

## **An Introduction to Contaminated Sites in British Columbia**

### **What is a contaminated site?**

In British Columbia, a contaminated site is defined as an area of land in which the soil or underlying groundwater or sediment contains a hazardous waste or substance in an amount or concentration that exceeds provincial environmental quality standards. A site is contaminated if it is unsuitable for specific uses of land, water and sediment.

Many sites in the province became contaminated during past industrial or commercial uses. Such activities often resulted in chemicals and other toxic materials being spilled or deposited on land. The most common substances found at sites in BC are heavy metals such as lead, arsenic, cadmium, and mercury. Organic chemicals, including benzene and toluene in gasoline, occur at about two-thirds of the sites. Chlorophenols are common at wood treatment operations, as are benzo[a]pyrene and naphthalene from creosote. Polychlorinated biphenyls (PCBs) often occur at sites where electrical equipment was used.

### **Why are contaminated sites a concern?**

Contaminants pose a threat to human health, the environment, and safety. Their potential effects on humans, for example, range from minor physical symptoms to life-threatening diseases such as cancer. Children are often most at risk from exposure to contaminated soil, air, water, and food. And even if a site does not pose a threat to people, it can still be an environmental hazard. Soil, water, and sediment at a site may

contain substances that can injure fish or mammals; impair the reproduction of birds; and accumulate in the food web. These effects can be severe enough to impair, or cause imbalance in, ecological functions or systems.

### **How many contaminated sites are there in British Columbia?**

Currently, there are over 9000 sites in the ministry's records. This number includes sites that are being screened and are not yet confirmed as being (or not being) contaminated; sites that are being cleaned up; sites that are awaiting final confirmation that cleanup is complete; and sites where cleanup is confirmed.

### **Why does the provincial government regulate contaminated sites?**

The impetus for creating a system to regulate and administer the investigation and cleanup of contaminated sites has come from several quarters. Stakeholders asked for a system that would:

- improve protection of human health, environment, infrastructure, and safety;
- enhance business certainty in land transactions;
- increase fairness in determining liability (amongst land owners and operators, financial institutions, and local governments);
- provide easy public access to information sites;
- minimize government involvement in site cleanups;

- provide formal certification of cleanups;
- use defensible, scientifically based standards; and
- involve public health officials to develop alternative health protection standards.

**How is contamination on Crown land managed?**  
 The Crown Land Restoration Branch in the Ministry of Agriculture and Lands manages identified high risk contaminated sites on provincial lands, to ensure protection of human health and the environment. The Program provides cross-government policy on site management; improves the store of information on provincial contaminated sites; and establishes a way for ministries and agencies to report their progress in dealing with the liabilities and risks posed by contaminated sites on Crown land. For more information, view the Program's web site at: <http://www.agf.gov.bc.ca/clad/ccs/>

**Who else is involved in the contaminated sites process in BC?**

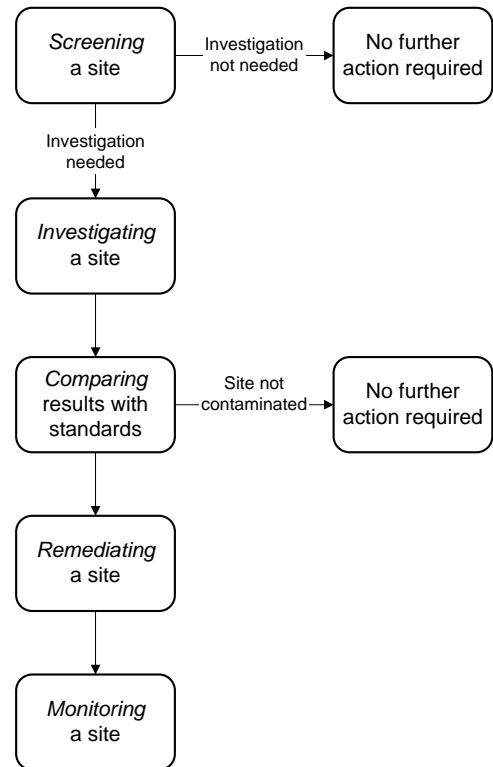
Many other parties play a role in the management of contaminated sites in the province. Examples include land owners and developers, provincial law makers and ministry staff, approved professionals and environmental consultants, lawyers, local governments, and scientific experts.

**What requirements has the provincial government put in place to regulate contaminated sites?**

The *Environmental Management Act* is the main law governing contaminated sites in the province. Brought into force in July 2004 (replacing the former *Waste Management Act*), it lays out standards for site identification, assessment, and cleanup ("remediation"). Other provisions are set out in the Contaminated Sites Regulation. It includes a system to streamline the cleanup of low and moderate-risk sites. The Ministry of Environment administers these legal requirements.

**What are the steps in investigating and cleaning up a site?**

The flow chart below shows the stages of the process for identifying, assessing, and cleaning up contaminated sites.



**Process for determining whether a site is contaminated**

**When does the ministry find out about a site that is, or might be, contaminated?**

There are several ways that potentially contaminated sites can come to the attention of the ministry:

- when a spill has occurred or a complaint of possible contamination is received;
- when a development application for land rezoning, demolition, soil relocation, or similar activity is received by a local government agency;

- when certain specific industrial or commercial land uses are known to have occurred on the site;
- when information is received about an independent cleanup taking place;
- when a property-related decommissioning or bankruptcy occurs, and
- when an application for a contaminated site service by the ministry is received.

In many cases, the requirement for a *site profile* is triggered.

**What is a site profile?**

A site profile is a screening form for identifying potentially contaminated sites. This summary is created from readily available information about a site, including a basic description and its past and present uses. The form is typically filled out by a site owner or a qualified consultant acting for the site owner. Based on the information provided, a site profile could trigger a site investigation.

**What is a site investigation?**

A site investigation is the key means of gathering information to determine if a site is contaminated. Land owners can have an investigation done without government involvement, but it should be carried out by experienced consultants. Under the contaminated sites legislation, the ministry’s Director of Waste Management can order a site investigation, prompted by a site profile or other information received.

Site investigations can be done in one or two stages. A *preliminary site investigation* involves searching existing records for information about a site, interviewing people who are or have been involved with the site, and determining the general location and degree of any contamination. If more information is needed, then a *detailed site investigation* is undertaken. In this case, investigators conduct more detailed work to

determine the location, extent, and impact of contamination. The information gathered is usually sufficient to develop a remediation plan, or a human health or environmental risk assessment. Sometimes both stages are combined.

Findings of these investigations are compared with environmental quality standards in the Contaminated Sites Regulation – the “measuring sticks” against which the presence of contamination by substances in soil, surface water, ground water, vapour and sediment is determined.

The ministry’s Director of Waste Management has the authority to order site investigations.

**What are environmental quality standards, and how were they developed?**

The contaminated sites legislation defines two general types of standards:

- *Numerical standards* are acceptable concentrations of substances in soil, surface water, groundwater, vapour and sediments.
- *Risk-based standards* are acceptable risk levels from exposure to substances at sites.

To meet stakeholders’ requests for flexibility, the ministry has provided five specific types:

- generic numerical standards and criteria,
- matrix numerical standards,
- site-specific numerical standards,
- Director’s interim standards, and
- default risk-based standards.

**Environmental quality standards are used to:**

- determine if a site is contaminated;
- determine when a site has been adequately cleaned up;
- determine when soil relocation may occur; and
- identify potential safety hazards.

## Process for cleaning up contaminated sites

### Once a site is known to be contaminated, who is liable to pay for the cleanup?

The *Environmental Management Act* casts a relatively wide net of liability for contaminated sites remediation. Individuals with potential responsibility might be, for example, current or former owners (including developers) of a contaminated site or of a site from which contamination migrated. Other potentially responsible individuals include those who produce or transport hazardous substances.

To achieve fairness, the legislation also provides many exemptions from liability. Among those exemptions are:

- a government body involuntarily acquiring ownership of contaminated land;
- a person who “innocently” acquired the land;
- a person whose site is contaminated only by migration from another site;
- a consultant assisting a developer in the remediation of a site, provided the consultant is not negligent;
- construction contractors and transporters of contaminated soil who did not contribute further to the contamination at a site; and
- secured creditors who act only to protect their financial interest and do not, in any way, cause or increase contamination.

### How clean should a contaminated site be after cleanup?

To be considered fully cleaned up, a contaminated site must meet the environmental quality standards set for the intended use of the site. Those remediation standards are, as described above, either numerical- or risk-based.

## Site Cleanup Success Stories

How well has contaminated site management in BC worked? The record speaks for itself. In the 20 years since first developing standards to deal with the Expo '86 site in Vancouver, there has been significant progress in cleaning up sites across the province. To date, well over 2000 sites have been remediated. Most of the cleanup work has taken place in areas of BC where industrial and commercial activity has been greatest.

Among the most high-profile contaminated sites now successfully remediated are:

- the Nexen site near Squamish;
- the Songhees site in Victoria; and
- the area below Vancouver's Oak Street bridge.

At the same time, the Crown Land Restoration Branch (part of the Ministry of Agriculture and Lands) has also achieved a number of milestones, including substantial progress in cleaning up the Britannia Mine site near Howe Sound, and Pacific Place (part of the lands occupied by Expo '86), located on False Creek in Vancouver.

When contaminated sites have good potential for redevelopment (once remediated), they're referred to as “brownfields.” Cleanup of these abandoned or underutilized commercial and industrial properties offers numerous public benefits to the community, the economy, and the environment.

A notable brownfield site currently undergoing redevelopment is the award-winning Dockside Green located near downtown Victoria. The project involves a mix of residential, commercial, and industrial use on the 11-acre property, and incorporates an extensive range of environmentally sustainable features. Dockside Green won the Canadian Urban Institute's 2005 Brownie Award recognizing leadership and innovation in brownfield redevelopment.

## What are the options for voluntary site remediation?

Once it is determined that a contaminated site requires cleanup, the site owner generally has a number of options for going ahead. These differ

according to the extent of involvement required by the ministry and by environmental consultants and according to the legal instruments required. One option does not require any ministry involvement. This is called “independent remediation.” Other options require increasing degrees of ministry involvement.

*Sites remediated without ministry involvement – independent remediation*

Independent remediation carried out in accordance with regulations is allowed, as long as the ministry is notified at the start and at the completion of remediation. At many sites, remediation may be routine, the risks posed by the site low, and methods of treatment readily available. With the assistance of capable environmental consultants, such a site can be remediated with very little involvement of the ministry.

With environmentally responsible care by site owners, independent site cleanups are practical and sensible. About 55% of the sites being cleaned up in BC are handled this way.

***Sites remediated with ministry involvement – the ministry process***

Option 1: Submission to ministry by Approved Professional – Applications for ministry services for low and moderate risk sites (such as an application to receive a Certificate of Compliance) must be submitted by an Approved Professional. About 25% of sites being cleaned up in BC are handled this way.

Option 2: Submission to ministry requesting external contract review – In limited cases, the ministry may contract out report reviews externally to qualified consultants. About 5% of site cleanups are handled this way.

Option 3: Submission to ministry for direct ministry review – For high risk sites and sites where risk-based standards are used, the ministry must conduct the review directly. About 15% of cleanups are handled this way.

**Initiating and approving remediation**

There are several options for initiating remediation. A person may request an Approval in Principle of a remediation plan or a Voluntary Remediation Agreement to obtain ministry approval of the conditions required to address contamination.

When a person does not voluntarily remediate a site, a remediation order can be issued by a Director. This could occur if contamination is severe or the person found liable will not agree to responsibility or to carrying out remediation requirements. At high risk orphan sites or other sites where environmental or human health is seriously threatened, the Minister may order remediation. The legislation also provides for access to funds for orphan site cleanup.

**What steps are taken to ensure that a site meets the remediation standards after cleanup?**

For sites being cleaned up to meet numerical remediation standards, post-cleanup sampling and analyses are obtained to ensure that the contaminants have been removed and that the residual soil, water, and sediment meet the applicable standards.

For sites being cleaned up to meet risk-based standards, post-cleanup inspections and regular environmental monitoring are carried out to check that exposure to substances remaining in place is reduced and satisfies the applicable remediation standards.

**Are there any regulations for the relocation of contaminated soil?**

Yes, Contaminated Soil Relocation Agreements regulate the movement of soil from contaminated sites, taking into account the soil quality and environmental conditions at the deposit site.

**What services does the ministry offer in dealing with contaminated site cleanups?**

The ministry offers clients a range of services related to managing and regulating contaminated sites. Clients may apply for services such as:

- site investigation report and remediation plan reviews;
- determinations whether or not a site is contaminated;
- Approvals in Principle of site remediation plans;
- Certificates of Compliance for cleanups to remediation standards;
- Voluntary Remediation Agreements; and
- Contaminated Soil Relocation Agreements.

The province uses a fee for service approach in providing these services.

**How can you get information about specific contaminated sites?**

The ministry's Site Registry documents milestones in the screening, identification, and cleanup of all sites in the province's records. Information gathered since 1988 is accessible to the public. The Site Registry is *not* a registry only of contaminated sites. Some sites on file are contaminated, but most are simply being investigated and require little if any cleanup, or they have already been cleaned up to provincial standards.

To get information about a particular site, search the Site Registry through BC OnLine ([www.bconline.gov.bc.ca](http://www.bconline.gov.bc.ca)). The Site Registry

*User's Guide* is also available on BC OnLine's web site. As well, ministry staff will perform a search if requested. If you wish to obtain site information that is available in paper records or on other databases, ministry staff can also get that for you through the Site Information Request process.

**What other information is available?**

Extensive information about contaminated sites in BC is available from the ministry in a number of different forms, including fact sheets, policies, procedures, protocols, and guidance documents. Visit the ministry's contaminated sites web site at <http://www.env.gov.bc.ca/epd/remediation/> Paper copies of legislation and other documents can be purchased from Crown Publications ([www.crownpub.bc.ca](http://www.crownpub.bc.ca)).

**What changes are coming?**

Since the release of the Minister's Advisory Panel Report in 2003, we have worked hard to update and improve the contaminated sites legal regime in BC. The result is a fairer, more streamlined, more effective process for regulating and managing the investigation and cleanup of contaminated sites. Key changes already underway include increasingly greater reliance on the services of Approved Professionals, greater focus by ministry staff on the highest risk sites, and elimination of the backlog of contaminated sites applications.

*Note: This summary is solely for the convenience of the reader. The current legislation and regulations should be consulted for complete information.*

For more information, contact the Environmental Management Branch at [site@gov.bc.ca](mailto:site@gov.bc.ca)