines in British Columbia with TSFs must establish an Independent Tailings Review Board by Dec. 31, 2016. • The Terms of Reference and the proposed membership of the Independent Tailings Review Boards must be approved by the Chief Inspector of Mines.	Completed
3-1 Professional Reliance • The Chief Inspector recognizes the necessity of reliance on professional practice for the design, construction, operation and closure of mines and mine facilities. The Regulator does not design the mine or associated structures, and thus is reliant on the professional practice of the designer. Reliance on professional practice requires that the organizations overseeing the professionals or developing guidelines and standards for the professional community incorporate best available practices into their oversight.	Changes made to Part 10 of the code: The Code outlines requirements for the designation and reporting responsibility for the mine to designate an Engineer of Record who is a professional engineer. The Engineer of Record has a duty to report any unresolved safety issue that compromises the integrity of the TSF. Additionally, the Code sets out requirements for professionals or designated responsibilities for the creation of water management and water balance plans.	Completed This will be further informed by the review of the Professional Reliance model in the Natural Resource sector being led by ENV

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3-2 Integration of Standards • The Regulator should consider and incorporate as appropriate guidelines from these external associations as applicable and consistent with EMPR objectives.	Changes made to Part 10 of the code: Sections added specifying: **10.1.8** Seismic and Flood Design Criteria, **10.1.9** Design Slopes **10.1.10** Minimum Factor of Safety **10.1.11** Breach and Inundation Study and Failure Runout Assessments • Mines with one or more tailings storage facilities shall develop and maintain a Tailings Management System that includes regular system audits	Completed
4-1 Review of the Code • Ministry of Energy, Mines and Petroleum Resources (EMPR) should undertake a comprehensive review of the Code to ensure that the lessons learned and recommendations from this report are fully considered and appropriately incorporated; and that all relevant standards and guidelines from external bodies (such as MAC, CDA, and APEGBC) are fully considered in the review as appropriate.	A Code Review Committee was appointed pursuant to section 34 of the Mines Act in June 2015.	Completed

Recommendation by Investigation Report from Chief Inspector of Mines	Implementation	
4-2 Life of Mine Planning for Permitting • Short-term, incremental Mines Act permit amendment applications can obscure life-of-mine conditions and long-term risks. The Regulator should ensure a perspective that spans the life of the mine be considered for Mines Act permit applications, while acknowledging that the nature of mining frequently requires changes to the life-of-mine plan.	Changes made to Part 10 of the code: • A mine plan must be included in the Mines Act permitting application that includes an inventory of areas disturbed to date, and projected over the next 5 years and over the projected life of the mine • Mine, environmental protection, reclamation and closure plans shall be prepared in consideration of the HSRC Guidance Document, by qualified professionals or persons who in the opinion of the chief inspector are qualified to perform the work.	Completed

Recommendation by Investigation Report from Chief Inspector of Mines	Implementation	
4-3 Investigation, Compliance and Enforcement Review • The Regulator must enhance its investigative capacity, as well as its ability to exercise its existing compliance and enforcement authority under the Mines Act and Code. A supported director-equivalent position specific to investigation, compliance and enforcement should be established to evaluate and oversee these roles. This oversight should extend to applying recommended standards to the Regulator's compliance and enforcement function. A full range of regulatory tools, such as incentives, administrative penalties, outside agency collaboration and other best practices should be considered.	Deputy Chief Inspector of Mines (C&E) position in place. Dedicated investigative unit established within EMPR The legislation increased penalties available for court prosecutions under the act from $100,000 and/or up to one year imprisonment to $1 million and/or up to three years imprisonment Regulation for administrative penalties now in effect to enable penalties for non-compliance (February 2017) Deputy Minister Compliance and Enforcement board created to establish compliance and enforcement oversight. Budget lift for EMPR for mines permitting and oversight.	Completed
4-4 Geotechnical Oversight • The Regulator has a responsibility to oversee the decisions of the EoR. The Regulator must maintain sufficient technical capacity to conduct appropriate oversight of the professional opinions on which it relies. A Regulatory Dam Safety Manager dedicated to the coordinated regulatory oversight of tailings dams in the Province could be responsible for ongoing policy development, technical review, and inspection capacity as it relates to tailings impoundments.	The position of Dam Safety Manager within EMPR has been created and filled. Dam Safety Manager in place as of April 2017	Completed

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4-5 Organizational Review of Inspectorate • There exists an ongoing need to adequately support the increased tempo of review, monitoring and inspection that would be placed on EMPR's inspectorate. It is recommended that a comprehensive internal review of operational and business practices be conducted.	Organizational Effectiveness Review of Mines and Mineral Resources Division (MMRD) completed in June, 2017. The mandate letter of the Minister of Energy, Mines and Petroleum Resources reflects government's commitment to establishing an independent oversight unit for mines. Work is underway to develop options for implementing this commitment.	Ongoing
5-1 Internal Records Management • A formal EMPR management system of documentation for all mines from development to post-closure should be established. The system will assist the Chief Inspector in integrating regulatory oversight capabilities; assist with investigation, project tasking, formal documentation and indexing; and enhance the ability of EMPR to meet the expectations for transparency and appropriate disclosure within the limits of privacy considerations.	Records management systems under review. Includes implementation of the Natural Resource Inspection System (NRIS) and the refresh of the Mine Management System (MMS) for tracking of mine activities and regulatory oversight. Creation and ongoing enhancements to the mine information public website to provide direct access to mine information such as inspections, annual reports and permits relating to mining activity.	Ongoing

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6-1 Alignment of Regulatory Objectives • Agency objectives (environmental protection, worker health and safety, facilities integrity) overlap but are not always integrated. MOE and EMPR interests, disciplines and standards should be reviewed for alignment opportunities to support timely and effective program outcomes while optimally fulfilling the mandates of both agencies.	EAO, EMPR and Ministry of Environment (ENV) deputy minister board established to oversee compliance and enforcement The Mining Compliance and Enforcement Strategic plan released. Includes the optimization of resources to effectively coordinate activities for major mines, and protect the environment, human health and public safety. The Major Projects Coordination Committee was established and is working to collaboratively develop risk-based Compliance Management Plans with lead staff from across Natural Resource agencies.	Ongoing
6-2 Permitting Process Alignment • Separate permitting processes for EMPR and ENV should be reviewed for opportunities to integrate and align these processes as appropriate to avoid duplication and increase efficiencies.	Integration between EMPR and ENV is a key priority and the Major Mines Permitting Office (MMPO) was created in 2015. MMPO is working to ensure continuous improvement and process alignment. This includes specific work to determine areas of shared jurisdiction between ministries through the sequence of interrelated regulatory processes for mining projects in BC from exploration through to closure/post-closure. Includes strategies, tools and guidance to promote an understanding of environmental assessment (EA) and permitting requirements, and manages shared jurisdiction appropriately to ensure effective transitions along the regulatory continuum.	Completed

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7-1 Collaborative Education • EMPR, the industry, professional organizations, and educational institutions should continue to seek new collaborative opportunities to foster education (including formal academic, onsite or online employee-focused, public-facing, and professional continuing education).	EMPR, industry, professional organizations, and educational institutions continue to explore collaborative educational opportunities such as: • Educational programs being supported by Mining Association of BC, BCIT, Community College School of Exploration and Mining, UBC, Northwest Community College and others. • EMPR working with professional associative bodies such as Engineers and Geoscientists BC and Canadian Dam Association to develop further educational opportunities. • EMPR continues to work through the Mining Association of BC, and the Mining Association of Canada on the Towards Sustainable Mining program. • EAO, EMPR, ENV early proponent education program to ensure proponent understanding of regulatory requirements following EAC issuance.	Ongoing

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7-2 Research and Development • Current technologies in tailings processing, dewatering, and discharge water treatment have not achieved a sufficient level of technical and economic feasibility in many projects. Both government and industry should support research and development efforts to improve these technologies for practical application.	Changes made to the tailings portion of the code: Government is now requiring an assessment of BAT/BAP under the new EAO requirements. Government participated in various initiatives such as the Mine Environment Neutral Drainage (MEND) Committee who commissioned a study on Tailings Management Technologies which was completed in 2016. Added a definition of Best Available Technology (BAT) and the requirement of an alternatives assessment that considers BAT in future Mines Permit applications EAO requires new mine projects to assess BAT for tailings management	Completed