Orphaned/Abandoned Mines
Quick Facts on British Columbia

- 4.5 million population
- 950,000 sq.km on west coast of Canada; fourth largest province; about the size of Japan and Vietnam combined
- Borders the Pacific Rim
- Parliamentary system of government
- Liberal (majority) government; held power since 2001
- 2010 gross domestic product: C$200 Billion (12% of Canadian economy)
### Jurisdictional Authority in Canadian Federation

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<thead>
<tr>
<th>Federal</th>
<th>Provincial</th>
<th>Federal/Provincial</th>
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<tr>
<td>Foreign Policy</td>
<td>Health</td>
<td>Agriculture</td>
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<td>National Defence</td>
<td>Education</td>
<td>Employment</td>
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<td>Criminal Law</td>
<td>Social Welfare</td>
<td>Housing</td>
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<td>Citizenship</td>
<td>Property and Civil Rights</td>
<td>Environment</td>
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<td>Immigration</td>
<td>Natural Resources</td>
<td>Economic Development</td>
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<td>Trade</td>
<td>Local Affairs</td>
<td>Income Security</td>
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<td>Aboriginal Issues</td>
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<td>Justice</td>
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<td>Indirect Taxation</td>
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<td>Transportation</td>
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<td>Communication</td>
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<td>Direct Taxation</td>
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As mineral production values rose to over $8.6 billion in 2011, provincial mineral tax revenue increased sevenfold from $50 million in 2001 to over $357 million in 2011.
In addition to the 12,600 direct mining jobs, there are 17,000 jobs in the minerals sector in exploration, smelting, refining and mineral processing. Average annual compensation in the mining sector exceeds $11,000, making it one of the highest-paying industries in B.C.
The British Columbia Crown Contaminated Sites Program (CCSP):
- looks at more than mine sites, but
- 90 percent of the focus is on the identification and remediation of historic mine sites

Public safety related to mining hazards is managed by BC’s Ministry of Energy and Mines

CCSP complies with the *Environmental Management Act* and Contaminated Sites Regulation

Goal is to manage risks to human health and the environment
The Crown Contaminated Sites Program (CCSP)

- 2002 Auditor General’s report
- Three key recommendations:
  1. lead agency
  2. information
  3. accountability
- The CCSP established in 2003
What is Required to Implement an Orphaned/Abandoned Mine Program?

- Lead Agency
- Funding and resources
- Regulatory structure
- Operational policy
- Process to identify and prioritize sites
- Data management
- Reporting for accountability
Lead Agency

• The Ministry of Forests, Lands and Natural Resource Operations

- Crown land manager  (94% of land in BC is Crown owned)
- Delivers Crown Contaminated Sites Program
  – Identify, prioritize and remediate sites based on risk to human health and the environment
  – Historic contaminated sites (past industrial uses)
  – No identifiable responsible person
  – Crown land
Funding and Resources

- Crown Contaminated Sites Program is wholly funded by the provincial government.
- The province has committed approximately $237 million to the program since 2001.
- Program consists of only 5 staff members.
- High utilization of professional environmental consultants to undertake site investigations, evaluations and remediation.
Staff Resources
Utilization of Consultants

- Agreement (Standing Offer) with top environmental consulting firms in BC to provide services to CCSP
- First initiated in 2006
- Re-issued in 2012 with a 2 year renewal option
- 4 consulting firms to provide environmental investigation and remediation services
- 3 consulting firms to provide risk assessment services
### Program Funding

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<th>Year</th>
<th>Amount</th>
<th>Year</th>
<th>Amount</th>
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<tbody>
<tr>
<td>2001</td>
<td>45.9 million (Britannia)</td>
<td>2007/08</td>
<td>24.1 million</td>
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<td>2003/04</td>
<td>400,000</td>
<td>2008/09</td>
<td>28.5 million</td>
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<tr>
<td>2004/05</td>
<td>26.0 million</td>
<td>2009/10</td>
<td>7.8 million</td>
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<tr>
<td>2005/06</td>
<td>21.6 million</td>
<td>2010/11</td>
<td>4.8 million</td>
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<tr>
<td>2006/07</td>
<td>23.1 million</td>
<td>2011/12</td>
<td>4.1 million</td>
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Values in Canadian dollars
Average over almost 10 years is $16 M/year
Recognizing Liabilities

- Environmental liabilities for contaminated sites are recognized by the BC Provincial Government when:
  - Site resides on Crown land
  - No responsible person can be identified or exists
  - Site presents a high risk to human health and/or the environment

- CCSP reports out according to General Accepted Accounting Procedures (GAAP) – Crown’s liabilities are booked if it is determined to be a Crown Responsibility and the liability can be accurately quantified.
The Ministry of Environment
- Enforces *Environmental Management Act (EMA)* and Contaminated Sites Regulation (CSR)
- The *Environmental Management Act* casts a relatively wide net of liability for contaminated sites remediation in identifying responsible persons
- The Law provides a prescriptive process for site investigation and remediation based on numeric standards and end land uses.
- Based on ‘Polluter Pay Principle’
- This legislation applies to all Crown land in the Province
Operational Policy

- Developed with interagency government committee
- Outlines a risk-based framework for a coordinated and consistent approach
- Provides guiding principles
Provincial Contaminated Sites Committee

- Ministries with resource management responsibilities for Provincial lands, and those with a related central agency role
- Chaired by Ministry of Forests, Lands and Natural Resource Operations
- PCSC provides input into the development of various Program components, such as Policy
- Annual meetings
Process to Identify and Prioritize Sites
Coarse Filter

- Long list of potential sites is screened using consistent approach with readily available information

Site ID and Status

- Confirm site meets Program requirements

Modified PSI

- Modified Preliminary Site Investigation conducted

Risk Ranking

- Sites are ranked using site-specific data (preliminary and detailed) & expert workshop process

Detailed Site Investigation & Risk Assessment

- Advance site to more detailed study and risk assessment to decide if remediation is merited

Plan Remediation & Implement

- If merited, plan and implement remediation (with regulatory and stakeholder input)

CCSP Site Identification, Prioritization and Evaluation
CCSP Site Identification, Prioritization and Evaluation

Outcome: Remediated sites
Data Management
Crown Contaminated Sites Database

- Consolidated repository of information for management, accountability and reporting
- Planned integration with other land management systems
Reporting

- Annual Financial Report
- Biennial Report
- Website

http://www.al.gov.bc.ca/clad/ccs
# Program Accomplishments

<table>
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<tr>
<th>Performance Measure</th>
<th>2010/11</th>
<th>2011/12</th>
<th>2012/13 Target</th>
<th>2013/14 Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Program sites where remediation is underway or completed</td>
<td>77</td>
<td>82</td>
<td>87</td>
<td>92</td>
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Lessons Learned

• Attracting and retaining experienced & competent program staff is a challenge
• Funding is critical but is uncertain each fiscal year based on Government priorities
• Contaminated sites remediation is almost always more complex and costly than first projected
• Changes in regulatory standards provides challenges as well as increased regulatory oversight
Lessons Learned

- Consult with stakeholders and First Nations (aboriginals) early and often
- Continue to be innovative in program delivery including the use of technology
- High quality consultants are imperative for program delivery
- Remember that sites need to be monitored and managed post remediation (need $)
- Demonstrate real progress to your political masters
Emerald Glacier - Mill and Tailings

Former silver mine (+Au, Pb, Zn, Cu, Cd), 80 km west of Houston

As, Cd, Cu, Pb, Zn in tailings and waste rock, leaching/eroding to wetland/creek

Liability: $1M
Former silver mine near Altin. Recreational use + Woodland Cariboo

Main adit, mill bld, tailings and settling ponds.

- Contamination mainly very high As and Pb, plus leachable Cd and Zn in soil
- No groundwater issues
- Most surface water infiltrates into ground
Former coal loading facility for Cumberland mines, Vancouver Island
- Waste coal pile of 1 million cubic metres
- on the shore of Baynes Sound, south of Courtenay
- ARD/ML issue – pile is generating acid and leaching metals into foreshore environment (shellfish harvesting)
- Capping is proposed solution
  Total cost: $60 to $100 M
Bralorne-Takla Hg Mine

37 km northeast of Takla Landing

Mined & processed mercury 1943-44
Shaft, headframe, equipment and calcines remain. High Hg & As in soils.

Significant First Nations consultation

Liability booked: $3.7M
Yankee Girl Mine Tailings Project
Before and After
Britannia Mine Water Treatment Plant
Questions?

Website
http://www.al.gov.bc.ca/clad/ccs

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