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Ministry of Environment

Approach to Mine Risk Assessment and Risk Management under the *Environmental Management Act*

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Key topics

- Approaches to remediation under the *Environmental Management Act* (EMA) and the Contaminated Sites Regulation (CSR)
- Remediation liability provisions
- Site-specific examples
  - Trail
  - Sullivan mine
- Selected projects underway

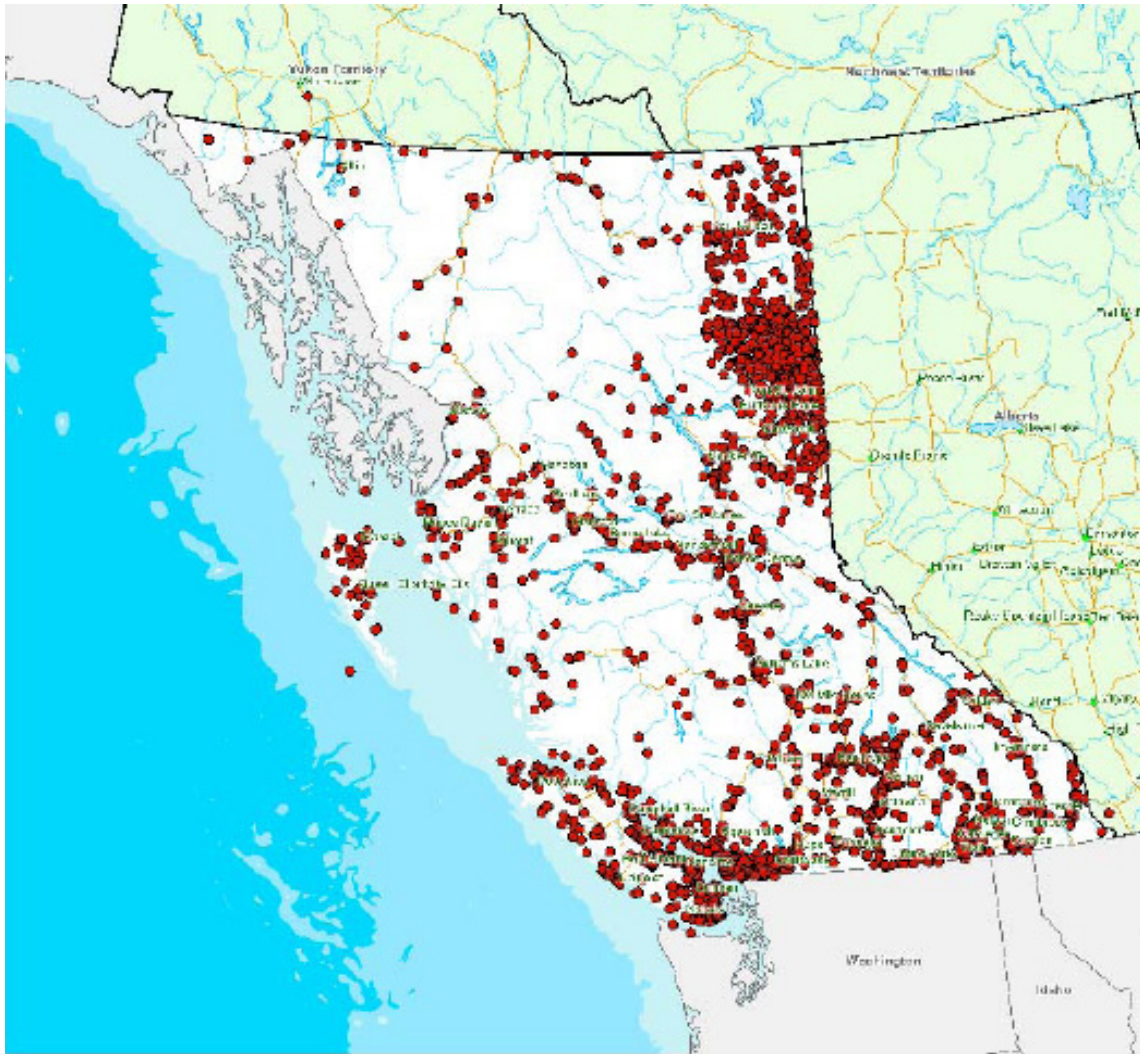
Legal regime

Key features of legislation and regulation

- Staged identification, assessment and cleanup provisions
- Tools for access to site information
- Cost recovery fees to offset our costs
- Flexible, scientifically-based standards
- Extensive rules on liability
- Guidance on independent remediation
- Requirements for offsite migration
- Reliance on Approved Professionals

Sites on the Site Registry

9366 sites as of June 2008



Routes to remediation (2007-08)

60% of sites cleaned up independently

Process	Instruments Issued	Number of Sites Remediated	Number of Sites Undergoing Remediation
Ministry/ Approved Professional	Certificate of Compliance	126 (35 risk-based)	N/A
Ministry/ Approved Professional	Approval in Principle	N/A	27
Independent remediation		192	334
Total for category		318	361

Environmental quality standards

- Numerical standards in soil, water, sediment
  - Are concentrations of substances
  - Define when a site is contaminated
  - Define when remediation by contaminant removal is satisfactory
- Risk-based standards
  - Hazard index ≤ 1 for non-cancer endpoints
  - Human lifetime cancer risk ≤ 1/100,000
  - Only used as remediation standards
  - Contaminants not removed
  - Site remains contaminated after remediation

Risk-based remediation standards

- Often used for large-scale sites where contaminant removal is not practical
- Two approaches to establishing standards
  - Default risk-based standards (CSR section 17)
  - Alternate risk-based standards recommended by local Medical Health Officer (CSR sections 18 and 18.1)
    - Developed through a community-based consultation process
    - Recommended to Director of Waste Management
- Releases available for natural background levels of substances

Types of risk assessment allowed

- Deterministic
  - Most common
  - Uses point estimates for variables
- Screening level
  - Adopted in August 2008 in Protocol 15
  - Includes simplified evaluation of exposure pathways and receptors
- Stochastic (probabilistic)
  - Uses distributions for variables
  - Used twice – Wells and Trail

Use of risk-based standards in B.C.

Fiscal Year	Risk-based Certificates	Total Certificates	Percent Risk-based
2004	12	97	12%
2005	21	108	19%
2006	9	93	10%
2007	26	96	27%
2008	35	123	28%
Total	**103**	**520**	**20%**

Remediation liability

- Polluter pays principle
- Cleanup costs to be paid by those causing contamination
- Based on National policy – 1993 Canadian Council of Ministers of the Environment
- Similar approach implemented throughout U.S. and Canada
- Wide liability net approach followed by many exemptions

EMA Responsible persons

- Current or previous owner or operator
- Producer of a substance
- Transporters of a substance
- Above if source of substances migrating offsite

EMA Persons not responsible

- Acts of God, acts of war
- Over 20 exemptions unless contamination is caused
- Sureties
- Insurers and insurance brokers
- Secured creditors
- Receivers, and receiver managers
- Trustees, executors

Provisions in EMA for mines

- Part 5 has provisions specific to core and non-core areas of mines
  - Exploration and advanced exploration sites
  - Producing and past producing mine sites
  - Historic mine sites
- Provisions address
  - Responsibility for remediation
  - Ability of EMA Director to issue Orders
  - Security and fees
  - Indemnification and transfer agreements

Provisions in EMA for mines

Transfer agreements

- Written agreements between the Chief Inspector of Mines and the Director of Waste Management
- Extinguish the remediation liability of previous owner
- Administrative procedures being developed with Ministry of Energy, Mines and Petroleum Resources
- High risk sites may not be eligible

Provisions in EMA for mines

Indemnification

- Provided pursuant to the *Financial Administration Act*
- Remediation liability of previous owner under Part 4 of EMA extinguished
- Rarely used for contaminated sites in B.C. (including mines)
- Government normally does not wish to become involved in private business transactions

Different statutory liability schemes

Mines Act

- Current owner's liability for reclamation of a mine is extinguished when a permit is transferred to a new owner

Environmental Management Act

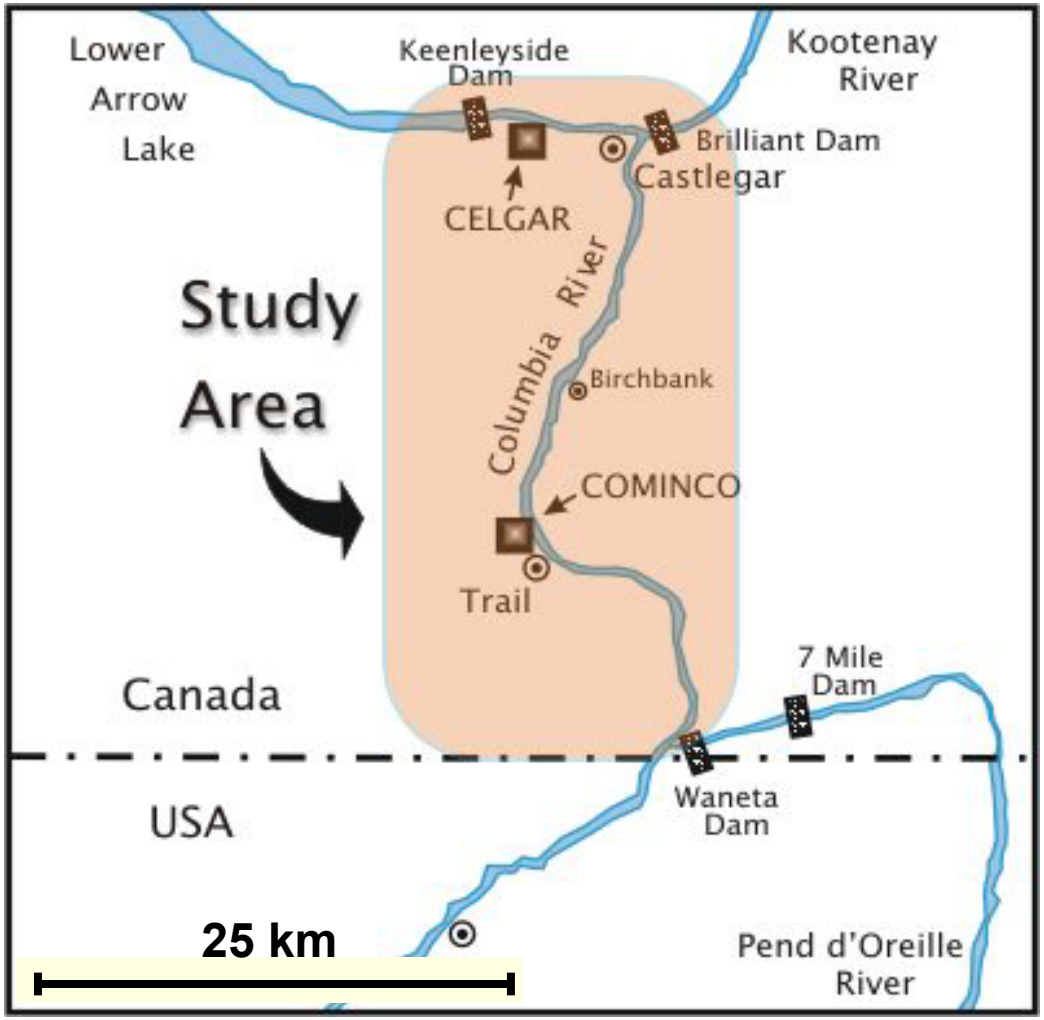
- Current owner's liability for remediation of a site is not extinguished when a site is sold to a new owner except under Part 5

- Seeking to synchronize these approaches for all sites

Remediation liability review

- 14th remediation liability principle adopted by Canadian Council of Ministers of the Environment (CCME) in 2006
- Deals with liability transfer between sellers and buyers of land
  - Idea is to extinguish the liability of sellers
- Contract to obtain options for incorporating the principle under the *Environmental Management Act* completed
- Grant to the B.C. Chapter of the National Brownfields Association provided
  - Stakeholder consultations underway

Trail contamination



Trail contamination – early years

- 1896: Trail smelter operations commence
- 1940s: regulatory control of stack emissions
- 1940s-1990s: stack emissions decrease
- 1975-1988: Federal blood lead guidelines decrease (40 to 10 µg/dL)
- 1988: about half of Trail children have blood lead levels > 10 µg/dL
- 1990s:
  - Task force formed to address community lead exposure
  - Teck Cominco initiates Trail human health and environmental risk assessments

Trail risk assessments – human health

- 90% of Trail children blood lead < 10 µg/dL
- Blood lead average for children < 5 µg/dL
- Lead risks to be managed by Medical Health Officer
- Other metals (arsenic, cadmium . . .) risks to be reviewed by ministry
- Stochastic risk assessment underway
  - Reviews multiple pathways of exposure, e.g. garden vegetables, fish, soil
- Remediation strategies to be proposed

Trail risk assessments – ecological health

- Terrestrial and aquatic components
- Remediation planning underway
  - Expect implementation of wildlife habitat management plan instead of contaminant management plan
  - Would be developed by multistakeholder process
  - Anticipate greater benefits with lower costs

Sullivan mine risk assessment

- Mine decommissioned
- Contamination mainly affects ground- and surface water
- Several severely impacted creeks
- Source is acid rock drainage from waste rock
- Typical risk management strategy
  - Pump and treat contaminated groundwater
  - Maintain cover
  - Monitor the site

Selected projects underway

- Proposed CSR amendments
  - New wildlands use definition and standards
  - New vapour standards
  - Standards for barium and salt
- Brownfields renewal strategy
  - Announced late February 2008
  - Interagency project with Ministry of Agriculture and Lands leading
- Science Advisory Board
  - Recommendations for detailed ecological risk assessment guidance

For more information

- Use our e-mail address for general queries

  site@gov.bc.ca

- Check out our web site

  www.env.gov.bc.ca/epd/remediation/
  (or Google "BC contaminated sites")

- Consult the staff contact list on our web site

- Join our CS e-Link mailing system

- Attend our 3rd annual workshop next spring

Thank you!

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