



**II CONGRESO  
INTERNACIONAL  
DE MINERÍA**



# ***IMPROVEMENTS TO REGULATORY OVERSIGHT OF TSFs IN BRITISH COLUMBIA***

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# PRESENTATION OUTLINE

- Mining in British Columbia (BC)
- Mount Polley Dam Failure
- Immediate Response
  - Investigations
  - Chief Inspector of Mines (CIM) Directives
- Findings and Recommendations
- Legislative and Regulatory Changes
- Organizational Changes
- Engagement and Transparency



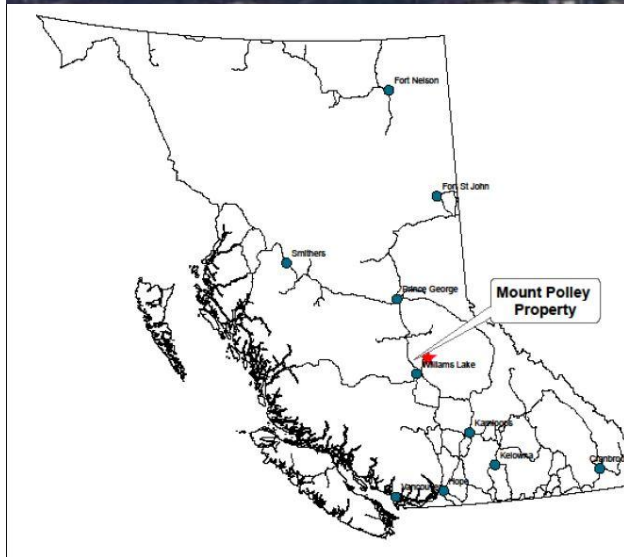
# MINING IN BRITISH COLUMBIA PROVINCE

- \$9.7B production value in 2018
- More than 30,000 employed in mineral exploration, mining and related sectors
- Coal (39%), copper (35%) and gold (7%) are major products
- Open pit and underground operations
- **98 Tailings Storage Facilities (TSFs) at 61 permitted mines**



# MOUNT POLLEY DAM FAILURE

AUGUST 4, 2014





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*IMMEDIATE RESPONSE*

# IMMEDIATE RESPONSE

## INVESTIGATIONS LAUNCHED

- 1) Independent Expert Engineering Investigation and Review on Mount Polley (January 2015)
- 2) Chief Inspector of Mines' Investigation on Mount Polley (November 2015)
- 3) Joint Conservation Officer Service – Federal Department of Fisheries and Oceans Investigation (Ongoing)

# IMMEDIATE RESPONSE

## CHIEF INSPECTOR OF MINES (CIM) DIRECTIVES

### 1. Issued August 2014:

- Dam Safety Inspection
- 3<sup>rd</sup> Party Review
- Mine Manager Commitment Letter
- Emergency Preparedness and Response Plan (EPRP)/Testing
- Dam Break and Inundation Study

### 2. Issued February 2015:

- Undrained shear failure of silt and clay foundations
- Water balance adequacy
- Filter adequacy



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# *FINDINGS & RECOMMENDATIONS*



# OFFICE OF THE AUDITOR GENERAL

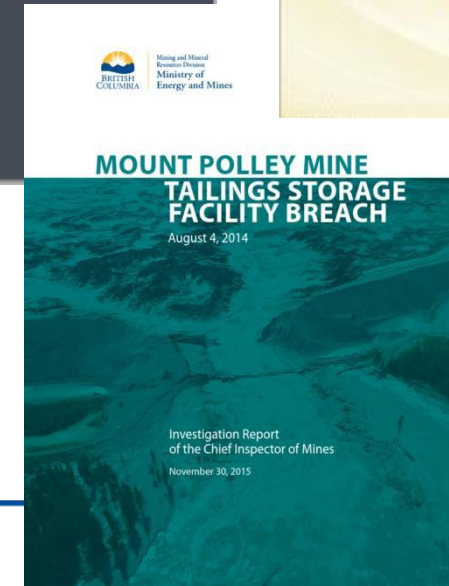
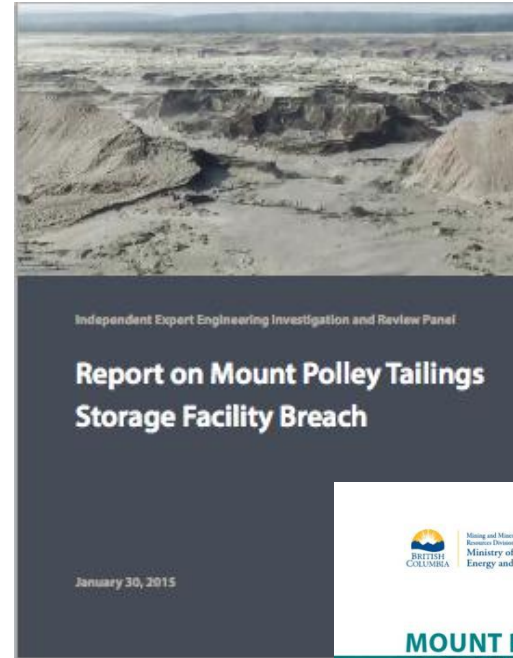
## OFFICE OF THE AUDITOR GENERAL OF BC (OAG)

At the time of the incident, the OAG was already conducting an audit of compliance and enforcement in the mining sector.

- The main recommendation: “...create an integrated and independent Compliance and Enforcement unit...”
- 16 additional sub-recommendations

# TOTAL OF 43 RECOMMENDATIONS

- 43 recommendations resulted from the two Investigations and the Audit. All recommendations have been accepted by BC Government and continue to be implemented.
- Remainder of presentation will outline how these recommendations have been applied.





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# *LEGISLATIVE AND REGULATORY CHANGES*

# LEGISLATIVE AND REGULATORY CHANGES

## REGULATORY CONTEXT

- The province of British Columbia utilizes a *Professional Reliance* model.
- The Regulator relies on the technical expertise and professional opinion of external professionals.
- The Regulator does not direct design and is not prescriptive with respect to specific technologies etc.
- The role of the Regulator is to evaluate that the design, construction, operation and closure meet the intent of the legislation and regulations.

# LEGISLATIVE AND REGULATORY CHANGES

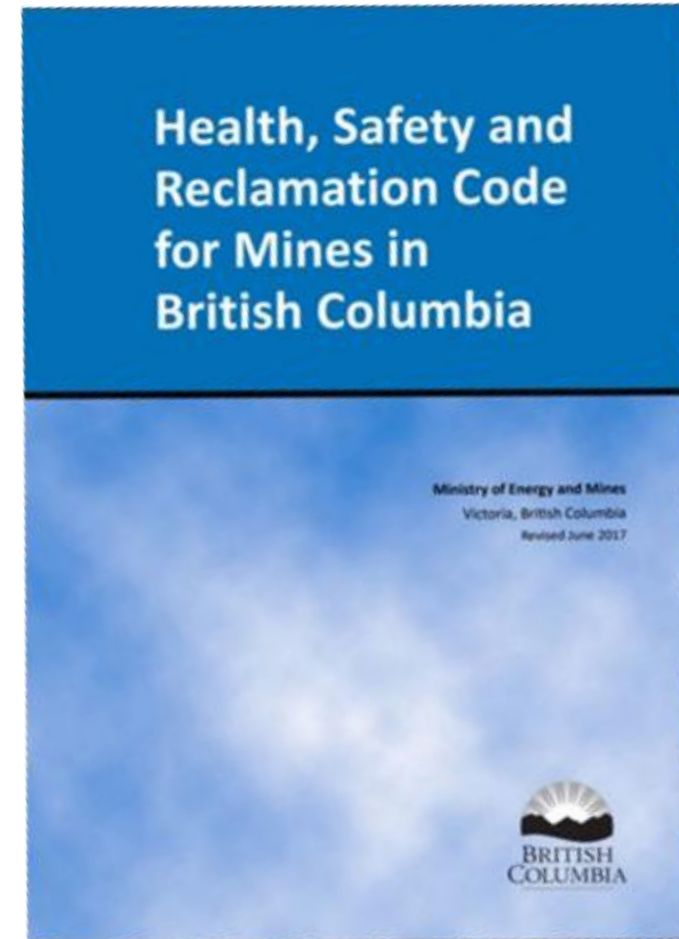
## LEGISLATIVE REVISIONS TO THE *MINES ACT*

- Administrative Monetary Penalties (AMPs)
- Increased timeframe to commence prosecution (from 1 to 3 years)
- Enable court prosecution and fines of up to \$3,000,000 or 3 years in jail

# LEGISLATIVE AND REGULATORY CHANGES

## CODE REVIEW

- Mining in BC is governed by The Health, Safety and Reclamation Code for Mines in BC (and the *Mines Act*)
- The Code provides a structure like a regulation enabled by the Mines Act
- Tailings section revised in 2016
- Revisions were developed by a committee composed of members from government, industry, labour unions and First Nations
- Opportunity for public input prior to Code revisions



# LEGISLATIVE AND REGULATORY CHANGES

## SUPERVISION/OVERSIGHT

### Engineer Of Record

- Registered Professional Engineer required for every TSF and dam
- Assure TSFs and dams have been designed and constructed in accordance with applicable guidelines, standards and regulations
- Carries out:
  - Annual Dam Safety Inspections (DSIs)
  - Participates in Dam Safety Reviews (DSRs) and risk assessments
  - Provides Quantitative Performance Objectives (QPOs) for inclusion in Operations Maintenance Surveillance Manuals (OMS)

# LEGISLATIVE AND REGULATORY CHANGES

## SUPERVISION/OVERSIGHT

### Independent Tailings Review Board (ITRB)

- Required for each TSF (unless meets exemption criteria)
- Composition based on complexity of the facility (i.e. size, disciplines)
- Terms of reference (TOR) and board members required to be submitted to the Chief Inspector of Mines (CIM) for approval
- Report of ITRB activities required annually



# LEGISLATIVE AND REGULATORY CHANGES

## SUPERVISION/OVERSIGHT

### TSF Qualified Person

- A designated, knowledgeable on-site person required for TSFs
- Coordinates the design, construction and day-to-day management of tailings storage facilities with all personnel
- Implements the OMS and reports on the status and performance of the Tailings Management System (TMS)

# LEGISLATIVE AND REGULATORY CHANGES

## CORPORATE GOVERNANCE/COMMITMENTS

### **Best Available Technologies (BAT)**

- Permit applications must include an alternatives assessment of Best Available Technologies for tailings storage

### **Tailings Management System (TMS)**

- Includes regular system audits
- Example of a TMS is Mining Association of Canada (MAC)'s Towards Sustainable Mining (TSM) – very comprehensive set of guidance and protocols.

# LEGISLATIVE AND REGULATORY CHANGES

## CORPORATE GOVERNANCE/COMMITMENTS

### Quantitative Performance Objectives (QPOs)

- Performance measurements (e.g. beach width, impoundment filling schedule, construction material availability, freeboard, instrumentation trigger levels etc.)
- Should be implemented in conjunction with Trigger Action Response Plans (TARPs) and included in the OMS
- Determined and reviewed by the EOR and TSF Qualified Person

# LEGISLATIVE AND REGULATORY CHANGES

## DESIGN AND FACTOR OF SAFETY (FOS)

- The EOR shall justify downstream slopes steeper than 2H:1V and receive authorization from the Chief Inspector of Mines (CIM)
- The EOR shall justify a calculated static FOS less than 1.5 and receive authorization from the Chief Inspector of Mines (CIM)
- Minimum flood and seismic design criteria are more conservative than previous criteria (that followed CDA Dam Safety Guidelines)

# LEGISLATIVE AND REGULATORY CHANGES

## REPORTING REQUIREMENTS

- Annual Reporting
  - Summary of TSF and dam safety recommendations, including a scheduled completion date
  - Updates to the TSF and dam register
- Water balance and water management plans
- OMS Manuals
- TSF Risk Assessment

# LEGISLATIVE AND REGULATORY CHANGES

## REPORTING REQUIREMENTS

- Dam Safety Reviews (DSRs)
  - Required every 5 years for all dams regardless of consequence classification
- Duty to Report Safety Issues at TSFs
  - The EOR shall immediately notify the Mine Manager in writing of any unresolved safety issue that compromises the integrity of the TSF



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# *ORGANIZATIONAL CHANGES*

# REGULATORY EXCELLENCE:

- Restructuring to ensure clear separation of authorization and compliance functions (2 Mining Divisions)
  - Properly resourced authorizations process
  - Independent Effectiveness Audits function
  - Policy and Industry Competitiveness
  - Code Review Branch
  - Abandoned Mines Branch
  - Mines Investigation Unit
  - Indigenous Engagement
  - Increased transparency of oversight







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# *ENGAGEMENT AND TRANSPARENCY*

# ACCESS TO INFORMATION

## BC Mine Information Website

<http://mines.nrs.gov.bc.ca/>

## Health, Safety and Reclamation Code

<http://www2.gov.bc.ca/gov/content/industry/mineral-exploration-mining/health-safety>

## Mining Compliance and Enforcement

<http://www2.gov.bc.ca/gov/content/industry/mineral-exploration-mining/compliance-enforcement>

# SUMMARY

- Issued technical directives to improve understanding of TSFs
- Initiated External and Internal investigations
- Revised Mines Act/Code:
  - Stronger compliance and enforcement actions
  - Multiple layers of TSF oversight
  - Corporate governance/commitments
  - Improvements to reporting requirements
  - Stronger design criteria
- Reviewed organization for regulatory excellence:
  - Independent effectiveness audits function
  - Practices and regulations in other jurisdictions
  - Improved organizational structure (New units)
- Proactive engagement and transparency





THANK YOU!

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# REFERENCES

## INTERNAL

BC Mine Information Website

<http://mines.nrs.gov.bc.ca/>

Health, Safety and Reclamation Code

<http://www2.gov.bc.ca/gov/content/industry/mineral-exploration-mining/health-safety>

Health, Safety and Reclamation Code Guidance Document

[https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/mineral-exploration-mining/documents/health-and-safety/part\\_10\\_guidance\\_doc\\_10\\_20july\\_2016.pdf](https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/mineral-exploration-mining/documents/health-and-safety/part_10_guidance_doc_10_20july_2016.pdf)

Mining Compliance and Enforcement

<http://www2.gov.bc.ca/gov/content/industry/mineral-exploration-mining/compliance-enforcement>

## EXTERNAL

Canadian Dam Association

<https://www.cda.ca/>

Mining Association of Canada

<https://mining.ca/>