Environment Canada’s

*Environmental Code of Practice for Metal Mines*

Presented to the Lake Superior Binational Program Webinar on Acid Rock Drainage

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Overview

- What is an environmental code of practice
- Overview of Environment Canada’s *Environmental Code of Practice for Metal Mines*
- Environmental management principles and practices related to acid rock drainage
What are Environmental Codes of Practice
Features of Environmental Codes of Practice
They are…

• Initiatives to be implemented on voluntary basis by corporate or facility policy commitment
• Guides to exercising due diligence
• Living documents that will evolve with emerging guidelines and regulations
• More comprehensive, more flexible than laws such as conventional release regulations like the *Metal Mining Effluent Regulations*
Features of Environmental Codes of Practice
They can be....

- Adopted by all levels of governments as a guidance document that delineate appropriate environmental standards
- Adopted by companies or industrial associations as a commitment to continual improvement in environmental performance
- Can be incorporated into permitting requirements by various levels of government
- Used to inform environmental assessment
- Linked to pollution prevention plans or regulated reporting requirements
Features of Environmental Codes of Practice
They are not …

• Documents that have the force of law on their own
• Substitutes for municipal, Aboriginal, provincial and/or federal legal requirements
• In conflict with municipal, Aboriginal, provincial and federal regulatory requirements
Overview of the Environmental Code of Practice for Metal Mines
Objective of the Mining Code

- To identify and promote recommended best practices to facilitate and encourage continual improvement in environmental performance of mining facilities throughout all phases of the mine life cycle, in Canada and elsewhere.
- Code supports the *Metal Mining Effluent Regulations* (MMER) but also covers a broad spectrum of environmental aspects that extend well beyond MMER coverage.
- Code is intended to be a resource for mine owners and operators, regulatory authorities and the general public, particularly those in communities affected by mining.
- Many aspects of Code can be applied to non-metal mining operations.
The Mine Life-Cycle

Exploration & Feasability
- exploration, locate mineral anomalies
- discovery, sampling
Feasability
- decision about economic feasibility of mining

Planning & Construction
- mine planning
- environmental/social planning
- closure plan
- environmental and other permits
Construction:
- clearing, stripping, blasting
- infrastructure

Operations
- ore crushing, grinding, concentrating
- waste rock, tailings and wastewater management

Closure
- site clean-up, reclamation, rehabilitation
- maintenance, environmental monitoring
Scales of Mining Activity
Origin of the Code

• Code updates a previous Environmental Code of Practice that was published in 1977 as a supporting document to the *Metal Mining Liquid Effluent Regulations* (MMLER) which were also released at that time

• A multi-stakeholder review of the MMLER recommended that Code be updated, with a continued focus on water management and water pollution prevention and new sections to address other aspects of environmental management and monitoring across the complete mine life cycle

• Code was released in June 2009, and reflects input from technical experts from government, industry and other key stakeholders
Focus of Recommendations

- Code recommendations intended to facilitate mitigation of potential environmental impacts of mining activities
- Code recommends best practices and guides readers to additional information sources to make good use of proven and successful documentation existing
- Code makes recommendations but does not present detailed information on how to implement recommendations – it is not a “how to” guide
- This approach serves to manage size of Code and helps ensure its continued relevance in light of changing science and technology developments
Scope of Recommendations

- Code presents over 130 recommendations regarding environmental management tools applicable throughout the mine life cycle, and practices for each phase in the mine life cycle.
- Environmental management tools applicable throughout the mine life cycle include:
  - environmental risk management
  - environmental management systems
  - pollution prevention planning
  - environmental monitoring
  - environmental auditing
  - incorporation of traditional ecological knowledge
  - designing for mine closure
  - public involvement
Scope of Recommendations

• Technical aspects addressed for each phase of the mine life cycle include:
  – water management and treatment
  – waste rock and tailings characterization and management
  – chemicals management, including cyanide and ammonia
  – sewage and domestic wastes
  – air quality, particularly particulate matter releases
  – terrestrial habitat and wildlife concerns
  – reclamation, closure and long-term maintenance and monitoring
Linkages with Legislation

Federal legislation:

• Code supports the *Metal Mining Effluent Regulations* (MMER)
  – MMER are *Fisheries Act* regulations which impose effluent quality standards on effluent from metal mines

• Code builds on other legislative requirements, such as the CEPA *Environmental Emergency Regulations*

• Code recommendations to be considered in reviewing environmental assessments under the *Canadian Environmental Assessment Act*
Linkages with Legislation

Provincial/territorial legislation:

• Metal mining activities are regulated primarily by the provinces, except in the Northwest Territories and Nunavut, where Indian and Northern Affairs Canada regulates mining.

• Companies are encouraged to implement all applicable Code recommendations in developing and implementing their environmental management systems and complying with applicable legislation.

• Regulatory agencies are encouraged to incorporate Code recommendations into permit requirements.
Implementation of the Code

• Notice of the publication of the Code of Practice was given in the Canada Gazette, Part I in June 2009
• Metal mines subject to the MMER were informed of the publication of the Code
• Industry associations were informed of the publication of the Code of Practice
• Environment Canada is using other venues to promote the Code, such as making reference to it in environmental assessments
• Adoption of the recommendations in the Code are voluntary but are strongly encouraged
Environmental Management Principles and Practices Related to Acid Rock Drainage
Management Principles and Practices in the Code

- The Code recommends a number of environmental management principles and practices that are directly or indirectly related to preventing problems associated with ARD and metal leaching.
- Recommends the implementation of a number of management principles across the mine life cycle which are pertinent, including designing for mine closure.
- Recommends the implementation of a number of management practices for various phases of the mine life cycle which are pertinent, including practices related to mine waste characterization, management and monitoring, and water management.
Designing for Mine Closure

• Mine closure planning is a key tool in preventing or limiting environmental problems after a mine closes.

• When mine closure planning was first introduced, closure plans were typically developed towards the end of the mine life.

• The sooner in the mine life cycle that designing for mine closure begins, the greater the likelihood that closure measures will be effective.

• Early development of closure plans can facilitate progressive reclamation activities during mine operations, helping to prevent pollution during operations and reducing costs at closure.

• Designing a mine for closure should be an underlying theme in the design, implementation and management of all aspects of a mine throughout the mine life cycle, including those aspects related to ARD potential, such as waste rock and tailings.
Characterization of Geological Materials

- The characterization of geological materials to be disturbed by the mine, including ore, host rock and overburden, is key.
- Detailed characterization should begin as early as possible since the potential for ARD and metal leaching will impact project economics at the feasibility phase and will be a key consideration in the planning phase.
- Characterization should include:
  - identification and description of all geological materials to be excavated, exposed or otherwise disturbed by mining.
  - prediction of ARD and metal leaching potential of all geological materials, including timing and conditions during which metal leaching and acidic drainage are expected to occur.
- Characterization and prediction work should continue throughout the mine operations phase and results can be used to verify earlier predictions and help refine mine waste management plans.
Waste Rock and Tailings Disposal Planning

• Characterization informs planning of waste rock and tailings disposal
• Prevention and control of ARD and metal leaching should be primary considerations in this planning
• Waste rock and tailings management facilities can have major design, operational and reclamation implications at many mines and should be designed to minimize environmental risks
• Effective methods for preventing and controlling ARD and metal leaching from waste rock and tailings management facilities include:
  – limiting the production of waste with ARD or metal leaching potential
  – preventing or limiting the availability of oxygen to the acid-generating material by use of water covers or dry covers
  – blending potentially acid generating material with neutralizing materials
  – segregating potentially acid generating or metal leaching material from other material to facilitate efficient management of this material
• In addition to recommendations directly related to the prevention and control of ARD and metal leaching from waste rock and tailings, the Code also presents a number of recommendations related to the design of waste rock and tailings management facilities, including:
  – selection of locations for waste rock and tailings management facilities
  – tailings management facility design
  – design of containment structures for tailings management facilities
  – long-term stability of waste rock and tailings management facilities
Waste Rock and Tailings Management during Mine Operations

- Emphasis for waste rock and tailings management during mine operations shifts from planning to the implementation and ongoing review of tailings management practices.
- Monitoring of all aspects of performance of waste rock and tailings management facilities is essential to ensuring that the facilities are performing as designed.
- Site-specific waste rock and tailings monitoring programs:
  - verify predictions made during the mine planning phase and continue characterization work
  - evaluate the effectiveness of measures that have been implemented to prevent and control ARD and metal leaching
  - identify potential surface seeps and groundwater contamination
  - assess whether other features of the facilities, particularly containment structures, are performing as designed
Waste and Water Management at Mine Sites
For more information

The Environmental Code of Practice for Metal Mines is available for download at:

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