

BRITISH COLUMBIA CROWN CONTAMINATED SITES PROGRAM OVERVIEW

Gregg Stewart, P.Geo.
Heather Johnstone, P.Eng.

Crown Contaminated Sites Branch
Ministry of Agriculture and Lands
PO Box 9373 Stn Prov Govt
Victoria, B.C. V8W 9M3

ABSTRACT

This paper is an overview of the British Columbia Crown Contaminated Sites Program, which addresses historic¹ Crown contaminated sites, including historic mine sites. It reports on Crown Contaminated Sites Program components and current priorities and initiatives. Since the Program's inception in 2003, all of the recommendations in an Auditor General's audit report have been substantially addressed regarding management of Crown contaminated sites in British Columbia. The Program has been allocated a three-year (2007 to 2009), \$47.2 million budget.

INTRODUCTION

The Province established the Crown Contaminated Sites Program (CCSP) in 2003 in direct response to the Auditor General's report, *Managing Contaminated Sites on Provincial Lands, 2002/2003: Report 5*. This 2002/2003 audit assessed whether the Province had: established an adequate governance framework; gathered appropriate information to develop management plans and to support resource allocations; and accounted adequately for its overall performance. The Auditor General recommended that the Province:

1. **Identify a lead ministry** to oversee a government-wide framework for managing its Contaminated Sites.
2. Ensure that the **information** needed to develop sound site management plans is obtained, and that management plans are developed and used as the basis for making resource allocation and funding decisions. This process should include a **province-wide prioritization of Contaminated Sites** to guide the allocation of scarce funds to where they will achieve the greatest reduction in risk.
3. Establish a **management accountability framework** for its Contaminated Sites that requires the disclosure of financial liabilities, expenditures and information about the accomplishments of its management of Contaminated Sites.

¹ "Historic Contaminated Site"— a contaminated site that is not being managed or regulated by the Province, under an approval, permit, or other authorization and where no responsible person can be identified.

The Ministry of Agriculture and Lands (MAL), through the Crown Contaminated Sites Branch (CCSB), is the lead ministry that the Auditor General called for to “oversee the development and implementation of a comprehensive and coordinated government-wide policy framework for management of its contaminated sites.” MAL, the Crown land owner, and other provincial ministries are subject to the provisions of the *Environmental Management Act (EMA)*. The Ministry of Environment ensures that these provisions are enforced on private and public land.

British Columbia does not have a stand-alone orphaned/abandoned mines program as do some other provincial jurisdictions. Through the CCSP, CCSB addresses historic mine sites and other types of contaminated sites such as landfills and pulp mills.

Orphaned and abandoned mines are a large subset of the current provincial contaminated sites inventory and rank as one of the higher-risk industrial categories in terms of potential human health and environmental impacts related to metals in the environment. Estimates from the Auditor General suggest that there are more than 2,000 known or potential Contaminated Sites in B.C.² The number of these sites that are a Crown responsibility is unknown.

Since 2001, the Government of British Columbia has committed more than \$116 million for the management of the Province’s contaminated sites. An additional \$48 million has been allocated to the program for fiscal years 2007–2009.

CROWN CONTAMINATED SITES PROGRAM INITIATIVES

Program Policy

The government’s approach to managing historic Crown contaminated sites is guided by the Management of Provincial Contaminated Sites Policy. The Policy responds to the issues raised in the 2002 Auditor General’s report, and it outlines a risk-based framework for a coordinated and consistent approach. This policy framework was developed with the assistance of the Provincial Contaminated Sites Committee, and is built on the experiences of other jurisdictions including Canada, the United States, Great Britain, Australia and New Zealand.

The Policy, approved by Cabinet in 2004, is currently undergoing revisions to reflect experience gained since the inception of the CCSP and to reflect changes in government organization.

The following guiding principles underlie the Policy and reflect a systematic approach to managing contaminated sites that is based on science and fiscal and performance accountability:

² Office of the Auditor General of British Columbia. 2002/2003 Report 5: Managing Contaminated Sites on Provincial Lands. ISBN: 0-7726-4869-7

1. Apply Provincial Standards and a Risk-Based Approach

- Where possible, reduce and eliminate risks to human health and the environment, and minimize legal and financial liability associated with contaminated sites.
- Apply risk-management and remediation standards that are in keeping with the *EMA* and the Contaminated Sites Regulation (CSR). Manage sites in a cost-effective and consistent manner based on available resources and with consideration for current and future site use.

2. Apply the “Polluter Pays Principle”

Under this international principle adopted with the *EMA*, users and producers of contamination should bear the responsibility for their actions and pay for the costs they impose on society.

3. Encourage Consultation and Co-operation

Manage contaminated sites co-operatively across ministries and involve consultation on a case-by-case basis with stakeholders and First Nations.

4. Ensure Consistency and Fairness

Develop processes and standards to ensure consistency and fairness.

5. Ensure Accountability and Transparency

Ensure the accountability and the transparency with which contaminated sites are managed and reported.

6. Consider Innovative Strategies

Pursue innovative strategies for managing contaminated sites, e.g., Public-Private Partnerships (P3s).

7. Promote Prevention of Contamination

Support the development of ministry-specific operational policies to minimize the creation of future contaminated sites and associated liabilities.

8. Adhere to Sound Science

Ensure that defensible science and technology guide the management of contaminated sites.

Provincial Contaminated Sites Committee

The cross-ministry Provincial Contaminated Sites Committee (PCSC), formed in July 2003, has representation from ministries with ownership and management responsibilities for provincial lands, and those with a related central agency role. It provides input into the development of the various Program components, such as the Management of Provincial Contaminated Sites Policy and the Crown Contaminated Sites Database.

The PCSC ensures a government-wide perspective and consistency and coordination among relevant provincial ministries. At present, the PCSC has representation from the following ministries and organizations:

- Labour and Citizen's Services – Accommodation and Real Estate Services;
- Attorney General;
- Energy, Mines and Petroleum Resources;
- Finance – Risk Management Branch;
- Forests and Range;
- Transportation;
- Agriculture and Lands (PCSC Chair); including the Integrated Land Management Bureau;
- Office of the Comptroller General;
- Crown Agencies Secretariat; and
- Treasury Board.

The PCSC meets on a quarterly basis.

Site Prioritization

Investigation and physical remediation of Crown Contaminated Sites is guided by the provisions under the *EMA* and *CSR*, which are based on the *Polluter Pays Principle*, and lays out a fairly prescriptive process for addressing and managing contamination and is based on the source-pathway-receptor model. The legislation also prescribes the assignment of liability. Therefore the Government of British Columbia will only expense public funds on those sites where no responsible person can be found and the site in many instances has escheated to the Crown.

Choosing and evaluating contaminated sites involves a number of steps to determine whether and how the work should be undertaken. Once a site is identified, its proximity to sensitive environments is gauged and evaluation of risk to human and environmental health determined. The objective of this process is to ensure that public funds are used only on those sites that present the highest risk to human health and the environment. The step-by-step process includes (see Figure 1):

1. **Candidate Site Identification** – PCSC members identify known contaminated sites as candidate sites. CCSB has also developed a ‘coarse filter’ tool that uses the existing Historic Mine Sites Atlas developed jointly by the Ministry of Energy and Mines and Petroleum Resources and Environment Canada. This geo-referenced mine sites database uses several criteria, including tonnage mined, acid rock drainage potential and proximity to sensitive environments, i.e., fish-bearing streams and human drinking water sources, to identify potentially high-risk sites.
2. **Ownership Evaluation** – Since the Province can only take on sites that are Crown responsibility, a preliminary assessment is conducted to verify land ownership and responsibility for historic contamination.

3. **Modified Preliminary Site Investigation (PSI)** – A Modified PSI is very similar to the prescribed Stage 1 and Stage 2 PSI under the CSR. This includes data collection that provides a comprehensive background summary of the site which is used to identify the location and types of contamination as well as soil, groundwater, surface water, and/or sediment samples are collected for analysis. A risk-assessment approach, however, will be utilized in assessing source contaminants, pathways and receptors.

The results from the Modified PSIs will be input to the Risk Ranking Support Tool that is being developed specifically for the CCSP to determine which identified sites present the highest risk to human health and the environment. These sites are then classified as priority sites.

4. **Detailed Site Investigation (DSI)** – A DSI is completed on those areas of the site that have been confirmed as areas of environmental concern and that contain contaminants in concentrations greater than allowable standards. During this step, the magnitude of the contamination is identified.
5. **Risk Assessment** – This step involves assessing the risks to human health and the environment.
6. **Reconfirming Crown Responsibility** – Before any site remediation begins, the Attorney General's office will review relevant information and assist in confirming the Crown's responsibility for site clean up.
7. **Site Remediation** – The action plan for site remediation is developed. This can include removing the contamination from the site or leaving it in place in such a way that it does not pose any health or environmental risks. In-situ remediation methods can include covering contaminants, cutting off pathway of transport into the environment and water treatment.
8. **Site Monitoring** – Monitoring is an important and essential follow up to site remediation. After each data-collection step, i.e., PSI, DSI or risk assessment, a site is re-evaluated to assess the level of risk it poses to human health and the environment. If the results of the investigative work confirm that the level of risk is low, or that the site is not among the highest risk priority sites, no further immediate work is conducted at the site. This continuous risk evaluation ensures that public funds are used only on high-risk sites.

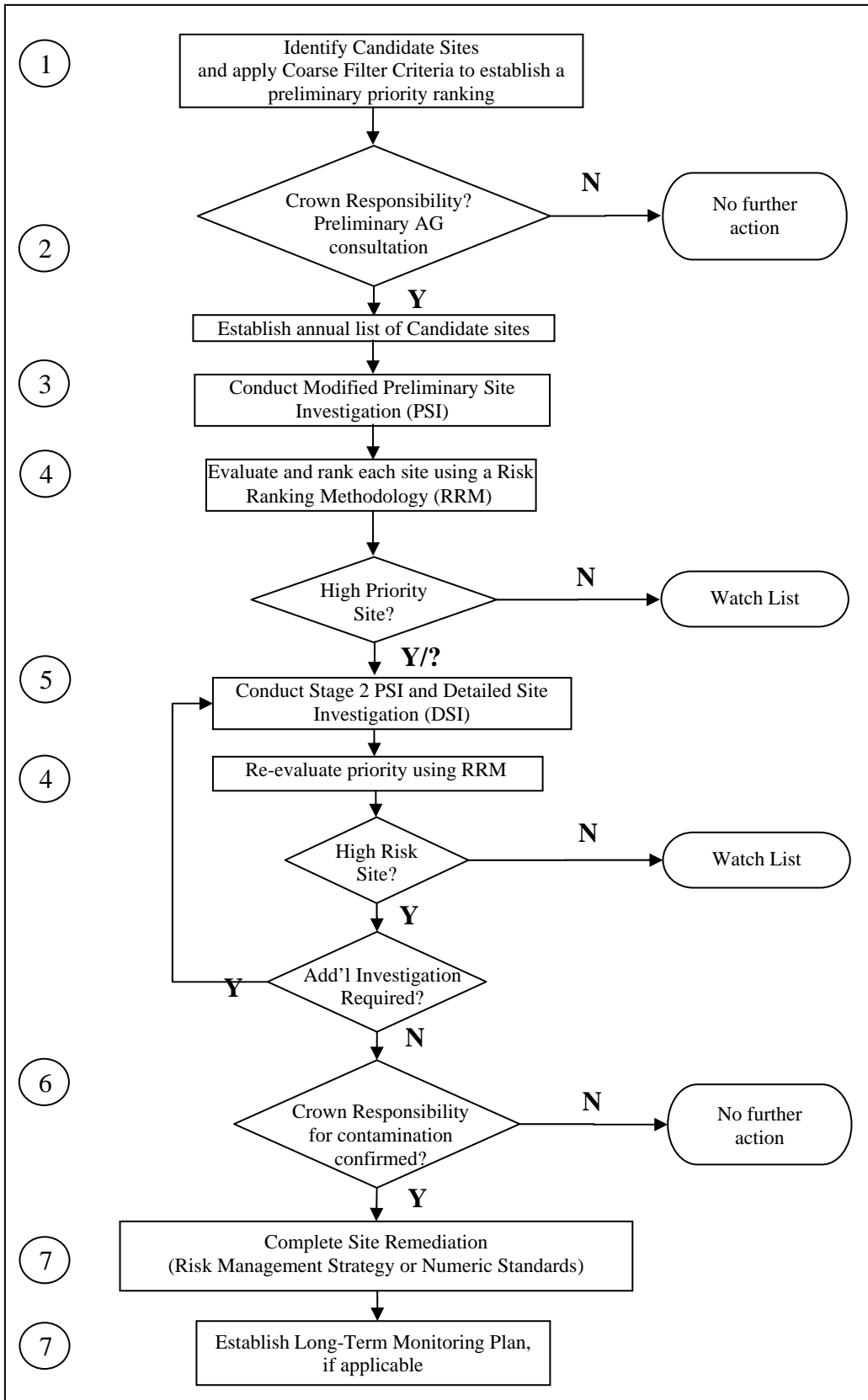


Figure 1: Generalized Steps for Prioritizing and Evaluating Contaminated Sites

Data Management and Site Inventory

The Crown Contaminated Sites Database (CCSD) was created in 2004 in response to the Auditor General's recommendation to develop needed information and to minimally serve as a repository of information for accountability and reporting purposes. The current CCSD project focus is on further development, enhancements, and cross-government procedures and inventory and data uploads that will result in a functional management tool that is populated with cross-government information.

The CCSD is intended to encompass information on both historic and other Crown contaminated sites, with information and input from ministries represented on the Provincial Contaminated Sites Committee.

Underlying the overarching goal to provide a functional consolidated repository of information are the following objectives, which relate to the CCSD serving as Crown contaminated sites management tool:

- Inform the contaminated sites prioritization process
- Quantify (risk) and characterize sites, which relies on processes external to the CCSD
- Provide (validated) CCSD land resource information to other land management systems, such as the Integrated Land Resource Registry (ILRR)
- Track government liabilities
- Inform land allocation decisions, e.g., treaty land negotiations

Priority Remediation Projects

Significant program successes where remediation has been completed include the Pitt River landfill and the Goose Bay Cannery. The Pitt River landfill, located northeast of Vancouver about 72 kilometres from Pitt Meadows, was a permitted facility for logging operations from 1978 until it closed in 1991. The natural flow of the river resulted in the landfill materials being eroded along its banks and downstream of the site. The upper Pitt River, located in close proximity to metropolitan Vancouver, is a significant salmon spawning river and a popular destination for fly fishers and wilderness tourists.

Due to the active riverbank erosion, it was determined that complete excavation was needed because of the significant environmental threat caused by the loosening debris. Barges were used for the cleanup operation, and they traveled across Pitt Lake to both dispatch equipment to the site and to bring back tonnes of garbage from along the riverbank. A separate contract was issued to remove debris that had floated downstream prior to the cleanup operation. The site cleanup was completed in November 2005. The debris was taken to an approved waste facility in the Lower Mainland. The excavation was backfilled with clean fill material, and an erosion barrier was constructed. Vegetation was planted in the spring of 2006 to further stabilize the riverbank.

A historic fishing destination and former cannery at Goose Bay underwent a cleanup in September 2005. Located 100 kilometres south of Bella Bella and 483 kilometres north of Vancouver, Goose Bay was the site of many a fishing expedition with a base camp situated on a foreshore water lot. The site was leased to a number of companies from 1973 to 2002.

By 2004, the abandoned fishing camp, cannery and rundown wharf were dilapidated. A preliminary site investigation revealed a toxic mix of heating oil, asbestos, polychlorinated biphenyls, solvents, flammable liquids, lead acid batteries, propane cylinders and drums containing aerosols and other hazardous materials littering the site. CCSB conducted the cleanup of the area to protect the safety of the marine environment. This included removal and disposal of all hazardous materials, which were disposed of in a safe and environmentally friendly manner at five approved disposal sites.

Significant progress has been made on key sites such as Britannia Mine near Squamish, Pacific Place, located on the former Expo lands in Vancouver, the Yankee Girl mine in the Kootenays, and the Malakwa landfill site on the Eagle River east of Sicamous.

The Britannia Mine Remediation – Water Treatment Plant, a P3 remediation arrangement, resulted in a successful project with EPCOR Water Services to design, build, finance, and operate a high-density sludge water treatment plant to treat acid rock mine drainage entering Howe Sound. It became operational in December 2005.

At the historic Yankee Girl mine tailings site near Nelson, B.C., tailings had eroded into a fish-bearing river over several years. A remediation plan to protect human health and the environment involved extensive study and an innovative solution including an in-stream erosion barrier and engineered cover that is scheduled to be completed in 2008. This project has involved public consultation through a series of public meetings and open houses.

Riverbank erosion exposed a history of landfill use that needed to be cleaned up along the Eagle River at the Malakwa waste disposal site east of Sicamous, B.C. Remediation work began in November 2005 after it was discovered the river was actively eroding old landfill materials which could pose a significant health and environmental threat as the waste erodes into the river.

The landfill site was used by area residents and commercial operators during the 1960s and early 1970s for the disposal of waste materials near the southern bank of the Eagle River. The site was closed in 1975 after the Columbia/Shuswap Regional District opened a new landfill facility.

The initial cleanup and riverbank stabilization was a joint effort between CCSB and the Department of Fisheries and Oceans Canada. Waste material along the banks of the Eagle River was excavated and removed, and the bank was replanted with stockpiled shrubs and undergrowth. Work on this project, which will involve source removal, will continue through 2007.

Detailed Site Investigation and Human Health and Risk Assessment work is ongoing at a number of priority Crown contaminated sites, and Modified Preliminary Site Investigation work is being undertaken at 20 historic mines sites over the 2007-2008 field season.

Reporting

Reporting on status, progress, and key indicators of the Program is a critical step in the response to the Auditor General's report. The CCSP's reporting responsibilities encompass annual financial reporting, a web-based presence, and a Program Biennial Report.

An Annual Financial Report provides liability and expenditure information to the Office of the Comptroller General (OCG) on an annual basis. The Crown Contaminated Sites Branch website provides online versions of all Biennial Reports, and the current status of the CCSP, including Candidate Sites, Priority Sites, sites investigated to date, site locations and historic uses, etc. Additionally, the website will provide ongoing access to links to related industry, government, and educational sites; legislation, policy, principles, frameworks, etc.; and CCSP contact information.

A Biennial Report on the state of the CCSP is scheduled to be published once every two years. The first Biennial Report was published in 2006. It provides an overview of principles, policy, process, governance, and legislation driving the CCSP and anecdotal, case study, and success story vignettes from province-wide experience. It also compares progress to other jurisdictions worldwide.

PROGRAM FUTURE

Since it was established in 2003, the CCSP has made significant progress in taking action on contaminated sites in British Columbia. Over the last six years, the Province has committed more than \$180 million for the management of Crown contaminated sites. An additional \$47.2 million has been allocated to the Program for 2007–2009. The source of these funds is direct government funding from general revenue.

With the government's commitment to a three-year program budget, the CCSB will continue to work with project partners to clean up contaminated sites and reverse the legacy of pollution left decades ago.

In its November 2004 follow-up report, the Office of the Auditor General of British Columbia reported on progress made after its initial recommendation to establish a central arm of government to provide clear direction and management of the Province's Crown contaminated sites. The three recommendations of the 2002 audit—to identify a lead agency to take on this work; to develop needed information, including a prioritized system to manage contaminated sites; and to establish an accountability framework—have been substantially implemented.

As contaminated sites are cleaned up and their value to human health and the environment is proven to the communities in which they're located, it is expected momentum will grow in continuing this valuable work.