Backgrounder

Removing Barriers: Redeveloping Contaminated Sites for Housing

CMHC SCHL
Helping to house Canadians
Question habitation, comptez sur nous

National Round Table on the Environment and the Economy
Table ronde nationale sur l'environnement et l'économie

Canadian Cataloguing in Publication Data

Main entry under title: Removing barriers: redeveloping contaminated sites for housing: backgrounder

Issued also in French under title: Élimination des obstacles au réaménagement des terrains contaminés à des fins résidentielles : rapport de synthèse.
Includes biographical references.
ISBN 1-895643-62-7

1. Brownfields — Canada 2. Housing development — Canada. 3. Soil pollution — Health aspects — Canada. 4. Soil remediation — Canada. 5. Soil pollution — Government policy — Canada. 6. Soil pollution — Law and legislation — Canada. I. National Round Table on the Environment and the Economy (Canada).

HD259.R45 1997 333.77 C97-900829-8

This book is printed on Environmental Choice paper containing over 50 percent recycled content including 10 percent post-consumer fibre, using vegetable inks. The coverboard also has recycled content and is finished with a water-based, wax-free varnish.

National Round Table on the Environment and the Economy
344 Slater Street, Suite 200
Ottawa, Ontario
Canada K1R 7Y3
Tel.: (613) 992-7189
Fax: (613) 992-7385
E-mail: admin@nrtee-trnee.ca
Web: http://www.nrtee-trnee.ca

Other publications available from the National Round Table Backgrounder Series:

1. Sustainable Transportation in Canada
2. Going for Green: Meeting Foreign Demand for Environmentally Preferable Products and Services through Federal Procurement
3. Contaminated Site Issues in Canada
4. Improving Site-Specific Data on the Environmental Condition of Land
5. The Financial Services Sector and Brownfield Redevelopment
6. Measuring Eco-efficiency in Business

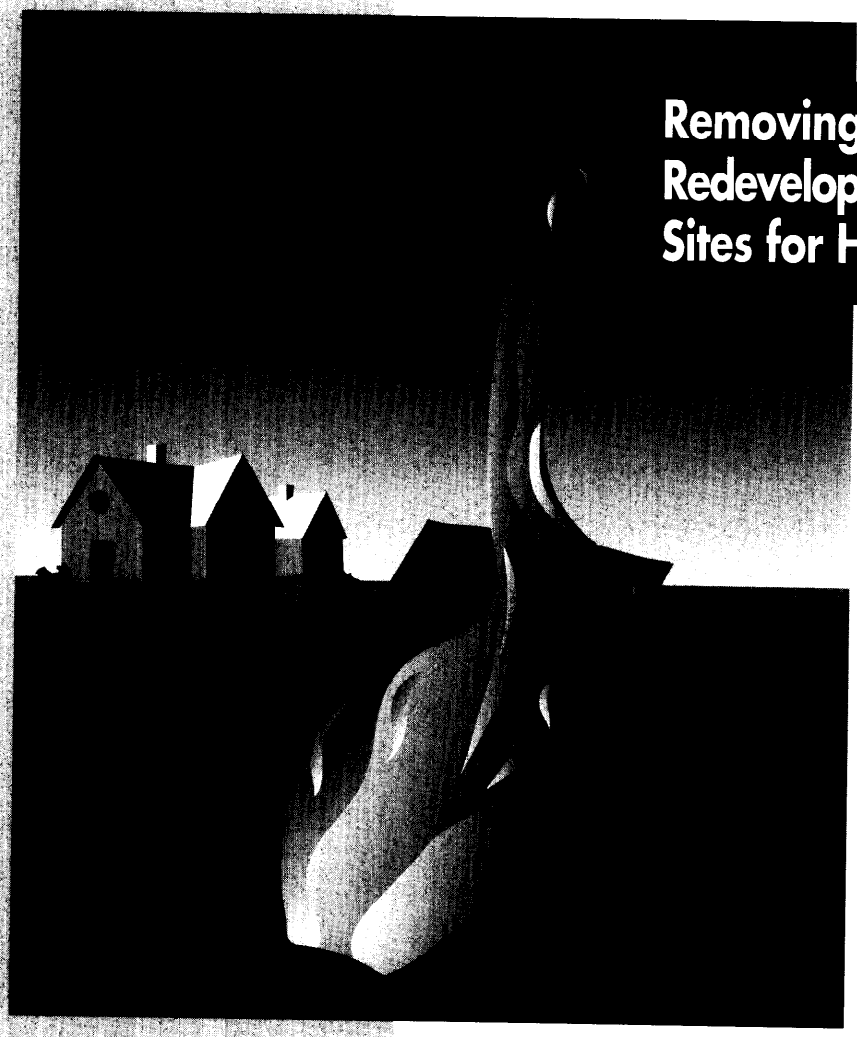
Toutes publications de la Table ronde nationale sur l'environnement et l'économie sont disponibles en français.

To order:
Renouf Publishing Co. Ltd.
5369 Canotek Road, Unit 1
Ottawa, ON K1J 9J3
Tel.: (613) 745-2665
Fax: (613) 745-7660
Internet: http://fox.nstn.ca/~renouf/
E-mail: order.dept@renoufbooks.com

Price: C$8.95 plus postage and tax

Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
Canada K1A 0P7
Web: www.cmhc-schl.gc.ca

Backgrounder



Removing Barriers: Redeveloping Contaminated Sites for Housing

Prepared by Delcan Corporation, Golder Associates Ltd. and McCarthy-Tétrault under the direction of the NRTEE's Financial Services Task Force.

Mandate

The National Round Table on the Environment and the Economy (NRTEE) was created to "play the role of catalyst in identifying, explaining and promoting, in all sectors of Canadian society and in all regions of Canada, principles and practices of sustainable development." Specifically, the agency identifies issues that have both environmental and economic implications, explores these implications, and attempts to identify actions that will balance economic prosperity with environmental preservation.

At the heart of the NRTEE's work is a commitment to improve the quality of economic and environmental policy development by providing decision makers with the information they need to make reasoned choices on a sustainable future for Canada. The agency seeks to carry out its mandate by:

- advising decision makers and opinion leaders on the best way to integrate environmental and economic considerations into decision making;
- actively seeking input from stakeholders with a vested interest in any particular issue and providing a neutral meeting ground where they can work to resolve issues and overcome barriers to sustainable development;
- analyzing environmental and economic facts to identify changes that will enhance sustainability in Canada; and
- using the products of research, analysis and national consultation to come to a conclusion on the state of the debate on the environment and the economy.

The NRTEE's state of the debate reports synthesize the results of stakeholder consultations on potential opportunities for sustainable development. They summarize the extent of consensus and reasons for disagreement, review the consequences of action or inaction, and recommend steps specific stakeholders can take to promote sustainability.

Members of the National Round Table on the Environment and the Economy

The NRTEE is composed of a Chair and up to 24 distinguished Canadians. These individuals are appointed by the Prime Minister as opinion leaders representing a variety of regions and sectors of Canadian society including business, labour, academia, environmental organizations, and First Nations. Members of the NRTEE meet as a round table four times a year to review and discuss the ongoing work of the agency, set priorities, and initiate new activities.

Chair
Dr. Stuart Smith
Chairman
ENSYN Technologies Inc.

Vice-Chair
Lise Lachapelle
President & CEO
Canadian Pulp & Paper Association

Vice-Chair
Elizabeth May
Executive Director
Sierra Club of Canada

Paul G. Antle
Chairman, President & CEO
SCC Environmental Group Inc.

Jean Bélanger
Ottawa, Ontario

Allan D. Bruce
Administrator
Operating Engineers' (Local 115)
Joint Apprenticeship and Training Plan

Patrick Carson
Strategic Planning Advisor
Loblaw - Weston Companies

Elizabeth Crocker
Co-owner, P'lovers

Johanne Gélinas
Commissioner
Bureau d'audiences publiques sur l'environnement

Sam Hamad
Vice-President
Roche Construction

Dr. Arthur J. Hanson
President & CEO
International Institute for Sustainable Development

Michael Harcourt
Senior Associate
Sustainable Development
Sustainable Development Research Institute

Cindy Kenny-Gilday
Yellowknife, N.W.T.

Dr. Douglas Knott
Professor Emeritus
University of Saskatchewan

Anne Letellier de St-Just
Lawyer

Ken Ogilvie
Executive Director
Pollution Probe Foundation

Joseph O'Neill
Vice-President
Woodlands Division
Repap New Brunswick Inc.

Dee Parkinson-Marcoux
President
CS Resources Limited

Carol Phillips
Director
Education and International Affairs
Canadian Automobile Workers

Angus Ross
President
SOREMA Management Inc. and
CEO, SOREMA Canadian Branch

John D. Wiebe
President & CEO
Globe Foundation of Canada and
Executive Vice-President
Asia Pacific Foundation of Canada

Executive Director and Chief Executive Officer
David McGuinty

Table of Contents

Glossary

Administrative order	Orders given by empowered government authorities to designate sites as being contaminated.
Alternative Dispute Resolution (ADR)	The process of resolving disputes using alternative techniques, such as mediation, in out-of-court settings.
Brownfields	Contaminated sites that are typically large and located in older industrial areas.
Certificate of Compliance	A certificate given by a government agency (typically a Ministry of the Environment) that verifies that a site has been remediated or managed to meet the requirements of the agency.
Contaminant risk mapping	Mapping and information that is maintained by government agencies (typically municipalities) that identify sites or districts that have a potential for soil contamination because of previous land uses.
Contaminated site profile	A report on a contaminated site that includes vital information on the location and nature of the contamination.
Contaminated site registry	A database that documents the location of known contaminated lands in a jurisdiction.
Future clause	A clause that can be enforced by contaminated site regulators that requires further study of a previously remediated site, despite the existence of previous Certificates of Compliance.
Greenfields	Clean, never-contaminated development lands, often located on the periphery of urban areas.
Liability	The issue of being obligated according to law to assume responsibility for the consequences of land contamination.
Liability, fault-based	A type of liability applied by the courts in which the Crown must prove a causal connection between the contamination and the defendant in order to render the defendant guilty.
Liability, joint and several	A type of liability in which one or more parties are proven to be responsible, at least in part, and may be individually or collectively liable for clean-up costs.

Liability, strict	A type of liability applied by the courts in which proof by the prosecution that the defendant caused the pollution renders the defendant guilty unless proven that the defendant exercised all reasonable care.
National Contaminated Sites Remediation Program (NCSRP)	A program administered federally by Environment Canada which was discontinued on March 31, 1995. It had a budget of $250 million to assist in the clean-up of orphan sites and to develop remediation expertise.
Orphan site	A contaminated site where the land owner will not or cannot pay for clean-up, or where the land owner cannot be located.
Remediation	The process of managing contaminants to the degree necessary to accommodate a specified land use.
Risk assessment/risk management	The method of estimating the likelihood of undesired effects on human and ecological health resulting from exposure to a contaminant source.
Sustainable communities	Communities that emphasize the efficient use of land, resources, and infrastructure, that reduce consumption of material and energy, and that are conducive to long-term human and ecological health.

Preface

While the potential exists to redevelop many contaminated sites across Canada for housing, a number of factors impede such initiatives. Among the barriers to redevelopment are: complex and inconsistent federal and provincial legislation, policies and guidelines; regulations that demand unrealistic clean-up activities; liability concerns; and misconceptions among the public and other stakeholder groups.

Recognizing the need for research and discussion in this area, Canada Mortgage and Housing Corporation (CMHC) commissioned a study to identify the barriers to redevelopment, to examine "best practices" in Canada and the United States aimed at relaxing these barriers, and to indicate areas for further research. This study builds on a 1993 report by the Canadian Council of Ministers of the Environment (CCME) which identified 13 principles to guide public policy in this area. While this study concludes that much work remains to be done to address the issue of redevelopment of contaminated sites for housing, it also identifies a variety of successful practices carried out in Canada and the United States which can be incorporated into future planning efforts by government and other participants in the land development planning process.

As a complement to this study, the NRTEE's Financial Services Program has prepared three additional backgrounders: Contaminated Site Issues in Canada, The Financial Services Sector and Brownfield Redevelopment and Improving Site-Specific Data on the Environmental Condition of Land. All were intended to promote discussion and debate among key stakeholders. As a follow-up to these reports, the Program sponsored workshops and prepared a state of the debate report on the issues.

This report was prepared by Delcan Corporation in collaboration with Golder Associates Ltd. and McCarthy-Tetrault. The content of the report does not necessarily represent the position of CMHC or the NRTEE.

Angus Ross
Chair, Financial Services Task Force
National Round Table on the Environment and the Economy

Debra Darke
Director, Research Division
Canada Mortgage and Housing Corporation

National Round Table on the Environment and the Economy
Financial Services Task Force

Chair
Angus Ross
President
SOREMA Management Inc.

Carol Anne Bartlett
Assistant General Counsel
Head Office, Law
Royal Bank of Canada

Beth Benson
Project Director for Site Remediation
Waterfront Regeneration Trust

Douglas M. Bisset
Bisset Engineering Inc.

Wally Braul
Barrister & Solicitor
President
West Coast Environmental Law Association

J. Anthony Cassils
Policy Consultant
NRTEE

Luc Charbonneau
Director
Samson Bélair Deloitte Touche

Wayne Proctor
Manager
Lending Services
Credit Union Central of British Columbia

Dick Stephens
Director
Legislation and Intergovernmental Affairs

Executive Summary

The purpose of this study is to provide suggestions, and to identify future research, that would assist in removing or relaxing barriers to the development of housing on contaminated sites. This information could, in turn, be used by all levels of government and participants in the land development and planning process. To achieve this purpose, an examination of three major issues was needed:

- The factors currently discouraging the redevelopment of contaminated sites in Canada.
- Initiatives in various Canadian and U.S. jurisdictions to address these problems.
- Areas in which research is required to address information gaps.

The data on the number of contaminated sites in Canada is poor. It is clear, however, that contaminated sites represent a large amount of land that has potential for urban housing redevelopment. Many sectors of government, business, and society in general have strong interests in the redevelopment of contaminated sites for housing. The prime interests shared by most are that human and ecosystem health be protected and that urban areas be developed sustainably.

The development of housing on contaminated sites most often requires that various processes be followed. This is a complex undertaking involving many participants. As a minimum, a four-step contamination assessment and restoration process is required, which includes: non-intrusive assessment; intrusive characterization; remediation design and implementation; and verification and compliance monitoring. Options to manage contaminants include soil excavation and landfill disposal (*in situ* and *ex situ* treatment) and in-place management.

In Canada, there is a myriad of laws, policies, and guidelines that control the redevelopment of contaminated sites. The Canadian Council of Ministers of the Environment (CCME) prepared a report in 1993 that established thirteen principles to guide public policy on contaminated sites. It is apparent that Canada has a long way to go towards capturing these principles in federal and provincial legislation. The provinces of Manitoba, Nova Scotia, Alberta, and, in particular, British Columbia, appear to be the most progressive in their public policies dealing with contaminated sites. Some lessons can be learned from U.S. and European public policy.

Barriers to housing development on contaminated sites can be divided into six issue groups: regulatory, technical/scientific, legal/liability, financial, urban planning, and communications.

By far the most prominent issue is the desire of all participants in the development process to reduce or eliminate their exposure to liability to pay for site clean-up or the effects of contamination. Another significant issue is the added time and expense required to develop contaminated sites that may result from inefficient and overlapping approval processes, and regulations which call for unnecessary or unrealistic clean-up activities. The inability to gain financing and insurance for redevelopment projects is a

significant barrier. Better ways of communicating the issues concerning contaminated sites are needed to reduce fears and misconceptions among process participants and observers alike.

To address the many issues common to redeveloping contaminated sites, 22 best practices are recommended to complement the 13 CCME principles. These include, for example, adopting a "User-Pay" approach to regulatory approvals, registering or certifying practitioners, and developing contaminated site profiles and registries. Further research is required in certain areas.

The single most important best practice is the risk assessment/risk management approach. Favoured by many practitioners, this method evaluates the actual human or environmental risk, considering the nature of contaminants in relation to the sensitivity of receptors and exposure pathways. It should be pursued in all jurisdictions in Canada, and acknowledged in legislation, policies, and guidelines.

It is clear that considerable work needs to be done across Canada to create a contemporary and consistent approach to dealing with the development of housing on contaminated lands. The best practices, in combination with the CCME principles, can be incorporated into any such approach. To pursue this objective, this study recommends that *Contaminated Site Redevelopment Action Plans* be developed. Such plans may be made at either the federal or provincial levels, or both, if efforts are coordinated.

Introduction

This study was initiated to assist in finding solutions to a problem which can be stated as follows:

> *In Canada, there are thousands of hectares of vacant or underutilized lands with contaminated soils that have potential for housing development. Various issues related to the contaminated soils often combine to create barriers to housing development.*

The purpose of this study, therefore, is to provide suggestions, and to identify future research, that would assist in removing or relaxing barriers to the development of housing on contaminated sites. This information could, in turn, be used by all levels of government and participants in the land development and planning process. To achieve this purpose, the study's terms of reference required an examination of three major issues:

- What factors are currently discouraging the redevelopment of contaminated sites in Canada?
- What has been done in various Canadian and U.S. jurisdictions to address these problems?
- What are the areas in which research is required to address information gaps?

This report is based on research completed during February through May 1996. The report, including the legislation, policies and guidelines referred to in the document, is therefore current as of May 1996. The following tasks were performed to complete this research:

- A literature review of related publications, of the database of the Intergovern-mental Committee on Urban and Regional Research (ICURR), and of information on the Internet.
- Telephone consultation with provincial jurisdictions on the status of legislation, policies, and guidelines.
- Brainstorming and collaboration with professionals in the authors' various offices across Canada, and with Canada Mortgage and Housing Corporation (CMHC) staff.

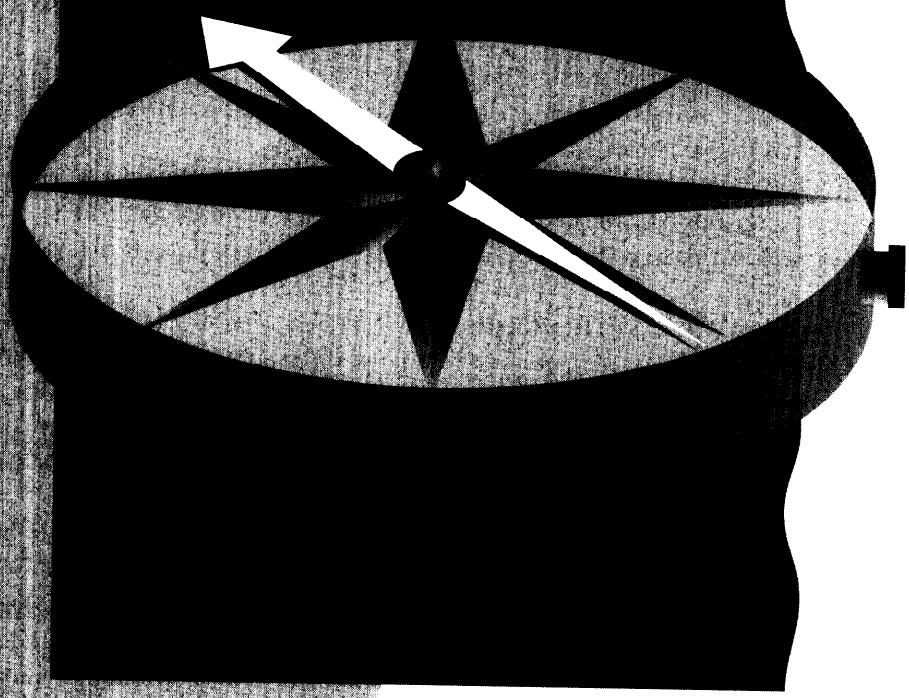
This report is organized into seven chapters. Chapter 1 provides an overview of the topic of contaminated lands and housing. Chapter 2 provides an overview of the process for approving development. Chapter 3 presents Canadian legislation, policies, and guidelines, and reviews progress on the implementation of the 13 principles prepared by the Canadian Council of Ministers of the Environment (CCME). Chapter 4 discusses issues that may act as barriers to the development of housing on contaminated sites. Chapter 5 presents some "best practices" that should help to remove these barriers, along with initiatives that can be undertaken to pursue the practices, as well as a summary of conclusions and one final recommendation.

Acronyms

ADR	Alternative Dispute Resolution
CCME	Canadian Council of Ministers of the Environment
CDIC	Canada Deposit Insurance Corporation
CERCLA	*Comprehensive Environmental Response, Compensation and Liability Act* (United States)
CSA	Canadian Standards Association
ICURR	Intergovernmental Committee on Urban and Regional Research
NCSRP	National Contaminated Sites Remediation Program
NRTEE	National Round Table on the Environment and the Economy
OMEE	Ontario Ministry of the Environment and Energy

1

Contaminated Sites and Housing: An Overview



This chapter provides an overview of the topic of contaminated sites and housing. It includes an indication of the scope and importance of the issue in Canada, provides some observations on the geographic context of sites, and explains why contaminated sites are often good candidates for housing development. It gives an overview of typical sources and types of contamination, and illustrates issues of public interest, focusing on public health. The risk assessment model of dealing with contaminated sites is explained, as are other practices and technologies to manage contaminants.

The Number of Sites

There is no reliable data on the amount of contaminated land existing in Canada. The *National Contaminated Sites Remediation Program* (NCSRP), administered by Environment Canada from 1989 to 1995, attempted to compile a national inventory of orphan sites. This was never accomplished, as some of the provinces and federal departments were reluctant to disclose their knowledge of the location of contaminated sites. The NCSRP was disbanded in 1995, and no organization now administers any similar program.

Previously cited ball-park estimates suggest that there may be over 20,000 sites in Canada contaminated by gasoline storage, industrial operations, or accidental spills, as well as an estimated 10,000 active and inactive waste disposal sites.[1] These would not all be in urban areas. Other estimates of 30,000 sites[2] have a similar order-of-magnitude. However, previous NCSRP staff believe that these figures are too high.[3] The NCSRP office is now closed and there is no division in Environment Canada that is pursuing the database.

Sites can range in size from approximately 0.1 hectare (a small gasoline station) to over 100 hectares (large industrial districts). For discussion purposes, 30,000 sites, each 5 hectares in size, would produce 150,000 hectares of contaminated land. This amount of land could accommodate 1,500,000 dwellings, if developed at a density of 10 units per hectare. This hypothetical estimate of housing supply would provide for a 10-year supply of housing for Canadians, mostly in already serviced areas.

A discussion of the amount of contaminated sites in Canada should also have a view to the future. In theory, the amount of contaminated land should be dropping as sites are remediated and redeveloped. Also, contemporary environmental regulations should have the effect of reducing new contamination of otherwise clean land. However, in reality, the amount of land is probably increasing, because additional contaminated sites are being identified regularly across the country. The rate of discovery appears to be exceeding the rate of remediation. Until a reliable database exists, it will be impossible to monitor the amount of contaminated lands in Canada or to discuss trends.

The Geography of Sites

Contaminated lands exist in virtually all settings in Canada. They may exist in city centres in former rail yards or harbours, under gasoline service stations in rural settlements, in spill zones in remote areas along highways or railways, or in many other locations. Because this report examines the relationship between new housing development and contaminated lands, the focus is predominantly on urbanized settings.

Within urban areas in Canada, larger contaminated sites (such as those greater than five hectares) can have similar characteristics. Often, the sites:

- are vacant or have buildings with little or no value (and sometimes negative value)
- are part of a former traditionally industrial area
- are surrounded by urban development
- have a location associated with railways or harbours
- are near lakes or waterways
- are near city centres
- have servicing infrastructure in place (such as roads, watermains, sewers)

Such sites are often referred to as *brownfields.*

Other small sites exist in urban centres across Canada. These may be the result of individual sources such as gasoline stations, dry-cleaning establishments, or abandoned landfill sites. A map of most cities will be dotted with such hot spots, including locations within existing residential areas. These are often centrally located, with ready access to services and community infrastructure.

This report will use the term *contaminated site* or *contaminated land*, to refer to any site, regardless of size or location, that has contaminated soil or ground water.

Development Opportunities and Influences

In the eyes of a home builder or land developer, many of the characteristics listed above are the hallmarks of a prime development site for housing. However, after considering the contamination issue, most would pass over these sites in favour of a greenfield setting, where there is less financial risk and more certainty for development. In most Canadian cities, planning policies encourage a long-term supply of land for housing, usually between 10 and 20 years. This has the effect of ensuring a ready supply of greenfields, thereby reducing demand for inner city contaminated sites.

In the eyes of the consumer, these sites can also be desirable addresses, provided of course there is no health risk, perceived or otherwise. It is expected that there will be a future demand for higher density housing in downtown environments — a demand which contaminated sites can serve.[4] Inner city locations bring the inherent benefits of living closer to both work and other urban amenities.

From the public policy perspective, contaminated sites are also preferred locations for housing redevelopment, for many reasons. Redevelopment is encouraged because:

- It is generally more cost-effective to develop lands that already have municipal services, including transportation, sewer, water and utilities, than it is to extend services and develop greenfield sites.
- The development of large tracts of land in inner cities can kick-start other urban renewal and development projects.

- Development will avoid the orphan-site situation, and ensure that realty taxes are paid.
- Housing development can produce realty tax revenues and, in some provinces, development charges or lot levies, and other economic spin-offs.
- Residential intensification will avoid the need to expand urban boundaries which sometimes consumes valued resources such as agricultural land or areas of environmental significance (thereby exacerbating urban sprawl and its by-products).
- Populating inner cities can bring vitality and safety to otherwise vacant and derelict areas and can support existing commercial enterprises.

All of these factors point to a need to find ways to reduce barriers to the development of housing on contaminated sites.

Typical Sources and Types of Contamination

Contamination is the concentration of a compound exceeding the natural abundance of the compound that may adversely affect ecological and human health.

A list of typical sources of land contamination is provided in Exhibit 1.1. This list is not intended to be exhaustive. It merely cites some of the more common historical land uses, industries and activities that have progressively led to land contamination in Canada's urban areas.

Exhibit 1.1

Typical Sources of Contamination

- coal gasification plants
- automotive/fuel storage
- armed force bases
- petrochemical industries
- industry/factory emission outfalls
- power transmission
- utilities
- smelters
- garbage/land filling
- dry cleaning
- paint/solvents users
- jewellery manufacturing
- paper/wood processing
- building material storage
- agricultural activities
- forestry
- metal industry
- mining activities
- ports
- warehouses
- salt storage

Some common groups of contaminants, that may result from these sources, are listed below.

- petroleum hydrocarbons (volatile, non-volatile)
- landfill gas and leachate
- heavy metals, e.g., mercury, lead, nickel

- pesticides
- chlorinated organics: wood treatment, solvents, PCB, dioxin
- other inorganic contaminants such as antimony, arsenic and sulphur

In the context of this report, lands that are host to these types of contaminants meet the definition of "contaminated sites." Radioactive contaminants are not included in the above list. In Canada, nuclear contaminants are strictly regulated by the Atomic Energy Control Board in Canada. As such, this issue is not considered a part of this study.

The Public Health Interest

In Canada, various federal, provincial, territorial, regional and municipal government agencies have a public interest in regulating the development of contaminated sites for housing. At the heart of the public interest in contaminated lands and housing is a broad public health issue: contaminants in soils and ground water pose a potential threat to human, ecosystem, and urban health.

The public health interests are interrelated. Human health can be directly tied to the health of the environment (both inside and outside the home) and the availability of clean air and water, for example. Urban health is often measured in environmental, social, and economic terms. As humans are an important part of ecosystems in urban areas, it is clear that ecosystem health is tied to the actions of humans and of urban development, both past and future.

When housing is developed on contaminated sites, the public interest relates to ensuring that the health of the future residents is not at risk, and that the site can promote and support an urban ecosystem. This premise is consistent with the popularized theme of sustainable development; when applied in the context of urban development, the generally accepted goal is to develop sustainable communities that emphasize the efficient use of land and resources, reduce consumption of material and energy, and encourage long-term social and ecological health.[5]

The theme of cost-effective urban development is also increasingly important. Municipalities are pursuing development that reduces infrastructure costs and that has the least impact on the public purse. Developing lands in already-serviced areas that would otherwise remain vacant can often cost less.

There are other interests in developing contaminated sites for housing, which include the land owner/developer, housing consumers, adjacent communities, and all levels of government. These interests are discussed in Chapter 2.

The Risk Assessment Approach

The public interest in developing housing on contaminated sites presents a paradox: on the one hand, health must be protected; on the other, social and political pressures exist for residential development. It can be argued that the lack of affordable housing itself has a measurable impact on the health of a community. The challenge, therefore, is to develop techniques to address the health issue associated with contaminated sites in a manner that facilitates housing development, without reducing

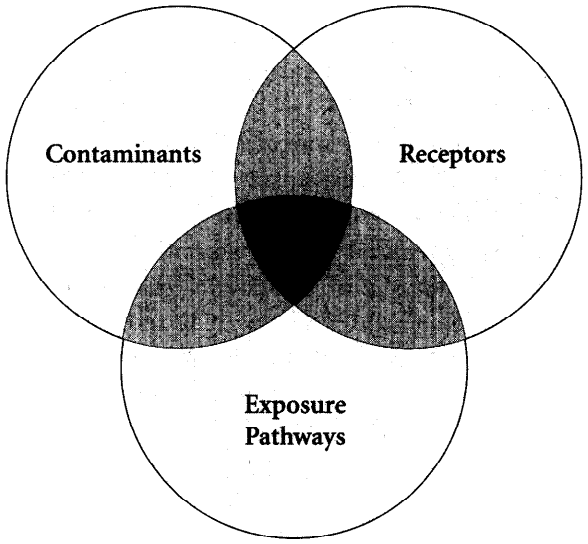
protection of the community or the environment, and without bankrupting the developer or the municipality. Where chemical concentrations in soil and ground water exceed generic environmental criteria established by the regulatory agencies, a technique known as risk assessment/risk management may be used to evaluate the actual risk that is posed to the community or the environment.

Risk assessment is the process of estimating the likelihood of undesired effects on human and ecological health occuring as a result of exposure to a contaminant source. There are three prerequisites for risks to exist at contaminated sites (see Exhibit 1.2):

- A source of the *contaminant* must be present at concentrations capable of causing an adverse effect.
- A *receptor* must be present.
- An *exposure pathway* must exit by which the receptor can come into contact with the chemical.

Exhibit 1.2

The Risk Paradigm



These three prerequisites are interdependent, because both the significance of the environmental concentration and the potential health effects depend on the pathway by which the exposure occurs. The exposure pathway, in turn, is influenced by the nature of the receptor (such as behaviour, lifestyle), as well as site-specific environmental characteristics. The most likely routes of exposure to contaminants found in soil and ground water are shown in Exhibit 1.3.

Exhibit 1.3

Human and Ecosystem Exposure Routes

Exposure Routes	Description
Dermal contact	Physical contact with soils, ground water and/or water
Inhalation	Breathing dust from surface soils, or breathing gases from soils, ground water and/or surface water
Ingestion	Ingesting (eating, drinking, absorbing) plants, animals, soil, dust, ground water and/or surface water

The objectives of the risk assessment/risk management approach are to assess risk to human health and the environment under various current and future land-use scenarios. This involves identifying contaminants, receptors and exposure pathways, and performing a calculation to estimate risk for relevant pathways. The more specific objectives of the undertaking are:

1. Using risk assessment, to determine whether any unacceptable health risks exist to humans or the environment and characterize them.
2. Pursuant to (1), above, to provide preliminary recommendations on mitigative measures which could be considered to remediate the site to a level of acceptable health risk.
3. Recognizing that future land use of the site will include housing, to determine whether unacceptable health risks could be anticipated to the residents, and, if so, to characterize the specific level of risk.
4. Pursuant to (3) above, to make preliminary recommendations on appropriate mitigative measures and/or land-use restrictions concerning future development of the site.

A Case in Point

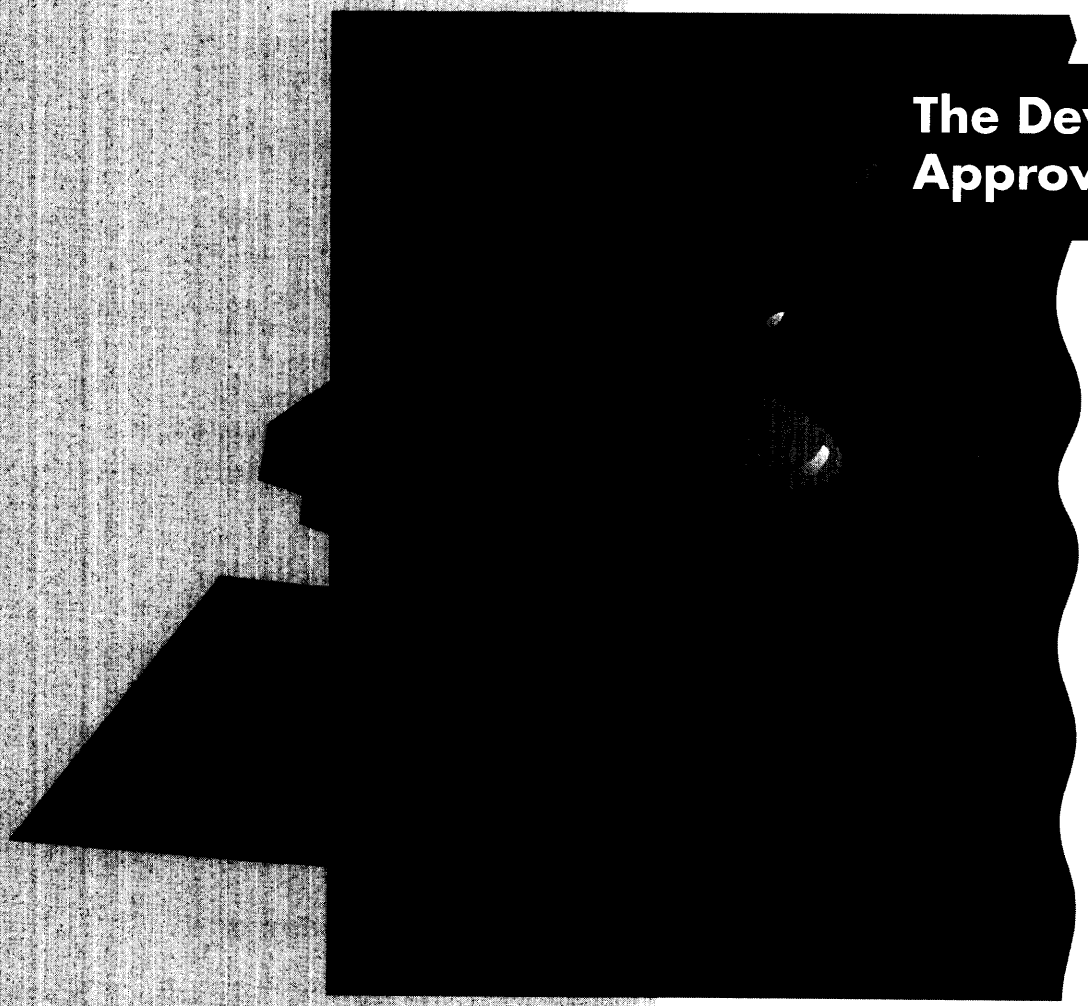
Risk Assessment in Practice

Pacific Place, the former Expo '86 site in Vancouver, British Columbia, has been the home of various industries over the past 100 years including a harbour, a railway station, coal gasification plants, sawmills, metal industries, which resulted in contamination of portions of the site. This 66-hectare site is being redeveloped for mainly residential use with some commercial facilities, and recreational uses. The site remediation is underway in a staged manner, and follows the stages of the building project. The most contaminated area of the site is the former coal gasification plant, which has been developed into an urban park with soil vapour and ground water control systems to allow containment of contamination in place, thereby employing the risk assessment principle. Risk assessment and risk management is also used at the rest of the site. The soil that is being excavated and treated or disposed of, are soils that are to be excavated for building foundations and two levels of underground parking. Most of the site requires only a cover of surface soils in order to eliminate the pathway of direct exposure to contaminated soil. This cover is a combination of buildings, pavement for parking and roads, as well as topsoil and landscaping.

Source: See Appendix B, Case Study D.

Radon contamination in homes provides an example of an application of the risk assessment/risk management approach. Radon is a contaminant that is found naturally occurring in the subsurface in Canada. Its presence is readily mitigated by venting and sealing foundations. Radon, when mitigated, is accepted by the public.

2



The Development Approval Process

This chapter identifies participants in the process of developing housing on contaminated sites, and their interests. It also provides an overview of the general process in Canada for approving site development. This is followed by a discussion of the technical process that must be undertaken once a risk has been identified.

Participants and Their Interests

Exhibit 2.1 provides a summary of the interests of persons, corporations and agencies that may be involved during the process of developing a contaminated site, and identifies their typical interests.

Exhibit 2.1 indicates that there are three principal types of interests. First, in no particular order, the development proponent and others providing services are interested in *financial gain.* This may be from the sale of land or housing units, or fees from financial or professional services. In the case of non-profit housing, the interest is usually in providing affordable and accessible housing. Second, municipal and provincial governments, and host communities, are interested in healthy, *sustainable communities* (as described in Chapter 1), and urban development that reduces the costs of infrastructure over its life cycle. New housing also leads to population growth and tax revenues, and can kick-start urban renewal. Third, almost all parties are interested in avoiding any burden of *future liability* to which they may be exposed during the development approval process.

The third interest, that of avoiding liability, has had a strong influence on current policy and practice relating to the development of housing on contaminated sites. For example, if a level of government or a financial institution must weigh the opportunities of a housing development against the risk of liability, liability usually carries the most weight in decision-making. Issues relating to liability, along with other issues, are discussed further in Chapters 3 and 4, in the context of Canadian public policy.

Exhibit 2.1

Participants in Redevelopment of Contaminated Sites and Their Interests

Person, Corporation or Agency	Typical Interest in Development of Contaminated Site for Housing
Land owner/proponent of redevelopment	To build safe, marketable new neighbourhoods. To maximize a timely profit or return on investment. To avoid future liability
Existing community	To benefit from new development. To ensure housing is compatible and desirable. To be part of the planning process.
Future residents	To gain access to safe housing that suits their needs and budgets.

Person, Corporation or Agency	Typical Interest in Development of Contaminated Site for Housing
Municipal governments	To ensure health and safety of existing and future residents. To benefit from urban development and growth. To reduce infrastructure cost. To avoid future liability.
Provincial/territorial governments	To ensure health safety of area residents. To avoid future liability.
Federal Government	To facilitate the development of sustainable communities. To avoid future liability.
Canada Mortgage and Housing Corporation	To ensure healthy housing for Canadians. To facilitate the development of sustainable communities. To avoid future liability. To benefit from the sale of mortgage insurance.
Financial institutions	To benefit from provision of financial service. To avoid future liability.
Other professionals (planners, engineers, solicitors, scientists, etc.)	To benefit from consulting opportunities. To avoid future liability. To contribute to sustainable urban development.

Note: All participants are assumed to share, in varying degrees, a common interest in promoting the clean-up of contaminated sites in order to pursue environmental integrity and health.

Source: Delcan Corporation, Golder Associates Ltd. and McCarthy-Tétrault.

Land Approval Processes

The typical process for approving land development in most Canadian jurisdictions is complex. As a minimum, a site must go through a land-use planning process, which may require the approval of the host municipality and usually the province or organization with delegated provincial authority.

To complete a typical planning process for a residential project, various experts may be required, even on a greenfield site. This normally includes planners, engineers and surveyors as a minimum. Solicitors are usually required to attend to matters of land title and plan registration. When bank financing or bonding is needed, financial institutions are involved. A range of other experts may be required to address site-specific matters that may arise. In Canada, most jurisdictions also provide opportunities for the public to participate in the planning process. Depending on the jurisdiction, and the nature of planning approvals required, a housing development can take from three months to five years, or longer, to be approved.

Experienced land developers are familiar with the development approval process in their jurisdiction, and often have a degree of certainty about the process. This familiarity enables better calculations of risk and potential profitability. However, with

contaminated sites, the complexity of the land development process usually increases markedly, and other processes are triggered. Some of these processes may be foreign to many developers.

Exhibit 2.2 illustrates some of the additional requirements and considerations that are encountered in the approval process for developing contaminated sites. These include the technical and scientific process of evaluating and mitigating the contamination, the regulatory process within which this occurs, and the legal process for determining liability, if any. The financial and insurance institutions also have rigorous protocol when dealing with land development projects on sites where the possibility of contamination exists.

Exhibit 2.2 shows that the land-use planning process, as well as communication and public participation, is still required. However, land-use approvals are often deferred until the contamination issue is addressed. The technical/scientific and regulatory processes usually drive the process. The key elements of the generic site assessment and remediation process are described below. In today's policy context, this process often results in delay, uncertainty, and, ultimately, additional cost to the proponent of redevelopment.

Site Assessment and Restoration Process

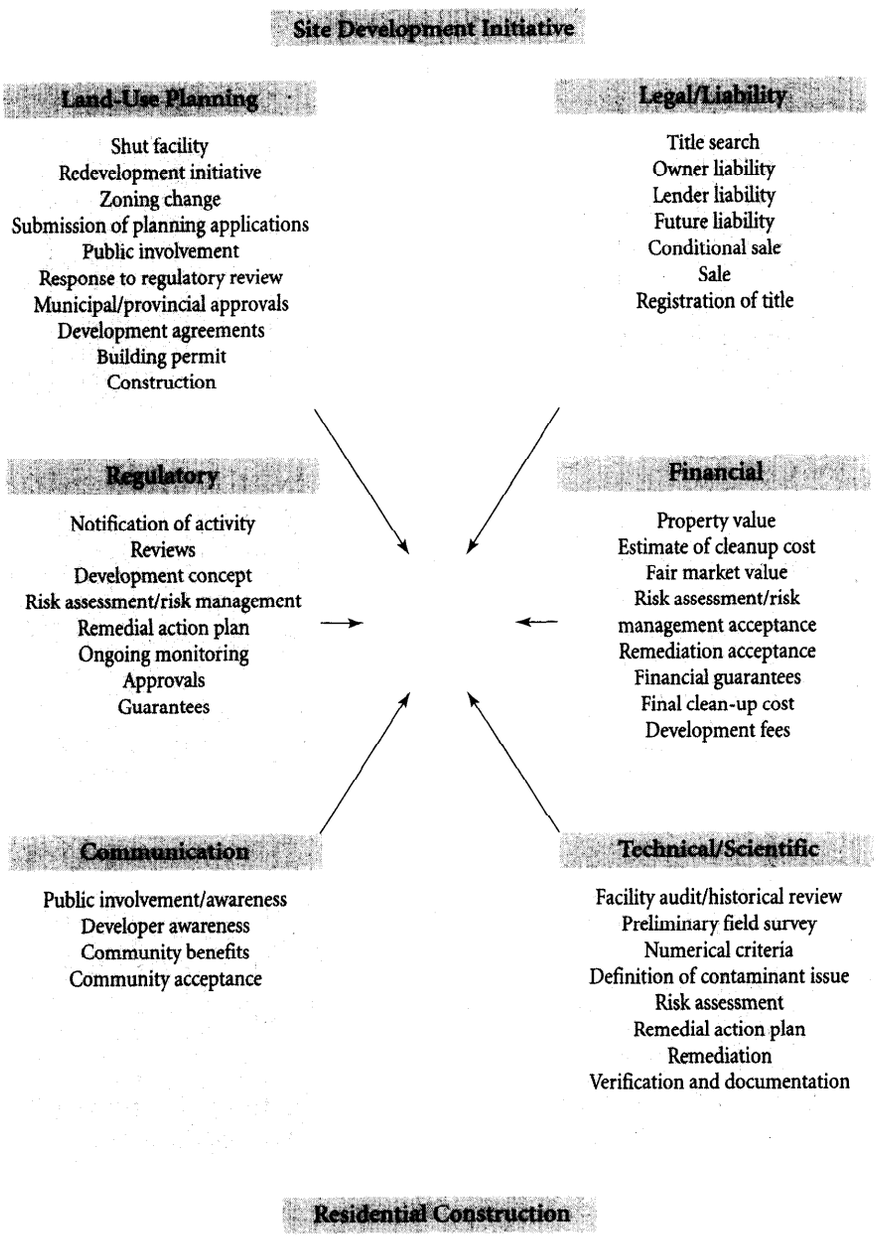
A developer that chooses to develop on a potentially contaminated site in Canada normally must adhere to a regulated process of assessing a site for contamination and remediating the site, if necessary. This is a four-stage, iterative process in all Canadian jurisdictions, consisting of the following steps:

- non-intrusive assessment
- intrusive characterization
- remediation design and implementation
- verification and compliance monitoring

Step 1: The non-intrusive assessment usually consists of a review of historical site activities; interviews; research to determine the location of any historical activities that are potentially of environmental concern; an assessment of the expected impacts from adjacent land use; and any other relevant information. The non-intrusive assessment also commonly involves a site visit and is used as a screening tool to determine the potential for environmental issues and to establish the requirements for chemical analyses in the intrusive characterization that may follow. This assessment is not required in all cases, but is often completed by prospective purchasers or their lenders who take the "buyer beware" approach. In British Columbia, the non-intrusive assessment information is documented in a site profile required by law and is entered into a site registry. No other provinces have such a requirement. The non-intrusive assessment is commonly called a *Phase I Site Assessment* and is more fully described in the Canadian Standards Association (CSA) document Z768-94.

Exhibit 2.2

The Context of Redevelopment Approval



Source: Delcan Corporation, Golder Associates Ltd. and McCarthy-Tétrault.

Step 2: The intrusive characterization follows Phase I to investigate further the areas of environmental concern identified in the non-intrusive assessment. The intrusive characterization is commonly referred to as *Phase II Environmental Site Assessment.* The investigation consists of some form of subsurface investigation and sampling methodology, followed by reporting. A proponent or stakeholder should be aware of the limitations of intrusive characterization,[6] including:

- Failure to detect contamination as a result of site conditions.
- Inadequate background information to guide the investigations.
- Errors by third parties such as laboratories.
- Delineation limited by budget, access and time.
- Natural site constraints.
- Other considerations such as environmentally sensitive areas, access control, site safety limitations and operational limitations.

The media quality (i.e., of soil and ground water) determined by the intrusive characterization is compared to generic remediation criteria and an assessment is made of the extent of remediation based on inferring the extent of contamination between the sampling locations completed at the site. These generic criteria vary by jurisdiction and are commonly derived from, and based on, the following sources:

- aesthetic considerations
- ambient background conditions
- toxicology and risk assessment
- phytotoxilogical considerations
- laboratory detection limits
- criteria borrowed from other jurisdictions
- other sources

The above listing of methods to derive generic criteria shows that the intent of generic criteria is to provide protection for human health and the environment. Ultimately, however, the derived criteria ultimately may not satisfy this consideration because of the complex set of variables that define a site condition, resulting in possible over- or under-estimation of clean-up requirements. British Columbia has re-evaluated their generic criteria by developing generic toxicity-based criteria for various potential exposure pathways to assess whether a site is contaminated.[7] These criteria can be modified for site-specific conditions or for a more detailed assessment of risks which allows for the control of exposure pathways as a means of controlling risks. This methodology attempts to address the requirement for more site-specific assessment.

Step 3: Following the intrusive characterization, a site remediation or management design is completed, if required, consisting of:

- A description of the site contamination.
- Location and volume of materials to be remediated.
- Type of test needed to verify remediation technology.
- Description of regulatory approval requirements.
- Communication plans.
- Construction plans.
- Design and tendering of remediation.
- Site management during remediation.
- Follow-up sampling requirements.
- Materials-handling protocols.
- Site safety.
- Other considerations.

In Ontario, a Certificate of Approval is required from the Ontario Ministry of Environment and Energy for many of the remedial technologies. Non-acceptance of remedial technologies by the regulator sometimes eliminates options for remediation. Subsequent to acceptance of the remedial plan by the regulator (in British Columbia, "approval in principle") the plan would normally be implemented. The section *Contaminant Management Options* below describes the various options that are typically available for site remediation and management.

Step 4: Following site remediation, verification of the effectiveness of the remediation is required. In the case of a site remediation approach consisting of excavation, removal and disposal of contaminated soil ("dig and dump"), this verification consists of the submission of samples from the boundary areas of the excavated contamination. If results meet the appropriate generic criteria, the site is pronounced remediated and can be developed. If remediation consists of *in situ* or *ex situ* remediation, compliance monitoring of additional soil or ground water samples will follow site remediation to confirm that the remediation effort has reduced the contamination to acceptable levels. Documentation in both cases must be sufficient to demonstrate that the remedial objectives were achieved. Following site remediation, approval or "sign-off" by the regulator is desired. Sign-off is provided in British Columbia with a "Certificate of Compliance."[8] Ontario provides statements of completion; however, these may no longer be provided under the proposed remediation policy.[9]

The policy context which has driven this approvals environment in Canada is discussed in Chapter 3, and barriers to the development of contaminated lands with housing are identified in Chapter 4.

Contaminant Management Options

Once a site has been identified and assessed as posing health risks, remediation or management of contamination has to take place before redevelopment can proceed. There are three contaminant management options:

- soil excavation and landfill disposal
- *in situ* and *ex situ* treatment
- in-place management

- *Excavation with landfill disposal* is the low-technology favourite and is widely used for lower concentrations of contamination. Excavation and landfill disposal allows for confirmed removal of all contaminated subsurface material and, if conducted to the generic numerical criteria, will limit future liability to that associated with the landfill rather than to the site itself. In other words, the residual liability from the site is eliminated. Landfill disposal cost governs the market for all other remedial groups. Recent landfill market prices have varied from $40 to $100 per tonne depending on site setting, market pressures, and the level of contamination (soil with special hazardous waste levels of contamination may cost two to three times as much). When the cost drops below $40 per tonne, it is generally accepted that a variety of *in situ* and *ex situ* treatment technologies will be excluded from site remediation because they are no longer cost competitive.

A Case in Point

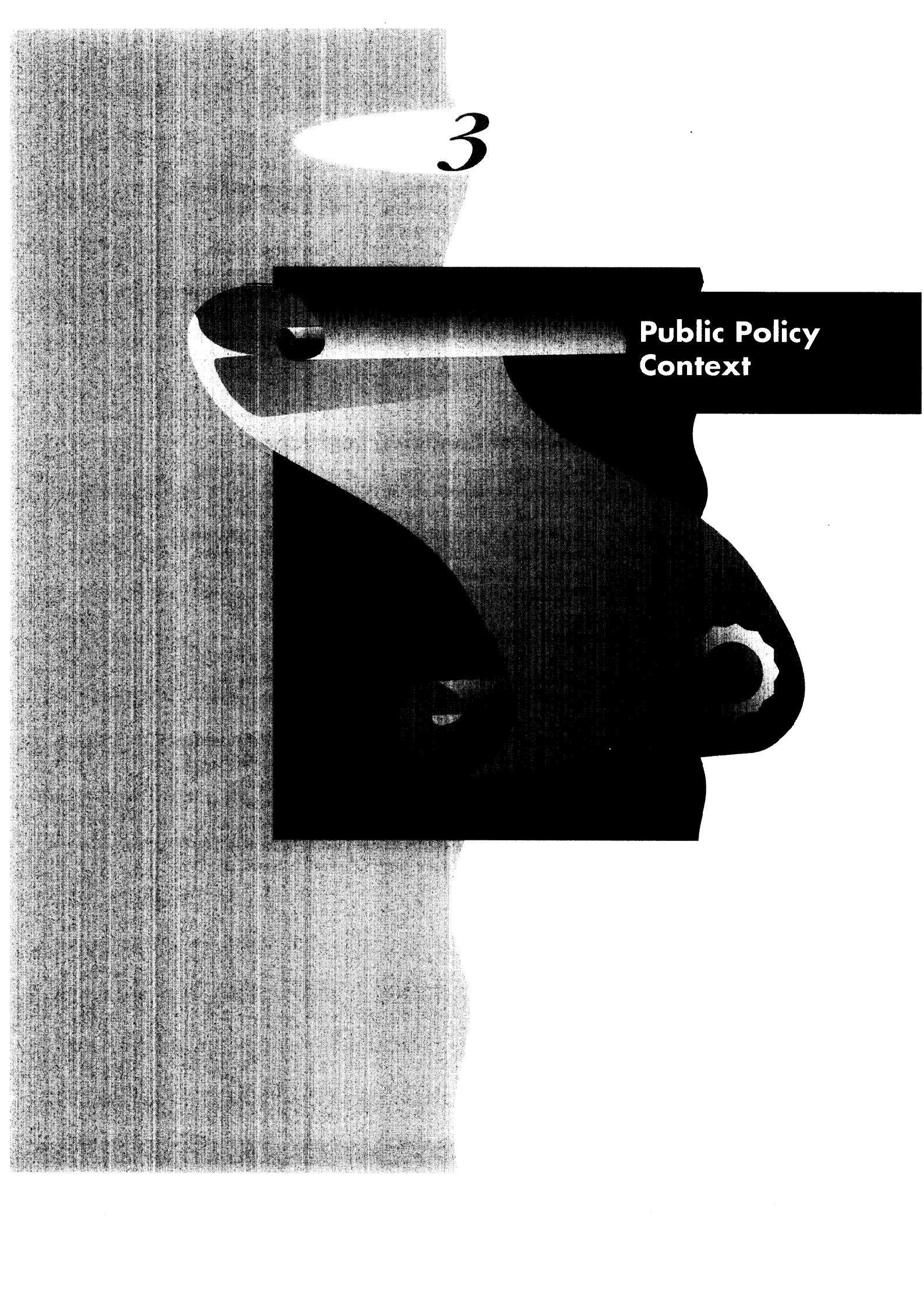
Remediation can be Expensive

Costs of remediating a five-hectare site in Minneapolis are estimated at $1.8 million (U.S.). When spread over the 66 townhomes to be constructed, this equates to over $27,000 per dwelling. The project used a combination of soil excavation and landfill disposal, along with in-place management of bedrock contamination. Over 23,000 m^3 of soil and water was removed from the site.

Source: See Appendix B, Case Study G.

- *In situ and ex situ treatments* include bioremediation, low thermal desorption, soil washing, vapour extraction, reactant injection, and airsparging. *In situ* treatment deals with contamination in place and *ex situ* treatment deals with *excavated* contaminated material on-site or off-site. Site remediation with these treatment methodologies may take considerable time and normally costs more than landfill disposal. The most common technologies are landfarming, bio-pile and soil vapour extraction, all of which are widely used for treatment of fuel- and oil-contaminated soil.

3



Public Policy Context

This chapter explores Canadian legislation, and accompanying policies and guidelines, that apply when developing contaminated sites for housing. It provides a review of progress made across Canada in implementing the 13 principles as published by the Canadian Council of Ministers of the Environment (CCME) in 1993. Public policy in the United States and Europe is also discussed briefly.

Appendix C provides a legislative review for each of the provinces and territories, summarizing the key enabling legislation and statutes. This can be read in conjunction with a review of the key features of the various provincial and territorial guidelines and policies, as presented in Appendix D. Legislation provides the legal authority on which the more specific policies and guidelines are based. In other words, the legislation is the *enabler*, whereas the policies and regulations are the *doers*. Both are often captured in the term "public policy." Both of these comparative reviews include existing and emerging public policy.

Comparative Review of Canadian Legislation

The CCME is the primary intergovernmental forum in Canada for discussion and joint action on environmental issues. Its members are the 13 ministers of the environment in Canada, representing the federal government, the provinces and the territories. At CCME's spring meeting in 1993, the Council approved a report (prepared by its Core Group on Contaminated Site Liability) entitled *Contaminated Site Liability Report — Recommended Principles for a Consistent Approach Across Canada.* The report was an initiative of the CCME Task Group on Contaminated Site Liability in response to government and business pressure on the CCME to lead a national exercise of resolution to reduce the unpredictabilities of liability.

In general, the CCME report endorses the principle of "polluter pays" and the view that liability should be allocated on the basis of relative fault based on the particular circumstances, although it does retain the concept of joint and several liability where the allocation process fails (see the discussion in Chapter 4).

The CCME report recommends 13 principles which establish a framework to assist governments in developing legislation addressing liability associated with contaminated sites. The recommended principles are not in the form of draft provisions but are statements of policy options on the basis of which legislation should be enacted. The first five "underlying" principles are general policies which are recommended to form the basis of this type of legislation, and are not specific to the question of liability. The next eight "specific" principles directly address more substantive liability issues. The 13 principles are paraphrased in Exhibit 3.1.

Exhibit 3.1

The CCME Principles on Contaminated Site Liability

The Five "Underlying" Principles

1 The principle of *polluter pays* should be paramount in framing contaminated site remediation policy and legislation.

2 In framing contaminated site remediation policy and legislation, member governments should strive to satisfy the principle of *fairness.*

3 The contaminated site remediation process should enshrine the three concepts of *openness, accessibility and participation.*

4 The principle of *beneficiary pays* should be supported in contaminated site remediation policy and legislation, based on the view that there should be no *unfair enrichment.*

5 Government action in establishing contaminated site remediation policy and legislation should be based on the principles of *sustainable development,* integrating environmental, human health and economic concerns.

The Eight "Specific" Principles

6 A broad net should be cast for determining potentially responsible persons, with "conditional exemptions" enacted for lenders and receivers, receiver managers, and trustees where they have not contributed to the contamination. Lenders should be exempt beyond the outstanding balance of the debt unless the lender had actual involvement in the control or management of the borrower's business. Receivers and trustees should be exempt unless they fail to take reasonable steps to prevent further contamination or to address ongoing environmental concerns at the site.

7 Authority should be provided in legislation to recover public funds expended on the remediation of contaminated sites from the persons responsible for the contamination. Environmental claims should have priority over all other claims or charges on an estate that has entered into receivership or bankruptcy.

8 Processes should facilitate the efficient clean-up of sites and result in the fair allocation of liability. A four-stage process designed to discourage excessive litigation and promote alternative dispute resolution is proposed. Following site designation and the identification of responsible persons, liability should be allocated through voluntary, mediated or directed processes. If these attempts at allocation fail or are not used, joint and several liability should apply (i.e., this applies as a fall-back to promote resolution by Alternative Dispute Resolution (ADR) and to minimize the frequency of litigation).

9 Liability allocation factors are suggested for use in cases where there is more than one responsible person. Based primarily on a list of factors in Alberta's *Environmental Protection and Enhancement Act*, the following are among the matters that should be considered in the apportionment of liability:
   - When did the contamination took place?
   - Who caused the contamination?
   - Were reasonable steps taken to prevent the contamination?
   - Were industry standards and practices of the day followed in dealing with the offending substance?
   - What steps were taken upon knowledge of the contamination?
   - What is the degree of hazard?

10 A four-stage process designed to discourage excessive litigation and promote alternative dispute resolution is proposed, as discussed above. Provisions should be included to enable government authorities to accept or reject any particular liability allocation scheme or to have joint and several liability apply to individuals who unscrupulously avoid their obligations.

11 Governments should retain the discretion to designate contaminated sites and should involve the public in such site designation. For the purposes of better predictability, governments should clarify their policies regarding site designation. Such policies should be based on risk to human health and the extent of environmental risk.

12 Certificates of Compliance should be issued to responsible persons who complete the clean-up of a contaminated site to the satisfaction of the regulatory authority. The certificates should expressly state that they are based on the condition of the site at the date of issuance and that the remediation undertaken met the standards of the day, thereby leaving open the possibility that the responsible person may be liable for future clean-up.

13 Benchmarks for the remediation of contaminated sites should be developed with public input. The use of benchmarks will allow remediation plans or orders to be tailored on a site-specific basis.

Source: CCME, *Contaminated Site Liability Report — Recommended Principles for a Consistent Approach Across Canada*, Winnipeg, 1993.

Exhibit 3.2 illustrates the degree to which various jurisdictions in Canada have implemented the 13 CCME principles in legislation. Policies and guidelines that implement the legislation are discussed in the next section, and in Exhibits 3.3 and 3.4. A review of pertinent legislation, which forms the basis of the Exhibit 3.2, is provided in Appendix C. It demonstrates that the existing or proposed legislative frameworks of Nova Scotia, Manitoba, Alberta and British Columbia capture many of the CCME principles. Federal legislation does not. The remaining provinces and territories have

many gaps in terms of their implementation of the CCME principles. Canada has a long way to go towards legislating the framework for dealing with contaminated sites as recommended by the CCME.

Exhibit 3.2

Canadian Progress on Implementing CCME Principles in Legislation — May 1996

CCME Principle Regarding Liability	Can.	NF	NS	PE	NB	PQ	ON	MB	SK	AB	BC	NT	YT
1 Polluter pays			■					○		■	○		■
2 Fairness			■					○		■	○		
3 Site remediation: openness, accessibility and public participation								■ ○			○		
4 No unfair enrichment: beneficiary should contribute according to benefits accrued			■					○		■			
5 Sustainable development: integrates environmental, human health and economic concerns			■					○		■	○		■
6 Lenders should be exempt from personal liability for pre-existing contamination	○		■				■	○		■	○		
7 Recovery of public funds from parties responsible for contamination	■		■				■	○		■	○		■
8 Avoidance of excessive litigation in site remediation process			■					○			○		
9 Liability allocation factors			■					○		■	○		
10 Four-stage dispute resolution			■					○		■	○		
11 Clarification of designation of contaminated sites			■		■	■		○		■	○		■
12 Certificate of Compliance and exemption from future liability			■				■	○			■ ○		■
13 Benchmark standards								○			○		

Notes: Black boxes ■ indicate legislation or statutes in place. Hollow circles ○ indicate draft legislation or statutes. In the absence of legislation, the CCME principles are used as informal public policy. This table is current to May 1996.

Source: Delcan Corporation, Golder Associates Ltd., and McCarthy-Tétrault.

Comparative Review of Canadian Policies and Guidelines

Exhibits 3.3 and 3.4 provide a list of 12 distinguishing features of the policies and guidelines of Canadian provinces and territories. Appendix D provides data sheets for each of the provinces and territories listing the policies and guidelines reviewed to perform this comparison and identifying their key features. This review was assisted by communication with various provincial agencies across Canada.

Exhibit 3.3

Features of Provincial and Territorial Policies and Guidelines

1* *Generic numeric criteria:* Standard, risk-based and generic numeric criteria can be applied efficiently and consistently across the country for screening of sites as potentially contaminated.

2* *Exposure pathway-specific criteria:* Criteria should be tied to specific exposure pathways, such as ingestion/inhalation of soil or protection of ground water used for drinking.

3* *Depth-related criteria:* Remediation criteria should be relaxed according to depth below ground surface.

4* *Site-specific risk assessment/risk management:* Equally important is the flexibility to be able to consider site specific conditions (rather than conservatively selected generic criteria) when cleaning up or managing the site contamination.

5* *Acceptance of new procedures:* Acceptance of new or alternate technical procedures for investigation, interpretation and confirmation of site remediation will also provide for a more efficient and flexible approach.

6 *Requirement for certified practitioners:* First and foremost is the need for the technical assessments and designs to be carried out by competent and qualified professionals. This could be implemented through a formal certification process or through the requirement to include relevant qualifications on the signatory page of reports for review and acceptance by the regulators.

7 *Timelines and fee to expedite service:* Timeliness of the regulatory approval process is of utmost importance in the development process. The implementation of a fee structure to allow for a predictable and fair review period is also an important consideration.

8 *Wide-area designation:* Contamination does not follow property boundaries, and wide-area based remediation and management is often more effective and predictable.

9 *Contaminated soil relocation control:* Contaminated soil ranges in terms of concentrations and potential hazard, and it is therefore important to guide and track its relocation. The lack of local treatment and disposal facilities is both a cost and risk issue.

10 *Encouragement of within-province treatment and disposal of contaminated soil:* Policies and their application should encourage the establishment of safe local (municipal, regional or provincial) options for dealing with contaminated soil that has to be excavated.

11 *Permitting cross-border import of contaminated soil for treatment and disposal:* Specialized treatment facilities may require larger markets in order to be viable.

12 *Issuance of Approval in Principle and Certificate of Compliance:* An Approval in Principle and/or a Certificate of Compliance is granted by some regulatory agencies under certain circumstances.

* CCME principle #13 strongly encourages the development of site-specific benchmarks for clean-up or control, based on the location and usage of the site. These first five policy and guideline features listed in Exhibit 3.4 track provincial progress relating to this principle.

Exhibit 3.4

Comparison of Contaminated Site Policies and Guidelines — May 1996

Distinguishing Feature of Policy or Guideline	Can.	NF	NS	PE	NB	PQ	ON	MB	SK	AB	BC	NT	YT
1* Generic numeric criteria	■	■	■	■	■		■	■	■	■	■	■	■
2* Exposure pathway-specific criteria											■		
3* Depth-related criteria							○			○	■		
4* Site-specific risk assessment/ risk management	■		■		■	■	○	■		○	■		
5* Acceptance of new procedures										○	■		
6 Requirement for certified practitioners							○						
7 Timeliness and fee to expedite service											■		
8 Wide-area designation													
9 Contaminated soil relocation control											■		
10 Encouragement for within-province treatment and disposal of contaminated soil						■	■			○	■		
11 Permitting cross-border import of contaminated soil for treatment and disposal													
12 Issuance of Approval in Principle and Certificate of Compliance	■		■		■		■†	■	■	■	■		■

* Features 1 to 5 relate to CCME principle #13 which encourages the development of site-specific benchmarks.

† Ontario's proposed policy will remove this provision.

Black boxes ■ indicate policies and guidelines in place. Hollow circles ○ indicate draft policies and guidelines. In the absence of policies or guidelines, the CCME principles are used as informal public policy.

Source: Delcan Corporation, Golder Associates Ltd., and McCarthy-Tétrault.

When examining the approach to remediation across Canada compared to the policy and guideline features shown in Exhibit 3.4, it is clear that there is no consistency among the provinces and territories.

The province that has addressed most of the CCME principles and policy attributes is British Columbia. The lack of suitable, low-cost disposal options for contaminated soil and the legacy of the former Expo '86 site forced the province to address site-specific and risk-based remediation involving in-place management of contamination because of the high costs of meeting generic criteria. This has led to the progressive development of new regulations that deal with liability, the use of public consultation,

and technical issues (as enabled by draft *Bill 26, Contaminated Sites Regulations, Draft 3*, 1995). Distinguishing features of draft *Bill 26* include the endorsement of site-specific risk assessment; the acceptance of new procedures; fee for service; classification of special waste (under revision); and generic remediation criteria based on exposure pathways.

The inconsistency between regions in Canada is partly due to different physical and commercial characteristics, but is also due to the political and social context. British Columbia, Alberta, Ontario and Quebec each have policies that were mainly developed independently, but within the general framework of the CCME guidelines. The remaining provinces and territories appear to have followed these provincial jurisdictions, or have, more or less, simply adopted the federal policy as promulgated by CCME.

Recently, a sense of convergence in policy is noted with endorsement of the risk assessment/risk management approach and acceptance of risk-based remediation criteria across Canada. This is probably brought about by CCME's acceptance of the risk-assessment concept. Both Ontario and Quebec, under proposed policies, will implement many of the contemporary approaches already in practice in British Columbia, including the risk assessment/risk management approach. However, generic remediation criteria and application of criteria still vary between jurisdictions. This clearly results in inconsistent approaches to redevelopment of contaminated sites for housing across Canada.

U.S. Public Policy

In the United States of America, the *Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)* — commonly called "Superfund" in reference to its revolving trust of available funding — has guided the U.S. in its regulation of contaminated sites. *CERCLA* has caused the liability issues to become a dominant factor in site redevelopment and has resulted in extensive and expensive litigation.

Even though the Superfund has successfully cleaned up over 1,200 contaminated sites, it has created major barriers for the less contaminated sites. These barriers were identified as:

- Lack of specific remediation standards.
- Delays as a result of extensive submission requirements.
- Strict joint and several liability provisions which led many proponents to avoid potentially contaminated properties, specifically in the case of former industrial and commercial properties.

To overcome these problems, 21 states have developed voluntary clean-up programs.[10] The primary goals of these remediation programs are to avoid time delays and the expense and liability issues associated with Superfund regulations. For example, Minnesota's remediation program dating back to 1988 provides a streamlined regulatory procedure and offers a variety of written assurances to address liability concerns. Specific written assurances include statements that remediation work is not

needed, certificates of completion, and no association determinations with the presence of contamination. Despite all these efforts the cost of redevelopment of contaminated sites is still higher than for greenfield sites.

The U.S. federal government has since set up trust funds and tax incentives to try to counter balance this cost difference in the development of contaminated sites.[11] Sites in the U.S. are normally cleaned up to conservative site-specific risk-based standards that are much more stringent than those employed in Canada. The U.S. *CERCLA* risk-assessment approach is considered conservative because it includes all pathways and risk is additive. It also assumes worst-case receptors. There is little opportunity for judgment, interpretation or flexibility.

European Public Policy

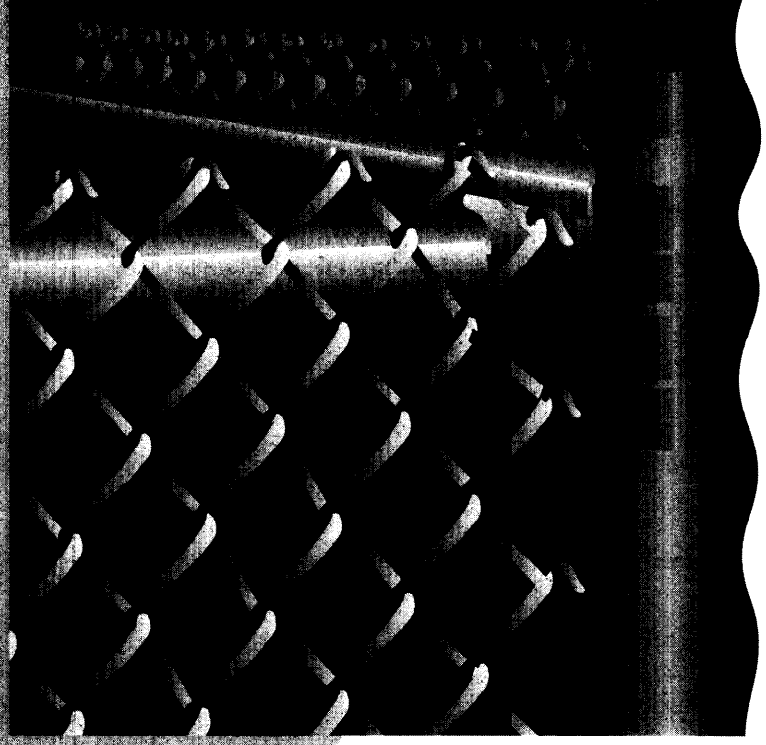
The European Union has a cultural and legislative setting in which contaminated site redevelopment is much less dominated by liability.[12] In general, countries in the European Union have redeveloped contaminated sites more successfully than in North America.

To date, a common European policy has not been developed, although the objective in preliminary discussions is to put emphasis on the clean-up and redevelopment of contaminated sites. A prime example of European site redevelopment success is the role government plays in the form of subsidies and partnerships with the private sector. In these ventures, public agencies generally initiate, plan, and take responsibility for reclamation efforts, as well as protecting private partners from liability for any remaining contamination.

Most sites in Europe are mostly cleaned up to generic numeric standards. The Netherlands provided leadership in the early 1980s with the development of the first criteria designed for site clean-up. Similar standards were adopted in 1988 by the Province of Quebec, and many international jurisdictions. Clean-up of decommissioned NATO military bases in Europe generally refer to the Netherlands criteria.

4

Key Issues and Barriers to Housing Development on Contaminated Sites



This chapter highlights how issues arising from the previously described public policy context often act as barriers to housing development on contaminated sites. "Real-life" examples are provided to illustrate how current policies and processes have indeed acted as barriers and jeopardized housing proposals on contaminated sites. Details on these illustrative examples are included in Appendix B.

Six Issue Groups

Policies that pose barriers to housing development on contaminated sites can be grouped into the following six issue groups:

- regulatory
- technical/scientific
- legal/liability
- financial
- urban planning
- communications

It is important to recognize that many of these issues are inter-related. Elaboration on these issue groups is provided in the following sections.

Regulatory Issues

Regulatory issues are those that arise from the processes and approvals that accompany the policies and guidelines regulating the development of contaminated sites. Examples of issues are listed below:

- *Slow regulatory reviews:* Slow regulatory reviews delay project progression, which ties up capital and thus increases site redevelopment costs. The long-term commitment of capital reduces lender confidence in engaging in contaminated site redevelopment.
- *Lack of consideration of exposure pathways:* Remediation without consideration of applicable exposure pathways results in overspending. For conditions where

A Case in Point

The Ataritiri Legacy

A good example of development being halted by an economic barrier is the "Ataritiri" site in Toronto. This site, located in the lower Don Lands, was slated for residential redevelopment in the late 1980s. MOEE regulations requiring complete clean-up to generic numeric criteria created a cost obstacle and left a legacy. New initiatives by the MOEE and the Waterfront Regeneration Trust will probably help kick-start commercial and, perhaps, some residential redevelopment of this site.[13]

Source: See Appendix B, Case Study H.

ground water impact is not considered an issue of concern, remediation to an unrestricted depth offers little additional protection to receptors, and significantly increases remediation costs.

- *Generic and conservative criteria:* The application of generic and overly conservative criteria results in over-spending on low-risk or remote sites, because the criteria have been established for worst-case or highly sensitive receptors.

- *Use of future clause:* It is common that regulatory policies include the option to trigger additional study or remediation at a site if conditions change. This is triggered by incorporation of a future clause into the remediation plan review, such as provision for the emergence of new information on the toxicity of a particular chemical. This clause raises uncertainty for future financial and liability issues for lenders and owners and could hinder site redevelopment.

- *Waste disposal issues:* Waste disposal issues that were identified as barriers include lack of licensed hazardous waste disposal facilities and poorly defined criteria for classifying waste disposal sites that are more tolerant of the established contamination. The lack of hazardous waste disposal sites raises the cost of disposing of heavily contaminated soil. These increases may be the result of either increased hauling distance or reduced competition between waste disposal sites. Permanent disposal of PCB-impacted material is the best example of this undesirable situation. Often, contaminated soil on a site destined to be developed for residential purposes may meet industrial criteria. Thus, reuse of the soil at an industrial site could be an option.

- *Lack of remediation plan sign-off:* When no sign-off of the remediation plan by the regulatory agency is provided, lenders and buyers may continue to be concerned with future liability associated with a formerly contaminated site. Sign-off provides confidence to prospective buyers and lenders. Due to lack of will or simple bureaucratic delay and reluctance, sign-off is difficult to obtain. In Ontario, the proposed MOEE guidelines suggest that sign-off will not be provided in Ontario.

- *Inconsistencies in approval processes:* Approvals processes can be inconsistent both within, and between, jurisdictions at a federal, provincial and municipal level. Regulations tend to be revised and changed with time. Internal and long-term inconsistencies raise uncertainty and financial concerns with lenders and buyers. For example, the MOEE recently lowered the maximum allowable generic criteria for lead. This has resulted in the potential for rejection of lands that had previously been considered acceptable for residential development.

- *Contamination beyond the site:* Contamination beyond site boundaries — prompting the involvement of adjacent landowners — can halt development due to ongoing concerns with renewed contamination from off-site sources. Often, contamination can result from distant sources. Policies to deal with this issue, such as wide-area designations, are not in place in any jurisdiction.

- *Need for investigative priorities:* There is never an unlimited amount of resources or time to study a site, and therefore investigative priorities must be established, which may not reveal all contamination at all sites.

- *Use of experts:* It is important that assessment, characterization, remediation design and planning be carried out by qualified practitioners, thus expediting the approvals process and ensuring that implementation of site development occurs appropriately.

Technical and Scientific Issues

Technical and scientific issues relate to limitations of current knowledge, technologies and procedures, as well as their lack of widespread use. Examples of issues are listed below.

- *Cost-effectiveness:* There is a need to continue developing new technologies and improving existing ones to achieve more cost-effective solutions.

- *Lack of contaminant disposal options:* The lack of treatment and destruction options for some contaminants such as PCBs has resulted in a large number of storage sites, which themselves may potentially be a large risk.

- *The cost of storage:* The economic cost of long-term storage may significantly outweigh the cost of treatment and/or destruction. For example, the opening of the Swan Hill incinerator in Alberta has relieved the specific PCB situation somewhat; however, the high cost of transportation and destruction make this option unattractive for most proponents. Remediation alternatives for many contaminants are not available, nor proven.

A Case in Point

New Technologies in Practice

The need to improve the cost and effectiveness of site remediation technologies is characterized by continued reliance on landfill disposal of most contaminated soils. For example, site remediation using existing technologies was more costly than landfill disposal of heavily impacted soil at the Port Credit Former Refinery Site. Site remediation was achieved by soil extraction, segregation and soil tilling with off-site disposal of heavily impacted soil. Site-specific clean-up criteria were developed to facilitate the project. Full extraction of contamination ensured the competency of clean-up, but reduced the rate of progress of some aspects of the project.

Source: See Appendix B, Case Study C.

- *Risk assessment/risk management approach:* Widespread acceptance of the risk assessment/risk management approach is lacking. Generic remediation criteria are based on sensitive and conservative assumptions with respect to migration pathways and receptors, causing overspending on site remediation in terms of protecting human and ecological health. Risk assessment is still a new and developing process — more proponent education and user awareness is required. Widespread, use-specific, common methodologies would be accepted and used by many professionals.

- *Statistical evaluation of contamination:* Statistical evaluation of contamination is lacking. In some cases one instance of exceeding a criterion may trigger site remediation. Decisions should be based on statistically significant testing to determine whether detected contamination is truly significant.

- *Improved investigation and remediation technologies:* Improved or new technologies for more cost-effective investigation and remediation are lacking. Although technologies exist today for investigation and remediation, improvements will undoubtedly result in better contaminant elimination and lower costs. Improved remediation that is more cost-effective will obviously encourage redevelopment. However, progress is expected to be continuous and gradual.

- *Lack of knowledge about unusual contaminants:* The toxicological impacts of the more unusual contaminants are not well studied. As a result, scientific professions are often forced to forecast impact through the extrapolation of limited existing data. This is not normally a factor on most sites; however, in locations such as the arctic, it is a critical deficiency.

- *Lack of knowledge about all components of the ecosystem:* The ecosystem is a complex interaction of numerous components. Society has only recently begun to study the interaction between contaminants and various ecosystem components. Our understanding can be called preliminary, at best. With such a complex system, the modelling of impacts is difficult. The following two factors are particularly difficult to understand at this stage of scientific understanding: (1) long term impacts associated with low levels of contamination, and (2) cumulative (or sometimes synergetic) impacts of various contaminants.

Legal and Liability Issues

Liability issues include the need to determine who is responsible for managing or remediating contaminated sites, and who pays the costs. There are four general categories of statutory provisions leading to contaminated site liability that have been adopted by Canadian government authorities:

- general pollution or contamination prohibitions

- obligations on persons responsible for current spills (as opposed to historical discharges)

- restrictions on land use, development and transfers relevant to the contaminated property issue

- provisions authorizing the issuance of administrative orders requiring the performance of various activities addressing contamination.

A discussion follows on the nature of the four general categories of statutory provisions and resulting issues. Appendix C contains a detailed review of the actual provisions in the existing legislation (and in some cases, proposed legislation) from all Canadian jurisdictions. The provisions triggering liability are identified in each case.

General Pollution or Contamination Prohibitions

The most common approach to dealing with contamination is to prevent pollution. In all jurisdictions in Canada, the act of polluting is an offence. For example, in Ontario, there are two primary pollution prohibitions in the *Environmental Protection Act.* The first prohibits the discharge into the natural environment of any contaminant in excess of concentrations or levels prescribed by regulations. The second is more general: this prohibition renders it an "offence to cause or permit the discharge of a contaminant into the natural environment that causes or is likely to cause an adverse effect." The terms "natural environment," "discharge," and "adverse effect" are all defined extremely broadly. These sections are typical of the *prohibition approach* to the issue of contamination.

Pollution prohibitions are *strict liability* and *fault-based* offences. *Fault-based* refers to the necessity for the crown to prove a causal connection between the defendant and the pollution event in order to be successful in a prosecution (in contrast to the exposure to liability pursuant to the *administrative order* category. *Strict liability* refers to a concept applied by the courts in regulatory offences where the proof by the prosecution of all of the elements of the offence (i.e., that the defendant caused the pollution and is not just connected to it) indicate that the defendant is guilty of the offence (unless it is proven that the defendant exercised all reasonable care).

Current Spill Provisions

Many statutes impose a duty to report current spills and obligate the clean-up or remediation of such spills on persons in control of the substance released into the environment. Failure to report or fulfill the remedial obligations constitutes an offence. The question arises, however, about the application of current spill provisions to historical discharges. Most contaminated sites involve historical discharges.

The *Canadian Environmental Protection Act* requires that property owners report to an inspector any release of a toxic substance regulated under the *Act.* Under the same part of the *Act,* persons who own or have charge of a regulated substance before its release, or persons who caused the release, are obligated to remedy the situation or reduce or mitigate any danger to the environment.

Current spill provisions are also strict liability and fault-based offences. They are present in legislation in all jurisdictions except Manitoba and British Columbia.

Land Use, Development and Transfer Restrictions

In many Canadian municipalities, the usual methods of land use and development control such as planning approvals, building and occupancy permits now involve the consideration of potential contamination as a matter of course. Applications for approvals and permits may be denied by a municipality with respect to land that the provincial ministries have identified as contaminated. This effectively blocks redevelopment projects until clean-ups are performed.

In addition, as a condition to the issuance of provincial licences or other environmental or development permits, use restrictions for the contaminated land may be imposed at the provincial or municipal level. Also, some environmental legislation contains certain generic restrictions. For example, under Ontario's *Environmental*

Protection Act, land used as a waste disposal site is restricted from alternative uses for a period of 25 years from the year in which it ceased to be used as a waste site, subject to the approval of the Minister.

Also, many environmental statutes contain the requirement to register a notice on the title to the property. For example, under British Columbia's *Land Titles Act*, in cases where persons would be exposed to health dangers due to contamination of special wastes, a notice will be registered on title by the Director designated under the *Act*. Manitoba and Yukon also have some related provisions. Other jurisdictions do not.

Administrative Orders

This is the most contentious category of contaminated site liability. Under *administrative order* provisions, government authorities are empowered to issue orders and designate sites as being contaminated as part of the administration of the statutory scheme. Usually, the legislation will specify that a person designated as either a "director," a "manager" or "inspector" has such authority to issue the orders. In some cases, however, the authority rests with the "minister," which has implications as to how frequently the orders will likely be issued. Ministerial orders are typically reserved for serious situations (usually involving current spills) and if the statute only provides for the issuance of such orders, it is probable that the authority is rarely utilized.

The various potentially responsible parties who can typically receive such orders always includes those persons responsible for causing the pollution, which is generally in accordance with the fundamental principle of fairness in regulation ("polluter pays"). These provisions, however, usually extend potential liability to innocent owners, lessees and occupiers of the land in question and, often, to predecessors in title or their successors. The liability associated with this category is typically not fault-based: it does not depend upon a causal connection between the party ordered and the event which triggers the order.

In addition, the government authorities may, at their discretion, issue the orders to one or more of the potentially responsible parties as identified in such provisions, or to all of them. This concept is characterized as *joint and several liability*. Parties who are ordered under such provisions are collectively or individually liable for the full cost of the clean-up of the site. The premise underlying the extended and joint and several liability aspects of this category of provisions is that the public interest is secured by ensuring an efficient and immediate response to the contaminated site issue.

These concepts are, however, extremely contentious and have given rise to significant attention over the last few years, particularly regarding their lack of adherence to the principle of fairness. Needless to say, these elements of contaminated site liability have a deterrent effect on the redevelopment of contaminated sites because of the risk they pose to parties "coming to the sites" (for example, innocent purchasers and successors in title, who often discover the contamination in the course of redevelopment).

In many jurisdictions, the principle of fairness is having the effect of slightly modifying the associated risk. For example, the principle has been applied in recent case law in Ontario and is codified in "liability allocation factors" in statutory enactments in British Columbia, Alberta and Nova Scotia. However, the basic concepts

of "joint and several" and "extended" liability have been held in reserve and apply if the allocation process fails. To this extent, these concepts continue to characterize this category of contaminated site liability.

Clean-up criteria are contained either in the legislation (typically in a regulation) or in supporting policies. Where possible, the discussion of the actual provisions in Appendix C identifies where the criteria can be found in each jurisdiction. Any discussion of supporting policies in Appendix C is restricted to matters of a legal nature in the policy (such as the registration of notices on the title to the property). The technical discussion of the policy is contained in Appendix D.

Failure to comply with such administrative orders can either constitute an offence or attract civil liability by permitting the government to recover the public funds expended on the clean-up of a contaminated site in the courts, or both. Where failure to comply is an offence, it constitutes a strict liability offence.

Financial Issues

Financial issues are those related to the ability to secure financing of development projects and to the costs associated with developing on contaminated sites. Examples of financial issues are listed below:

- *Exorbitant costs:* The costs of site remediation or management are often exorbitant, and can quickly render a housing project uneconomical to develop.

- *Lack of incentives:* In some instances, lands will remain undeveloped without some form of economic incentive. Clean-up funds such as those provided in the past by the NCSRP and the American "Superfund" have had some success. The NCSRP funding program was terminated as of March 1995, and there is no alternative program planned.

- *Lack of funding:* Most financial institutions in Canada (banks, trust companies, cooperatives, etc.) will not provide capital financing to land developers until contamination issues are resolved, typically to the satisfaction of provincial ministries of the environment. This is because of fears of legal liability and the uncertainty that the real estate asset will retain its value.

- *Orphaning of sites:* With contaminated lands, lenders may fail to realize their security (by assuming possession of the asset when the mortgagor defaults) because of fear of exposure to liability. Sites therefore become orphaned.

- *High rates:* Financing of projects on contaminated sites often comes at a premium as institutions perceive greater risk.

- *Risks of bankruptcy:* Even minor cost over-runs in contamination management or treatment plans can bankrupt the developer when profit margins are slim.

- *Costs of insurance:* When several firms including contractors and other professionals are engaged in site remediation or management, the cost of each firm securing its own environmental insurance is compounded.

- *CMHC insurance:* CMHC will not provide mortgage insurance until contamination issues are resolved.

- *Negative value:* The presence of contamination usually triggers a reduction in property value — sometimes to a negative value — when the cost of remediation or management exceeds the asset's normal market value.

- *Loss of tax revenues:* Negative market values can lead to the orphaning of sites, and municipalities and school boards then go without realty tax revenues.

- *Impact on adjacent property:* The value of adjacent properties may also depreciate because of fear of the unknown and perceived exposure to risk.

- *Impact on housing cost:* The costs of site remediation or management usually yield housing that is more expensive. When the market is for more affordable housing, projects may not be viable.

- *Cost benefit due to location:* Because contaminated sites often exist in areas that already have municipal services (such as water, sewer), these areas may be more economical to service than to expand outward to urban boundaries. This cost benefit is not often factored into calculations of the net costs of remediation.

- *Multiple ownership:* Where contaminated sites are under more than one ownership, it can be difficult to allocate costs and to confirm participation in housing development projects.

- *Under-used insurance options:* Insurance industry products (such as those providing a clean-up cost cap), environmental wrap-up, spills insurance, and future funding policies are relatively unknown and possibly under used.

Urban Planning Issues

Urban planning issues are those related to land-use planning and development processes, and to other matters of municipal interest. Examples of issues are as follows:

- *Registries:* It is difficult to plan for contaminated sites when their location and nature is not known. In this context, many municipalities have initiated mapping, registries, and databases for potentially contaminated sites. This has the potential to be a valuable tool, especially if it can be a living database which is regularly updated. The issue is whether or not these initiatives should be mandatory, and what level of government should be responsible.

- *Land-use policies:* Given the choice, land developers will select greenfields for development, because there is more certainty. Thus, land-use policies that encourage a long-term supply of development land actually work against policy efforts to develop contaminated sites.

- *Planning regulations:* Official plans, secondary plans, district plans, and zoning by-laws often place another layer of regulation on contaminated sites by putting special restrictions on the use of contaminated sites, or on the redevelopment of

industrial sites that may not necessarily be contaminated. In Ontario, for example, such sites are sometimes placed in a "holding zone" until the contamination or its potential is addressed by applicants.

- *Clean-up costs:* High clean-up costs can force developers to pursue higher-cost housing,[14] which runs contrary to many planning policies that encourage the development of more affordable housing.

- *Municipal incentives:* Municipalities should recognize that it can be less expensive to redevelop sites in already-serviced areas — where contaminated sites are often located — and should consider development incentives and favourable planning policies.

Communication Issues

Communication issues are those that arise from the level of understanding of the various participants in the development approval process (as illustrated in Exhibit 2.2). These issues pose some of the more significant barriers to the development of housing on contaminated sites. Examples are as follows:

- *Lack of knowledge:* Many of the misconceptions and fears of all the participants stem from a lack of fact-based knowledge of the topic.

- *History of sites:* Fear of contamination at a former industrial site may discourage potential site purchasers. Since it is difficult for members of the public to understand contaminant impacts and transport, they fear a potential threat to their health. A site registry, as implemented in British Columbia, reduces uncertainty about the history of a site.

- *Liability:* Any former industrial site prompts liability concerns with regard to residual contamination. Lack of early identification of a contaminated site can discourage lenders and developers from considering an industrial site for redevelopment. This barrier is simply the fear of the unknown.

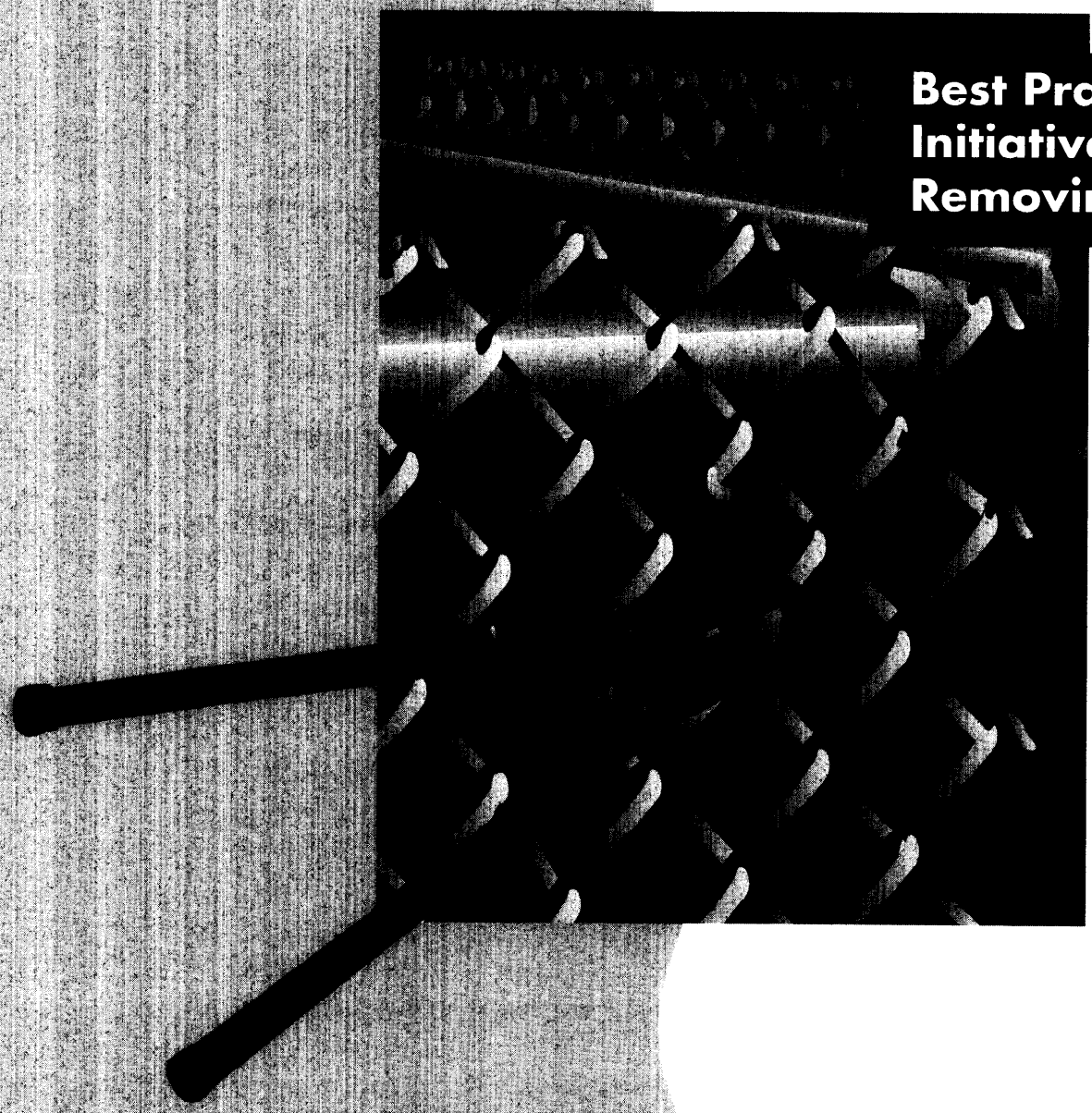
- *Restricted knowledge:* Participants are not well-educated on the topic of developing housing on contaminated sites because knowledge is primarily in the hands of engineers, scientists, and regulators.

- *Lack of educational tools:* There are few educational tools, particularly about health risks and liability, that can be used by non-technical participants such as land developers, municipal planners and decision-makers, financial institutions, community groups, and ordinary citizens.

- *Media:* The media often exacerbates the problem by continually referring to the most heralded contamination cases, thereby raising more anxiety.

- *Closed processes:* The processes through which the development of housing on contaminated sites occurs are often not open and consultative in terms of the general public. This can breed fear and misconception.

5



Best Practices and Initiatives for Removing Barriers

This chapter presents a selection of best practices that can be used to break down barriers to the development of housing on contaminated sites. These best practices can guide policy making and provide solutions for all participants in the process. To illustrate key points, examples are provided. Initiatives to pursue the best practices, including further research needs, are suggested.

Augmenting the CCME Principles

The 13 CCME principles are undoubtedly a good starting point for a consistent and sound approach to regulating contaminated sites across Canada, particularly from the liability perspective. They can be adapted to suit provincial and territorial sensitivities. The best practices highlighted in this chapter therefore focus on the other five issues, considering that the legal/liability issue is but one of six broad issue groups that can act as barriers to the development of housing on contaminated sites.

In most provinces the technical/scientific approach and regulatory approval processes need to be improved and accelerated to encourage contaminated site redevelopment. The objective is to improve lender and site-user confidence, minimize lender liability, and reduce site remediation costs — the issues that are the principal barriers to site development.

From Chapter 3, it is apparent that many regulatory guidelines suitable for the housing sector are currently under development. Guidelines and regulatory policy in British Columbia, the most advanced relative to other jurisdictions, are currently encouraging the development of inner-city sites. Many provinces tend to focus on removal or treatment of contamination and consequently lag behind the capabilities of current technology and current understanding of the potential risks. The basic objectives of British Columbia's guidelines are to provide adequate and appropriate protection of public health and the environment. This includes the protection of drinking water, surface water, and air quality, as well as overall ecosystem health. These regulatory changes are being driven by the political desire to reduce costs and liability, as well as to increase lender and user confidence in the redevelopment of contaminated lands, without jeopardizing the level of protection.

A Case in Point

British Columbia is a Leader

Through its experience with Pacific Place in Vancouver, British Columbia, has emerged as a leader in this field, by embracing a risk-based approach and pursuing regulatory flexibility. Because the liability and cost for clean-up remained with the Province for this orphan site, the site became a test case for the development of new criteria and approaches to safe and cost-effective contaminated site management since the initiation of site investigation in 1988. The development of new provincial guidelines based on the risk assessment/risk management principles made in situ *management of contamination possible in this case.*

Source: See Appendix B, Case Study D.

Twenty-Two Best Practices

Twenty-two best practices are recommended to augment the CCME principles. These are articulated in this chapter, along with suggested initiatives for their implementation.

Exhibit 5.1

Best Practices for Removing Barriers to the Redevelopment of Contaminated Sites for Housing

1. Adopt the principle of *user pay* for site review to allow for fast tracking of approvals.
2. Develop exposure-pathway-specific and depth-restricted numerical cleanup criteria (based on toxicity).
3. Allow the use of future clauses.
4. Make provisions for contaminated soil relocation.
5. Improve regulatory sign-off mechanisms.
6. Ensure a consistent approval process.
7. Pursue integration of land use planning with other approvals.
8. Consider the application of wide-area designations.
9. Require the registration or certification of qualified practitioners.
10. Develop and encourage the use of risk assessment/management methods.
11. Encourage a statistical evaluation of soil and water quality data.
12. Pursue further research regarding toxicological data and environmental effects.
13. Improve support for the development of new remedial technologies.
14. Encourage the use of limited liability agreements.
15. Promote collaboration between all levels of government to provide financing, incentives, and public/private joint venturing opportunities.
16. Promote awareness and innovation of new environmental insurance products.
17. Encourage the use of, or require, contaminated site profiles.
18. Require registries or databases of known contaminated sites.
19. Encourage municipalities to prepare contaminant risk mapping.
20. Pursue alternative methods of notices on title of contamination issue.
21. Develop information tools to help educate all participants in the process.
22. Promote awareness of contaminated site development "success stories."

Source: Delcan Corporation, Golder Associates Ltd., and McCarthy Tétrault.

The following paragraphs provide a brief description of the application of each best practice. It should be stressed that many of these individual approaches can be integrated. To pursue these best practices, various initiatives are suggested.

1 *User-Pay*

Adopting the user-pay principle for review services allows fast tracking of approvals through the regulatory agency. "User" normally means the landowner or developer. In several jurisdictions the review process for large-project submissions can be uncertain and can take up to several years, resulting in higher costs. These delays may cause some projects to stall or be cancelled by the owners. The fear of a potential delay is a barrier to developers in even considering site development.

A Case in Point

User-pay can Fast-track Approvals

In the case of the Port Credit former refinery site in Mississauga, Ontario, the proponent, Imperial Oil, adopted the user-pay principle and hired their own consultants to act in consort with the MOEE. An interactive working relationship developed with the MOEE that led to the smooth progression of approvals. However, some approvals for major issues still took years to obtain.

Source: See Appendix B, Case Study C.

British Columbia has provided proponents of site redevelopment with the option of fast tracking review time with service fees. The service fee supports the use of independent consultants for review or promotes adequate staffing levels with the agency. A set rate schedule permits, as required, a review of site applications by prequalified review consultants acting in parallel, or on behalf of, the regulatory agencies. It is therefore up to the proponent to evaluate the benefits of fast tracking approvals. This process simply ensures that the proponent has one more controllable factor in the development of a contaminated site.

To pursue this best practice, the following initiatives should be undertaken:

- **Review the acceptance of user pay in the provincial political climate.**
- **Establish the personnel qualifications to complete the review (see also Best Practice 8).**
- **Assess the benefit of user pay versus a regulatory agency commitment to fast tracking.**

2 *Numeric Clean-up Criteria*

Consideration of exposure pathways (including depth) for the development of numerical criteria remediation will allow for more appropriate mitigation. Traditionally, site remediation for residential use dictated removal of all contaminated soils to levels at which soil quality met generic residential criteria. To achieve compliance, these excavations have no depth limitation. Proposed Ontario policy and current policy in British Columbia include options for depth restrictions of site remediation to numeric criteria, and stratified remediation criteria. In British Columbia's policy, migration pathways and receptors are considered, as well as how they influence the corresponding risks. If conditions are acceptably met, site

remediation to residential criteria will proceed to a specified depth. Beyond this specified depth, identified for protection of receptors at the surface, other criteria such as protection of ground water for drinking or aquatic use would apply.

In the Province of Ontario, it is proposed that stratified remediation will have to be registered on title to ensure that future land owners and users are aware of the condition and extent of remedial work. Though this registration may have a disadvantage from a property value point of view, this stratified remediation approach will allow site redevelopment to proceed with significant reductions in project costs.

To pursue this best practice, the following initiatives should be undertaken:

- **Implementation of generic risk-based criteria should be considered.**
- **Mechanisms should be researched which allow the communication of exposure pathway considerations to future landowners.**

A Case in Point

Depth-Restricted Criteria can Save Clean-up Costs

In order to properly protect human health and the environment in the remediation of lands in Montreal, Quebec (along the Lachine Canal in a former industrial area), an essential step in the integrated decision process was to proceed with a risk assessment. The risk assessment was based upon the U.S. Environmental Protection Agency approach. The costs for decommissioning the site, including excavation and disposal of soils exceeding the CCME criteria for residential/ parkland areas, were estimated at approximately $9 million. According to the findings of the risk assessment, the costs could be reduced to approx. $1.9 million. The site remediation concept adopted by Public Works Canada cost approx. $2.4 million, because, under the integrated decision framework approach, the "good neighbour" issues were judged as of paramount importance and, consequently, a free hydrocarbon phase had to be removed along with the top metre of contaminated soil. The one-metre depth was chosen on the basis of phytotoxicological considerations.

Source: See Appendix B, Case Study F.

3 *The Future Clause*

This clause describes the option a regulator can trigger some time in the future to initiate additional study of a previously remediated site, despite the issuance of a confirmation that the site remediation process took place according to the policy effective at the time of the work. The future clause would be triggered by items such as changes in contaminant toxicity, available data, standards, site activity, or proper care of the known contamination. It is recognized that adopting such a clause is in the public interest because it provides increased protection. However, it introduces financial uncertainty to the process of site remediation, increases costs, and may raise future liability issues. Although the intent of the clause is consistent with the intent of the regulators for protection of the public, its application and trigger mechanisms need to be examined to reduce uncertainty among investors and users.

To pursue this best practice, the following initiatives should be undertaken:

- **Harmonize the terminology for inclusion in future clauses between jurisdictions.**

- **Research the procedure by which the public can be adequately protected from remnant contamination at a property.**

- **Research the procedures by which future liability is reduced for investors and users of a property with remnant contamination.**

4 *Soil Relocation*

Presently, remediation by excavation and disposal of soil to a waste disposal site or the *in situ* or *ex situ* treatment of subsurface conditions are among the more cost-effective remedial options (not including in-place risk management of contamination). For some projects, the disposal costs still make up a significant percentage of site remediation costs. Overall project costs could be reduced if an alternative for landfill disposal were permitted, and the waste classification of soils were modified.

Soil relocation is based on the consideration that excavated soil that may not meet residential use criteria can be relocated and reused on an industrial site. This will require some regulatory change in order to grant approval for this practice. Through a soil relocation agreement, transport of the soil to another location may provide another alternative. This soil relocation is, however, subject to the consideration that the relocated soils must not pose a risk in the new location, and that they be suitably tested to confirm compliance consistency and suitability for reuse. It should be noted that policy in British Columbia allows for soil relocation, whereas the materials management plan initiative on this subject has not been finalized in Ontario. Residual liability for the relocated soils appears to be an unresolved issue and requires research and resolution.

To pursue this best practice, the following initiatives should be undertaken:

- **Research the implementation of reuse of contaminated soils in less sensitive site settings.**

- **Research the regulatory requirements to reuse contaminated soil.**

- **Study the associated liability issues.**

5 *Regulatory Sign-off*

British Columbia currently issues "Approval in Principle" for remediation plans and "Certificates of Compliance" for completed sites. In Ontario, the MOEE issued statements of completion under the 1989 Site Decommissioning Guideline. (Note that similar statements of completion are not included in the proposed revised MOEE Remediation Guidelines.) Though British Columbia does not accept liability, these statements by an independent regulating body provide confidence to prospective buyers and financiers. They therefore encourage site remediation. Regulators must be encouraged to demonstrate leadership with respect to these issues.

To pursue this best practice, a review of the implementation of regulatory endorsement of completion of site remediation should be undertaken.

6 Approval Process Consistency

Consistency in the approval process both over the long term and between jurisdictions is a key factor in encouraging site redevelopment. Of great concern to the investors and insurers is the possibility of future reductions in remediation criteria which would result in changes to the potential land use. Remediated sites could be reclassified by guideline reductions and rendered unusable. For example, Ontario recently lowered the acceptable criteria for lead in soil from 375 ppm to a criteria value of 200 ppm for residential sites. The other concern is that regulations and policies are interpreted differently between different jurisdictions, which leads to confusion and eventual delays in the site development process.

A Case in Point

Minneapolis Sets an Example

Regulatory sign-off has a proven track record in the United States in addressing concerns with lender liability. A good example is Sawmill Run, Minneapolis. Both the aggressive and persistent work of the Minnesota Community Development Agency, and the Minnesota Pollution Control Agency's Voluntary Investigation and Clean-up Program were keys to the success of a 66-unit townhome development on a riverfront site in that city. The latter program offers an expedited oversight process and provides written assurance letters to address lender liability concerns.

Source: See Appendix B, Case Study G.

To pursue this best practice, the following initiatives should be undertaken:

- **Harmonize approval processes and requirements between jurisdictions.**
- **Determine where regulations or guidelines allow for ambiguity or not.**
- **Develop clear and universal policies and regulations where practical.**
- **Improve regulator education and communication between offices.**

7 Integration of Land Use Planning with Other Approvals

Because the redevelopment of contaminated sites for housing requires the successful completion of numerous — and often unrelated — planning and approval processes, it follows that these processes should be as integrated and streamlined as possible. Such processes may include a rezoning and site plan approval being administered by the municipality, at the same time as a site remediation application is being processed by a provincial body. A harmonization of these types of processes should help reduce duplication of effort, enable consistent opportunities for public input, ensure consistent information, and reduce the approvals time frame.

To pursue this best practice, the following initiatives should be undertaken:

- **Provincial legislation and regulations should be reformed, where necessary, to ensure that an integrated approvals process can be utilized.**
- **Municipal planning documents such as Official Plans should contain policies that enable special planning processes for developments on contaminated sites.**

8 *Wide-Area Designation*

Contamination from historical spills can spread and cause a low level yet regional impact on ground water or surface water. Other sources, such as factory emission fall-out, may not be limited to the site of origin. In some cases, the source industry, such as coal gasification, may have ceased operation long ago. Contamination beyond site boundaries with the consequential involvement of other land owners can halt development due to ongoing concerns with renewed contamination from off-site sources. Instances when the contaminants identified are of acceptable risk should be confirmed, and the sources should be clearly documented. This is especially true when the historical source of contamination is no longer operational.

Wide-area designation is defined, for the purpose of this study, as the process in which regional contamination cannot be addressed from a site-specific perspective, but has to be addressed from a regional perspective, and where the initiative is taken to address contamination on a multiple site level. Wide-area site designation may need to be invoked by the regulator or other local or regional municipal agency to address the contaminant issue on a multiple-site scale.

To pursue this best practice, the following initiatives should be undertaken:

- **Identify the role of government in undertaking and encouraging a wide area remediation effort.**
- **Identify mechanisms by which wide-area remediation could be achieved.**
- **Research the potential for cumulative impacts of contaminants from a number of sources.**

9 *Registration/Certification of Qualified Practitioners*

Currently, professional groups with a wide variety of backgrounds and experience perform site investigations leading to site remediation and undertake the technological aspects of site redevelopment. It is suggested that qualified practitioners be registered under an approved federal body such as the Canadian Council for Human Resources in the Environmental Industry. Registration of qualified practitioners will ensure better consistency in site redevelopment.

To pursue this best practice, the following initiatives should be undertaken:

- **Set out and establish the requirements for qualified practitioners, including academic credentials and experience.**
- **Develop universal training courses and materials.**
- **Register or certify qualified practitioners under a national/provincial regulating body.**

10 *Risk Assessment/Risk Management*

The risk assessment/risk management approach as discussed in Chapter 1 is preferred to the generic numeric approach. Generic site remediation based on a consideration of migration pathways and receptors is a generalized and conservative approach, which typically leads to large site remediation costs to meet compliance with the remediation values. Risk assessment/risk management is preferred for site redevelopment because it provides proven significant reduction in site remediation costs, and it also provides additional site information through site-specific assessment of exposure and migration pathways. This site-specific assessment of exposure and migration pathways allows for better definition of the contaminant problem.

Developing an understanding of the exposure and migration pathways, as well as the toxicity associated with a contaminant, assists in communicating the development concept and the adequacy of remedial work and contaminant migration control measures to the public.

Risk assessment allows for better design of site investigation techniques, improving the knowledge gained and the use of resources. Only the issues of concern are examined and addressed during the investigation and remediation process: consequently remediation costs are significantly less in the site development process. British Columbia is developing a tiered approach to risk-based remediation, with Tier One consisting of generic- and toxicity-based criteria for all relevant exposure pathways. Tier Two then allows for adjustments of the Tier One criteria for site-specific conditions such as depth to contamination and soil type. Tier Three is a detailed assessment of risk, and may include measures for controlling exposure pathways such as isolation of contamination. The Department of National Defence has adopted a similar tiered approach to investigation and remediation. This approach allows for the allocation of the appropriate level of resources to both the investigation and remediation.

A Case in Point

Risk Assessent/Risk Management in Practice

The success of risk assessment/risk management is demonstrated by the following example. The site remediation and in situ management works were implemented during the construction of an apartment building in Vancouver, British Columbia. The risk assessment/risk management approach involved cutting off the exposure pathways and thereby eliminating risks to human health. Potential soil vapour exposure was controlled by providing ventilation underneath the building. This had the dual function of venting potential hydrocarbon vapours from the heating oil contamination and venting methane gas from peat deposits at the site. Metal-contaminated soil was partly removed for foundation construction and site grading, and the remaining soils were covered by the building and pavement. Site redevelopment would likely not have been considered if the risk assessment/risk management had no regulatory acceptance in British Columbia.

Source: See Appendix B, Case Study E.

To pursue this best practice, the following initiatives should be undertaken:

- **Develop generic criteria related to exposure pathways for site screening purposes.**

➤ **Implement risk assessment/risk management as an acceptable approach in new legislation, policies, and guidelines across Canada.**

11 *Statistical Evaluation of Contamination*

Classification of soil and ground water impacts can be established based on a single instance of exceeding the criteria, without regard for the significance of that instance. On one site, hundreds of samples may be taken with only a few exceeding the criteria. Statistical evaluation of soil and water and other media quality data allows for an evaluation of the significance of a specific example of exceeding a criterion. A statistical evaluation typically leads to a more appropriate interpretation of the potential impact of the instances when guidelines are exceeded.

A Case in Point

Learning from Holland

In a redevelopment project in Lasalle, Quebec, the application of the generic criteria from the Dutch approach led to further development of guidelines in Quebec. Guidelines for characterization, rehabilitation, control measures during excavation, design and construction of high and maximum secure landfill cells, standardization for sampling, standard methods for chemical analysis of samples, criteria to assess treatment technologies, etc., have all been developed.

Source: See Appendix B, Case Study A.

To pursue this best practice, a statistical assessment should be allowed by regulatory authorities as an aid to evaluating whether or not a contaminant exceeds the criteria.

12 *Toxicological Research*

The identification and prediction of impacts on an ecosystem component is still a new and developing field. Over time, more and more toxicological data will become available for the prediction of environmental impacts. Improvement is especially required in the evaluation of cumulative and long-term impact. These data will become available and accepted through more academic study and empirical observation.

To pursue this best practice, research on toxicological data and ecosystem impacts should be encouraged.

13 *New Remedial Technologies*

More cost-effective remediation could result from the development of improved and new technologies, overcoming the current lack of acceptance by regulators and the public for the treatment or destruction of certain contaminants, such as PCBs. Alternative, local solutions to soil treatment and disposal could be pioneered.

To pursue this best practice, the development of remedial technologies should be supported by government programs and resources.

14 *Limited Liability Agreements*

Lenders may fail to realize their security when mortgagors default, because of fears of exposure to liability. One approach to mitigate this involves limited liability agreements. Ontario has a draft standard form agreement that enables lenders to limit

their liability (see Province of Ontario *Agreement Limiting Environmental Liability of Lenders*, December 1995, in Appendix C). In essence, if lenders know that there is an upset limit or cap on their liability, they are more predisposed to act on their security, taking possession of a land asset.

To pursue this best practice, the following initiatives should be undertaken:

- **Research the extent to which, in practice, the liability allocation processes which have been introduced in legislation have succeeded in avoiding the application of the concepts of extended and joint and several liability.**
- **Recognize the use of limited liability agreements in legislation, where desired.**

15 *Public Funding, Incentive and Joint Venturing Programs*

For many contaminated sites, the magnitude of the contamination problem is too large for the private sector to take on. Without some form of government funding or financial incentives, such lands may remain vacant, idle, orphaned, and contaminated indefinitely. Also, governments and the private sector may be able to pursue joint ventures, in which both risk and profit potential are shared. Collaborative government assistance is especially important now that the NCSRP has been abandoned.

To pursue this best practice, the following initiatives should be undertaken:

- **All layers of government, including federal, provincial, regional, and municipal, need to collaborate and pool resources.**
- **Government decisions on funding should consider the high social and environmental costs of keeping contaminated lands vacant and idle. Research is required in this area.**
- **Local governments should explore the use of incentives — including elimination of lot levies (development charges) for dwellings developed on previously contaminated sites, or property tax breaks, for example.**

16 *Environmental Insurance Products*

A range of environmental insurance products are available to developers of contaminated sites in Canada. *Clean-up Cost Cap Policies* protect a site remediator from cleanup costs that overrun the budgeted amount. The policy would insure the amount of overrun up to a specified amount. The price of the insurance may be less than $50,000 for an overrun policy up to $1 million, for example. *Environmental Wrap-up Insurance* is available for contractors' operations and professional services to insure themselves from liability, all under one policy for each project, as opposed to various individual policies. *Pollution Legal Liability Insurance* or *Spills Insurance* is available to protect businesses and landowners from the liability of a future contamination problem, such as a future spill or the detection of existing, yet unknown, contamination. Also, some insurance companies can provide policies that act as a future clean-up fund, and have the effect of transferring and timing the risk and capital outlay.

To pursue this best practice, the following initiatives should be undertaken:

- **Increase awareness and use of environmental insurance products.**
- **Encourage insurance companies to develop other innovative and flexible products.**

17 *Contaminated Site Profile*

British Columbia requires that a site profile be submitted to the regulator with each site redevelopment. This site profile consists of a standard questionnaire that addresses site history and related contaminant concerns. This site profile reduces the perception that every site that had former industrial use is contaminated, by allowing a rapid identification of sites with potential contaminant problems. Early classification of site contamination concerns reduces the fears of developers of former industrial sites. A consistent approach will foster acceptance of redevelopment through better understanding of contamination issues and the routine exposure of all potential concerns.

To pursue this best practice, the following initiatives should be undertaken:

- **Encourage preliminary site screening in transactions.**
- **Update Contaminant Risk Mapping as outlined in Best Practice 19.**

18 *Contaminated Site Registry*

A site registry to protect the future use of a known contaminated site is a requirement in British Columbia. Some municipalities in Ontario have started compiling lists of documented contaminated sites. This requirement gives comfort to the regulators and future site owners. The site registry may depress the value of a property, but deters unwary purchases. With wider routine documentation, the practice of risk management and site remediation will be better accepted in general.

To pursue this best practice, the following initiatives should be undertaken:

- **The requirement of municipalities to maintain a registry of known contaminated sites should be contemplated in new legislation and policies.**
- **Research should be undertaken to show how these registries, where in place, have contributed to the due diligence performed in the typical property transaction.**

19 *Contaminant Risk Mapping*

Knowledge of historical land use can often provide clues or indications of the risk of land contamination. For example, if city records or air photography indicate the past existence of a coal gasification plant or a landfill site, there is a strong likelihood of some form of contamination, even if no on-site investigations have been carried out. This mapping can be accompanied by a historical land use database (HLUD).[15] With

this information, urban planners can designate contaminant risk areas in planning documents such as Official Plans and Zoning By-Laws. This can give early warning to interested parties, promote awareness, and facilitate appropriate land use planning.

To pursue this best practice, the following initiatives should be undertaken:

- **Through provincial land use planning policy, encourage or even require municipalities to maintain mapping of potentially contaminated sites.**
- **Develop and make available a model computer-assisted database for coding sites, possibly using Geographic Information Systems (GIS) technology.**

20 *Notice of Site Remediation*

Current requirements in British Columbia are that a site that has undergone site remediation has a notice registered on title. This is useful in promoting awareness. However, the current method of registration yields a "contamination problem" stigma to the respective property. A more appropriate way defining the condition of the site in more positive terms may be possible. Public education on risk assessment and the potential for impacts is also required. This can be done on a project-by-project basis through the application of best practices concerning public consultation.

To pursue this best practice, methods of communicating remediation efforts to prospective buyers, with less negative connotation and stigma, along with better public education, should be explored.

21 *Information Tools and Accessibility*

Accessible information and the opportunity for public input should be included in all approval processes, as is required in the legislation under development in British Columbia. Educational material that suits the interests of a wide range of participants should be developed and written in plain language, in an attempt to reduce fears and misconceptions.

To pursue this best practice, the following initiatives should be undertaken:

- **Explore methods to include the public in decision-making and activities regarding contaminated site remediation.**
- **Examine the appropriateness of public consultation processes for site remediation, such as those that are currently required under the *Canadian Environmental Assessment Act* under certain circumstances.**
- **Publish more explanatory material, written in plain language, that can educate the public and all participants in the process.**

22 *Promote Awareness and Success*

Awareness and education of advances in site remediation and contaminant management technology can help reduce fears and misconceptions. For all of the participants in the site redevelopment process (as identified in Exhibit 2.1), ongoing education is required.

To pursue this best practice, those involved in regulating and developing housing on contaminated sites should promote, as often as possible, the significant advances and success stories, as well as the environmental benefits in terms of community health and sustainability.

Conclusions

- The issue of removing barriers to the development of contaminated lands in Canada is an important one, considering that there is an opportunity to produce tens of thousands of dwellings for Canadians on lands in areas already serviced with urban infrastructure. The key areas of public interest regarding housing and contaminated sites include protection of human health, ecosystem health, and the overall health of our urban areas. This interest is consistent with the theme of sustainable development.

- The typical land development approvals process in Canada is complex. It involves many different participants, including various government agencies, and the process is further complicated when soil contamination issues arise.

- There is a myriad of legislation, statutes, regulations, policies, and management practices that exist in various jurisdictions in Canada regarding the development of housing on contaminated sites.

- There has been little progress across Canada in implementing the 13 principles established by the CCME.

- Key issues regarding housing and contaminated sites can be grouped as: Regulatory, Technical/Scientific, Legal/Liability, Financial, Urban Planning, and Communications.

- In many jurisdictions, the regulatory environment places unnecessary and onerous requirements on the land development process, which often combine to act as barriers to development. These regulatory issues are usually the root of the more significant barriers. There often are other factors including urban planning practices and communication issues that contribute to barriers to development.

Recommendations

- The approach being introduced in British Columbia, which includes risk assessment/risk management, is a model which can be used as a building block for a preferred policy model for Canada. Some of these policies are now also included in proposed policies for Ontario and Quebec.

- There are at least 22 best practices, as illustrated in Exhibit 5.1, that can be pursued in combination with the 13 CCME principles to help remove barriers to the development of housing on contaminated sites. The majority of these relate to regulatory issues.

- The single most important best practice is risk assessment/risk management approach. This should be pursued in all jurisdictions in Canada, and acknowledged in legislation, policies, and guidelines.

- Various initiatives can be taken to pursue the 22 best practices. Because the best practices are inter-related and often mutually supportive (although not inter-dependent), it is difficult to prioritize the initiatives. They should be pursed by governments as a package, where possible.

- To the extent that priorities can be made, the more important research-oriented initiatives are in pursuit of the following best practices:

  2 numeric clean-up criteria

  3 the future clause

  4 soil relocation

  9 registration/certification of qualified practitioners

  12 toxicological research

  13 new remedial technologies.

In conclusion, it is clear that considerable work needs to be done across Canada to create a contemporary and consistent approach to dealing with the development of housing on contaminated lands. The 22 best practices can be incorporated into any such approach. To pursue this objective, it is recommended that *Contaminated Site Redevelopment Action Plans* be developed. Such plans may be made at either the federal or provincial levels, or both, if efforts are coordinated. These action plans can address the following questions:

- Who is the lead agency or authority?

- What opportunities for public/private partnerships can be realized?

- What are the program priorities in terms of actions and research?

- What are the costs?

- What are the available resources and funding sources?

The 22 best practices, and the initiatives for pursuing them, should be embellished in such action plans.

Endnotes

1 G. Ford et al., "Who Pays for Past Sins?" *Alternatives*, Vol. 20, No. 4.

2 K. Sisson et al., *Toxic Real Estate Manual* (Toronto: Wilms and Shier, 1989).

3 Communication with Doug Tilden, 1989.

4 Canada Mortgage and Housing Corporation (CHMC), *The Relationship Between Urban Soil Contamination and Housing in Canada*, report prepared by Gardner Church and Associates (Ottawa, 1993).

5 Mark Roseland, *Toward Sustainable Communities: A Resource Book for Municipal and Local Governments* (Ottawa: National Round Table on the Environment and the Economy, 1992).

6 Professional Engineers of Ontario, Professional Engineers Providing Services in Environmental Site Assessment, *Remediation and Management*, 1996.

7 British Columbia, Ministry of the Environment, *Contaminated Sites Regulation*, third draft (Victoria, BC, 1995).

8 Ibid.

9 Ontario, Ministry of the Environment and Energy, *Proposed Guidelines for the Clean-up of Contaminated Sites in Ontario* (Toronto: Queen's Printer, 1994).

10 C. Bartsch and E. Collaton, *Coming Clean for Economic Development: A Resource Book on Environmental Cleanup and Economic Development Opportunities* (Washington, DC: Northeast-Midwest Institute, 1995).

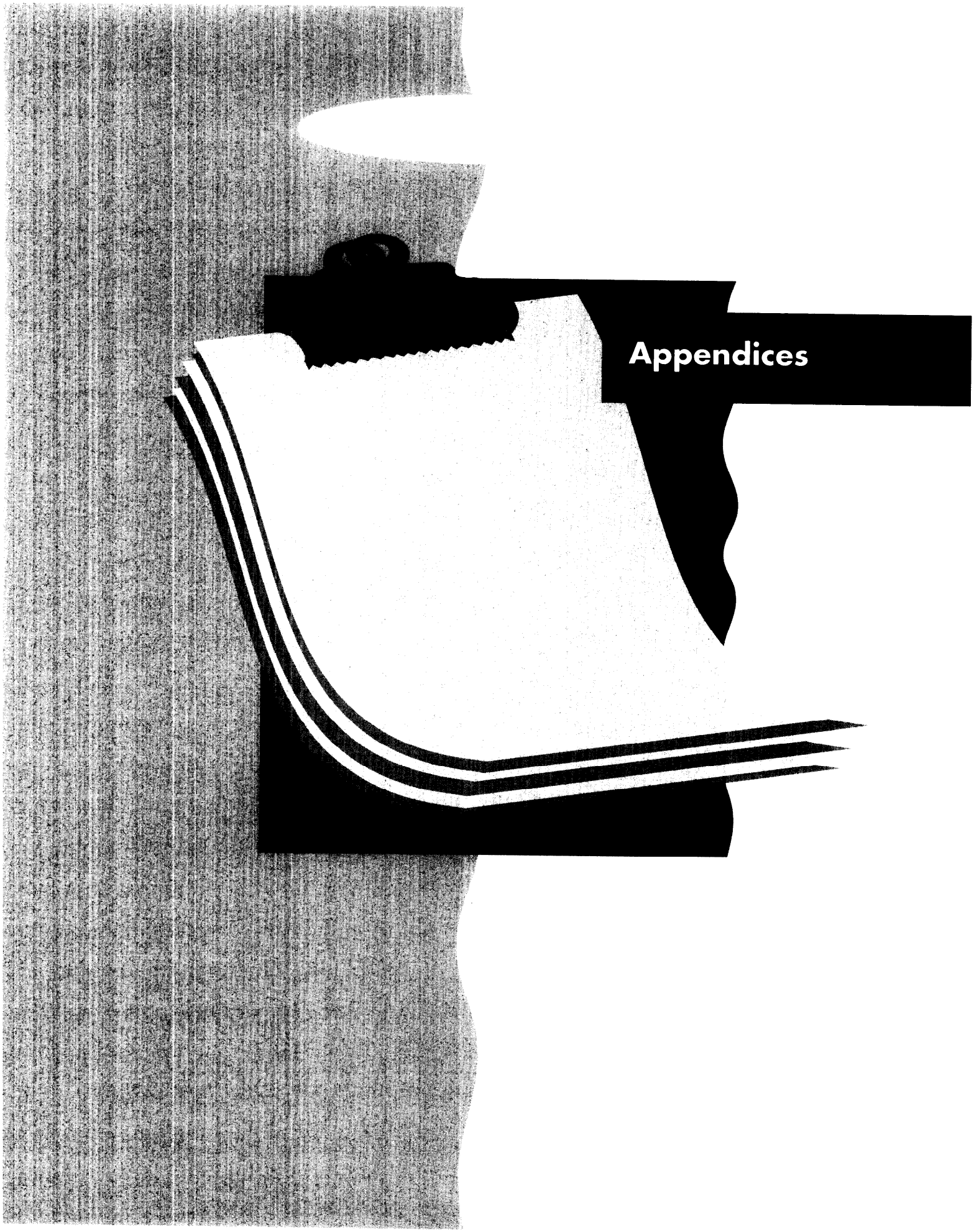
11 C. Bartsch, *Federal Legislative Proposals to Promote Brownfield Cleanup and Redevelopment* (Washington, DC: Norhwest Institute, 1996).

12 P.B. Meyer et al., *Contaminated Land: Reclamation, Redevelopment and Reuse in the United States and the European Union* (Brookfield, VT: Edward Algar Publishing Company, 1995).

13 Communication with the Waterfront Regeneration Trust, 1996.

14 William E. Munson, *Soil Contamination and Port Redevelopment in Toronto, Working Papers of the Canadian Waterfront Resource Centre* (Toronto, 1990).

15 Monica Campbell et al., "Historical Land Use Database: A Municipal Tool to Screen Potentially Contaminated Properties," *Environmental Health Review*, Summer 1994.



Appendices

Appendix A

Bibliography

Bartsch, C. *Federal Legislative Proposals to Promote Brownfield Cleanup and Redevelopment.* Washington, DC: Northwest Institute, 1996.

Bartsch, C. and E. Collaton. *Coming Clean for Economic Development: A Resource Book on Environmental Cleanup and Economic Development Opportunities.* Washington, DC: Northeast-Midwest Institute, 1995.

Black, Thomas J. *Recycling Inactive Urban Industrial Sites.* Washington, DC: Urban Land Institute, 1994.

British Columbia. *Bill 26, Waste Management Amendment Act,* 1993.

_____. Ministry of the Environment. *Contaminated Sites Fee Regulation,* Victoria, 1995.

_____. Ministry of the Environment. *Contaminated Sites Regulation,* third draft. Victoria, 1995.

_____. Ministry of the Environment. *New Directions for Regulating Contaminated Sites: A Discussion Paper.* Victoria, 1991.

Campbell, Monica, Joan Campbell and Stephen McKenna. "Historical Land Use Database: A Municipal Tool to Screen Potentially Contaminated Properties." *Environmental Health Review,* Summer 1994, 32-37.

Canada. Health and Welfare, Federal-Provincial Advisory Committee on Environmental and Occupational Health. *Guidelines for Canadian Drinking Water Quality,* 4th edition. Ottawa: Canadian Government Publishing Centre, 1989.

Canada Mortgage and Housing Corporation. "Appendices A, B, C, D, E and F." *Study of Houses Affected by Hazardous Lands.* Ottawa, 1992. Report prepared by CH2MHILL Engineering.

_____. *CMHC Kitchener Townhouse Study of Soil Gas Ventilation as a Remedial Measure for Methane Entry into Basements.* Ottawa, 1989. Report prepared by CH2MHILL Engineering.

_____. *Federal/Provincial/Territorial Subcommittee on Contaminated Lands and Housing,* 1994.

_____. *Field Tests of Remedial Measures for Houses Affected by Hazardous Lands.* Ottawa, 1995. Report prepared by CH2MHILL Engineering.

_____. *Residential Environmental Hazard Policies in Other Countries.* Report prepared by ARA Consulting Group. Ottawa, 1994.

_____. *Soil Gases and Housing: A Guide For Municipalities.* Ottawa, 1993.

_____. *Study of Houses Affected by Hazardous Lands.* Ottawa, 1992. Report prepared by CH2MHILL Engineering.

_____. *The Relationship Between Urban Soil Contamination and Housing in Canada.* Report prepared by Gardner Church and Associates. Ottawa, 1993.

Canadian Council of Ministers of the Environment. *Contaminated Site Liability Report — Recommended Principles for a Consistent Approach Across Canada.* Winnipeg, 1993.

_____. *Interim Canadian Environmental Quality Criteria for Contaminated Sites.* Winnipeg, 1991.

_____. *National Classification Systems for Contaminated Sites.* Winnipeg, 1992.

_____. *National Guidelines for Decommissioning Industrial Sites.* Winnipeg, 1991.

_____. *National Guidelines on Physical Chemical Biological Treatment of Hazardous Waste.* Winnipeg, 1989.

_____. *Subsurface Assessment Handbook for Contaminated Sites.* Winnipeg, 1994.

Canadian Council of Resource and Environment Ministers. *Canadian Water Quality Guidelines.* Prepared by the Task Force on Water Quality Guidelines for the Council of Resource and Environment Ministers. Ottawa, 1987.

Canadian Home Builders' Association. *Discussion Paper on Government Policies, Procedures and Criteria for the Clean Up of Contaminated Sites.* 1993.

Commission of the European Communities. *Green Paper on the Urban Environment.* COM (90) 218, final. Brussels: CEC, 1990.

Farrell, J. "Contaminated Soil Becomes Parking Lot at N.J. Site" *Soil and Ground Water Cleanup*, March 1996, 26-28.

Ford, Glenna, Doug MacDonald and Mark Winfield. "Who Pays for Past Sins?" *Alternatives*, Vol. 20, No. 4, 28-34.

Gosse, Robert. *Controlling Site Re-use and Soil Contamination Through the Planning Process.* A CMHC Scholarship Program report. Toronto: University of Toronto, 1990.

Greater Toronto Area (GTA) Task Force. *Greater Toronto: Report of the GTA Task Force*, Section 4.6. Toronto, 1996.

"Is It Time for Risk Assessment and Management to Take on a Larger Role?" *Environmental Science and Engineering,* May 1996, 17-19.

Lincoln Institute of Land Policy. *Brownfields and Greenfields Opportunities and Challenges for Metropolitan Development: Resource Manual.* Cambridge, MA, 1996.

McMullin, D.N. "Risk-Based Approach to Contaminated Site Clean-up." *Ubique No. 53, the Journal of Canadian Military Engineers.* Ottawa: Department of National Defence, 1995.

Meyer, P.B., R.H. Williams and K.R. Yount. *Contaminated Land: Reclamation, Redevelopment and Reuse in the United States and the European Union.* Brookfield, VT: Edward Algar Publishing Company, 1995.

Minnesota. Pollution Control Agency. *Voluntary Investigation and Cleanup Guidance Document Number 4,* St. Paul, MN, 1994.

Munson, William E. "Soil Contamination and Port Redevelopment in Toronto." *Working Papers of the Canadian Waterfront Resource Centre.* Toronto, 1990.

Nabaldian, R. "Brownfields Redevelopment: Reality or a Theory?" *ECON,* March 1996, 28-31.

New Brunswick. Department of the Environment. *Guidelines for the Assessment of Contaminated Sites.* New Brunswick, 1992.

Nye, J.L. "States Promise Not to Sue Brownfield Developers." *Soil and Ground Water Cleanup,* March 1996, 22-25.

Ontario. Ministry of the Environment. *Guidelines for the Decommissioning and Clean Up of Sites in Ontario.* Toronto: Queen's Printer, 1989.

_____. Ministry of the Environment and Energy. Hazardous Contaminants Branch. *Interim Guidelines for the Assessment and Management of Petroleum Contaminated Sites in Ontario: Report of the Petroleum Contaminated Sites Working Group.* Toronto, August 1993.

_____. Ministry of the Environment and Energy. *Policies, Guidelines and Provincial Water Quality Objectives of the MOEE.* Toronto: Queen's Printer, 1994.

_____. Ministry of the Environment and Energy. *Proposed Guidelines for the Clean Up of Contaminated Sites in Ontario.* Toronto: Queens Printer, 1994.

Professional Engineers of Ontario. "Professional Engineers Providing Services in Environmental Site Assessment." *Remediation and Management,* 1996.

Québec. Ministère de L'Environnement. *Politique de protection des sols et de réhabilitation des terrains contaminés,* 1996.

_____. Ministère de L'Environnement. "Politique de réhabilitation des terrains contaminés." *Direction des substances dangereuses.* Sainte Foy, Quebec, 1988.

Roseland, Mark. *Toward Sustainable Communities: A Resource Book for Municipal and Local Governments.* Ottawa: National Round Table on the Environment and the Economy, 1992.

Sisson, K., D. Shier and J. Wilms. *Toxic Real Estate Manual.* Toronto: Wilms and Shier, 1989.

United States. Environmental Protection Agency. *The Brownfields Economic Redevelopment Initiative: Application Guidelines for Demonstration Pilots.* USEPA EPA/540/R-94/068. Washington, DC, 1995.

_____. Environmental Protection Agency. *Internet site http://www.epa.govre, Brownfields.* Victoria, 1996.

Ville de Montréal. Division des analyses d'impacts et de l'environnement. *L'Environnement à La Ville de Montréal, La Contamination des Sols, version préliminaire.* Montréal, 1994.

Appendix B

Case Studies — May 1996

Case Study A

Residential/Commercial Area — Lasalle, Québec

Vital Data	Information
Urban context and previous use	Suburban area of Montreal. Ville LaSalle operated a landfill which accepted all sorts of waste, including industrial wastes. Operated from the 1940s to 1959 (closing date). In the 1960s, the City of LaSalle permitted the development of residential/commercial construction on the site. In 1983, the Ministere de l'Environnement du Quebec (MEQ) did an investigation of former hazardous waste landfills and the Depotoir LaSalle was among them.
Site land area (hectares) and housing potential	7,000 cubic metres of industrial wastes located largely in trenches. The The area is residential/commercial zoned. Development occurred in the context of scarcity of available land for residential/commercial development.
Ownership and development value	Owner of the former landfill site: Ville Lasalle Residential/commercial development: private
Number of years idle and type of contamination	After closing the landfill in 1959, the trenches were filled up and the site was leveled. Residential/commercial development began in the 1960s. High levels of PAH, PCB and other complex mix of organic compounds were recorded.
Exposure pathways	The contaminants present under some of the constructed areas were considered a potential risk to the health of the residents/users of the site and represented a possible threat for the nearby aquaduct of Montreal. Health authorities, after examining the characterization results and all potential exposure pathways, concluded that the situation demanded rapid action and the removal of the most important sources of contaminants.
Site remediation plan	The government had no policy to resolve this case. The LaSalle case was the starting point for the development of guidelines in site rehabilitation. In 1985, with the characterization results in hand and after looking over policies in other countries, the MEQ adopted a modified version of the Dutch approach (1983), consisting of a grid of criteria including three levels of contamination (A, B and C). The rehabilitation of the site has led to the excavation of 100,000 cubic metres of contaminated soils and wastes, the demolition of eight houses and the temporary relocation of 65 persons.
Estimated remediation costs	$10 million for rehabilitation of the residential area on the site.
Status of the project	Completed.
Key to project completion	• Identification of the principal areas of concern for human health protection • Creation of different committees to make rapid decisions and to do interactive communications with the residential/users of the site; a Committee of Directors composed of the LaSalle mayor, representatives of all stakeholders; work committees.

Key Issues	Successful Resolution or Reason for Delay
Regulatory	
Various legislation, policies, regulation and practices	Without the application of the generic criteria from the Dutch approach, rapid action would not have been possible. This approach was an advancement for Quebec and the Canadian Council of Ministers of the Environment (CCME) took it as a base for its guidelines. In 1988, the *Contaminated Site Rehabilitation Policy* was published in Québec.
Legal/Liability	
Future liability	The government took charge of the problem. No actions are foreseen from the Government or stakeholders against the City of LaSalle.
Financial	
• Cost of remediation	• Impossible to evaluate if a risk assessment done at that time would have reduced the cost of remediation.
• Effect on property value	• Without excavating the main sources of contamination, properties may have lost 50 percent of their value at that time (1985).
Technical/Scientific	
Development of generic criteria and related guidelines	The application of the generic criteria from the Dutch approach led to: further development of guidelines in Quebec; guidelines for characterization, rehabilitation, control measures during excavation, design and construction of high and maximum secure landfill cells, standardization for sampling, standard methods for chemical analysis of samples, criteria to assess treatment technologies, etc.
Urban Planning	
• Residential intensitification	• Residential/commercial development continued.
• Cost-effective development	• At the time, the remediation was considered expensive but necessary.
• Zoning by-laws	• Still residential/commercial.
Communications	
Public awareness	Good interactive communications was one of the most important keys to success.

Sources: Ministère de l'Environnement du Québec: *Bilan de situation et stratégie d'intervention*, 25 juillet 1985; *Caractérisation de l'ancien dépotoir de la ville de LaSalle*, septembre 1985; *Dix ans de restauration des terrains contaminés — Bilan de 1983 à 1993*, septembre 1994.

Case Study B

Cooksville Quarry — Mississauga, Ontario

Vital Data	Information
Background	Brick manufacturing facility decommissioning.
Project name and location	Cooksville Quarry, Mavis Road, Mississauga, Ontario.
Urban context and previous use	Shale Quarry and three former brick manufacturing facilities located within a mixed residential and commercial/industrial neighborhood. A portion of former quarry was used as a regulatory agency-approved coal fly-ash disposal area. Site traversed by two tributaries of the Credit River. Site active from 1991 until 1994. Proposed development plan to include high- and low-density residential land uses with some prestige commercial.
Site land area (hectares) and housing potential	75 hectares. A mixed-use development is proposed. Specific issues include passive recreation use upon the fly-ash disposal area and high-density residential land use downgradient of the fly-ash.
Ownership and market value or purchase price	Private owner: Jannock Ltd. Servicing Developer: Jannock Properties
Number of years idle and type of contamination	Two years idle. Mixture of brick manufacturing related heavy metals, fuel related contaminants, and fly-ash from an Ontario Hydro coal burning electrical generation, thermal plant (included in an approved disposal site). Also aesthetic materials, including a lot of whole and broken brick.
Exposure pathways	Mainly direct contact with soil containing heavy metals. Possible ground water downgradient of fly-ash disposal area.
Site remediation plan	Site remediation is being completed in a phased approach to allow concurrent development of segments of the site while remedial activities are completed in others. Remedial activities are being completed on an interactive basis with the MOEE to allow for the site-specific use of physical and aesthetic clean-up criteria. With respect to the fly-ash disposal area a Problem Formulation and Exposure Assessment and Contaminant Transport Modeling have been completed for the fly-ash disposal area.
Estimated remediation costs	Confidential.
Status of project	Remediation initiated in 1994. Closure plan for fly-ash disposal area to be submitted in the future. Development scheduled 1997 to 1998.
Key to project completion	Continued interactive and cooperation of client with MOEE and extensive stakeholder groups. Risk-based approach provided a means of allowing a pragmatic management of fly-ash area.

Key Issues	Successful Resolution or Reason for Delay
Regulatory	
• Various legislation, policies, regulations, and practices	• *Ontario Environmental Protection Act.*
• Roles and responsibilities of various agencies	• Ontario Regulation 347.
• Time frames for approvals	• *Ontario Water Resources Act.*
• Duplication	• Policy 07-07: Development Adjacent to Landfills.
• Institutional policy variability	• MOEE Guidelines, which include site-specific risk assessment approach currently under review.
• Acceptance of new procedures by agencies	• MOEE Approvals Branch to provide concurrence of closure plan and Section 46 approval of land use on fly-ash disposal area. City of Mississauga to provide draft plan of subdivision approvals and potential storm sewer discharge of fly-ash prewater. Similarly the Region of Peel to provide approvals for potential sanitary sewer discharge.
• Long-term consistency of regulatory process and approvals	• Approvals anticipated to take six months to one year.
Legal/Liability	
Who pays for past contamination?	Fly-ash disposal area is currently the responsibility of Ontario Hydro.
Technical/Scientific	Not available.
Urban Planning	Not available.
Communications	Not available.

Case Study C

Port Credit Former Refinery Site — Mississauga, Ontario

Vital Data	Information
Background	Decommissioning former oil refinery.
Project name and location	Port Credit Former Refinery Decommissioning Project, Port Credit, Ontario.
Urban context and	Former oil refinery site including refinery previous use infrastructure, tank farm storage area and refinery waste Landfarm area. Situated within an established residential area that has developed around the site.
Site land area (hectares) and housing potential	Approximately 80 hectares. Proposed re-development of the site is predominantly with some commercial/industrial development.
Ownership and market value or purchase price (year)	Ownership: Imperial Oil. Purchase price: confidential.
Number of years idle and type of contamination	• Site investigation and decommissioning commenced in 1985 when refinery was closed. • Contamination is mainly refinery-related and fuel-type impact.
Exposure pathways	Mainly direct contact with impacted soil.
Site remediation plan	Site remediation plan developed in late 1980s included complete extraction of chemically and aesthetically impacted soils.
Estimated remediation cost	Confidential.
Status of project	Currently 8 hectares area of site remediated. site received Statement of Completion from MOEE and is currently under development for commercial uses. North portion of property (52 hectares) remediated in 1996 for residential development. South portion of property on hold.
Key to project completion	Interactive working relationship developed with MOEE that led to the smooth progression of approvals. However, some approvals for major issues took years to obtain. In 1989 development of site-specific health-based clean-up criteria for 43 organic compounds relating to refinery wastes facilitated the project. Active public consultation program initiated and maintained by Imperial Oil.

Key Issues	Successful Resolution or Reason for Delay
Regulatory	
• Various legislation, policies, regulations, and practices	• Good interactive working relationship with the local office of the MOEE facilitated approval process.
• Roles and responsibilities of various agencies	• Development of site-specific clean-up criteria made the project possible.
• Time frames for approvals	• Lack of suitable organic, aesthetic and chemical clean-up criteria would have stopped project.
Legal/Liability	
Who pays for past contamination?	Soil contamination created during refinery operation is being remediated at cost to Imperial Oil, the property owners.
Financial	
Costs of addressing issue	Property value is maximized by achieving compliance with approved clean-up criteria and a statement of clean-up will be issued when the completed works are approved by MOEE.
Technical/Scientific	
• Traditional remediation philosophies and techniques • Acceptance of risk-based site • Remediation/ management • Site-specific clean-up parameter site remediation • Subsurface migration	Site remediation was achieved by soil extraction, segregation and soil tilling with off-site disposal of heavily impacted soil. Site-specific clean-up criteria were developed to facilitate project. Full extraction for off-site migration reduced rate of progress in some aspects of the project.
Urban Planning	
Sustainable development	Sustainable development achieved by the restoration of industrial land for use as residential and commercial properties.
Communications	
Developer education and public awareness	Imperial Oil developed and actively maintained a good public communications plan which included: an owner representative on-site, regular public meetings, and newsletters.

Case Study D

Pacific Place (Former Expo '86 Site) — Vancouver, British Columbia

Vital Data	Information
Urban context and previous use	Harbour, railway station, coal gasification plants and industrial area, along the shoreline of False Creek. About 100 years of industrial activities and infilling of the old shoreline with refuse. Used for Expo '86, and now under development for mainly residential use with some commercial facilities, and recreational uses.
Site land area (hectares) and housing potential	66 hectares. A mixed use development including housing of 13,500 people, parks, schools, office and retail space.
Ownership and development value (or purchase price)	Private: Concord Pacific Developments Ltd. Development value: $2.5 billion
Number of years idle and type of contamination	Ten to thirty years idle. Mixture of heavy metals, creosote, and coal tar. Contamination is limited to the historical fill zone.
Exposure pathways	Mainly direct contact with soil containing heavy metals and coal tar. Also soil vapour in zones of coal tar contamination. Ground water is a potential pathway for aquatic receptors only.
Site remediation plan	The site remediation is underway in a staged manner, and follows the stages of the building project. The largest and most contaminated area associated with the coal gasification plant has been developed into an urban park with soil vapour and ground water control systems to allow containment of contamination in place under risk assessment principle. Risk assessment and risk management is also used at the rest of the site. The soil that is being excavated and treated/disposed of, is soils that has to be excavated for building foundations and two levels of underground parking. Most of the site requires only a cover of surface soils in order to eliminate the pathway for direct exposure to contaminated soil. This cover is a combination of buildings, pavement for parking and roads, and topsoil and landscaping.
Estimated remediation costs	$50 to 70 million for risk-based approach. At least 10 times higher for numerical criteria approach.
Status of project	Development started in 1992, and is now about a third complete.
Key to project completion	Risk-based approach and regulatory flexibility. As the liability and cost for clean-up remained with the Province for this orphan site, the site became a test case for the development of new criteria and approaches to "safe" and cost effective contaminated site management since the initiation of site investigation in 1988.

Key Issues	Successful Resolution or Reason for Delay
Regulatory	
Acceptance of new procedures by agency	Without the development and application of new risk-based remediation approach, this project may have been stalled or reduced in scope.
Legal/Liability	
Future liability	Covenant on legal land title addressing leaving contaminated soils in place. Future liabilities remain with "historical owner", i.e., the province as it is considered to be an orphan site.
Financial	
• Costs of remediation	• Adopting a risk-based approach to remediation allowed the project to proceed, as the associated cost were about an order of magnitude lower than those of traditional site remediation.
• Effect on property value	• Covenant of legal title to address contamination left in place appeared to have little effect on property value as the province retained future liability.
• Lender/insurer concerns	• Lender concerns were also addressed by the province retaining liability.
Technical/Scientific	
Development of risk-based site remediation/ management	The development of new provincial guidelines based on the scientific principles of estimating risks to human and ecological health from exposure to chemicals found at contaminated sites made *in situ* management of contamination possible.
Urban Planning	
• Residential intensification	• Rejuvenation and expansion of Vancouver's downtown core.
• Cost-effective development	• Cost effective remediation made the project possible.
• Zoning by-laws	• Approved re-zoning from industrial to residential land use.
Communications	
• Public awareness • Real estate industry awareness	Intensive public consultation and information has educated the public and the real estate industry on contaminated site risks and the options for managing these risks.

Case Study E

Apartment Housing — Vancouver, British Columbia

Vital Data	Information
Urban context and previous use	A former Canadian Legion was redeveloped for "care" apartments.
Site land area (hectares) and housing potential	City corner lot, 0.2 hectare. The development involved apartments senior citizen members of the Canadian Legion.
Ownership and for development value (or purchase price)	• Canadian Legion. • Development value: $0.5 million
Number of years idle and type of contamination.	One to two years. A leaking underground heating oil tank had contaminated to soil to a depth of up to 10 metres. Metal contamination was present in imported fill.
Exposure pathways	Mainly soil vapour from the heating oil contamination, and to a lesser degree direct contact with soil-containing metals. Ground water was not considered to be a potential pathway because of the city setting and the several kilometres distance to the nearest surface water body.
Site remediation plan	The site remediation and *in situ* management works were installed during the construction of the apartment building. Risk assessment and risk management approach involved cutting off the exposure pathways and thereby eliminating risks to human health. Potential soil vapour exposure was controlled by providing ventilation underneath the building. This ventilation has the dual function of ventilating potential hydrocarbon vapours from the heating oil contamination, and the ventilation of methane gas from the extensive peat deposits on the site. Metal contaminated soil was partly removed for foundation construction and site grading, and the remaining soils were covered by the building and pavement.
Estimated remediation costs	$50,000 for risk-based approach. At least 10 times higher for numerical criteria approach.
Status of project	Development was completed in 1995, and the apartments are now occupied.
Key to project completion	• Risk-based approach allowed under British Columbia regulations, and the liability protection of "innocent parties" such as lenders/ insurers. • Awareness and acceptance by the real estate industry of *in situ* management of contamination.

Key Issues	Successful Resolution or Reason for Delay
Regulatory	
Various legislation, policies, regulations and practices	*British Columbia Criteria for Managing Contaminated Sites, Bill 26 — Contaminated Sites Regulations*, and specific guidelines for the application of risk assessment and risk management made the project possible.
Legal/Liability	
Future liability	Covenant on legal land title addressing leaving contaminated soils in place. Future liabilities remain with Canadian Legion, and the lenders are protected through British Columbia Regulations.
Financial	
• Costs of remediation	• Adopting a risk-based approach to remediation allowed the project to proceed, as the associated cost were about an order of magnitude lower than those of traditional site remediation.
• Effect on property value	• Covenant of legal title to address contamination left in place have little effect on property value given the type of housing development.
• Lender/insurer concerns	• Lender concerns are addressed by British Columbia Regulations.
Technical/Scientific	
Development of risk-based site remediation/ management	The acceptance of risk assessment/risk management based on the scientific principles of estimating risks to human and ecological health from exposure to chemicals found at contaminated sites made *in situ* management of contamination possible.
Urban Planning	
• Residential intensification	• Rejuvenation of a commercially zoned lot.
• Cost-effective development	• Cost-effective remediation made the project possible.
• Zoning by-laws	• Approved re-zoning from commercial to residential land use.
Communications	
• Public awareness • Real estate industry awareness	No special effort was required, as the public and the real estate industry is aware and accepting of the risk-based approach used for contaminated sites.

Case Study F

Linear Park Alongside Canal Lachine and Residential Areas — Montreal, Québec

Vital Data	Information
Urban context and previous use	Marsh sector alongside former St.-Pierre River before the construction of Lachine Canal in 1825. Industrial activities since 1841, from wood transformation to steelworks (Stelco) in 1986. Former railway, remnants of coal storage, petroleum products from years of leakage were found on the site. The shutting down of industrial activities and redevelopment for residential and recreational purpose began in the 1980s.
Site land area (hectares) and housing potential	Surface of 13,000 square metres for the recreational use of the nearby residential area. A 25-resident condominium building is situated at the northwest limit of the site. Other statistics: population surrounding the site numbers 19,250 persons in a radius of 1 km; further users of the parkland area numbers 500,000 yearly.
Ownership and development value	Federal property under the responsibility of Patrimonie Canada (formerly Parks Canada). High value site considering the geographical situation (near the heart of Montreal); high recreational possibilities associated with the Lachine Canal; and high prices of the condominiums constructed and under construction nearby.
Number of years idle and type of contamination	No occupation from 1986 (closure of Stelco) to 1995 (restoration of the site). Type of contamination included benzene, copper, lead, oil and mineral greases, PAHs, xylene and zinc.
Exposure pathways	For different population groups, the three most important pathways were: inhalation of airborne chemicals (volatile compounds and particulate matters), ingestion of chemicals from the contaminated soils, and dermal contact with the contaminated soils. Ground water was not considered on the basis that people are serviced by the Montreal aquaduct.
Site remediation plan	In order to properly protect human health and the environment, an essential step in the integrated decision process was to proceed with a risk assessment to human health, and to define remediation scenarios. The risk assessment was based upon the U.S. Environmental Protection Agency approach. The costs for decommissioning the site, including excavation and disposal of soils exceeding the CCME criteria for residential/parkland areas were estimated at approximately $9 million. According to the findings of the risk assessment, the costs could be reduced to approx. $1.9 million. The site remediation concept adopted by Public Works Canada could cost approx. $2.4 million, because, under the integrated decision framework approach, the "good neighbour" issues was judged to be of paramount importance and, consequently, a free hydrocarbon phase had to be removed along with the top metre contaminated soil layer. The one-metre depth was chosen on the basis of phytotoxicological considerations.
Status of the project	Completed.
Key to project completion	Risk-based approach and regulatory flexibility on federal land.

Key Issues	Successful Resolution or Reason for Delay
Regulatory	
Various legislation, policies, regulations and practices	Without the use of risk-based management and remediation approach, the project might have been stalled.
Legal/Liability	
Future liability	There are still unanswered questions about future liabilities if contaminants are found in the future near the residential construction nearby.
Financial	
• Costs of remediation	• The cost was $2.4 million instead of $9 million.
• Effect on property	• No effects on properties value have been recorded.
• Lender/insurer concerns	• No specific concerns from lender/insurers have been recorded.
Technical/Scientific	
Development of generic criteria and related guidelines	The growing acceptance of the risk-based management approach to protect human health and the environment made the project possible. The risk assessment coupled with other environmental studies helped in better understanding the problem and its complexity.
Urban Planning	
• Residential intensification	• Extension of the recreational area without health risk will help the residential development.
• Cost effective development	• Cost effective remediation made the project possible.
• Zoning by-laws	• Approved rezoning from industrial to residential parkland area.
Communications	
Public awareness	The City of Montreal and the MEQ were informed of all the characterization results and management decisions. Presentations have been made to inform the public and the real estate industry on the use of risk assessment.

Sources: D'Aragon, Desbiens, Halde Associés Ltée.; Daniel Morin, *Congrès annuel de l'Association professionnelle de géologues et géophysiciens du Québec*, Laval, 1995.

Case Study G

Sawmill Run — Minneapolis, Minnesota, United States

Vital Data	Information
Urban context and previous use	From 1885 to 1940, the site contained a sawmill, railroad yard, roundhouse, and coal gasification plant. From 1953 to 1972 a portion of the site was used by a drum reconditioner. The site is located along the Mississippi River, approx. 1 km from the central business district.
Site land area (hectares) and housing potential	5 hectares. A luxury townhome development including 66 units.
Ownership and development value	Began as a private development in 1983. The Minneapolis Community Development Agency (MCDA) acquired the site in 1989 and completed the project. Development value: $12 million (U.S.).
Number of years idle and type of contamination	Twenty-four to fifty-eight years. Forty-four corroded drums of waste remained on-site. Soil was contaminated with coal tar and petroleum hydrocarbons. Ground water contained solvents, VOCs and PAHs.
Exposure pathways	Primarily direct contact with contaminated soil. Also soil vapour in zones of soil contamination. Ground water is a potential pathway for aquatic receptors only.
Site remediation plan	The private developer conducted an environmental investigation and removed all known contaminated materials and soils prior to selling the property to the MCDA. During construction additional coal tar contamination was discovered, bringing the construction to a five-year halt. A risk-based approach was not used. Instead, the final remediation strategy involved excavating all contaminated soils down to bedrock for off-site treatment and disposal. Residual contamination in the underlying bedrock was managed in place using a clay cap and vapour collection and detection system. A total of 18,000 cubic metres of contaminated soil, 4,500 cubic metres of refuse of slag, and 1,100 cubic metres of contaminated water were removed and treated or disposed.
Estimated remediation costs	$1.8 million (U.S.). A risk-based approach may have allowed in-place management of contaminated soils and significantly reduced remediation costs.
Status of the project	Townhomes are under construction, selling quickly and will be ready for occupancy in summer 1996.
Key to project completion	The aggressive and persistent work of the MCDA in cleaning up the site and the Minnesota Pollution Control Agency's Voluntary Investigation and Clean-up program which offers an expedited oversight process and provides written assurance letters to address lender liability concerns.

Key Issues	Successful Resolution or Reason for Delay
Regulatory	
Various legislation, policies, regulations and practices	The *Minnesota Land Recycling Act* of 1988 and the Voluntary Investigation and Clean-up program were among the first programs in the United States aimed at promoting the clean-up and redevelopment of contaminated sites. Upon completion of the remediation work, the site received the first Certificate of Completion issued by the Minnesota Pollution Control Agency. The MCDA was allowed to obtain this Certification of Completion with only a partial clean-up because their actions were voluntary and they were not deemed the responsible party.
Legal/Liability	
Future liability	The voluntary clean-up program protected the MCDA from liability for past contamination, while the Certificate of Completion protects them and potential buyers from future liability.
Financial	
• Costs of remediation	• The relatively high project costs limit the ability of the MCDA to address the remaining 1,000 hectares of brownfield sites in the city. The City of Minneapolis is in the process of seeking compensation from the original owner who is deemed the responsible party.
• Effect on property	• The residential contamination in the bedrock appears to have had little or no effect on the desirability of the property to prospective home buyers.
• Lender/insurer concerns	• After obtaining their Certificate of Completion, MCDA personnel met with the Federal National Mortgage Association and the Federal Home Loan Mortgage Corporation in Chicago to obtain guarantee letters for the townhome project.
Technical/Scientific	
Development of generic criteria and related guidelines	Cost savings were realized by recycling much of the contaminated soil into asphalt.
Urban Planning	
• Residential intensification	• Rejuvenation and expansion of Minneapolis' downtown riverfront area. This was the first new residential construction in this area of Minneapolis and has stimulated several other residential developments on nearby brownfield sites.
• Zoning by-laws	• Approved re-zoning from industrial/residential land use.
Communications	
Public awareness	Not applicable.

Sources: Communication with Larry Heinz, Minneapolis Community Development Agency (MCPA), May 3, 1996, and Jennifer Haas, Minnesota Pollution Control Agency, May 6, 1993; and review of project files at the MCPA.

Case Study H

The West Don Lands (Ataritiri Site) — Toronto, Ontario

Vital Data	Information
Urban context and previous use	Industrial area, coal gasification plant, along the west shoreline of Don River. Proposed development some residential use with mostly commercial facilities, and parkland uses.
Site land area (hectares) and proposed development	32 hectares. Ataratiri housing development project was proposed in 1988 and efforts were abandoned in 1992. Now various land uses are proposed.
Number of years idle and type of contamination	• Some of site idle for 10 to 30 years. • Mixture of heavy metals, creosote, and coal tar.
Exposure pathways	Mainly direct contact with soil containing heavy metals and coal tar. Also soil vapour in zones of coal tar contamination. Ground water is a potential pathway for aquatic receptors only.
Site remediation plan	Significant site remediation has not been carried out to date. Site remediation following site specific risk assessment methodology as provided in MOEE's proposed *Guideline for Use at Contaminated Sites in Ontario* will provide up to 90 percent reductions in the amount of soil needing management compared to previous assessments.
Status of project	Preliminary Planning Stages.
Key to project completion	Promulgation of the MOEE *Guideline for Use at Contaminated Sites.*

Key Issues	Successful Resolution or Reason for Delay
Regulatory	
Clean-up requirements	Clean-up costs to generic clean-up criteria, was one of the reasons for the stalling of the Ataritiri housing project at the location of the West Don Lands, together with a depressed housing market and a flood-management issue for the project. Proposed new guidelines provide the option of site-specific risk assessment and contaminated site management and are believed to resolve the clean-up cost roadblock. Initiatives are reviewed between the City of Toronto and MOEE to make the development approvals process more efficient.
Financial	
Costs of remediation	Adopting a risk-based approach to remediation gives new impetus for the project to proceed, as the associated costs were about an order of magnitude lower than those of traditional site remediation.
Technical/Scientific	
Development of risk-based site remediation/ management	The development of new provincial guidelines based on the scientific principles of estimating risks to human and ecological health from exposure to chemicals found at contaminated sites makes *in situ* management of contamination possible.
Urban Planning	
• Remove use restrictions	• New direction for physical planning is considered in Toronto, and includes initiatives to remove use restrictions from the zoning by-laws and Official Plan.
• Cost-effective development	• Cost-effective remediation renews interest in redevelopment.
Communications	
• Public awareness • Real estate industry awareness	Intensive public consultation and information is educating the public and the real estate industry on contaminated site risks and the options for managing these risks.

Source: Waterfront Regeneration Trust, *The West Don Lands*, 1995.

Appendix C

Review of Legislation — May 1996

Federal Government

Relevant Acts

- *Canadian Environmental Protection Act*

Guiding principles: N/A to remediation

Retroactivity: N/A

What triggers liability:

Designation of contaminated sites: N/A

Self-identification of contamination

- Person must report the occurrence or reasonable likelihood of a release of a toxic substance into the environment to an inspector or prescribed person, and take reasonable emergency measures consistent with public safety to prevent the release. If it cannot be prevented, the person must remedy any dangerous condition or mitigate the danger posed by the substance's release (s. 36(1)).

- All persons whose property is affected by the release, and who know that the substance released is specified on the List of Toxic Substances, must report the matter to an inspector or other prescribed person as soon as possible (s. 36(3)), unless the Governor in Council declares that provincial procedures are adequate (s. 36(4)).

- All other persons having knowledge of the occurrence or reasonable likelihood of a release of a toxic substance may voluntarily report such information to an inspector or other prescribed person (s. 37(1)).

- Where there occurs or is a reasonable likelihood of a release into the environment of a substance in contravention of a regulation, a person shall, as soon as possible in the circumstances, report the matter to an inspector or to such person as is designated by regulation, take all reasonable emergency measures consistent with public safety to prevent or eliminate a dangerous condition or reduce or mitigate the danger to the environment or human health, and make an effort to notify other adversely affected members of the public (s. 57(1)).

- Other individuals affected by the same release who know that the substance has been released in contravention of the regulations shall report the matter to an inspector or prescribed individual (s. 57(3)).

- Similarly, voluntary reporting is available for all other persons with knowledge of an occurrence or reasonable likelihood of a release into the environment of a substance under regulation (s. 58(1)).

General provisions

- The Minister may direct any manufacturer, processor, importer, retailer or distributor of a substance or product to give public and private notices of the substance's danger to the environment, human life or health. The Minister may also direct that the person replace the substance or product with one that does not pose such dangers, to accept the return of the product from the purchaser and refund the purchase price; or take any other measure to protect the environment, human life or health (s. 40).

Offences and penalties

- Any person who fails to report or take any measures required to be made or taken under s. 36 or s. 57 or fails to comply with a direction under s. 40, is guilty of an offence and is liable on summary conviction to a fine not exceeding $300,000 and to imprisonment for a term not exceeding six months, or both, or on indictment, to a fine not exceeding $1,000,000 or to a term not exceeding three years, or both (s. 113).

- Every person who intentionally or recklessly causes a disaster that results in loss of the use of the environment, or shows wanton or reckless disregard for the lives and safety of other persons and thereby causes a risk of death or harm to another person, is guilty of an indictable offence and is liable to a fine or to imprisonment for a term not exceeding five years or both (s. 115).

- Where an offence is committed or continued on more than one day, it is a separate offence for each day on which the offence was committed or continued (s. 118).

- Where a corporation commits an offence under the *Act*, any officer, Director or agent of the corporation who directed, authorized, assented to or acquiesced in or participated in the commission of an offence is a party and guilty of the offence, and is liable to the above punishment, whether or not the corporation has been prosecuted or convicted (s. 122).

- No person shall be found guilty of any offence where the person establishes that he exercised all due diligence to prevent the commission, other than for offences with fraud or intentional or reckless environmental damage (s. 125(1)).

- Where an offender is convicted, the court may impose an additional fine in an amount equal to the estimation of the amount of monetary benefit obtained by committing the offence (s. 129).

- Convicted individuals may also be required to take such actions as are appropriate to remedy or avoid any harm to the environment that results or may result from the act or omission that constituted the offence, etc. (s. 130).

- The person may also be ordered to compensate persons who have suffered loss or damage to property (s. 131(1)).

- Every person who fails to comply with the above court orders is guilty of an offence and is liable on summary conviction to a fine not exceeding $200,000 or imprisonment for a term not exceeding six months, or both, or on proceedings by way of indictment, to a fine not exceeding $1,000,000 or to imprisonment not exceeding three years, or both (s. 133).

Parties to whom an order may be directed

For toxic or other regulated substances, the following individuals are required to report and take remedial action:

- any person who owns or has charge of a substance immediately before its initial release or its likely initial release into the environment (ss. 36(2)(*a*), 57(2)(*a*)),

- persons who cause or contribute to the initial release or increases the likelihood of the initial release (ss. 36(2)(*b*), 57(2)(*b*)).

Considerations the Ministry will take into account: N/A

Apportionment of remediation costs: N/A

- Persons who own or have charge of a substance immediately before its initial release or its likely initial release into the environment will be jointly and severally liable for the costs incurred by the Crown (s. 39(3)).

- Persons who cause or contribute to the initial release or who increase the likelihood of the initial release shall not be held liable to any extent greater than the extent of the person's negligence in causing or contributing to the release (s. 39(4)).

Civil recovery of public costs

- Where a person fails to take the measures required in s. 36(1) for toxic substances, an inspector may take those measures, cause them to be taken or direct that person to take them (s. 36(5)).

- The Crown can recover reasonable costs and expenses incurred under s. 36(5) (s. 39(1),(2)).

- Where a person fails to take steps required in s. 57(1) for regulated substances, an inspector may take those measures, cause them to be taken or direct the person to take them (s. 57(4)).

- The Crown may also recover reasonable costs and expenses incurred under s. 57(4) for regulated substances (s. 60).

Remediation criteria

The Minister may issue guidelines for the purposes of carrying out the Minister's duties and functions related to the quality of the environment (s. 53).

Certificates of compliance: N/A

Is the remediation certificate final and binding? N/A

Notices: N/A

Federal Government

Relevant Acts

- *An Act to Amend the Bankruptcy and Insolvency Act*
- *Companies' Creditors Arrangement Act*
- *Income Tax Act, Bill C- 5*

Guiding principles: N/A

Retroactivity: N/A

What triggers liability: N/A

Parties to whom an order may be directed: N/A

Considerations the Ministry will take into account: N/A

Apportionment of remediation costs

Trustees in bankruptcy or proposal, interim receivers and receivers (s. 14.06(1.1)) are not *personally* liable under federal or provincial environmental legislation, in respect of any environmental condition that arose, or any damage that occurred on the bankrupt's estate before the trustee's appointment as trustee of the estate, or after the appointment, unless it occurred as a result of the trustee's gross negligence or wilful misconduct (s. 14.06(2)). The trustee is still obligated to report environmental transgressions where required under other statutes (s. 14.06(3)). A trustee would not be liable for failing to comply with any environmental order affecting real property in limited circumstances. Trustees are not liable if the order was made before the trustee was appointed, and the trustee then complies with the order or abandons, or is divested of the property, or if a stay is requested and granted to enable the trustee to examine the viability of complying with the order, or if the trustee had abandoned or renounced or had been divested of any interest in the property before the property was vested (s. 14.06(4)). Any claim against the debtor in a bankruptcy, proposal or receivership for costs of remedying any environmental condition or environmental damage affecting real property is secured by a superlien on the real property and on any other real property of the debtor that is contiguous and related to the activity that caused the environmental condition or damage.

Civil recovery of public costs: N/A

Remediation criteria: N/A

Certificates of compliance: N/A

Is the remediation certificate final and binding? N/A

Notices: N/A

Alberta

Relevant Acts

- *Environmental Protection And Enhancement Act*, S.A. 1992, c. E-13.3, as amended ("*EPEA*"). *Conservation and Reclamation Regulation Reg.* 115/93.

Guiding principles: N/A

Retroactivity

The contaminated site provisions apply regardless of when a substance becomes present in, on or under the contaminated site (s. 108).

What triggers liability

Designation of contaminated sites

- Where the Director of the Ministry of the Environment is of the opinion that a substance may cause, is causing or has caused significant adverse effects, the Director may designate an area as a contaminated site (s. 110(1)).

- Designation of a site may take place notwithstanding that a reclamation certificate (for approved, non-residential projects) has been issued, administrative enforcement remedies have been pursued, the substance was released in accordance with the *EPEA* or any other *Act*, the release was not prohibited under the EPEA, or the substance originated from a source other than the contaminated site (s. 110(2)).

- Where the Director designates a site as being contaminated, the Director may issue an environmental protection order ("order") to a responsible person (s. 114(1)).

- The order may direct the person to take any measures necessary to restore and secure the contaminated site, it may apportion costs, and it may regulate or prohibit use of the site or any product that comes from the contaminated site in accordance with regulations (s. 114(4)).

- Additional requirements for orders include maintaining records, periodic reporting, preparing audits, action plans and other measures (s. 227(1)).

- Designations can also be cancelled (s. 110(3)).

Self-identification of contamination

- Any person other than the person having control of the released substance that has caused or may cause an adverse effect shall report it to the Director as soon as the person knows of it or ought to know of the release (s. 99(1)). Persons having control shall report it to the Director immediately upon becoming aware of the release (s. 99(2)).

- As soon as the person responsible becomes aware or ought to have been aware that a substance has been released, and has caused, is causing or may cause an adverse effect to the environment, he or she shall take all necessary measures to repair, remedy and confine the effects, remove or dispose of the substance in a manner giving maximum protection to human health, life and the environment, and restore the environment to a satisfactory condition (s. 101).

- Where a release has occurred, persons responsible must prepare a remedial action plan for approval by the Director, and enter into agreements with other persons responsible and the Director to remediate the land and apportion the costs (s. 113).

General provisions

- Where the Director is of the opinion that the release of a substance may occur, is occurring or has occurred, and the substance may cause, is causing or has caused a significant adverse effect in an area of the environment, the Director may issue an order to the person responsible for the released substance, and may require measures to be taken, including investigation, monitoring, remediation and reporting (s. 102).

- An emergency order may also be issued by an inspector, an investigator, or Director if a release has occurred, is occurring or has occurred, and the release is causing or has caused an immediate and significant adverse effect (s. 103(1)).

- Orders may also restrict the manufacture, use, handling, transportation, sale, storage or application of a hazardous substance or pesticide (s. 151).

- An order may also be issued to clean up unsightly property (s. 174).

Approved (non-residential) projects

- Where the release was authorized by an approval (for non-residential projects) or by regulations, the Director may not issue an order if the adverse effect was reasonably foreseeable when the approval or regulations were issued (s. 102).

- An inspector, investigator or the Director may direct a person responsible to take necessary measures in emergency situations, without regard for any project approval or regulations, if the release may cause, is causing, or has caused an immediate and significant adverse effect (s. 103).

- An inspector may issue an order if an operator of an approved project (non-residential) allows a substance to cause an adverse effect on other land, or allows the substance to leave or escape the property (s. 126).

- An emergency order may be issued to require the operator of an approved project (non-residential) to suspend any work where an inspector is of the opinion that an immediate and adverse effect may occur, is occurring or has occurred on specified land (s. 128).

Prohibitions and offences

- No person shall knowingly or otherwise release a substance into the environment in an amount, concentration or rate in excess of that expressly prescribed by regulation (s. 97(1), (2)).

- No person shall knowingly or otherwise release or the permit release of a substance into the environment in an amount, concentration or rate that causes or may cause a significant adverse effect (s. 98(1), (2)) unless the release was authorized by another enactment (s. 98(4)).

- No person shall dispose of waste on public lands, on highways, on land administered by local authorities, or land owned by other persons, except as provided (ss. 169-173).

- A person who knowingly or otherwise provides false or misleading information required under the *Act*, fails to provide information, or knowingly or otherwise contravenes an environmental protection order is guilty of an offence (s. 213) but no criminal penalty appears to exist with respect to orders regarding contaminated sites under s. 114(1);

Penalties

- Persons who knowingly release a substance under s. 97(1) or s. 98(1) in excess of prescribed levels or levels causing a significant adverse effect are guilty of an offence and are liable for a fine of not exceeding $100,000 and/or two years, imprisonment for individuals, or a fine not exceeding $1,000,000 for corporations (s. 214(1)).

- Persons who release a substance under s. 97(2) or s. 98(2) in excess of prescribed levels or levels causing a significant adverse effect are guilty of an offence and are liable for a fine of not exceeding $50,000 for individuals, or a fine not exceeding $500,000 for corporations (s. 214(2)).

- Every person who commits an offence in ss. 169, 170, 171, 172 or 173 is liable for a fine not exceeding $250 for individuals, and a fine not exceeding $1,000 for corporations (s. 214(3)).

- Officers, Directors or agents of corporations who directed, authorized, assented to, acquiesced or participated in the commission of the offence are also guilty of an offence and liable to the above punishment (s. 218).

Parties to whom an order may be directed

- Persons responsible for the contaminated site (s. 114(1)) may include past and present owners, defined to include tenants and persons with lawful possession (s. 1(*rr*)), and persons with charge, management or control of a substance or thing for the purposes of, including manufacture, treatment, sale, handling, use, storage, disposal, transport display or a method of application (s. 1(*ss*)).

- Their successors, assignees, executors, administrators, receivers, receiver-Managers, trustees, principals and agents (s. 1(*ss*)).

Considerations the Director may take into account

Factors considered as to whether someone is a person responsible for a contaminated site include, but are not limited to (s. 114(1)):

- when the substance became present in, on or under the site;
- where the person is an owner or previous owner of the site, whether the substance was present at the time that person became an owner, and whether that person knew or ought to have known the substance was present when that person became an owner, whether the presence of the substance ought to have been discovered by the owner had the owner exercised due diligence, and whether the owner exercised such due diligence;
- whether the presence of the substance was caused solely by the act or omission of a third person;
- the relationship between that price paid for the site and the fair market value of the site had the substance not been present;
- where the person is the previous owner, whether that person disposed of the site without disclosing the presence of the substance;
- whether a person took all reasonable care to prevent the presence of the substance;
- whether the person dealing in the substance accepted industry standards and practices in effect at the time;
- whether the person contributed to further accumulation or the continued release of the substance after becoming aware of the presence of the substance;
- what steps the person took to deal with the site on becoming aware of the presence of the substance (s. 114(2)).
- whether the government has assumed responsibility for part of the costs for restoring and securing the contaminated site (s. 114(3)).

Apportionment of remediation costs

Where an order is directed to more than one person, all persons are jointly responsible for carrying out the terms of the order, and jointly and severally liable for payment of costs, including costs incurred by the Director (s. 266(1)). However, s. 266(1) does not apply (s. 266(2)) if the cost of doing any of the work, or carrying out any remediation measures is otherwise apportioned amongst persons to whom the order is directed (s. 114(4)(*b*)).

For orders under s. 114, the liability of executors, administrators, receivers, receiver Managers or trustees is limited to the value of the assets the person is administering (s. 266(3)). The exclusion does not apply if they have contributed to further accumulations or the continued release of the substance on becoming aware of the presence of the substance in, on or under the contaminated site (s. 266(4)).

Civil recovery of public costs

- If the person fails to comply with an order, the Minister may apply to the court for an order directing the person to comply (s. 230(1)).
- If the person fails to comply, the Director may take all action necessary to carry out terms of the order (s. 231(1)).
- The Director may recover incurred costs through an action for debt against the responsible person or the Minister may order anyone who is purchasing the land in question to pay the costs from the sale price less the purchaser's costs (s. 231(2)).

Remediation criteria

The levels of remediation and restoration guidelines are to be set by regulation (s. 107(1)(*a*)). Regulations may also prohibit the use of contaminated sites or any product from a contaminated site (s. 117). No such regulations appear to exist.

Certificates of compliance

Reclamation certificates may be issued for specific (non-residential) projects, but do not apply to remediated sites generally (s. 123 and see Conservation and Reclamation Regulations, Reg. 115/93).

Is the remediation certificate final and binding? See above.

Notices: N/A

British Columbia

Relevant Acts

- *Waste Management Act*, S.B.C. 1982, c. 41. Contaminated Sites Fees Regulation Reg. 269/95 (to be repealed after the *Waste Management Amendment Act* comes into force).

Guiding principles: N/A

Retroactivity: N/A

What triggers liability:

Designation of contaminated sites/general

- A contaminated site is defined to mean an area of land in which soil, ground water, or water, including the sediment and the bed below it, contains a special waste or other substance specified by the Director of the Ministry of the Environment ("Director") in quantities or concentrations exceeding established criteria (s. 20.1)

- A Manager of the Ministry of the Environment ("Manager") may issue a pollution abatement order ("order") where a substance escapes, is emitted, spilled, dumped, discharged, abandoned or introduced into the environment and require the person to remediate land in accordance with any criteria established by the Director and any additional requirements specified by the Manager (s. 22(2)). The order may also authorize any person designated by the Manager to enter land for the purpose of controlling, abating or stopping the pollution or to carry out remediation (s. 22(2.1)).

- The person to whom an order applies may also be required, at his or her own expense, to: provide information to the Manager relating to the pollution; to undertake investigations, tests, surveys and other actions and report the results to the Manager; to acquire, construct or carry out any works or measures that are reasonably necessary to control, abate or stop the pollution; or to adjust, repair or alter any works to the extent reasonably necessary to control, abate or stop pollution (s. 22(2)).

- An order may be issued even though the introduction of the substance into the environment is not prohibited by the *Act*, and regardless of the terms of any permit or approval (s. 22).

- The Regulations provide for the Manager's review of preliminary site reports, detailed site reports, remediation plans (which does not include a risk assessment report), and restrictive covenants prior to registration. Persons may request the Manager's approval in principle of remediation plans and certificates of compliance with or without a Manager's inspection. The Manager is to have a roster of expert consultants to assist in these matters.

- An order may be amended or cancelled (s. 22(3)).

Self-identification of contamination

- Where a polluting substance escapes or is spilled or waste is introduced into the environment, except where authorized, the person who had possession, charge or control of the substance must report the spill in accordance with regulations (s. 10(5)).

Prohibitions and offences

- No person in the course of conducting industry, trade or business shall introduce or cause or allow to be introduced into the environment any waste unless it is authorized (s. 3(1.1)), or any waste which is produced by a prescribed activity or operation (s. 3(1.2)).

- No person who produces, stores, transports, handles, treats, deals, processes or owns a special waste shall release a special waste, as defined in the *Act* (s. 3.1(2)).

- No person shall introduce waste into the environment in such a manner or quantity as to cause pollution (s. 3.1(2)).

Penalties

- A person who knowingly fails to comply with a requirement under a permit or approval is liable for a penalty not exceeding $1,000,000 (s. 34(5)).
- A person who fails to comply with the requirements of a permit or approval commits an offence and is liable for a penalty not exceeding $300,000 (s. 34(5.1)).
- Where a person acquires monetary benefits from the commission of an offence, the court may order the person to pay an additional fine equal to the monetary benefit (s. 34.1).
- Where a person causes intentional damage to the environment and reckless disregard for the lives and safety of others, it is an offence and the person is liable to a maximum fine of $3 million and up to three years' imprisonment.
- Where a corporation commits an offence, an employee, officer, Director or agent of the corporation who permitted, authorized or acquiesced commits an offence notwithstanding whether the corporation is convicted (s. 34(10)).

Parties to whom an order may be directed

A Manager may issue orders against a person who has possession, charge or control of the substance, or who caused or authorized the pollution, or who owns or occupies the land on which the substance is located or on which the substance was located immediately before it escaped or was emitted, spilled, dumped, abandoned or introduced into the environment (s. 22(1)).

Considerations the Ministry will take into account: N/A

Apportionment of remediation costs: N/A

Civil recovery of public costs: N/A

Remediation criteria

Procedures and criteria for assessment and remediation of contaminated sites, as well as fees with respect to services provided by the government relating to remediation are to be set by regulation (s. 35(2)(c.3), (c.1)). Regulations have been made with respect to fees (Reg. 269/95) but not with respect to criteria for remediation.

Certificates of compliance

Certificates of compliance may be issued for a contaminated site by a Manager where the site has been remediated to the Manager's satisfaction (s. 20.2). Regulations may be made governing certificates of compliance (s. 35(2) (c.2)).

Is the certificate of compliance final and binding?

The certificate may include conditions that a Manager considers necessary to maintain the validity of the certificate of compliance (Reg. 269/95, art. 1).

Notices: N/A

British Columbia

Relevant Acts

- *Waste Management Amendment Act*, 1993, S.B.C. c. 25. The *Act* will come into force following the creation of regulations. Contaminated Sites Regulation (draft December 4, 1995).

Guiding principles: N/A

Retroactivity: N/A

What triggers liability

In general, remediation is defined to mean actions to eliminate, limit, correct, counteract, mitigate or remove any contaminant or the negative effects on the environment or human health of any contaminant, and includes, but is not limited to:

- preliminary site investigations, detailed site investigations, analysis and interpretation, including tests, sampling, surveys, data evaluation, risk assessment and environmental impact assessment;
- evaluation of alternative methods of remediation;
- preparation of a remediation plan (may be open for public consultation — s. 20.7);
- implementation of a remediation plan;
- monitoring, verification and confirmation;
- other action that the Lieutenant-Governor may prescribe (s. 1, definition of remediate)

Self-identification of contamination — site profiles:

- Persons must submit site profiles if seeking approval of a subdivision, for the zoning of land, a development permit or variance permit, a temporary commercial or industrial permit, for the removal or deposit of soil, a building permit, a demolition permit for a structure that has been used for commercial or industrial purposes, or an activity prescribed by Regulation which may be brought to the attention of a Manager (s. 20.11).
- Any vendor of real property who knows or reasonably should know that real property has been used for an industrial or commercial purpose, or purposes or activities prescribed by Regulations, must provide a site profile to a prospective purchaser and to the Manager from the Ministry of the Environment, Land and Parks ("Manager")(s. 20.11(7)).

- Trustees, receivers and liquidators, as well as persons commencing foreclosure proceedings who take possession and control of real property for the benefit of one or more creditors shall submit a site profile if the property has been used for industrial or commercial purposes or for purposes prescribed by Regulation (s. 20.11(8)).

- Other obligations exist on owners under the *Petroleum and Natural Gas Act* and the *Mines Act* or municipalities in certain circumstances (s. 20.11(3), (4), (5)).

- Only those above persons who undertake certain industrial or commercial activities or purposes described in Schedule 2 of the Regulations must submit site profiles (Reg. art. 2). But profiles are not necessary if existing profiles filed with the site registry reflect the person's current knowledge about the site, if the site is the subject of an approval in principle or certificate of compliance and no new or additional contamination has arisen since it was filed, if the site is within a "wide area site" approved by the Manager, or if the site is contaminated pursuant to s. 20.3 and there is no new or additional contamination (Reg. 4(1)).

- If the Manager reasonably suspects on the basis of the site profile or other information that a site may be contaminated or the site contains substances that may cause adverse effects on human health, he or she may order a site investigation (s. 20.2).

- If a person provides sufficient information to determine that a site is contaminated and agrees to be the responsible person for the contaminated site, the requirements for a site profile or site investigation do not apply (ss. 20.2, 20.3, 20.11).

Designation of contaminated sites

- Following a preliminary determination and a commentary period (Reg. art. 14), a Manager may make a final determination as to whether the site is contaminated (s. 20.3).

- A site is a contaminated site if an area of land has soil or ground water lying beneath it, or the water or the underlying sediment contains a special waste or other prescribed substance in quantities or concentrations exceeding prescribed criteria, standards or conditions (s. 20.1 definition, see also Reg. s. 9(1)).

- A Manager may issue a remediation order to any responsible person (s. 20.5).

- Voluntary remediation agreements may provide for contributions to remediation, a schedule for remediation and remediation requirements, with the Manager's agreement (s. 20.61). Independent remediation may also take place with written notification to the Manager within 90 days of completion of the task (s. 20.8(1)).

- Contaminated soil may not be relocated without entering into a contaminated soil relocation agreement and complying with the terms and conditions of that agreement (s. 20.81(1)), unless the landfill is authorized by a valid permit or approval, an order, or an approved waste management plan (s. 20.81(5)).

- A Manager may also carry out remediation for orphan sites (s. 20.92(1)). Its reasonably incurred costs will take priority over all liens, charges or mortgages of every person with respect to the site or proceeds of the site, except for liens for wages (s. 20.92(5)).

- Liability applies notwithstanding that the introduction of a substance into the environment is or was not prohibited by any legislation, or by the terms of any cancelled, expired, abandoned or current permit, approval or waste management plan and by its associated operational certificate authorizing the discharge of waste into the environment (s. 20.41(3)).

General

- See the *Waste Management Act,* S.B.C. 1982, c. 41.

Prohibitions, offences and penalties

- Any person who fails to submit a site profile; fails to undertake a preliminary site investigation or a detailed site investigation and to prepare a report of the investigation; fails to comply with a remediation order; reduces the ability of any other person to comply with the terms and conditions of an order; fails to seek an opinion from an allocation panel if required to do so; fails to comply with terms and conditions in a voluntary remediation agreement; fails to notify a Manager of independent remediation; fails to comply with the requirements of a Manager regarding independent remediation, relocated contaminated soil without a contaminated soil relocation agreement; or fails to comply with the Regulations commits an offence and is liable to a penalty not exceeding $200,000 (s. 34(17)).

Parties to whom an order may be directed

A Manager may issue a remediation order to any responsible person to undertake remediation of a contaminated site, to contribute financially to the costs of remediation or to provide financial security (s. 20.5(1), (2)).

Responsible persons include

- current owner or operator of the site;

- a previous owner or operator of a site;

- a person who produced the substance and by contract, agreement or otherwise caused the substance to be disposed of, handled, or treated in a manner that, in whole or in part, caused the site to become a contaminated site [but that person is not responsible if ownership and responsibility for managing the substance was transferred to a transporter under prescribed circumstances — Reg. s. 21];

- a person who transported or arranged for transport of a substance and by contract, agreement or otherwise caused the substance to be disposed of, handled, or treated in a manner that, in whole or in part, caused the site to become a contaminated site;

- a person who is in a class designated as responsible by regulation (s. 20.31(1)).

If the contaminant has migrated offsite, responsible persons include:

- a current owner or operator of the site from which the substance migrated;
- a previous owner or operator of a site from which the substance migrated;
- a person who produced the substance and by contract, agreement or otherwise caused the substance to be disposed of, handled, or treated in a manner that, in whole or in part, caused the substance to migrate to the contaminated site;
- a person who transported or arranged for transport of a substance and by contract, agreement or otherwise caused the substance to be disposed of, handled, or treated in a manner that, in whole or in part, caused the substance to migrate to the contaminated site (s. 20.31(2)).

Considerations the Ministry will take into account

Persons who establish the following on a balance of probabilities are not responsible (s. 20.4):

- persons who become responsible only because of an act of God or act of war, if they exercised due diligence with respect to the contaminating substance;
- persons who become responsible only because of an act or omission of a third party, other than an employee, agent, or individual with whom the person has a contractual relationship if the person exercised due diligence with respect to the substance that, in whole or part, caused the site to be contaminated;
- an owner or operator if, at the time a person became an owner or operator, the site was contaminated but the person did not know or suspect that the site was contaminated, and the person undertook all appropriate inquiries into the previous ownership and uses of the site and undertook other investigations consistent with good commercial or customary practice at that time, in an effort to minimize potential liability [items of consideration outlined in Reg. art. 25];
- an owner or operator if the person disclosed any known contamination when an interest in the site was transferred [not applicable to situations where the owner leased, rented or allowed use of real property by another person and knew or had a reasonable basis for knowing that the lessor intended to use the property to handle or treat substances that would cause the site to become contaminated (Reg. art. 26)];
- an owner or operator whose acts or omissions have not caused or contributed to the contamination of the site;
- a former owner or operator if the site was not contaminated at the time of acquisition, and if during ownership or operation the owner or operator did not dispose of or handle the contaminating substance;

- a person who transported or arranged to transport a substance to a site where the owner or operator of the site was authorized by statute to accept the substance, or received permission to deposit the substance from the owner or operator [They will not be responsible where the person did not control the disposal, handling or treatment of the substance or contract, agreement or otherwise merely required adoption of standards of design, construction or operation of works at a site which were intended to prevent contamination, or compliance with environmental laws, standards policies or codes of practice (Reg. art. 18).];
- a government body that involuntarily acquires an ownership interest in a contaminated site, other than by government restructuring or expropriation, unless the government body caused or contributed to the contamination of the site;
- a person who provides assistance or advice respecting remediation work, unless the assistance or advice was carried out in a negligent fashion;
- the owner or operator of a site contaminated only by migration of a substance from other real property not owned or operated by the person;
- an owner or operator of a contaminated site containing substances that are present only as natural occurrences not assisted by human activity, and where those substances alone caused the site to be contaminated;
- a government body that possesses, owns, or operates a roadway or highway on a contaminated site, to the extent of the possession, ownership or operation, but liability exists if the government places or deposits contaminants below public roads or highways it possesses, owns or operates (see Reg. art. 27);
- a secured creditor who acts primarily to protect a secured interest. The secured creditor may only participate in purely financial matters of the borrower to protect a security interest, it cannot exercise its capacity or ability to influence a borrower's operation to cause or increase contamination, nor can it impose requirements on the borrower that have an effect of causing or increasing contamination. With the written consent of a Manager, the creditor may appoint a person to inspect or investigate a contaminated site to determine future steps or action that the secured creditor might take. However, the exemption does not apply if the creditor at any time was responsible for, encouraged, suggested or gave tacit consent for the treatment, disposal or handling of a substance by another person that results in contamination, or did anything without written consent of the Manager that results in diminution of assets that could be used to remediate (further defined under Reg. art. 23);
- a responsible person who received a conditional or full certificate of compliance, even if another person subsequently proposes to change the use of the contaminated site, and to provide additional remediation [includes current or previous owner of an easement, a right of way, a restrictive covenant, a covenant under s. 215 of the *Land Titles Act*, a lien, a judgment or an interest exclusively of subsurface rights — Reg. art. 20];

- a person who is in a class designated by Regulation as not being responsible (s. 20.4);
- a surety who issues a bid, performance, or labour and material payment bond for a construction contract at an existing contaminated site, or a site which becomes contaminated if the surety did not exercise control or impose requirements on any person regarding the treatment, disposal or handling of a substance that, in whole or in part, caused the site to be contaminated. Any liability is limited to the cost of remediation and the cost of completion of the bonded contract, unless the party intentionally caused damage or showed wanton or reckless disregard to the environment or lives or safety of others (Reg. art. 19);
- a person providing contracting or consulting services related to the construction of buildings and facilities at a contaminated site (Reg. art. 22);
- receivers, receiver managers and bankruptcy trustees, trustees, executors, administrators and other fiduciaries if at any time they exercised control or imposed requirements on any person regarding the manner of treatment, disposal or handling of a substance, and the receiver was grossly negligent or guilty of wilful misconduct in imposing such requirements, and the control or requirements caused the site to become, in whole or in part, contaminated [as further defined under Reg. arts. 24, 24.1(1)];
- lessors who provide surface access for subsurface use (Reg. art. 26.1);
- transporters of contaminated soil [further defined under Reg. art. 28].

Apportionment of remediation costs

- Persons responsible are absolutely, retroactively, jointly and severally liable to any person or government body for reasonably incurred costs of remediation of the contaminated site, whether incurred on or off the contaminated site (s. 20.41(1)).
- When allocating liability, the Manager may take into account private agreements respecting liability for remediation amongst responsible persons and apportion greater liability to those persons who contributed most substantially to the contamination as demonstrated by the degree of involvement by the person in the generation, transportation, treatment, storage or disposal of the substance that contributed in whole or in part to the contamination, and the diligence exercised by persons with respect to the contamination (s. 20.5(4)).
- Managers may determine the amount of remediation costs attributable to minor contributors, who will only be liable for remediation costs up to that amount (s. 20.6).

At the request of any person, an allocation panel, consisting of three allocations advisors with specialized knowledge in contamination, remediation or methods of dispute resolution will consider whether a person is a responsible person, whether the responsible person is a minor contributor and the share of the person's contribution to contamination, and the share of remediation costs where costs of remediation are known or reasonably ascertainable (s. 20.51). In doing so, the panel shall consider:

- the information available to identify a person's relative contribution to the contamination;
- the amount of substances causing the contamination;
- the degree of toxicity of the substances causing the contamination;
- the degree of involvement of the responsible person compared with other responsible persons in the generation, transportation, treatment, storage or disposal of the substances causing contamination;
- the comparative degree of diligence taking into account the characteristics of the substances;
- the degree of cooperation of the responsible person with government officials to prevent harm to human health and the environment;
- whether the person is a minor contributor as defined by s. 20.6 (also see Reg. art. 32).
- other factors relevant to the panel (s. 20.51(3) and above).

Civil recovery of public costs

- Any person, including the Manager, may pursue an action for reasonably incurred costs of remediation from responsible persons (s. 20.41(4)).

Remediation criteria

Regulations provide for both numerical standards (Reg. art. 16) and risk-based standards (Reg. art. 17). For numerical standards, contaminated sites will be satisfactorily remediated for agricultural, commercial, industrial, urban park or residential land use if the site does not contain any substance with a concentration greater than or equal to the applicable generic or matrix numerical soil standards, set out by regulation, while additional standards exist for surface water and ground water (Reg. art. 16). Risk-based standards must be approved by the Manager, be supported by evidence and be subject to a public consultation process (Reg. art. 17)

Persons conducting remediation must give preference to remediation alternatives that provide permanent solutions to the maximum extent possible, which will be considered before issuing an approval in principle, certificate of compliance or conditional certificate of compliance (s. 20(9)).

In selecting remediation options, consideration must be given to (s. 20.5(3)):

- adverse effects on human health or pollution of the environment arising from contamination at the site;
- potential for adverse effects on human health or pollution of the environment arising from contamination at the site;
- the likelihood of responsible persons or other persons not acting expeditiously or satisfactorily in implementing remediation;

- in consultation with the chief inspector of the *Mines Act*, the adequacy of remediation undertaken under that *Act*;
- in consultation with the division head of the *Petroleum and Natural Gas Act*, the adequacy of remediation undertaken under that *Act*;
- other factors, prescribed by regulations.

Certificates of compliance

- Upon application, the Manager may issue an approval in principle, a certificate of compliance or a conditional certificate of compliance for part of a contaminated site (s. 20.71(6)).
- Approval in principle is also available stating that a remediation plan has been reviewed by the Manager, has been approved by the Manager, and may be implemented in accordance with conditions specified by the Manager (s. 20.71(1)).
- The Manager may issue a certificate of compliance with respect to remediation of a contaminated site if the site has been remediated in accordance with prescribed numerical standards, any orders under the *Act*, any remediation plan approved by the Manager, and any requirements imposed by the Manager, and if security has been provided for the management of substances remaining on the site (s. 20.71(2)).
- Conditional certificates of compliance may be issued if the contaminated site has been remediated in accordance with prescribed risk-based standards, prescribed environmental impact requirements, any orders issued under the *Act*, any approved remediation plans, and any Manager's requirements (s. 20.71(3)).
- For conditional certificates of compliance, information about remediation and the substances remaining on the site must be recorded on the site registry, works must be installed to implement any monitoring plan, security must be provided for the management of substances remaining on the site, and the responsible person must provide proof of registration of the restrictive covenant under the *Land Titles Act* (s. 20.71(3)).

Is the remediation certificate final and binding?

The Province retains the right to take future action against any responsible person, if:

- additional information relevant to establishing liability for remediation becomes available, including information that the responsible person does not meet the requirements of a minor contributor;
- standards have been reviewed so that conditions at the site exceed or otherwise contravene new standards;
- activities occur on a site that may change its condition or use;

- information becomes available about a site that leads to a reasonable inference that a site poses a threat to human health or the environment
- a responsible person fails to exercise due care with respect to contamination at the site;
- a responsible person directly or indirectly contributes to contamination after the previous action (s. 20.95).

Notices

Information about remediation and the substances remaining on the site must be recorded with the site registry (s. 20.21(2)(*f*), Reg. s. 7).

British Columbia

Relevant Acts

- *Land Titles Act*, R.S.B.C. 1979, c. 219

Guiding principles: N/A

Retroactivity: N/A

What triggers liability: N/A

Parties to whom an order may be directed: N/A

Considerations the Ministry will take into account: N/A

Apportionment of remediation costs: N/A

Civil recovery of public costs: N/A

Remediation criteria: N/A

Certificates of compliance: N/A

Is the remediation certificate final and binding? N/A

Notices

Directors under the *Waste Management Act* may file a notice about land contamination where the person entering or using the land would be exposed to health dangers due to contamination of the land by special waste (s. 320.1). Special wastes are prescribed by regulations made under the *Waste Management Act* (s. 1, definition of special waste). If the Director is satisfied that the danger to health no longer exists, and provides notice to that effect to the Registrar of the Land Title Office, the endorsement of this information on the land title may be cancelled (s. 320.1).

Manitoba

Relevant Acts

- *Environment Act*, S.M. 1987-88, c. 26

Guiding principles: N/A

Retroactivity: N/A

What triggers liability:

Designation of contaminated sites: N/A

Self-identification of contaminated sites: N/A

General provisions

- An Environmental Officer may order a person in authority to cease or modify the activity causing the situation that results or is likely to result in unsafe conditions or irreparable damage to the environment or is likely to constitute an imminent threat to environmental health, for a period of not more than five clear days, unless the period is extended by the Director (s. 24(1)).

- If the Director is of the opinion that the situation exists or is likely to result in unsafe conditions or irreparable damage to the environment, the Director may order one or more of the following: that the person cease or modify the activity for such period of time as may be necessary, clean or repair the affected area, or restore the environment to a satisfactory condition (s. 24(4)).

- If the person fails to comply with the latter order, an Environmental Officer may apply to the courts for an order authorizing an officer to enter an affected area or premises, or to take or cause to be taken such steps are as necessary. The court may grant an order as the judge or justice deems proper, subject to such terms and conditions as he or she sees fit (s. 24(5)).

- If delay in applying to the courts will negate or frustrate the purpose of the order, the Director may enter the premises or cause entry to be made to take steps that are necessary to prevent or halt the damage (s. 25(6)).

- A court order is unnecessary if the Lieutenant-Governor in Council considers it in the public interest to take emergency action to alleviate an environmental emergency (s. 25).

- Approvals are also available for proposed projects to ensure that environmental management techniques are incorporated into all components of the life cycle of a proposed development and to ensure that the project is in accordance with environmental regulation (s. 10+). Orders, licences and permits are then binding on any person who purchases or otherwise acquires custody or control over the development (s. 15(4)).

- Abatement projects enable municipalities to remove and relocate developments and premises causing undesirable environmental conditions (s. 1(2)). Projects are approved by the municipality in which the proposed project would take place and are referred to the province for public hearings (s. 48). If approved by the Minister (s. 49(2)), the project then is enacted by municipal by-law (s. 49(3)). The cost of carrying out the project is essentially at municipal expense (s. 53).

Prohibitions, offences

- Any person who contravenes the *Act* or Regulations or fails to comply with any provision of an order, licence or permit issued by the Minister, Director or an Environmental Officer pursuant to the *Act*, Regulations or an order of a judge is guilty of an offence (s. 31).

- It is a continuing and separate offence for each day that a contravention violation or failure continues (s. 32).

Penalties

- Any person found guilty of an offence is liable for fine not exceeding $50,000 and/or imprisonment for up to six months for a first offence, and not exceeding $100,000 and/or imprisonment for up to one year for subsequent offences (s. 33(1)).

- Any corporation found guilty of an offence is liable for a fine not exceeding $500,000 for a first offence, and not exceeding $1,000,000 for second offences (s. 33(2)).

- If either a person or corporation is unwilling or unable to remedy the situation, the judge may also suspend or revoke all environmental licences or permits and thereafter the person may not carry on such operations until restored by a judge (s. 33(1), (2)).

- A judge may also require the convicted person to take all actions necessary to clean or restore the environment and to pay additional fines equal to the monetary benefit acquired as a result of the commission of an offence (s. 36).

- Officers, directors, and agents of corporations who directed, authorized, assented to, or participated in the commission of an offence are also guilty of an offence and liable to punishment (s. 35).

Parties to whom an order may be directed: A person in authority (s. 24(1)).

Considerations the Ministry will take into account to determine liability: N/A

Apportionment of remediation costs: N/A

Civil recovery of public costs

Where emergency action is taken by the Director, or any person acting on the instructions of the Director, the costs incurred by the government are a debt to the government by the person to whom the order was issued, and are recoverable through an action for debt (s. 24(9)).

Remediation criteria: N/A

Certificates of compliance: N/A

Is the remediation certificate final and binding? N/A

Notices: N/A

Manitoba

Relevant Acts

➤ *Contaminated Sites Remediation Act.* Draft bill is to be tabled in the legislature in the Spring of 1996 with minor amendments.

Guiding principles

Goals guiding the implementation of the *Act*, include creating a fair and efficient process for apportioning responsibility that takes into account the polluter pays principle and includes factors that would not be relevant in determining liability, and a system that encourages parties responsible for remediation to negotiate apportionment amongst themselves (preamble).

Retroactivity

The *Act* applies to contaminated sites which became contaminated before or after the coming into force of the *Act.* It will apply even if acts or omissions are not prohibited, or if another proceeding has been, is or may be taken, under any other *Act* (s. 2(1)).

What triggers liability:

Designation of contaminated sites

➤ If Director suspects that a site is contaminated, the Director may order the owner or occupier to undertake the necessary investigation to determine the existence, nature and extent of the contamination or to furnish an investigation report (s. 3(1)). The order's terms and conditions may include investigating land or premises not owned or occupied by the person if the Director suspects that the contaminant has migrated (s. 3(2)). Where access to surrounding lands is refused, the Director may require the owner or occupier of that site to carry out the investigation at their own expense or at the expense of the other person (s. 5). The Director may also enter into investigation agreements with one or more persons covering issues including the manner of investigation, time frames, financial and other contributions and possibly security for the performance of the obligations (s. 4).

➤ The Director may authorize or require any person who is or who may be responsible for remediation to investigate any lands or premises that include or form part of the site (s. 7).

➤ A site will be designated contaminated if contaminants are at a level which pose or may pose a threat to human health or safety or to the environment (s. 6(1)).

- Should the site be contaminated, the Director shall by written order designate the site as a contaminated site. The order may later be revoked if the contamination level no longer poses the threat (s. 6(2)).

- The Director is then authorized to determine whether remediation is necessary, to require a remediation plan to be filed, and to issue remediation orders if necessary. In determining whether remediation should be ordered, the Director shall consider all relevant factors, including the risk to human health or the environment which the site or contaminant of the site presents or might present; existing and planned uses of the site and of nearby properties; the proximity of the site to residential and other populated areas, or sensitive or significant areas of the environment, as determined by the Director; and the physical characteristics of the site (s. 17).

- The Director may order one or more potentially responsible persons, or the only responsible person, to prepare and file a plan for remediation of the site within 20 days of the order (s. 14). The plan may be referred to the Clean Environment Commission for its advice and approval, which may conduct a public hearing, and which shall report within 90 days (s. 15).

- The Director may issue and amend a remediation order to restrict or prohibit one or more uses of the site or of a product or substance derived from the site, and may require a person to do one or more of the following; effect remediation of the site which may include or incorporate all or any part of a remediation plan, contribute financially, at such times and in such amounts specified to the costs of remediation incurred or expected to be incurred by the Government of Manitoba, or to provide security in a form and manner acceptable to the Director and subject to any conditions the Director considers advisable (s. 16). The Director may also carry out remediation without assuming responsibility for the site (s. 16(5)).

- Appeals are also provided to the Minister and Court of Appeal (Part 7).

Self-identification of contaminated sites: N/A

General provisions: N/A

Prohibitions and offences

- Persons who fail to comply with a provision of the *Act*, hinder, or attempt to hinder a Commissioner, the Director, or an employee or agent of the commission or the government or any person acting under the authority of the *Act*, or who fail to comply with a decision or offer of the Director or the commission is guilty of an offence (s. 51(1)). Similarly, every Director, officer or agent of a corporation who authorizes or acquiesces or participates in an offence is guilty of an offence.

Penalties

- Noncompliance penalties for corporate offenders range from $500,000 for first violations to $1,000,000 for subsequent violations (s. 51(4)). Individuals face fines from up to $50,000 and possibly six months in jail for first violations, or $100,000 and possibly up to one year in jail for subsequent violations (s. 51(3)).

- A judge may also revoke all or part of the environmental licences or permits if the person is unwilling or unable to remedy the situation or condition, require the person to take any necessary action to prevent the commission of a further offence, pay damages or make restitution to any person who suffered damages by the commission of an offence, or require the person to pay an additional fine in an amount not exceeding the value of the benefit acquired, enjoyed or accrued to the person as a result of the commission of the offence (s. 51(5)).

Parties to whom an order may be directed

- Orders to have a site investigated are against a property owner or occupier (s. 3(1)).
- The Director will designate potentially responsible persons for the purposes of remediation (s. 9(1)).

A potentially responsible person can be

- an owner or occupier of a site; the owner or occupier of the site at a time when the contamination occurred or thereafter;
- a person who owns or has possession of a contaminant;
- a person who owned or had possession, charge or control of a contaminant of the site immediately before, or at the time of its release;
- a creditor of the above persons who was actively involved in the person's business or operations at the site;
- a director or officer of a corporation at the time of the contaminant's release;
- a person within a corporation whose acts, omissions, directions or authorizations, caused or contributed to the contamination;
- a principal whose acts or omissions in the course of acting as an agent, caused or contributed to the contamination;
- a person other than a principal whose acts or omissions, caused or contributed to the contamination, or who, being in a position to influence, control, direct or manage another person, directed or required or authorized any act or omission that contributed to contamination;
- a corporation for acts of its directors, officers or employees and a partnership, if a member or employee of the partnership by any act or omission as partner or within the scope of his or her employment caused or contributed to the contamination, or was, being in a position to influence, control, direct or manage another person, directed, required or authorized any act or omission that caused or contributed to the contamination;
- a trustee of any of the above, or any other prescribed person(s. 8(1)).

Active involvement by creditors includes

- control over the debtor's management of contaminants;
- the right to have another person manage the debtor's business or affairs, or a veto over proposed business activity of the debtor;
- participation of the creditor in day-to-day activities of the debtor's business or operations, direction by the creditors as to whether or not particular contracts may be made, other than financial contracts which would grant a person priority over the creditor; and
- the imposition of the requirement that cheques issued by the debtor or on the debtor's account be signed or co-signed by the creditor or a nominee of a creditor (s. 8(2)).

A person is not responsible for remediation if they

- acted or failed to act in his or her capacity as director or officer of a corporation, but exercised due diligence with respect to the contaminants of the site;
- a municipality which became an owner of a site as a result of a tax sale proceeding, or under prescribed circumstances;
- the owner or occupier of the site as a result of expropriation; the owner or occupier of a site that was contaminated only by reason of migration of a contaminant from other land not owned or occupied by the person;
- the owner or occupier of a site where the person was not, nor could reasonably have been, aware of existing contaminants at the time of becoming an owner or occupier;
- a person who exercised due diligence in providing advice and assistance regarding the handling of a contaminant or the remediation of the site;
- a creditor that neither caused nor contributed to the contamination of the site;
- a person who transported a contaminant to the site, unless the person did not obtain permission from the recipient to deposit the contaminant at the site;
- a transporter who could not have reasonably been aware that the recipient was prohibited by law from receiving or handling the contaminant, if they were permitted by law to transport the contaminant and did not contribute to the release of the contaminant; and
- a person responsible by reason only of prescribed circumstances (s. 8(4)).

Within 14 days of notice of its designation, a potentially responsible person may request the Director to designate another person as being potentially responsible for the remediation (s. 11). The Director may designate additional potentially responsible persons at any time before any apportionment hearing or where none is scheduled, before the day on which the apportionment agreement is approved by the Director (s. 12).

Considerations the Ministry will take into account to determine liability

Potentially responsible persons may request the Director to revoke the designation within 14 days of their designation (s. 10(1)). The Director will revoke the designation if, in the Director's opinion, the person neither caused nor contributed to the contamination of the site, or made an insignificant contribution to the contaminant, and if the person had not derived and cannot reasonably be expected to derive, an economic benefit from any purchase or sale of an estate or interest in land or from the remediation of the site (s. 8(5)).

In deciding whether to approve a proposed apportionment agreement, in mediating negotiations toward an apportionment agreement or in apportioning responsibility for the remediation or costs of remediation of a contaminated site among potentially responsible persons, the Director, mediator or commission, shall take into account all relevant factors, including:

- when the site became contaminated, and if the person is a current or previous owner or occupier of a site;
- whether the site was contaminated when the person acquired an interest and, if so, if the person knew or ought to have known, by making reasonable inquiries, of the contamination, and whether the presence of contaminants at the site was reflected in the value of consideration paid or payable by the person for the interest;
- where the person is a current owner or occupier, the effect of the remediation on the fair market value or the permitted uses of the site;
- whether a person disposed of an interest in the site knowing or suspecting contamination without disclosing to the acquirer of the interest, the existence or suspected existence of contaminants;
- whether the person took reasonable steps to prevent the contamination of the site;
- where the person handled the contaminant, whether he or she followed commonly accepted standards or practices of the industry at the time of release of the contaminant;
- whether the person, after becoming aware of the presence of a contaminant at the site, contributed by way of act or omission to the contamination;
- the actions taken by the person upon becoming aware of the presence of a contaminant, including steps taken to prevent or limit the contamination of the site and surrounding areas, and notification of and cooperation with the applicable regulatory authorities;
- the value of any economic benefit derived by the person from activities that resulted in contamination of the site or in the course of which contamination occurred;
- the degree to which the person contributed to contamination of the site in relation to the contributions made by others;

- the quantity and toxicity of the contaminants released into the environment; and
- if the contamination resulted from an act of God, terrorism or sabotage, whether the person took all reasonable steps after the act to prevent, contain or minimize contamination (s. 20).

Trustees, receivers or receiver managers of potentially responsible persons are not personally liable for the remediation of a site unless the trustee, receiver or receiver manager directly or indirectly through his or her employee or by exercising control over or imposed requirements on another person, that caused or contributed to the contamination of the site and in doing so failed to exercise due diligence to prevent the contamination or increase in the contamination of the site (s. 28).

If a secured creditor, who is not otherwise a responsible person, proposes to foreclose, the Director and secured creditor may enter into an agreement subject to any Director's terms and conditions, which may include an undertaking by the creditor to carry out specific remediation measures, and the limits of liability (s. 29(1)). The proceeds of sale or lease will be applied to the recovery of the costs of remediation before the government is reimbursed for its costs (s. 29(2)).

Apportionment of remediation costs

Where two or more potentially responsible persons are liable for remediation of a contaminated site, the *Act* encourages parties to reach their own apportionment agreement to be approved by the Director, to request the assistance of a mediator in negotiating an apportionment agreement, or request the Clean Environment Commission, a tribunal established pursuant to the *Act*, to apportion responsibility for the costs of remediation (ss. 9(2)(iv), 21, 22(1)). If persons will not negotiate or no agreement is reached, the Director may refer the matter to the Commission for hearing (s. 22(3)).

The Director may consider the following elements in reviewing apportionment agreements, in addition to those described above:

- the likelihood of any part to the proposed agreement being or becoming unable or unwilling to satisfy his or her financial obligations under the agreement;
- whether the parties to the proposed agreement have proposed a remediation plan acceptable to the Director;
- whether the agreement provides for security, in a satisfactory amount and form, for the performance of the parties' obligations respecting the remediation of the site;
- whether the sharing of the costs of remediation for which no party to the agreement assumes responsibility represents too great a portion or proportion of the costs of remediation of the site and any other factors that the Director considers relevant (s. 21(3)).

Responsible persons who neglect or refuse to participate in apportionment hearings, and who are neither assigned any share of responsibility, nor are expressly exempted from responsibility for the remediation of the site, are jointly and severally

liable for the share of costs of remediation that is not assigned to any one person (s. 27). Notwithstanding s. 27, and any apportionment order or agreement, persons who remain in default of their obligations for 21 days are jointly and severally liable with each other for all amounts due and payable (s. 30).

Apportionment agreements approved by the Director or an apportionment order of the Commission limit the liability of each party to the costs of remediation, and extinguishes participants' rights to seek or obtain compensation or reimbursement for any or all costs of remediation under this *Act* unless an agreement otherwise provides. It does not affect participants' rights to seek or obtain relief under other legislation or under the common law, including, but not limited to, damages for injury or loss resulting from the contamination (s. 31).

Civil recovery of public costs

- If a potentially responsible person fails to complete the remediation as ordered, the Director has the authority to complete the work and recover the costs from the defaulters (s. 32).

- The costs incurred by the government are a debt due to the government by the person who defaulted, and the certificate of debt is enforceable as if it were a judgment of the court (ss. 33, 34).

- Cost recovery of government expenses to investigate and clean up a contaminated site is also available through filing a lien in the provincial Land Titles Office on any land owned by the debtor, including a superlien on a contaminated site, and to file a registration against the debtor in the Personal Property Registry (ss. 35(3), 36(1), 37(1)).

- The lien on the contaminated property is payable in priority over all other existing or future claims or rights registered against those lands other than a lien for wages, including a priority over every registered mortgage, encumbrance, assignment, debenture, or other security interest (s. 36(4)).

Remediation criteria

The Director may adopt guidelines to determine the levels and nature of substances that constitute contamination of the site, the levels of contamination that require remediation, the levels or methods of remediation that may be required to restore a site to an acceptable level of remediation or methods of investigating sites, but the Director is not bound by any such guideline except to the extent that it forms part of an order (s. 55).

Certificates of compliance

At the request of a person named in a remediation order, and for a prescribed fee, the Director shall issue a certificate of compliance in respect of the order if, in the Director's opinion, the remediation of the site is substantially complete, and any security required by the Director for the performance of continuing obligations under the order to manage the contaminants remaining at the site has been provided (s. 18(1)).

Is the remediation certificate final and binding?

The certificate shall include a statement that the certificate is based on information in the Director's possession regarding the condition of the site, a reference to the order, a reference to the description of the level to which the site has been remediated, a reference to any outstanding or ongoing obligations under the order, a description of current or planned uses of the site as of the date of the certificate, and changes in use which will require further remediation, and any other matter that may be required by the Director or by regulation (s. 18(2)).

Notices

Once a site is designated as contaminated, the Director must file a notice under the certificate of title in respect of the contanicipality in the jurisdiction, and filed with a publicly accessible site registry, to be created under the legislation (s. 6(1)). Notices of revocation must similarly be filed in the registry (s. 6(2)). The site registry will also be established for the purpose of collecting and making information available to the public respecting the processes under the *Act* or Regulations affecting sites designated as contaminated sites (s. 53(1)).

New Brunswick

Relevant Acts

- *Clean Environment Act*, R.S.N.B. 1973, c. C-6 ("*CEA*")
- *Clean Water Act*, S.N.B. 1989, c. C-6.1. Contains corresponding provisions to the *CEA*. Water Quality Regulations, Reg. 95/59.

Guiding principles: N/A

Retroactivity: N/A

What triggers liability:

Designation of contaminated sites: N/A

Self-identification of contaminated sites: N/A

General provisions

- Where a release has occurred, the Minister may issue a Ministerial Order requiring a person to carry out clean-up, site rehabilitation or other remedial action under both s. 5(1)(*g*) of the *Clean Environment Act*, and s. 4(1)(*g*) of the *Clean Water Act*.
- Persons may also be directed to control the rate of release of any contaminant into or upon the environment or into water permanently, for a specified period, or in the circumstances set out in the order, to alter the manner, or set the procedures to be followed in the control or elimination of the discharging, emitting, leaving, depositing or throwing of any contaminant, or to install, replace or alter any equipment or thing designed to control or eliminate the discharging, emitting, leaving, depositing, or throwing of any contaminant. Persons may also be directed

to install, replace or alter sewage treatment facilities or waterworks, or if a contaminant or waste has been discharged, emitted, left, deposited or thrown into or upon the water, to carry out site rehabilitation or other remedial action in accordance with the order (*CEA*, s. 5(1)).

- The Minister may make an order respecting the release of a contaminant or waste notwithstanding that the person may be acting under authority of another *Act* and notwithstanding that the person is acting in compliance with such authority (*CEA*, s. 5.3(2)).

- The Minister, with the approval of the Lieutenant-Governor in Council, may by order designate a watershed, aquifer or ground water recharge area that is used as a source of water for a public water supply system as a protected area (*CEA*, s. 14).

Prohibitions and offences

- No person shall release (discharge, emit, leave, deposit, or throw — s. 1) any contaminant or waste or any class of contaminant or waste into or upon the environment, whether directly or indirectly, so as to cause water to be contaminated, unless the person is acting in compliance with authority or permission given under the *Act*, if to do so would affect the natural, physical, chemical or biological quality of the environment, endanger health or animal life or cause damage to property or plant life (*CEA*, s. 5.3(1)).

- A person who violates any provision of the *Act*, Regulations or order, or a term or condition of an approval, registration, licence, permit, exemption or determination commits an offence and is liable, on summary conviction (*CEA*, s. 33(1)).

Penalties

- Individuals are liable to a fine of not less than $500 and not more than $50,000 and in default of payment are liable to imprisonment under s. 31(3) of the *Summary Convictions Act* (*CEA*, s. 33(1)(*a*)).

- Persons other than individuals are liable to a fine of not less than $1,000 and not more than $1,000,000 (*CEA*, s. 33(1)(*b*)).

- The fine payable is the product of the above fine and the number of days on which the violation or failure continues (*CEA*, s. 33(2)).

- A judge may make an additional fine equal to the financial advantage gained from an offence, or where the offence was committed to avoid the financial burden of compliance, in an amount which is appropriate in the circumstances (*CEA*, s. 33.01(1)).

Parties to whom an order may be directed

- Person is defined in accordance with the *Interpretation Act* and includes a municipality, the Federal Crown and Provincial Crown (*CEA*, s. 1).

- The control order is binding upon the heirs, successors, administrators and assigns of the person to whom an order is directed (*CEA*, s. 5(8)).

Considerations the Ministry will take into account: N/A

Apportionment of remediation costs

If more than one person has failed to comply with the ministerial order, the persons are made jointly and severally liable (*CEA*, s. 5(2)).

Civil recovery of public costs

- Where the the Minister has reasonable and probable grounds to believe that a contaminant or waste is being released, and the origin of the contaminant or waste cannot be determined, or where, in the Minister's opinion, the issuance of an order would not result in immediate action to remedy the situation, the Minister may enter into the land in question (*CEA*, s. 5.01), and take necessary remedial action including clean-up, site rehabilitation or other remedial action (*CEA*, s. 5.01(3)(*g*)).

- Moreover, where the Minister believes the action taken under the ministerial order is not adequate, the Minister may, verbally or in writing, order the taking of such remedial action as the Minister considers necessary (s. 5.1(1)).

- If the person fails or refuses to comply with the order, the Minister may take such steps as are necessary to effect compliance (s. 5.1(2)).

- Following a written demand for payment (s. 5.2(1)), any unrecovered cost, expense loss damage, or charges incurred by the Minister to attend to a contaminant or waste that has been released into the environment may be recovered by the Minister in a debt action (*CEA*, s. 5.2(4)).

Remediation criteria

- Regulations may be made to control and prescribe the amounts, concentration and levels of contaminants in or upon the environment (*CEA*, s. 32(*r*)).

- Regulations may be made to authorize the Minister to require clean-up, site rehabilitation or other remedial action as a condition of obtaining or continuing to hold a registration, licence, permit or approval (s. 32 (*u.1*)).

- Regulations may be made to authorize the Minister to issue an order directing a person who has violated any provisions of the *Act* to carry out, in accordance with directions set out in the order, such clean-up, site rehabilitation and other remedial action as the Minister considers is necessary (s. 32(*u.2*)).

Certificates of compliance: N/A

Is the certificate of compliance final and binding? N/A

Notices: N/A

Newfoundland

Relevant Acts

- *Department of Environment and Lands Act*, R.S.N. 1990, c. D-11

Guiding principles: N/A

Retroactivity: N/A

What triggers liability:

Designation of contaminated sites

The Lieutenant-Governor in Council may make regulations to allow the Minister to issue orders requiring remediation of pollution, air, soil or water (s. 33(1)(*y*)). No such regulations exist.

Self-identification of contaminated sites: N/A

General provisions

- The Minister of Environment and Lands may issue an order upon receiving a report from his or her officials or from the Commission or a local advisory commission that a condition exists which is causing or is likely to cause pollution to the air, soil or a body of water. The Minister may prevent, restrict or prohibit the activity which is giving rise to or likely giving rise to the condition or make an order stopping works or operations either permanently or for a specific time (s. 28(1)).

Prohibitions and offences

- Subject to the Regulations, a person shall not discharge or deposit material of any kind into a body of water or a shore or bank of water or in any place that may cause pollution or impair the quality of water for a beneficial use (s. 25).

- A person who contravenes the *Act* or Regulations, or makes a false statement in a document made under this *Act* or the Regulations, is guilty of an offence (s. 47(1)).

Penalties

- Where no penalty is specifically provided for, corporations and municipalities are liable to a fine of not more than $25,000, and all others to a fine of not more than $1,000, and in default of payment, to imprisonment to a term not exceeding six months, or both (s. 47(1)).

- Every day a contravention continues constitutes a separate offence (s. 47(2)).

Parties to whom an order may be directed:

For stopping orders, the owner or person in charge of the works or the operations (s. 28(2)).

Considerations the Ministry will take into account: N/A

Apportionment of remediation costs: N/A

Civil recovery of public costs

Where pollution occurs and the person responsible fails to do the things that the Minister considers are appropriate to prevent, control, eliminate or ameliorate the pollution, the Minister may take appropriate action to prevent, control, eliminate or ameliorate the pollution. Costs incurred are a debt due to the Crown and are recoverable from the person the Minister considers responsible for the occurrence of the pollution (s. 41).

Remediation criteria

The Lieutenant-Governor in Council may make regulations requiring a person who has caused water or soil to become polluted or unwholesome to cleanse, disinfect or purify it at his or her own cost and expense, and prescribing how and when that cleansing, disinfection or purification is to be carried out (s. 33(1)(*k*)). No regulations appear to exist.

Certificates of compliance: N/A

Is the certificate of compliance final and binding? N/A

Newfoundland

Relevant Acts

➤ *Municipalities Act*, R.S.N. 1990, c. M-23.

Guiding principles: N/A

Retroactivity: N/A

What triggers liability:
Designation of contaminated sites: N/A

Self-identification of contaminated sites: N/A

General provisions

Town councils may order owners or occupiers of property to remove solid wastes, noxious substances and anything posing a hazard to public health and safety or that affects the amenities of a surrounding party (s. 186).

Prohibitions and offences: N/A

Penalties: N/A

Parties to whom an order may be directed: Owner or occupier (s. 186).

Considerations the Ministry will take into account: N/A

Apportionment of remediation costs: N/A

Civil recovery of public costs

Town councils may also remove the substance and charge the owner or occupier for the costs of doing so (s. 186).

Remediation criteria: N/A

Certificates of compliance: N/A

Is the certificate of compliance final and binding? N/A

Notices: N/A

Northwest Territories

Relevant Acts

- *Environmental Protection Act*, R.S.N.W.T. 1988, c. E-7

Guiding principles: N/A

Retroactivity: N/A

What triggers liability:

Designation of contaminated sites

The inspector may order that the person repair or remedy any injury or damage to the environment which results from the discharge (s. 7(1)).

Self-identification of contaminated sites

- When a discharge is in contravention of the *Act*, Regulations or applicable permits and licences, persons causing, contributing to, or increasing the likelihood of the discharge and the owner or person in charge, management or control of the contaminant immediately before the discharge or likely discharge must report the discharge or likely discharge to a prescribed person, and take all reasonable measures to stop the discharge, repair any damage and prevent or eliminate any danger to life, health, property or the environment (s. 5.1).

General provisions

- Where an inspector, appointed under the *Act* and including the Chief Environmental Protection Officer ("inspector") believes on reasonable grounds that a discharge of a contaminant is contrary to the *Act*, regulations or a permit or licence under the *Act*, or has occurred or is occurring, the inspector may issue a stop order that a person stop the discharge by a day named in the order (s. 6(1)).

- An inspector may issue a written order where an inspector believes on reasonable grounds that any land is unsightly to a person to improve the condition of the land in such a manner and to such an extent as may be set out in the order (s. 9.3(1)).

Offences

- No person shall discharge or permit the discharge of a contaminant into the environment, unless authorized or provided for by the *Act* (s. 5(1), (3)).

- No owner or occupier of land shall allow land within a municipality to become unsightly (s. 9.2).

Penalties

- Every person who contravenes s. 5 or fails to comply with an order under s. 6 or s. 7(1) is guilty of an offence and punishable on summary conviction, to a fine not exceeding $300,000 or to imprisonment for a term not exceeding six months, or both for first offences, and to a fine not exceeding $1,000,000 or to imprisonment for a term of less than two years or to both for subsequent offences (s. 12(1)).

- Every person who fails to comply with an order under ss. 4, 8.1 or 9.3 or with a notice under s.10(1) is guilty of an offence and liable on summary conviction to a fine not exceeding $200,000 or to imprisonment for a term not exceeding six months or both (s. 12(2)).

- It is a separate offence for each day an offence continues (s. 13(1)).

- A person convicted may also be directed to take any action that the court considers appropriate to remedy any harm to the environment that results from the act or omission that constituted the offence, etc. (s. 12.2).

- Where a corporation commits an offence under the *Act* or Regulations, any officer, Director or agent of the corporation who directed, authorized, assented to, acquiesced in or participated in the commission of the offence is a party to and is guilty of an offence (s. 14.1(1)), whether or not the corporation has been prosecuted and convicted (s. 14.1(2)).

Parties to whom an order may be directed

- Orders to remedy or repair damage may be issued to person who discharge or permit the discharge of a contaminant into the environment (s. 7(1)).

- Stop orders for releases may be issued to any person causing or contributing to a discharge, or the owner or person in charge, management or control of the contaminant (s. 6(1)).

- Where an emergency exists in the opinion of an inspector, the inspector may issue a verbal or written order under s. 6 or s. 7(1) to the person who, is the person best able to comply with the order (s. 8.1(1)).

- Unsightly land orders may be issued to the owner of the land or the last person to own or occupy the land no more than five years since the person did so (s. 9.3(1), (3)).

- Person includes successor, assignee, receiver, purchaser or agent of a corporation (s. 1).

Considerations the Ministry will take into account: N/A

Apportionment of remediation costs

Where the government can claim and recover costs incurred by the government from two or more persons, the cost and expenses may be recovered jointly and severally from those persons (s. 16(2)).

Civil recovery of public costs

- Where a person fails to comply with an unsightly land order, the Chief Environmental Protection Officer may take such action as he or she considers necessary to improve the condition of the land in accordance with the order (s. 9.3(2)).

- If a person who discharges or permits the discharge of a contaminant into the environment that injures or damages the environment, fails to do so, the Chief Environmental Protection Officer may take steps to repair or remedy the injury or damage (s. 7(2)).

- The Government of the NWT may claim and recover reasonable costs and expenses incurred in taking any measure under this *Act* form every person who, though his or her actions or negligence or through the actions of those for whom he or she is in law responsible, caused permitted or contributed to the discharge of a contaminant or otherwise contravened the *Act* or Regulations (s. 16(1)), and are recoverable as a debt due to the government (s. 16(4)).

Remediation criteria

Regulations may be made setting out required measures and standards of remediation of damage to the environment (s. 34(1)(*p*)).

Certificates of compliance: N/A

Is the remediation certificate final and binding? N/A

Notices: N/A

Nova Scotia

Relevant Acts

- *Environmental Act*, S.N.S. 1994-1995, c.1

Guiding principles

Goals guiding the implementation of the *Act*, include integrity of ecosystems; sustainable development through ecological value, the precautionary principle, pollution prevention, stewardship and responsibility of the producer, the polluter pays principle and the need for remedial action. Dispute resolution for rehabilitation of contaminated sites is also provided for in a form agreed to by the Minister in consultation with the affected parties.

Retroactivity

- A contaminated site may be designated regardless of compliance with any laws or any previous enforcement action which may have been taken (s. 87).

- Control, stop and emergency orders may be issued against any person responsible regardless of when the act or omission occurred (s. 130(4)).

What triggers liability

Designation of contaminated sites

- The Minister of the Environment may designate an area of the environment as a contaminated site where, in the Minister's opinion, a substance is present that may cause, is causing or has caused an adverse effect. The Minister must follow Environment Department standards, criteria or guidelines dealing with contaminated sites before making a designation (s. 87).

- The Minister may make an order requiring remedial action if an agreement between the persons responsible and the Minister has not been reached or has not been proposed within a reasonable time (s. 89).

Self-identification of contamination

- Any person responsible for the release of a substance into the environment that has caused or is causing or may cause an adverse effect, shall forthwith report it to the Department as soon as the person knows or ought to know of the release (s. 69(1)).

- Any person responsible for a release of a substance in excess of an authorized amount, concentration or level shall report it to the prescribed authority as soon as that person knows or ought to know of the release (s. 69(2)).

General

Where the Minister believes on reasonable and probable grounds that a person has contravened or will contravene the *Act*, the Minister may issue a control order:

- to undertake remedial action to control, to reduce or eliminate or mitigate the adverse effect (para. *(f)*);

- to carry out clean-up, site rehabilitation or management, site security and protection and other remedial actions (para. (*h*));

- to restrict or prohibit the use of a contaminated site or any product from that site (para. (*q*));

- to take precautions with respect to treatment or decontamination of an affected area (para. (*o*));

- to take precautions with respect to future use of an affected area (para. (*p*));

- to provide security during a clean-up and afterwards for monitoring purposes (para. *(r)*), and

- to do all things and take all steps necessary to comply with the Act or repair any injury or damage, or to control, eliminate or manage an adverse effect (s. 125(1)).

- In addition to the above, the Minister may issue a control order to cease the specified activity, stop, limit, alter or control the release; to follow new procedures in the control reduction or elimination of the release of any substance; to install replace or alter anything designed to control, reduce or eliminate the release of a substance; to take interim measures to control, eliminate or manage the adverse effect; to install, replace or alter a facility; to comply with directions respecting the withdrawal of water from a watercourse; to refrain from altering a watercourse; to remedy damage where a person has altered a watercourse or unlawfully released a contaminant into or migrated to the watercourse; to take steps to avoid contamination to persons handling, storing or transporting dangerous goods, waste, or pest-control products; to cause a crop or item to be destroyed or rendered harmless; and to restrict the sale of a crop or item (s. 125(1)).

- The Minister may require the person to whom a control, stop or emergency order is directed to take any measures that the Minister considers are necessary to restore and secure the contaminated site and the environment affected by the contaminated site (s. 129(2)). Rehabilitation may include removal of a contaminant from land or water, etc. (s. 3(*aq*)).

- The control order may require the person at his or her own expense to maintain records and report periodically to the Minister, to hire an expert to prepare a report, to prepare and submit contingency plans, to undertake tests, investigations and surveys, and to take any measure necessary to protect and restore the environment (s. 125(3)).

- Additional terms and conditions in excess of requirements in regulations, policies and guidelines may be imposed in control orders for environmentally sensitive areas (s. 125(2)).

- A control, stop or emergency order may also regulate or prohibit the use of a contaminated site or the use of any product that comes from a contaminated site (s. 129(2)(*c*)).

- Persons responsible for substance releases may also be required to take measures to rehabilitate the environment when a release occurs (s. 71).

Where a proposed undertaking is approved, the Minister can require the proponent to remediate the affected environment to acceptable levels (s. 41(*b*)).

- Where the Minister believes on reasonable and probable grounds that there is a likelihood of irreparable adverse effect, the Minister may make a stop order to shut down or stop an undertaking either permanently or for a specified period of time (s. 126).

- The Minister, administrator or inspector may also issue an order to clean up disposed litter (s. 127).

- The *Act* also provides for an order in emergency situations (s. 128(1)).
- Orders may be amended or revoked (s. 131(1)).

Prohibitions and offences

- No person shall knowingly or otherwise release or permit the release into the environment of a substance in an amount, concentration or level or rate that causes or may cause a significant adverse effect, unless authorized (s. 67(1), (2)).
- No person shall knowingly or otherwise release or permit the release of a substance into the environment in excess of authorized amounts, concentrations or levels (s. 68(1), (2)).
- A person responsible for the release of a substance shall take all reasonable measures to prevent, reduce and remedy the adverse effects of the substance, remove or dispose of the substance so as to minimize adverse effects, take any measures required by an inspector or an administrator and rehabilitate the environment to a standard prescribed by the Department as soon as the person knows or ought to know of the release that has caused, is causing or may cause an adverse effect (s. 71).
- A person responsible for a contaminated site who violates a term of an agreement reached for remedial action is guilty of an offence (s. 89(5)).
- Persons responsible for the release of a substance are under a duty to report the release (s. 69).
- Persons are under a duty to take remedial measures where a release of a substance has caused, is causing or may cause an adverse effect (s. 71).

Penalties:

- A person who commits an offence under s. 67(1) or s. 68(1), knowingly provides false or misleading information, or knowingly contravenes any order is liable to a fine of not less than $1,000 and not more than one $1,000,000 or to imprisonment for no more than two years, or both.
- A person who commits an offence under sections ss. 67(2) 68(2), 69, 71 or 89, providing false or misleading information, contravening an order, the Regulations, or otherwise is liable to a fine of not more than $1,000,000.

Parties to whom an order may be directed

- Persons responsible for a contaminated site include persons responsible for the substance present at the site, persons causing or contributing to the substance's presence at the site, current or previous owners, occupiers, and operators at the site, successors, principles and agents of all the above-mentioned persons (s. 2(*al*)).

- Otherwise persons responsible include the owner of a substance or thing, the present or previous owner or occupier of land on which an adverse effect has occurred or may occur, a person who had care, management or control during generation, manufacture, treatment, etc., a successor, assignee, executor, administrator, receiver, receiver Manager or trustee of the above, or a person who acts as the principal or agent of the above persons (s. 1(*ak*)).

- A control, stop or emergency order is binding on heirs, successors, executors, administrators, trustees, receivers, receiver Managers and assigns of the person to whom the order is directed (s. 130(3)).

- A control, stop or emergency order may be directed to one or more persons (s. 130(1)).

Considerations the Ministry will take into account

For control, stop or emergency orders, the Minister is to examine the following considerations if such information is available and accessible to the Minister, including:

- when the substance became present over, in on or under the site;

- for existing or previous owners, occupiers or operators, whether the substance was present at the time the person became an owner, occupier or operator;

- whether a person knew or ought reasonably to have known that the substance was present at the time the person became an owner, occupier or operator;

- whether the presence of the substance ought to have been discovered had the owner, occupier, or operator exercised due diligence;

- whether the owner, occupier, or operator exercised due diligence;

- whether the presence of the substance was caused solely by act or omission of an independent third party;

- the economic benefits the person may have received and the relationship between price and fair market value of the site had the substance not been present;

- for previous owners, occupiers or operators, whether that person disposed of an interest in the site without disclosing the presence of the substance to the person who acquired the interest;

- whether the person took all reasonable care to prevent the presence of the substance at the site;

- whether the person dealing with the substance ignored industry standards and practices in effect at the time or complied with the requirements of applicable enactments at the time;

- whether the person contributed to further accumulation and continued release of the substance upon becoming aware of the presence of the substance;

- what steps the person took upon becoming aware of the presence of the substance; and
- any other criterion the Minister considers relevant (s. 129).

Apportionment of remediation costs

- The Minister may refer a matter to a form of alternative dispute resolution, including but not limited to conciliation, negotiation, mediation and arbitration (s. 14(1)), and may be used in case of a dispute with respect to responsibility for rehabilitation of a contaminated site (s. 15(5)(*c*)).
- Persons responsible for a contaminated site may propose remedial action plans to the Minister, and may enter into agreements with the Minister and other persons responsible providing for remedial action and the apportionment of remediation costs (s. 89).
- The Minister may apportion the cost of compliance (s. 129(2)(*c*)).
- Where an order is directed to more than one person, all persons are jointly and severally liable, including any costs incurred by the Minister to carry out the terms of the order (s. 134(1)).
- The Minister and persons responsible may otherwise agree to apportion costs (s. 134(2)).
- Where a person is acting in the capacity of executor, administrator, receiver, receiver manager or trustee in respect of a contaminated site, the liability of that person is limited to the value of the assets the person is administering, less the reasonable costs and fees of administration. This limitation of liability does not apply if the executor, administrator, receiver, receiver manager or trustee contributes to further accumulation or further release of the substance on becoming aware of the presence of the substance in, on or under the contaminated site (s. 134(3), (4)).
- Where a person named in an order did not cause or contribute to the loss, damage, cost or expense by fault or negligence, each of the persons liable to pay compensation, whether or not they are named in the order are liable to make contribution to and indemnify that person to such degree as is determined to be just and equitable in the circumstances (s. 134(5)).
- Where two or more persons are liable to pay compensation, those persons are jointly and severally liable to the person suffering the loss, damage, cost or expense but, as between the persons, in the absence of contract or agreement, each is liable to make contributions and indemnify each other in accordance with stated principles (s. 134(6)).

Civil recovery of public costs

- Where the person to whom an order is directed fails to comply with the order, the Minister may carry out the terms of the order and recoup reasonable costs, expenses or charges incurred from the person to whom an order was directed, or from any person who purchased property from the responsible person from the money owed to the vendor less costs, expenses and charges. The purchaser is discharged from paying that amount to the vendor (s. 132).

- The order to pay has the same effect as a judgment against real property and a lien is established against the property and deemed to be taxes (s. 132).

Remediation criteria

The Minister may determine the manner and time frame for remediation of a contaminated site and may indicate the standards to be used in determining that a site has been satisfactorily remediated (s. 90).

Regulations may be made setting out criteria regarding the assessment, designation, classification and satisfactory remediation of contaminated sites (s. 91).

Regulations may be made regarding remediation measures where substances have been released (s. 74).

Certificates of compliance

The Minister may issue certificates of compliance where remediation is satisfactory (s. 90).

Is the remediation certificate final and binding? N/A

Notices

- An environmental registry will be established giving notice of environmental charges or liens, approvals, certificates of qualification, and certificates of variance (s. 10(1)).

Ontario

Relevant Acts

- *Environmental Protection Act*, R.S.O. 1990, c. E-19

Guiding principles: N/A

Retroactivity: N/A

What triggers liability:

Designation of contaminated sites

Self-identification of contamination

- Every person who discharges into the natural environment, or who is the person responsible for a discharged contaminant in an amount, concentration or level prescribed by Regulations shall forthwith notify the Ministry of the discharge (s. 13(1)).

- Every person who discharges a contaminant or causes or permits the discharge of a contaminant into the natural environment out of the normal course of events that causes or is likely to cause an adverse effect shall forthwith notify the Ministry (s. 15(1)).

- Every person having control of a pollutant that is spilled and every person who spills or causes or permits a spill that causes or is likely to cause an adverse effect shall notify the Minister of the spill and the actions the person has taken or intends to take (s. 92(1)), and do everything practicable to prevent, eliminate or ameliorate the adverse effect and restore the natural environment (s. 93(1)).

General provisions

- The Director may issue a control order where a contaminant was or is being discharged into the natural environment that causes or is likely to cause an adverse effect, or is contrary to the Regulations (s. 7(1)).

- The Director may issue control orders requiring a person to limit or control the rate of discharge of the contaminant into the natural environment in accordance with directions set out in the order; to stop the discharge of the contaminant into the natural environment permanently, for a specified period, or in certain circumstances, to comply with any directions in the order relating to the manner the contaminant may be discharged; to comply with directions for procedures to be followed in the control or elimination of the discharge of the contaminant into the natural environment; to install, replace or alter any equipment or thing designed to control or eliminate the addition, emission, or discharge of the contaminant into the natural environment; to monitor and record the discharge into the natural environment and to study and to report to the Director upon measures to control the discharge, effects of the discharge, and the natural environment the contaminant is being or is likely to be discharged; and to report to the Director in respect of fuel, materials and methods of production used and intended to be used, and the wastes that will or are likely to be generated (s. 124(1)).

- The Director is empowered to issue remedial orders where any person causes or permits the discharge of a contaminant into the natural environment, so that land, water, property, animal life, plant life, or human health or safety is injured, damaged or endangered, or is likely to be injured, damaged or endangered. The person will be required to repair the injury or damage, to prevent the injury or damage, or where the discharge has damaged or endangered or is likely to damage or endanger existing water supplies, to provide alternate water supplies (s. 17).

- The Director may also order persons to, *inter alia*, implement preventative procedures specified in the order, and to take all steps necessary to implement the order in the event the contaminant is discharged into the natural environment, and may be required to report to the Director in regard to the effects of the discharge of the contaminant into the natural environment (s. 18).

- Where waste has been deposited upon, in, into or through any land or land covered by water or in any building that has not been approved as a waste disposal site, the Director may order an owner, or previous owner, an occupant or previous occupant or a person who has or had charge and control of such land or building to remove the waste and restore the site to satisfactory condition (s. 43).

- The Minister may also issue orders where a pollutant is spilled and the Minister is of the opinion that there is or is likely to be an adverse effect and that it is in the interests of the public to make an order (s. 97(1)). A spill has occurred where a pollutant is discharged into the natural environment from or out of a vehicle, structure or other container and the quality or quantity is abnormal in light of all the circumstances of the discharge (s. 91(1)).

- The Director may issue a stop order, to order the person to whom it is directed to immediately stop or cause the source of contaminant to stop discharging into the natural environment any contaminant either permanently or for a specified period of time (s. 128).

- Waste orders may be issued where waste has been deposited upon, in, into, or through any land or land covered by water or in any building that is not a waste disposal site for which a certificate of approval or a provisional certificate of approval has been issued and upon the terms and conditions of the certificate (s. 40).

Prohibitions and offences

- No person shall discharge into the natural environment any contaminant, and no person responsible for a source of contaminant shall permit the discharge into the natural environment of any contaminant in an amount, concentration or level in excess of that prescribed by regulation (s. 6(1)).

- No person shall discharge a contaminant or cause or permit the discharge of a contaminant into the natural environment that causes or is likely to cause an adverse effect (s. 14(1)).

- No person shall deposit waste in, into or through any land or land covered by water or in any building that is not a certified waste disposal site (s. 40).

Penalties

- Every person who contravenes this *Act* or the Regulations is guilty of an offence (s. 186(1)).

- Every person who fails to comply with an order under this *Act* other than an order under s. 150 for litter (which is a separate offence) is guilty of an offence (s. 186(2)).

- Every person who is guilty of the above offences is liable on conviction for each day or part of a day on which the offence occurs or continues to a fine of not more than $10,000 on a first conviction and not more than $25,000 on each subsequent conviction (s. 186(5)), while a corporation faces a maximum fine imposed for each

day or part of a day on which the offence occurs or continues to a fine of not more than $50,000 on a first conviction and $100,000 on each subsequent conviction (s. 186(6)).

- Corporations convicted for actual pollution (s. 14(1)) or non-compliance with stop orders (s. 130(1)) are liable on conviction for each day or part of a day on which the offence occurs or continues to a fine of not less than $2,000 and not more than $200,000 on a first conviction and not less than $4,000 and not more than $400,000 on each subsequent conviction (s. 187(1)).

- Every person convicted of a contravention of s. 14(1) or s. 130(1) is liable, in addition to or in substitution for the penalty set out in s. 186(3), to imprisonment for a term of not more than one year (s. 187(2)).

- The court may order an additional fine imposed upon the person by an amount equal to the amount of the monetary benefit acquired by or that accrued to the person as a result of the commission of the offence (s. 189).

- The court may also order the person to act to prevent, decrease or eliminate the effects on the natural environment of the offence and to restore the natural environment within the period or periods of time specified in the order and under such conditions as the court considers appropriate to prevent similar unlawful conduct or to contribute to rehabilitation (s. 190).

Parties to whom an order may be directed

- Control orders and stop orders may be issued to past and present owners, occupiers and persons with charge, management or control of a source of contaminant, land or buildings (ss. 7(1), 8(1)).

- An order or approval is binding upon the successor or assignee of the person to whom it is directed (s. 19(1)).

- Where a pollutant is spilled, the parties against whom an order may be directed are broader, as the Minister may make an order against the owner of the pollutant, the person having control of the pollutant, the owner or the person having the charge, management or control of any real property or personal property that is affected or may reasonably be affected by the pollutant, the municipality or regional municipality within whose boundaries the spill occurred, any contiguous municipality or regional municipality, any affected municipality or regional municipality, any public authority, any person who is or may be adversely affected by the pollutant or whose assistance is necessary, in the opinion of the Minister, to prevent, eliminate, or ameliorate the adverse effects or restore the natural environment (s. 97).

- Where a pollutant is spilled, the term "owner of a pollutant" means the owner of the pollutant immediately before the first discharge whether into the natural environment or not, in a quantity or with a quality abnormal at the location where the discharge occurs (s. 91(1)).

- Where a pollutant is spilled, the term "person having control of a pollutant" means the person and the person's employee or agent having charge, management or control of a pollutant immediately before the first discharge of the pollutant, whether into the natural environment or not, in a quantity or with a quality abnormal at the location where the discharge occurs (s. 91(1)).

- Where a pollutant is spilled, the owner of the pollutant or person having control includes successors, assignees, executors or administrators (s. 91(5)).

Considerations the Ministry will take into account: N/A

Apportionment of remediation costs: N/A

Civil recovery of public costs

For spills, the owner of the pollutant or person having control of the pollutant must compensate the Crown for loss or damage incurred as a direct result of the spill of a pollutant, or for all reasonable costs and expenses incurred by the Crown in respect of carrying out the order or direction for spills (s. 99(2)). The person will not be liable if the spill was wholly caused by an act of war, civil war, insurrection, terrorism or other act of hostility, a natural phenomenon of an exceptional, inevitable and irresistible character or an act or omission with intent to cause harm by another person (s. 99(3)). Nonetheless, the person will still be liable if the person neglected to carry out imposed duties, an order or direction for spills, and is still liable for costs and expenses to carry out the terms of an order to the extent practicable to prevent, eliminate and ameliorate the adverse effect, and to do everything practicable to restore the natural environment, or both (s. 99(4)). Persons will be jointly and severally liable to the person suffering loss but as between each liable person, and in the absence of an express or implied contract, each will indemnify the other and pay contribution to the degree each person caused the damage (s. 99(8)).

Remediation criteria: N/A

Certificates of compliance: N/A

Is the remediation certificate final and binding? N/A

Notices

- As a lesser measure, a certificate of prohibition to deal with the property without first giving a copy of the order or decision to each party acquiring an interest in the property is registered with the Land Titles Office (s. 197).

- A certificate of a withdrawal of a prohibition may similarly be registered with the Land Registry Office if the certificate is on a prescribed form, signed by the Director and is accompanied by a registrable description of the property (s. 197).

- The certificate of withdrawal of prohibition will be registered where the sub-surface soils meet the Full Depth/Potable criteria (Proposed Guidelines, 5.4.2, see Appendix 2).

➤ No use shall be made of land or land covered by water which has been used for the disposal of waste within a period of 25 years from the year in which such land ceased to be so used unless the approval of the Minister for the proposed use has been given (s. 46).

Ontario

Legal Document

➤ *Agreement Limiting Environmental Liability of Lenders*, December 1995.

Description

Draft standard form agreement enables lenders to limit their environmental liability with respect to any secured property made avilable for public comment in the Spring of 1995.

Significant concern exists among lenders as to what actions could constitute the taking of charge, management or control of property so as to expose the lender to liability with respect to existing environmental contamination of the property.

Neither the lender nor any lender representative (defined in the agreement to include a trustee, receiver, receiver manager or other person acting in a similar capacity) will be considered to be a party on whom environmental liability may be imposed by virtue of having taken certain actions. Those actions are to include entering upon property or taking any action in order to conduct an investigation into the environment and other condition of the property owned, occupied or used by any of its debtors, and preserving the value of such property by taking steps to maintain public utility services, heat, maintenance, security or insurance, paying taxes, collecting rents or dealing with any immediate dangers resulting from the environmental condition of the property.

The draft agreement requires lenders to provide the Ministry with copies of any reports prepared as a result of environmental assessments carried out at debtor's properties.

Lenders who take any of the permitted actions with regard to a debtor's property must notify the Ministry in circumstances where the lender becomes aware of any immediate danger at the property due to its environmental condition or where the lender determines, on the basis of the environmental condition of the property, not to take further action with respect to the property. Failure to take these steps does not negate the lender's immunity.

The agreement would only apply to environmental contamination or violations of environmental legislation which exist at a debtor's property prior to, or at the time, the lender takes any actions contemplated by the draft agreement. Breaches of environmental legislation caused or aggravated by the lender or any lender representative continue to be the responsibility of the lender, as does continued compliance with environmental laws.

Provides protection only with respect of investigation and initial realization steps and not full operation and business by a receiver.

Prince Edward Island

Relevant Acts

- *Environmental Protection Act*, R.S.P.E.I. 1988, c. E-9, as amended.

Guiding principles: N/A

Retroactivity: N/A

What triggers liability:

Designation of contaminated sites: N/A

Self-identification of contaminated sites: N/A

General provisions

The Minister may issue an order where the Minister believes on reasonable and probable grounds that an act or omission of a person/corporation is or may be a contravention of the *Act* or Regulations, or otherwise a threat to the environment or environmental health, and it is necessary and advisable for the protection of the environment or prevention and control of danger to human life (ss. 7(2), 7.1(2)).

The Minister may order the person in writing, and subject to such terms and conditions as may be specified in the order, to do one or more of the following at the person's cost:

- to permit inspection of the premises in question at a designated time;
- to permit testing and sampling;
- to carry out inspections, testing and sampling;
- to cease the activity specified in the order;
- to clean and repair, at that person's own cost, the area affected;
- to take action to prevent or avoid danger to human life or health or damage to property; and
- to submit a report (ss. 7(3), 7.1(3)).

If the person fails to comply with the order, the Minister may, upon notice to the person, apply to a judge of the Supreme Court for an order authorizing an environment officer to enter the affected area and take necessary steps (ss. 7, 7.1). The Minister may proceed without notice, if notice is not practicable or delay will result in irreparable or costly contamination to the environment.

Every person who, without permission, discharges, or causes or permits to be discharged, a contaminant into the environment, or who owns or has control of a contaminant which is discharged into the environment, shall notify the Department and take such remedial measures as the Minister shall direct (s. 21).

Prohibitions and offences

- The contravention or failure of any natural person to comply with a term or condition of an order is an offence (s. 32(1)).

- The contravention or failure of any corporation to comply with a term or condition of an order is an offence (s. 32(3)).

Penalties

- Any natural person who contravenes or violates any provision of the *Act* or Regulations is guilty of an offence and is liable on summary conviction to a fine of not less than $200 and not more than $10,000 or to imprisonment for 90 days or both, and to pay restitution to any person aggrieved or affected by the contravention or violation (s. 32(2)).

- Any corporation who contravenes or violates any provision of the *Act* or Regulations is guilty of an offence and is liable on summary conviction to a fine of not less than $200 and not more than $10,000 or to imprisonment for 90 days or both, and to pay restitution to any person aggrieved or affected by the contravention or violation (s. 32(4)).

- Any officer, director or agent of the corporation who directed, authorized, assented to or acquiesced in or participated in the commission of an offence by the corporation is guilty of the offence for natural persons, above (s. 32(5)).

- Each day that a contravention or violation continues is a separate offence (s. 32(6)).

Parties to whom an order may be directed

To natural persons/corporations who are the owners or previous owners of the contamination or source of contamination; natural persons/corporations who are or were in occupation of the source of the contaminant, natural persons/corporations who has or had charge, management or control of the source of the contaminant (ss. 7(1), 7.1(1)); and natural persons/corporations whose act or omission is a threat to the environment or environmental health (ss. 7(2), 7.1(2)).

Considerations the Ministry will take into account: N/A

Apportionment of remediation costs: N/A

Civil recovery of public costs

- Where the person to whom an order has been issued fails to comply with it, the Minister may apply to the Supreme Court for an order authorizing the Minister to take remedial action (s. 33(1)). After taking the remedial action, the Minister may issue an order for the costs of the remedial action against the person to whom the original order or direction was given (s. 33(2)).

- The Minister may also take immediate emergency action and take appropriate remedial action (s. 35(1)), and then may issue an order for costs of the remedial action against the person who caused the contamination or damage (s. 35(2)).

Remediation criteria: N/A

Certificates of compliance: N/A

Is the certificate of compliance final and binding? N/A

Notice: N/A

Quebec

Relevant Acts

- *Environmental Quality Act*, R.S.Q. 1977, c. Q-2, as amended.

Guiding principles: N/A

Retroactivity

An order may be issued even where an emission, deposit, release or discharge occurred even before the passing of the *Act* (ss. 31.42, 31.43).

What triggers liability:

Designation of contaminated sites

- If the Minister believes on reasonable grounds that a contaminant is present in the environment in a greater quantity or concentration than is prescribed by regulation or the contaminant is likely to affect the health, safety, welfare or comfort of human beings, or cause damage to or otherwise impair the quality of the soil, vegetation, wildlife or property, the Minister may order anyone who has released, emitted, deposited, or discharged, all or some of the contaminant to furnish him with a characterization study, a program of decontamination or restoration of the environment describing the work proposed for the decontamination or restoration of the environment and a timetable for the execution of the work (s. 31.42).

- If the presence of contaminants exists in greater quantity or concentration than permitted, or the contaminants are prohibited, or likely to affect the life, health, safety, welfare, or comfort of human beings, or to cause damage to or otherwise impair the quality of the soil, vegetation, wildlife or property, the Minister may order the person to recover, remove, collect or neutralize the contaminant, and take any measure specified to decontaminate or restore the environment (s. 31.43).

Self-identification of contaminated sites

- Whoever is responsible for the accidental presence of a contaminant in the environment in greater quantity or concentration than permitted by Regulation, or where prohibited by Regulation or likely to affect the life, health, safety, welfare or comfort of human beings, or to cause damage to or otherwise impair the quality of the soil, vegetation, wildlife or property must advise the Minister without delay (s. 21).

General provisions

- Where the presence of a contaminant in the environment is in greater quantity or concentration than permitted by Regulation, or where prohibited by Regulation or likely to affect the life, health, safety, welfare or comfort of human beings, or to cause damage to or otherwise impair the quality of the soil, vegetation, wildlife or property, the Minister may order whoever is responsible to cease finally or temporarily or to limit the contaminant's emission, deposit, issuance or discharge (s. 25).

- Short term orders are also available requiring anyone responsible to abate the discharge of a contaminant when, in the Minister's opinion, an immediate danger to human life or health or a danger of serious or irreparable damage to property results (s. 26) and take other emergency measures (s. 114.1).

- Orders may also be made with respect to persons operating waterworks, sewer systems of water treatment plants (s. 34).

Prohibitions and offences

- No one may emit, deposit, issue or discharge or allow the emission, deposit, issuance or discharge into the environment of a contaminant in a greater quantity or concentration than provided for by Regulation (s. 20).

- No one may emit, deposit, issue or discharge any contaminant which is prohibited by Regulation or is likely to affect the life, health, safety, welfare or comfort of human beings, or cause damage to or otherwise impair the quality of the soil, vegetation, wildlife or property (s. 20).

- No person may emit, deposit, release or discharge or allow the emission deposit, issuance or discharge from an specified industrial establishment for which the Minister has refused to issue a depollution attestation (s. 30.1) or where the depollution attestation issued for an establishment has been suspended or revoked (s. 31.30).

Penalties

- Where a person fails to report contamination under s. 21, a person commits an offence and is liable to a fine of not less than $600 and not more than $20,000 for a first offence, and between $4,000 and $40,000 for second offences (s. 106).

- A corporation convicted of an offence under s.106 is liable to a maximum fine of three times higher than the minimum fine and six times than the maximum fine (s. 106).

- Anyone who contravenes s. 20, fails to undertake remedial work under s. 31.32, or fails to undertake remedial work pursuant to changing the use of the soil, or before undertaking excavation or construction work under s. 31.49 and s. 31.51 (not in

force) commits an offence and is liable to a fine of between $2,000 and $250,000 for a first offence, and between $50,000 and $1,000,000 for second offences, and between $500,000 and $1,000,000 for subsequent convictions (s. 106.1).

- A judge may also require that the offender, at his or its own expense, take corrective measures to restore the environment (s. 109.1.1).
- A judge may also pose an additional fine equal to the amount of any monetary benefit acquired or accrued to the person as a result of commission of the offence (s. 109.1.2).
- The owner or occupant of the land who has knowledge of and tolerates the emission, deposit, discharge or ejection of a contaminant on land he owns or occupies is also guilty of an offence and liable to the same penalties (s. 106.1).
- A person who does or omits to do something in order to assist a person in committing an offence against this *Act* or who counsels, encourages or incites a person to commit an offence, also commits and offence and is liable to the same penalty (s. 109.2).
- Every director or officer of a corporation whose orders, authorization, advice or encouragement leads the corporation to refuse or neglect to comply with an order to emit, deposit, release or discharge a contaminant into the environment commits an offence and is liable to the same penalties under s. 106.1 (s. 109.3).
- It is a separate offence for each day an offence continues (s. 110).
- Proof that an offence was committed by an agent, mandatory or employee of another is sufficient to establish that it has been committed by that other unless he/she establishes that the offence was committed without his or her knowledge or consent and despite measures taken to prevent its commission (s. 112).

Parties to whom an order may be directed

- Persons responsible for a source of contaminants, and to the owner of contaminated soil; and any person named in the Minister's order must carry out the work as approved by the Minister (s. 31.42).

Considerations the Ministry will take into account: N/A

Apportionment of remediation costs: N/A

Civil recovery of public costs

- Where someone refuses or neglects to do something required under the *Act*, the Minister may have the thing done at the expense of the offender and recover the costs from him or her with interest in the same manner as for any debt due to the government.

- The Minister may also have the thing done at the expense of the directors or officers of a corporation and recover the cost from them if they authorized, encouraged, ordered or advised the corporation to refuse or neglect to do the thing required, or if they tolerated the corporation's refusal or neglect to do the thing (s. 113). Every amount due is secured by a legal hypothec on the moveable and immoveable property of the offender.

- Where a person is found guilty of an offence, the Minister may also take steps to restore the environment at the expense of the offender (s. 115) and may recover any debt owing from any person or municipality who had custody of or control over the contaminants, and from any person or municipality responsible for the emission, deposit discharge or issuance of the contaminants, whether or not they have been prosecuted for an offence. Liability is joint and several where several debtors are involved (s. 115.1).

Remediation criteria

Regulations may be made setting quantities or concentrations of contaminants above which the environment is considered contaminated (s. 31.52(*a*)) and setting out methods of management of contaminated soil (s. 31.52(*d*)). Criteria for certain classes of industrial establishments are set out in the Contaminated Sites Rehabilitation Policy — see Appendix 2.

Certificates of compliance

For certain classes of industrial establishments, "depollution attestations" are available for approved projects (s. 31.11), but they are not available generally. In such projects, the Department of the Environment is able to require the developer to carry out certain remedial measures and to monitor implementation of those measures — see Appendix 2.

Is the remediation certificate final and binding? N/A

Notice

Provisions not in force would allow the Minister to register a notice of the presence of a contaminant in greater quantity or concentration on property with the registry office as well as publish the notice in a daily newspaper circulating in the area where the contaminated soil is located(s. 31.48).

Before the owner would undertake to change the use of the soil, or before undertaking excavation or construction work, the person would be required to conduct a soil characterization study, a program of decontamination or restoration of the soil, and a description of the proposed change or alternation of the use of the soil (s. 31.49). The notice may then be cancelled if the quantity or concentration of contaminants is equal or lesser than the prescribed requirements (s. 31.50).

Saskatchewan

Relevant Acts

➤ *Environmental Management and Protection Act*, S.S. 1983-84, c. E-10.2

Guiding principles:

Retroactivity

Unauthorized discharge orders can be issued where the discharge occurred before or after the coming into force of the *Act* (s. 4(1)).

What triggers liability:

Designation of contaminated sites: N/A

Self-identification of contamination

This is required only upon the request of the Minister, an environmental officer or another person designated by the Minister (s. 9).

General provisions

➤ Under the terms of any licence, permit or other privilege, where the Minister is of the opinion that a pollutant is being or was discharged, accidentally or otherwise, or is present in circumstances that are harmful or potentially harmful to the environment, the Minister may issue an order for the person to investigate the situation; monitor the pollutant; lessen or prevent further discharge of the pollutant; contain the pollutant; remove the pollutant; store the pollutant and monitor its storage; destroy or otherwise dispose of the pollutant; minimize the effects of the pollutant on the environment; remedy any adverse effects of the pollutant on the environment; restore the area affected by the discharge or presence of the pollutant to a satisfactory condition; maintain records on discharge or presence of the pollutant and the measures specified in any order; report periodically to the Minister, project manager or designated person; and to take any other measure the Minister considers necessary to facilitate compliance with the *Act* or to protect or restore the environment (s. 4).

➤ The Minister may appoint a project manager to oversee the carrying out of orders under s. 4 and to issue written directives relating to measures required by these orders (s. 6).

➤ Orders may also be issued against the owner or operator of any sewage works or waterworks to take specified measures.

Prohibitions and offences

Subject to the other provisions of the *Act* and Regulations, no person shall pollute or cause any pollution (s. 34.1).

Penalties

- Any person who contravenes the *Act* or Regulations or fails to comply with an order of the Minister is guilty of an offence and liable on summary conviction to a fine not exceeding $1,000,000 and to imprisonment for a term not exceeding three years or both (s. 35(1)).

- If a corporation has committed the offence, officers, directors or agents who directed, authorized, assented to, acquiesced in or participated in the commission of the offence are a party to and guilty of the offence and are liable on summary conviction to the above punishment, whether or not the corporation has been prosecuted or convicted (s. 35(2)).

Parties to whom an order may be directed

- Where the pollutant was discharged, accidentally or otherwise, against the owner of the pollutant or the person having control of the pollutant (s. 4(1)).

- The term "owner of a pollutant" means the owner of the pollutant immediately before first discharge, and includes a successor, assignee, executor or administrator of the owner (s. 1(*r*)).

- The term "person having control of a pollutant" means the person having charge, management or control of the pollutant immediately before first discharge, and includes a successor, assignee, executor or administrator of the owner (s. 1(*t*)).

- Where the pollutant is present in circumstances that are harmful, or potentially harmful to the environment, to the person responsible for the presence of the environment.

Considerations the Ministry will take into account: N/A

Apportionment of remediation costs: N/A

Civil recovery of public costs

- Where a person to whom an order was made fails to comply with the order, the Minister may carry out the order and recover the costs and expenses incurred as a debt due to the government from the person who failed to comply with the order (s. 7).

- Where it is in the public interest to take immediate action or the Minister is unable to locate or readily identify the person to whom an order should be directed, the Minister may carry out the work and recover costs from the owner or the pollutant or the person having control of the pollutant, where a contaminant was discharged, accidentally or otherwise, or from the person responsible for the presence of a contaminant (s. 8).

Remediation criteria: N/A

Certificates of compliance: N/A

Is the remediation certificate final and binding? N/A

Notices: N/A

Yukon Territory

Relevant Acts

- *Environment Act*, S.Y.T. 1991, c. 5
  (Special Waste Regulations and Amendments to Statute, 1995, not available)

Guiding principles: N/A

Retroactivity: N/A

What triggers liability:

Designation of contaminated sites

- Where the Minister believes that an area of land or part is a contaminated site, he or she may issue a notice designating the area of land or part thereof as a contaminated site (s. 114(2), not in force).

- Any person who owns or occupies the land where a notice has been registered shall before changing the use of the soil or ground water, undertaking excavation or construction, or dismantling equipment or buildings, shall provide a site assessment, a description of the proposed change and a plan of restoration (s. 114(6), not in force).

- Where the Minister believes on reasonable grounds that land is contaminated and that the contaminated site has caused or is likely to cause unsafe conditions or irreparable damage to the natural environment, or has caused or is likely to cause a threat to public health, the Minister may order a responsible party to provide information, undertake investigations, tests, surveys, etc., to determine the extent and effects of the contamination and report the results to the Minister, to establish a plan for restoration, and to carry out the restoration (s. 115(1), not in force).

Self-identification of contamination

- Every person who releases a contaminant in an amount, concentration or level in excess of that prescribed by Regulation or allowed under a permit shall, as soon as possible, report the release to an environmental protection officer or a prescribed person (s. 113, not in force).

General provisions

- Where an environmental protection officer has reason to believe that a development or activity is causing or is likely to cause irreparable damage to the natural environment, or, upon consultation with a health officer, that the development or activity is causing actual or imminent harm to public health or safety, an environmental protection officer may order the person to shut down the

development or cease the activity causing the damage or harm, or to take such other actions as may be necessary to prevent, remedy or mitigate the damage or harm (s. 159).

- Similarly, where an environmental protection officer has reason to believe that a development or activity is causing or is likely to cause a significant adverse effect or actual or likely threat to public health or safety, the Minister may issue an environmental protection order to shut down a development or to cease the activity until it is in compliance with the *Act*, Regulations or a permit or order, to prevent, remedy or mitigate any significant adverse effect or threat to public health or safety, to restore or rehabilitate the natural environment to a condition satisfactory to the Minister, to comply with any order issued by an environmental protection officer under the *Act*, and to comply with any directions issued by the environmental protection officer relating to the spill of a hazardous substance, pesticide, contaminant or special waste (s. 160).

- Every adult and corporation resident in the Yukon has a right of action regarding the impairment or likely impairment of the natural environment which, if successful, may lead to an order to carry out or pay for the restoration or rehabilitation of any part of the natural environment (s. 8). The court can also direct the Minister to monitor compliance with such an order (s. 12).

Prohibitions and offences: N/A

Penalties: N/A

Parties to whom an order may be directed

To persons in control of the development or conducting the activity (s. 159).

For releases, the term "responsible party" means the person who had possession, charge or control of the contaminant at the time of its release into the natural environment (s. 111, not in force).

Considerations the Ministry will take into account in assessing liability: N/A

Apportionment of remediation costs: N/A

Civil recovery of public costs: N/A

Remediation criteria: N/A

Certificates of compliance

Where restoration or rehabilitation has been undertaken, a certificate of compliance has the effect of cancelling a notice or an order and will be placed in the registry (s. 116(3), not in force). The certificate does not warrant that the land is free of contamination (s. 116(4), not in force).

Is the remediation certificate final and binding? N/A

Notices

The Minister is to establish a public registry of contaminated sites (s. 114(1), not in force).

Yukon Territory

Relevant Acts

➤ *Lands Act*, R.S.Y. 1986, c. 99

Guiding principles: N/A

Retroactivity: N/A

What triggers liability:

Designation of contaminated sites: N/A

Self-identification of contamination: N/A

General provisions

Where land is abandoned, the person must obtain written approval of an Executive Council Member. The Member may make the abandonment subject to such terms and conditions as the Member may determine (s. 22).

Parties to whom an order may be directed

Persons abandoning dispositions of Yukon land (grants of land controlled by the Yukon Government) or persons who use or occupy Yukon land without legal authorization.

Considerations the Ministry will take into account in assessing liability: N/A

Apportionment of remediation costs: N/A

Civil recovery of public costs: N/A

Remediation criteria

Where land is occupied without legal authorization, provides for service of notice requiring the person to restore lands to a satisfactory condition or to pay the costs of having the land restored (s. 23).

Certificates of compliance: N/A

Is the remediation certificate final and binding? N/A

Notices: N/A

Appendix D

Review of Policies and Guidelines — May 1996

Federal

Guidance	Key Features
CCME EPC-CS34 Interim Canadian Environmental Quality Criteria for Contaminated Sites — Remediation Criteria for Soil and Ground Water, 1991	Specifies soil and ground water quality criteria.
Protocol for the Derivation of Ecological Effects Based and Human Health Based Soil Quality Criteria July, 1994 and Framework for Ecological Risk Assessment, August 1995	Outlines acceptable risk analysis methodology.
CCME — National Classification System for Contaminated Sites, 1992	Allows preliminary determination of site risk to the environment.
Canadian Water Quality Guidelines Revised, 1995	Establishes water quality criteria.

Province of Alberta

Guidance	Key Features
Draft 1994 — Alberta Tier I Criteria for Contaminated Soil Assessment and Remediation	In accordance with the National Guidelines for Decommissioning Industrial Sites (CCME 1991), Alberta Environmental Protection subscribes to a two-tier approach to setting acceptable concentrations of contaminants in soil. Tier I values are generic. They approximate acceptable concentrations of soil for all site conditions and land uses without defining actual risk. In contrast, Tier II criteria, are site-specific concerning protection of human health and the environment. Such criteria are based on acceptable risk specific to the site in consideration of such variables as soil, geology, surface and ground water, climate and land use. These guidelines are the most recent version, and replace a 1990 version. Although still in draft, the criteria are being followed to determine the need for remediation, and quantify acceptable concentrations of soil contaminants. The remediation criteria for contaminated ground water adopted by Alberta Environmental Protection are the CCME guidelines (September 1991).
Draft 1994 — Remediation Guidelines for Petroleum Storage Tanks Site	These guidelines were developed to assess both the owners and operators of petroleum storage tanks systems and the regulatory authority in the remediation of sites contaminated by leakage or spillage of petroleum products. These guidelines have been developed through the use of a risk-based approach to remediation which ensures the protection of human health, safety and the environment. These guidelines still remain in draft and replace an earlier 1991 version. Although still in draft, the criteria are being followed and provide uniform standards for the remediation of petroleum storage tank sites in Alberta.
Alberta User Guide for Waste Managers, May 1995	This guide explains Alberta's waste classification procedures and test Watemethods, waste management options, transportation and manifest requirements, and the Alberta *Environmental Protection* and *Enhancement Act* approval system for waste management. These guidelines were finalized in May 1995. These guidelines classify hazardous and non-hazardous waste.

Province of British Columbia

Guidance	Key Features
Criteria for Managing Contaminated Sites (CMCS), July 1995	The CMCS provides criteria applicable to both assessment and remediation of contaminated sites. The criteria are based on planned land use including agricultural, residential, parkland, commercial and industrial. The CMCS includes provisions for both numerical and risk-based approaches to remediation. The criteria are in force under the *Waste Management Act* as of July 1995. They are intended to be incorporated into the Contaminated Sites Regulations. The CMCS provides the primary source of numerical criteria for assessment and remediation of contaminated sites. The document makes it clear that risk assessment and risk management can be used for contaminated sites. Although not a regulation, British Columbia Environment may use the CMCS in conjunction with a Pollution Abatement Order to mandate remediation to the indicated levels.

Province of British Columbia (cont'd)

Guidance	Key Features
Draft 3 Regulations for *Bill 26* — Contaminated Sites Regulations, December 1995	In addition to the legal/liability clauses described above, Draft 3 of the Regulations provides details on site discovery, criteria for investigation and remediation, risk assessment/risk management approaches, and fee structures for review of reports. The two-year review process for *Bill 26* has been extensive and has involved the industry, municipalities and other interest groups. Comments are currently being solicited on Draft 3 of the Regulations. No date has been set for release of the final regulation. Although still in draft, the criteria and guiding principles of the Regulation are being followed, in parallel to the CMCS document it will replace.
Special Waste Regulations (Part of *Waste Management Act*)	Regulations under the *Waste Management Act* provide requirements for handling, storage, transport and disposal of "Special Wastes". The Regulation defines Special Wastes as Waste Dangerous Goods (as defined in the *Transport of Dangerous Goods Act* and Regulation) and other specific wastes. The Regulation sets the quantity limits for its application, typically 5 kg or litres. The Regulation was proclaimed and effective April 1, 1988 and was last amended April 16, 1992. Amendments to the Special Waste Regulation are being prepared which will change the definition of a Special Waste. The timing for the amendments is unknown. The Special Waste Regulation applies to soils and water on contaminated sites that are discharged or removed and that exceed the criteria. Because of the handling and disposal requirements, dealing with Special Wastes has significant cost implications to a remediation program. If Special Wastes are known to be present on an historically (defined as pre-1988) contaminated site, the Regulation provides mechanisms for in situ management of the wastes, provided risk assessment does not indicate significant concerns.
Spill Reporting and Prevention	This Regulation requires the reporting of spills or releases of dangerous goods to the environment. The Regulation sets "reportable quantities" for each class of dangerous good. The Regulation was brought into force in August 1990. Because the Regulation requires reporting of spills, it provides information on possible contamination at and near a site.
Contaminated Sites Fees Regulation	This Regulation is issued pursuant to the *Waste Management Act* which sets the fees for British Columbia Environment review of reports or plans with respect to contaminated sites. The Regulation also provides for external review of reports at a higher cost, but more definite timeframe, than a British Columbia Environment review. The Regulation outlines the services that can be provided ranging from providing information to issuing a certificate of compliance for a remediated site. The Regulation was in force and effective July 1, 1995. It is intended to be included in the new Contaminated Sites Regulation. While the fee regulation makes some of the services that can be provided by British Columbia Environment clear, it also adds an additional cost to site investigations which need to be approved by British Columbia Environment. Many municipalities require receiving an Approval in Principle from British Columbia Environment prior to issuing a development permit. The cost and timing for such approval must be included in the overall development schedule.

Province of British Columbia (cont'd)

Guidance	Key Features
British Columbia Fire Code Regulation	The British Columbia Fire Code Regulation was adopted from the National Fire Code and provides construction and operation codes for fire safety pursuant to the *Fire Services Act.* The Fire Code Regulation was adopted in October 1992 and is amended from time to time. The Fire Code provides requirements for decommissioning of Underground Storage Tanks containing petroleum products. Under most circumstances, once a tank is no longer in use, it must be removed. The Code includes provisions for decommissioning tanks in place when removal is not practical.

Province of Manitoba

Guidance	Key Features
Guideline for the Environmental Investigation and Remediation of Petroleum Contaminated Sites in Manitoba, July 1993	In the absence of provincial policy, CCME format is followed. Specific criteria are provided for petroleum hydrocarbons.

Province of New Brunswick

Guidance	Key Features
Guideline for the Assessment and Remediation of Contaminated Sites, 1992, New Brunswick Department of the Environment	• Outlines approach to the assessment and remediation of contaminated sites.. • Generic numeric criteria are provided. • Talks in terms of risk assessment.
Above Ground Petroleum Bioremediation	Guideline that outlines methodology for above ground bioremediation.

Province of Newfoundland

Guidance	Key Features
Policy on Contaminated Sites, TPH Criteria, April 1993	Provides specific total petroleum hydrocarbon criteria. In the absence of provincial policy, CCME format is followed.

Northwest Territories

Guidance	Key Features
In absence of provincial policy, CCME format is followed.	

Province of Nova Scotia

Guidance	Key Features
Guidelines for Management of Contaminated Sites in Nova Scotia	Outlines procedure for site assessment and clean-up.
Guidelines for Remediation of Petroleum Contaminated Soils (1990)	Provides specific approaches for petroleum hydrocarbon contaminated sites.
A framework for Ecological Risk Assessment (Draft)	Although it is a draft, this risk assessment policy is currently being used.
Other	In the absence of provincial policy, CCME guidelines are used.

Province of Ontario

Guidance	Key Features
Guideline for the Decommissioning and Clean-up of Contaminated Sites Ministry of the Environment and Energy, 1989	• Outlines a four phase approach on the decommissioning and clean-up of contaminated sites. • Assesses contamination based on proposed land use using generic numeric criteria. • Allows for site specific guideline development for chemical parameters not in generic numeric tables.
Interim Guidelines for the Assessment and Management of Petroleum Contaminated Sites Ministry of the Environment and Energy, 1993	• Outlines an approach for the assessment of petroleum hydrocarbon. contaminated sites based on a generic site sensitivity. • Assesses contamination based on three generic site sensitivities.
Proposed Guidelines for the Clean-up of Contaminated Sites in Ontario, Ministry of the Environment and Energy, 1994	• Outlines an approach on the decommissioning and clean-up of contaminated sites. • Assesses contamination based on proposed land use using generic numeric criteria. • Risk assessment and risk management in lieu of generic criteria are accepted. • Currently only generic criteria are being implemented from Table A.

Province of Ontario (cont'd)

Guidance	Key Features
Water Management — Policies, Guidelines, Provincial Water Quality Objectives of the Ministry of the Environment and Energy	• Outlines surface water quality objectives for numerous chemical compounds. • Non-site specific.
Ontario Drinking Water Objectives	• Outlines drinking water quality criteria. • Sometimes used to address impact from contaminated site on the drinking water resource if a receptor exists.
Ontario Reg. 347	Outlines classification of hazardous and non-hazardous waste for disposal purposes.

Province of Quebec

Guidance	Key Features
Contaminated Sites Rehabilitation Policy, Ministère de l'Environnement, 1988, revised in 1994	• Classifies contaminants following a modified Dutch classification scheme, with regard to permissible land use. • Outlines clean-up approach. • Outlines soils management.
Politique de protection des sols et de rehabilitation des terrain contamines. Ministère de l'Environnement et de la Faune, 1996	• Policy not yet approved. • Contains similar concepts as 1988 policy. • Aims to clean up all contaminated sites. • Encouragement of preservation of soils and ground water. • Provision for risk analysis.
Guide technique des mesures de contrôle à effectuer lors des travaux d'excavation des sols contaminés, 1988	Technical guidance manual concerning recommended measures during excavation of contaminated soils.
Guide d'implantation et de gestion des lieux d'enfouissement de sols contaminés, 1988	Guidance manual for conception and management of contaminated soils disposal cells.
Guide standard de caractérisation des terrains contaminés, 1988	Standard guidance manual for the characterization of contaminated sites.

Province of Quebec (cont'd)

Guidance	Key Features
Lignes directrices pour les projets de traitement de type stabilisation/ fixation/solidification pour les sols contaminés, 1991	Guidelines for contaminated soil treatment projects pertaining to stabilization/fixation/solidification processes.
Lignes directrices de risque toxicologique (préliminaire), 1991	Preliminary guidelines for toxicological risk assessment.
Lignes directrices d'intervention lors de l'enlèvement de réservoirs souterrains ayant contenu des produits pétroliers, 1994	Guidelines for the removal of petroleum underground tanks.
Guide d'échantillonage à des fins d'analyses environmentales : Cahier 3, Échantillonage des eaux souterraines, 1994, Cahier 5, Échantillonage des sols, 1995	• Ground water sampling guide. • Soil sampling guide.
Directive sur les industries minières, n°. 019, 1988, revised in 1993	Directive on mining industries.
Hazardous Waste Regulation (R.R.Q.- Chap. Q-2, r. 3.01)	Regulates aspects of hazard waste management.
Regulation Respecting Solid Waste (R.R.Q.- Chap. Q-2, r. 14)	Regulates aspects of solid waste management.
Petroleum Products Regulation (R.R.Q.- Chap. U.1.1, r. 1)	Regulates aspects of petroleum products management.

Province of Saskatchewan

Guidance	Key Features
Risk-Based Corrective Actions for Petroleum Contaminated Sites, Guide, 1995	This policy outlines the risk assessment protocol for hydrocarbon contaminated sites.
Saskatchewan Guidelines	
Draft Guidelines for the Remediation Above/Underground Petroleum Storage Sites and Disposal of Petroleum Contaminated Soils in Saskatchewan	The draft policy provides specific protol and criteria for hydrocarbon contaminated sites.
Other	CCME criteria are used in the absence of provincial policy/criteria.

Yukon Territory

Guidance	Key Features
In the absence of provincial policy, British Columbia and CCME guidelines are followed.	

**Removing Barriers:
Redeveloping Contaminated
Sites for Housing**

National Round Table on the Environment and the Economy

Table ronde nationale sur l'environnement et l'économie

Canada Building, 344 Slater Street, Suite 200, Ottawa, Ontario, Canada K1R 7Y3
Tel.: (613) 992-7189 • Fax: (613) 992-7385 • E-mail: admin@nrtee-trnee.ca • Web: http://www.nrtee-trnee.ca

Printed in Canada on recycled paper