URBAN BROWNFIELDS: CASE STUDIES FOR SUSTAINABLE ECONOMIC DEVELOPMENT

The Canadian Example

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EXECUTIVE SUMMARY

This is an executive summary to a report, entitled, *Urban Brownfields: Case Studies for Sustainable Economic Development*. It has been prepared for Canada Mortgage and Housing Corporation (CMHC) by Delcan Corporation, Golder Associates Ltd. and McCarthy-Tétrault.

The paper is part of the contribution of CMHC to an ongoing collaborative initiative of the Organization for Economic Cooperation and Development (OECD), the United States Environmental Protection Agency (U.S. EPA), and the International City and County Managers Association (ICMA). The purpose of the report is to provide information on the current Canadian situation regarding legal and andministrative frameworks, players in the the process of developing contaminated sites, recent case studies, and suggested best practices that might be employed in other jurisdictions.

Many facets of government, business, and society in general have strong interests in the redevelopment of contaminated sites, and varied roles in the process. The one prime interest shared by most is that human and ecosystem health is protected, and that urban areas are developed in a sustainable manner.

Developing contaminated sites most often requires the fulfilment of various processes, involves many participants, and is a complex undertaking. A four step contamination assessment/restoration process is required as a minimum, including: the 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 legislation, policies, and guidelines which 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 way to go towards capturing these principles in federal and provincial legislation. However, recent progress at the provincial level is quite encouraging. The provinces of Manitoba, Nova Scotia, Alberta, and in particular, Quebec and British Columbia, appear to be the most progressive in their public policies dealing with contaminated sites.

Challenges to development on contaminated sites can be grouped 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 cleanup or the effects of contamination.

A significant issue is the added time and expense that is required to develop contaminated sites that may result from approval processes, and regulations which call for unnecessary or unrealistic cleanup activities. Progress in this regulatory issue is ongoing, however.

The inability to gain financing and insurance for redevelopment projects is a significant barrier. It is clear that financial incentives such as tax breaks will stimulate the redevelopment of contaminated sites.

There are opportunities for a better integration of land use planning and site remediation disciplines and their respective approval processes.

Methods to better communicate the issues surrounding 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, twenty-two best practices are suggested, to augment the thirteen CCME principles. The single most important best practice is the risk assessment/risk management (RA/RM) approach. This method evaluates the actual human or environmental risk, considering the nature of contaminants in relation to the sensitivity of receptors and the exposure pathways, and is favoured by many practitioners.

In conclusion, it is clear that considerable work still needs to be done across Canada to create a contemporary and consistent approach to dealing with the development of contaminated lands. However, lessons can be learned from various case studies, and some very positive initiatives of certain provinces. The twenty-two best practices, in combination with the CCME principles, can form the basis of any such approach.

RÉSUMÉ

Le présent résumé concerne un rapport intitulé *Urban Brownfields: Case Studies for Sustainable Economic Development* rédigé par Delcan Corporation, Golder Associates Ltd. et McCarthy-Tétrault pour la Société canadienne d'hypothèques et de logement (SCHL).

Ce rapport fait partie de la contribution de la SCHL à une initiative conjointe permanente de l'Organisation de coopération et de développement économiques (OCDE), de la United States Environmental Protection Agency (U.S. EPA) et de l'International City and County Managers Association (ICMA). Ce rapport a été produit pour fournir de l'information sur la situation actuelle, au Canada, en ce qui concerne les cadres légaux et administratifs, les acteurs qui prennent part au processus d'aménagement des terrains contaminés, les récentes études de cas ainsi que les pratiques exemplaires suggérées qui pourraient être utilisées dans d'autres territoires.

Bien des intervenants gouvernementaux, commerciaux et sociaux sont fortement intéressés au réaménagement de terrains contaminés et occupent des rôles divers dans le processus. L'intérêt premier que partagent la plupart des intervenants est la protection des personnes et des écosystèmes ainsi que le développement durable des zones urbaines.

La plupart du temps, l'aménagement de terrains contaminés doit passer par divers processus, met à contribution de nombreux intervenants et représente finalement une opération complexe. Au minimum, il faut respecter un processus en quatre étapes d'évaluation de la contamination et de restauration qui comportera les opérations suivantes : évaluation superficielle, caractérisation approfondie, planification et mise en oeuvre de l'assainissement, vérification et contrôle de la conformité. Pour gérer les contaminants, on dispose des moyens suivants : excavation et mise en décharge du sol contaminé, traitement *in situ* et *ex situ*, maintien en place.

Au Canada, une myriade de lois, de politiques et de directives régissent le réaménagement des terrains contaminés. En 1993, le Conseil canadien des ministres de l'environnement (CCME) publiait un rapport établissant treize principes devant guider la politique officielle en matière de terrains contaminés. Il est clair que le Canada a encore du chemin à faire pour que ses lois fédérales et provinciales tiennent compte de ces principes. Néanmoins, de récents progrès réalisés à l'échelon provincial sont très encourageants. Le Manitoba, la Nouvelle-Écosse, l'Alberta et, en particulier, le Québec et la Colombie-Britannique semblent être les plus dynamiques au chapitre de la politique officielle pour régler les problèmes soulevés par les terrains contaminés.

Les difficultés que représente l'aménagement des terrains contaminés peuvent être réparties en six groupes : problèmes de nature réglementaire, problèmes techniques ou scientifiques, problèmes de droit ou de responsabilité, problèmes financiers, problèmes d'urbanisme et problèmes de communication.

Le problème qui est de loin le plus frappant est le désir de tous les participants au processus d'aménagement de réduire ou d'éliminer leur exposition à la responsabilité d'assumer les frais inhérents à l'assainissement des lieux ou aux conséquences de la contamination.

Autres questions d'importance : le temps et les frais additionnels requis pour aménager les terrains contaminés qui pourraient découler des processus d'approbation et des règlements qui exigent des mesures d'assainissement inutiles ou irréalistes. Des progrès ont toutefois été accomplis sur cette question d'ordre réglementaire.

L'incapacité d'obtenir du financement et de l'assurance pour les projets de réaménagement représente un obstacle de taille. Il est clair que les mesures financières incitatives comme les allégements fiscaux contribueront à stimuler le réaménagement des terrains contaminés.

Il est possible de mieux intégrer l'aménagement du territoire, les disciplines liées à l'assainissement et leurs processus d'approbation respectifs.

Des méthodes permettant de mieux communiquer les questions entourant les terrains contaminés doivent être élaborées pour rassurer et renseigner les intervenants tout comme les observateurs.

Pour aplanir bon nombre de difficultés causées par le réaménagement des terrains contaminés, on suggère vingt-deux pratiques exemplaires venant s'ajouter aux treize principes du CCME. La pratique la plus importante parmi celles-ci est l'approche de l'évaluation et de la gestion du risque. Cette méthode consiste à évaluer le risque réel que courent les personnes ou l'environnement, en tenant compte de la nature des contaminants par rapport à la sensibilité des récepteurs et des modes d'exposition; une méthode que préconisent de nombreux praticiens.

En conclusion, il est évident qu'il reste beaucoup à faire d'un bout à l'autre du Canada pour en arriver à une approche contemporaine et uniforme à l'aménagement des terrains contaminés. Cela dit, des leçons peuvent être tirées de diverses études de cas et de certaines initiatives très constructives mises en oeuvre par quelques provinces. Les vingt-deux pratiques exemplaires, en association avec les principes du CCME, pourraient former la base d'une telle approche.

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1.0 INTRODUCTION

1.1 BACKGROUND

This paper has been prepared for Canada Mortgage and Housing Corporation (CMHC) to contribute to an ongoing collaborative initiative of the Organization for Economic Cooperation and Development (OECD), the United States Environmental Protection Agency (U.S. EPA), and the International City and County Managers Association (ICMA), regarding *Urban Brownfields: Case Studies for Sustainable Economic Development*. One objective of this initiative is to identify a set of best management practices that may be employed to promote the redevelopment of contaminated sites for urban renewal and overall economic development.

The research has been completed by Delcan Corporation in association with Golder Associates Ltd. and McCarthy-Tétrault. It draws substantially on their previous report prepared for CMHC entitled *Removing Barriers to the Redevelopment of Contaminated Sites for Housing*, completed in 1996. This previous research has been updated to recognize changes to legislation, policies, and guidelines enacted across Canada since that time.

1.2 REPORT PURPOSE

The issue of contaminated lands or *brownfields* is of tremendous importance to city managers, planners and developers not only in Canada but around the world. The issue can be generally stated as follows:

> *Globally, there is a significant amount of vacant or underutilised lands with contaminated soils that have potential for urban and economic development, where various issues related to the contaminated soils have combined to create barriers to the development.*

The overall goal of this report is therefore to assist the OECD, U.S. EPA, and ICMA in their efforts to find solutions to the overall issue. The more specific study purpose is to provide information on the current Canadian situation regarding legal and administrative frameworks, players in the redevelopment process, recent case studies from which lessons can be learned, and other issues. This information will be reviewed by the OECD - Group on Urban Affairs, in the context of other national overviews as comparative case studies.

1.3 THE CANADIAN CONTEXT

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 during 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 Canadian agency 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, in addition to an estimated 10,000 active and inactive waste disposal sites (Ford et al, 1994). These would not all be in urban areas. Other estimates of 30,000 sites (Sisson et al., 1989) have a similar order-of-magnitude. However, previous NCSRP staff (Pers. comm., Doug Tilden, 1996) believe that these figures are too high. 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 ha (a small gasoline station) to over 100 ha (large industrial districts). For discussion purposes, 30,000 sites, each 5.0 ha in size, would produce 150,000 ha of contaminated land. This amount of land could accommodate 1,500,000 dwellings, if developed at a density of 10 units per ha. This hypothetical estimate of housing supply translates roughly into 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 non-impacted land. However, in practice, the contaminated land base is likely increasing. This is 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.

Contaminated lands exist in virtually all settings in Canada. They may exist in downtowns 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. Within urban areas in Canada, larger contaminated sites (say, greater than 5 ha) can have similar characteristics. Often, the sites:

- are vacant or have buildings with little or no (and sometimes negative) value;
- are part of a former traditional industrial area ;
- are surrounded by urban development;
- have a location associated with railways or harbours;
- are near lakes or waterways;
- are near downtowns; and,
- have servicing infrastructure, eg. roads, water mains, sewers, in place.

Such sites, often referred to as *brownfields*, constitute some of the most prime urban development locations in Canada. Other small sites exist in urban centres across the country. 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 often are centrally located, with ready access to services and community infrastructure.

From the Canadian public policy perspective, contaminated sites are also preferred locations for redevelopment. Redevelopment is encouraged in such locations because:

- it is generally more cost-effective to develop lands that already have municipal services including transportation, sewer and 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;
- 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); and,
- 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 facilitate the redevelopment of contaminated sites.

2.0 PARTICIPANTS, THEIR ROLES AND RELATIONSHIPS

2.1 ROLES AND INTERESTS

This section identifies participants in the process of redeveloping contaminated sites in Canada, and what their interests are. Figure 1 provides a summary of the persons, corporations and agencies that may be involved.

Figure 1
Participants in the Process of Contaminated Site Redevelopment in Canada

Person, Corporation, or Agency	Typical Interests	Typical Role in the Process
Federal Government	To facilitate the development of sustainable communities. To avoid future liability.	- legislator - research - national standards
Provincial/ Territorial Governments	To ensure health safety of area residents. To avoid future liability.	- legislator - policy maker - regulator - research
Municipal Governments	To ensure health and safety of existing and future residents. To facilitate and benefit from urban development and growth. To reduce infrastructure cost. *To avoid future liability.*	- land use planning - development approvals
Existing Community	To benefit from services, dwellings from new development. To ensure urban uses are compatible and desirable. To be part of the planning process.	- participatory - advocacy of issues
Land Owner / Developer	To build safe, marketable new neighbourhoods. To maximize a timely profit or return on investment. To avoid future liability.	- proposer - development financing
Private Sector Business & Institutions (Professionals, Lenders, Insurers etc.)	To benefit from consulting, lending, or insuring opportunities. To avoid future liability. To contribute to sustainable urban development.	- provider of development services and expertise - provider of financing or lending insurance

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

Public Sector Role and Interests:
In Canada, various federal, provincial, territorial, regional and municipal government agencies have assumed the role of protecting the public interest by regulating the development of contaminated sites. It is a broad *environmental health* issue that is at the core of this public interest. This is because contaminants in soils and ground water pose a potential threat to human and natural environments, and therefore, the overall health of urban centres and their ecosystems.

When developing contaminated sites, the public interest is to ensure that the health of the future occupants are protected, 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 emphasise the efficient use of land and resources, reduce consumption of material and energy, and encourage long-term

social and ecological health (Roseland, 1992).

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. Development control in Canada is predominantly the role of local and regional governments.

This public interest in developing contaminated sites presents a paradox whereby, on the one hand, environmental health must be protected, but on the other hand, social and political pressures exist to promote urban development and renewal. The challenge therefore is to develop techniques of addressing the environmental health issue associated with contaminated sites in a manner that facilitates urban development, without jeopardizing protection to the community or the environment, and without bankrupting the developer or the municipality. The public sector therefore assumes a risk management role.

Community Role and Interests:
The role of the community in developing contaminated sites is typically as a participant in a land use planning process that is being managed by local governments and expedited by the development proponents. The role is primarily one of advocating the highest possible level of protection against the possible adverse effects of contaminants on their community environments. In most jurisdictions across Canada, land use decisions are made in an open and consultative setting, and citizens may influence local and regional government decisions through the political and planning processes.

Private Sector Role and Interests:
The principal role of the private sector is as the development proponent. The development proponent and other businesses that are providing development services are interested in financial gain. This may be from the sale of land or buildings, rental income, or fees from financial or professional services. Without a private sector company that envisions a profit opportunity in redeveloping any given site, that site is likely to remain idle. With the exception of a limited amount of non-profit housing, and park and open space developments, no level of government in Canada today typically acts as an urban developer.

Common Interests:
Almost all parties are interested in avoiding any burden of future liability where they may be exposed during the development approval process. This interest in avoiding liability has had a strong influence on current Canadian policy and practice regarding the development of contaminated sites. For example, if a level of government or a financial institution must weigh the opportunities of a development against the risk of liability and its financial consequences. The latter often carries the most weight in decision-making.

All participants are also assumed to share, in varying degrees, a common interest in promoting the cleanup of contaminated sites in order to pursue environmental integrity, health, and economic development.

2.2 LAND DEVELOPMENT APPROVAL PROCESSES

The typical land development approval process in most Canadian jurisdictions is complex. At 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 a body with delegated provincial authority.

To complete a typical planning process for a development, various expertise may be required. This is the case even on a *greenfield* site. The process normally includes planners, architects, engineers and surveyors at a minimum. Solicitors are normally required to attend to matters of land title and plan registration. When bank financing or bonding is required, financial institutions are involved. A range of other expertise may be required to address site specific matters that may arise.

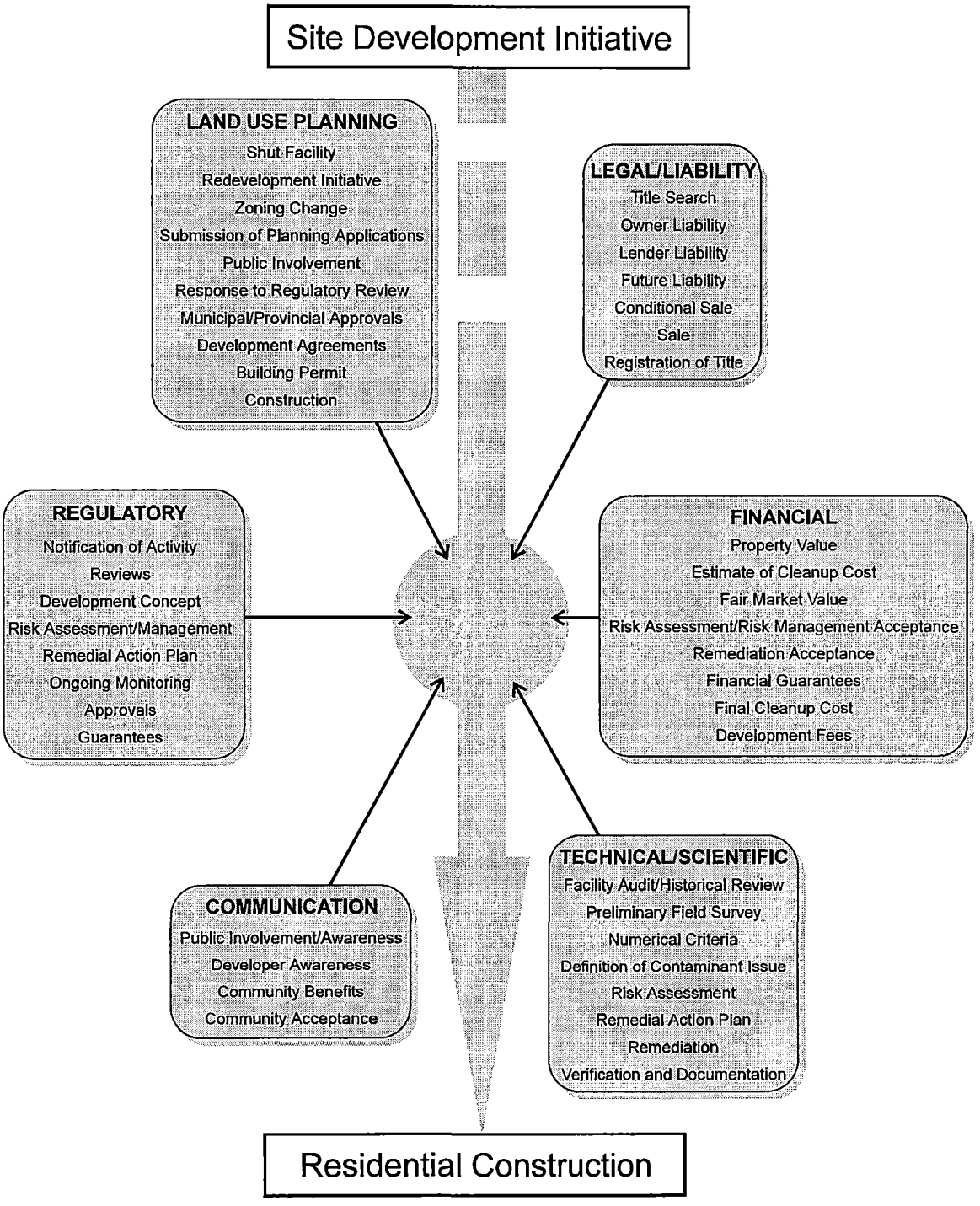
As mentioned earlier, most jurisdictions in Canada also have opportunities for the public to participate in the planning process. Depending on the jurisdiction, and the nature of planning approvals required, a development project can take from three months to five years or longer to be approved.

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 unfamiliar to many developers.

Figure 2 illustrates some of the additional requirements and considerations that are encountered in the approval process of developing contaminated sites. These include the technical/scientific process of evaluating and mitigating the contamination, the regulatory process within which this occurs, and the legal process of 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.

Figure 2 shows that the land use planning process, together with 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. These processes, and their separation from land use approvals, have in some cases created delay, uncertainty, and ultimately, additional cost to the proponent.

Figure 2 - Approvals Context



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

2.3 SITE ASSESSMENT/RESTORATION PROCESSES

A developer that choses to develop on a potentially contaminated site in Canada normally must adhere to a regulated process of assessing a site for contamination, and remediating if necessary. This is a four step iterative process common to all Canadian jurisdictions:

Step 1 - Non-Intrusive Assessment: The first step is a non-intrusive assessment commonly called a *Phase I Environmental Site Assessment*. This is more fully described in the Canadian Standards Association (CSA) document Z768-94. This assessment usually consists of a review of historical site activities, interviews, determination of the location of any potential activities of historic environmental concern, expected impacts from adjacent land use, and any other relevant information. The non-intrusive assessment commonly also involves a site visit and is used as a screening tool.

Step 2 - Intrusive Characterization: This step is commonly referred to as *Phase II Environmental Site Assessment*. In this step, there is further investigation of environmental concerns which were identified in the non-intrusive assessment. The investigation consists of some form of subsurface investigation and sampling methodology, followed by reporting.

The media (i.e. soil and groundwater) quality determined by the intrusive site 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.

Step 3 - Remediation, Design and Implementation: Following the site characterization, a site remediation or management design is completed, if required, consisting of:

1. a description of the site contamination;
2. location and volume of materials to be remediated;
3. type of test needed to verify remediation technology;
4. description of regulatory approval requirements;
5. communication plans;
6. construction plans;
7. design and tendering of remediation;
8. site management during remediation;
9. follow up sampling requirements;
10. materials handling protocols;
11. site safety, and,
12. other considerations.

To ensure that people and the environment are protected, the site remediation will have to achieve target clean-up criteria for priority chemicals. These criteria may be in the form of generic tables which apply to all sites, or they may be developed based on site specific consideration of the risks associated with exposure.

There are four generalized contaminant management options which can be utilized in this step:

1. Soil Excavation and Landfill Disposal, which is the traditional method of removing contaminated soils from a site;

2. In Situ Treatment, where contaminants are treated on-site without excavating soil;

3. Ex Situ Treatment, where soil is excavated and treated on-site by means such as landfarming, bio-pile, and soil vapour extraction;

4. In-place Management, where contaminants are isolated from pathways that would expose them to sensitive receptors that may include people, plants, fish and wildlife.

The latter option is typically supported by a Risk Assessment/ Risk Management (RA/RM) approach, which is somewhat contemporary in Canada. In-place management involves natural attenuation of barriers; engineering controls of exposure pathways; or a combination of both. A formal RA/RM approach is required to demonstrate that the in-place management will be protective to sensitive receptors. Long term monitoring of the effectiveness of the in-place measures, and notification on legal land title are required to ensure that the site remains safe. This approach in many jurisdictions is also applicable to develop site specific remediation criteria as an alternative to the typically more conservative generic criteria.

The essential principles of RA/RM in this context include the identification of potential exposure pathways and quantification of the potential chemical intake by the sensitive receptors. This involves the characterization of sources of chemicals found at the site, modelling of the potential exposure pathways, and the assessment of presence and sensitivity of receptors. For exposures scenarios with unacceptable risk, management options may include removal or treatment of the contaminant source, or the elimination of the exposure pathway by the use of natural or man-made barriers.

Step 4 - Verification and Compliance Monitoring: 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, this verification consists of 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. This can be issued in the form of a certificate of compliance or an approval in principle. As will be discussed in Section 3.0, this concept is not universally accepted in Canadian legislation, policies and guidelines, as regulators fear that the sign-off may burden them with potential future liability.

3.0 THE CANADIAN LEGAL AND ADMINISTRATIVE FRAMEWORK FOR REDEVELOPMENT

3.1 OVERVIEW

This section explores Canadian legislation, and accompanying policies and guidelines, that apply when developing contaminated sites. It provides a review of progress made across Canada in implementing the thirteen principles as published by the *Canadian Council of Ministers of the Environment* (CCME) in 1993, in the various provinces and territories. These CCME principles constitute the most recent expression of national policy on contaminated sites, although they are not supported by a national mandate or legislation.

Appendix A provides a legislative review, for each of the provinces and territories, which summarizes the key enabling legislation and statutes. This can be read in conjunction with a review of the key features of the various provincial/territorial guidelines and policies, as presented in Appendix B. Legislation provides the enabling legal authority on which the more specific policies and guidelines are based.

3.2 COMPARATIVE REVIEW OF LEGISLATION

The CCME is the primary intergovernmental forum in Canada for discussion and joint action on environmental issues. Its members are the thirteen ministers of the environment in Canada (representing the federal government, ten provinces and two territories). At CCME's spring meeting in 1993, it 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 uncertainties of liability.

The CCME report recommends thirteen 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 rather 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 thirteen principles are paraphrased below.

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-staged 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 (ie. 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 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? and
   - what is the degree of hazard?

10. A four-staged 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 cleanup 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 cleanup.

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.

Figure 3 illustrates the degree to which various jurisdictions in Canada have implemented the 13 CCME principles in legislation. A review of pertinent legislation, which forms the basis of Figure 3, is provided in Appendix A. This figure demonstrates that the existing or proposed legislative frameworks of Nova Scotia, Quebec, Manitoba, Alberta, 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. The conclusion is that Canada as a whole has a way to go towards legislating the framework for dealing with contaminated sites as recommended by the CCME.

Figure 3
Canadian Progress on Implementation of CCME Principles in Legislation

CCME PRINCIPLE REGARDING LIABILITY	CAN	NFLD	NS	PEI	NB	PQ	ONT	MAN	SASK	ALTA	BC	NWT	YK
1. Polluter pays principle as paramount			✔					✔					
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, with pre-existing contamination	✔		✔				✔	✔		✔	✔		
7.Recovery of public funds from responsible parties	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
8. Avoidance of excessive litigation in site remediation process			✔					✔		✔	✔		✔
9. Liability Allocation			✔			✔		✔		✔	✔		✔
10. Four step dispute resolution			✔					✔		✔	✔		
11. Clarification of designation of contaminated sites			✔		✔	✓		✔		✔	✔		✔
12. Certificate of compliance and exemption of future liability			✔				✔	✔		✔	✔		✔
13. Benchmark standards								✓			✔		

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

GENERAL NOTES: Solid check Marks ✔ indicate legislation or statutes in place. Hollow check marks ✓ indicate draft legislation or statutes. In the absence of legislation, the CCME principles are used as informal public policy. ***This table is current to November, 1997.***

3.3 COMPARATIVE REVIEW OF POLICIES AND GUIDELINES

Figure 4 provides a list of 12 distinguishing features of the policies and guidelines that implement the legislation of Canadian provinces and territories. Appendix B provides supporting data sheet with additional information. This review was assisted by communication with various provincial agencies across Canada.

Figure 4
Comparison of Contaminated Site Policies and Guidelines in Canada

DISTINGUISHING FEATURE OF POLICY OR GUIDELINE	CAN	NFLD	NS	PEI	NB	PQ	ONT	MAN	SASK	ALTA	BC	NWT	YK
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			✓			✓		✓	1 ✔		✔	✓	
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"	✔		✔		✔	✓		✔	✔	✔	✔	✓	✔

Source: Delcan Corporation, Golder Associates Ltd., and McCarthy-Tétrault
Note 1: Requirement only for risk based approach.

GENERAL NOTES:
Solid check marks ✔ indicate policies and guidelines in place. Hollow check marks ✓ indicate draft policies and guidelines, or common practice. Features 1 to 5 relate to CCME principle #13 which encourages the development of site specific benchmarks. Features 6 to 12 are other distinguishing features of policies for contaminated site redevelopment. In the absence of policies or guidelines, the CCME principles are often used as informal public policy. ***This table is current to November, 1997.***

CCME principle #13 strongly encourages the development of site specific "benchmarks" for clean-up (or control) which are based on the location and usage of the site. The first five policy/guideline features listed in Figure 4 can track provincial progress in this regard. An elaboration on these attributes is provided below.

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

Feature #2. Criteria should be tied to specific exposure pathways, such as ingestion/inhalation of soil or protection of ground water used for drinking.

Feature #3. Remediation criteria should be relaxed according to depth below ground surface.

Feature #4. 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.

Feature #5. 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.

Additional distinguishing features of provincial and territorial policies and guidelines are also listed in Figure 4. These features are elaborated on as follows:

Feature #6. 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.

Feature #7. 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.

Feature #8. Contamination does not follow property boundaries, and "Wide Area" based remediation and management is often more effective and predictable.

Feature #9. 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.

Feature #10. The setting of 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.

Feature #11. Specialized treatment facilities may require larger markets in order to be viable.

Feature #12. An "approval in principle" and/or a "certificate of compliance" are granted by some regulatory agencies under certain circumstances.

When examining the approach to site assessment and remediation across Canada in terms of the policy and guideline features shown on Figure 4, it is clear that with recent policy and guideline changes, a consistency in approach is emerging.

The provinces that have addressed most of the principles and attributes are British Columbia (B.C.), Nova Scotia, and Quebec. For B.C., this is attributed to the lack of suitable and low cost disposal options for contaminated soil and partly due to the legacy of the former Expo'86 site (see Case Study 6 in Appendix C), which 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, public consultation, and technical issues (as enabled by Bill 26 - Contaminated Sites Regulations, 1997). Distinguishing features of 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 difference in policy and guideline features between regions in Canada is partly due to differing physical and commercial characteristics, but also due to the political and social context. Quebec has been one of the most pro-active provinces in Canada concerning rehabilitation of contaminated sites since the mid 1980s. The province was the first to establish guidelines, in 1988, upon which the CCME guidelines have been largely based. Quebec also published the first provincial guideline in Canada for toxicological risk assessment, in 1991.

British Columbia, Alberta, and Ontario each have policies that were mainly developed independently, but within the general framework of the CCME guidelines. The remaining provinces and territories appeared to have followed these provincial jurisdictions, or have more or less adopted the federal policy as promulgated by CCME.

Recently, almost all provinces have endorsed RA/RM and accepted risk based remediation criteria. This is likely brought about by CCME acceptance of the risk assessment concept. However generic remediation criteria and application of criteria still vary between jurisdictions. This clearly results in different provincial approaches to redevelopment of contaminated sites across Canada. Complexity is further exacerbated by municipal governments within the same province that may endorse different approaches within the context of legislation, policies and guidelines.

3.4 SIX ISSUE GROUPS

Policies that pose barriers to the development of contaminated sites can be categorized 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. These issue groups are further elaborated in the following subsections.

3.4.1 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 as follows:

- Slow and/or overly conservative 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;
- Remediation without consideration of applicable exposure pathways results in overspending. For conditions where 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;
- 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;
- It is common that regulatory policies have 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 that were identified as barriers include: lack of licensed hazardous waste disposal facilities, 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 sites could be an option;
- 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 improves confidence to prospective buyers and lenders. Due to the lack of will or simple bureaucratic delay and reluctance, sign-off is difficult to obtain. For example, the Ontario MOEE guidelines just revised in 1997 do not provide for sign off;
- Approvals processes can be inconsistent both within and between jurisdictions at the federal,

provincial and municipal levels. Regulations tend to be revised and changed with time. Internal and long term inconsistency raises uncertainty and financial concerns with lenders and buyers. For example, the Ontario MOEE recently lowered the maximum allowable generic criteria for lead. This has resulted in the potential for rejection of lands that had been previously considered acceptable for residential development;

- Contamination beyond site boundaries with consequential involvement of adjacent landowners can halt development because of 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 most jurisdictions;
- There is never an unlimited amount of resources or time to study a site, and thus investigative priorities must be established which may not reveal all contamination at all sites; and,
- 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.

3.4.2 Technical / Scientific Issues

Technical/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.

- There is a need to continue developing new technologies and improving existing ones to achieve more cost effective solutions;
- 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 be a large potential risk;
- 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 and/or proven;
- RA/RM is still a developing process and more proponent education and user awareness is required;
- Statistical evaluation of contamination is lacking. In some cases one exceedance of a criterion may trigger site remediation. Decisions should be based on statistically significant testing to determine whether detected contamination is truly significant;
- 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;
- Some of the more unusual contaminants are not well studied for their toxicological impacts. 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;
- The ecosystem is a complex interaction of numerous components. Society has only relatively recently begun to study the interaction between contaminants and various ecosystem components. Our understanding can be termed 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.

3.4.3 Legal/Liability Issues

Liability issues include the requirements 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 which have been adopted by Canadian government authorities: (1) general pollution or contamination prohibitions; (2) obligations on persons responsible for current spills (as opposed to historical discharges); (3) restrictions on land use, development and transfers relevant to the contaminated property issue; and (4) 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 A 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.

1. General Pollution or Contamination Prohibitions: The most common approach to dealing with contamination is pollution prevention. In all jurisdictions in Canada, the act of pollution 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 upon proof presented by the prosecution of all of the elements of the offence (ie. 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.

2. Current Spill Provisions: Many statutes impose a duty to report current spills and obligate the cleanup 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, as to 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 cause the release are obligated to remedy the situation or reduce or mitigate any danger to the environment.

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

3. Land Use, Development and Transfer Restrictions: The usual methods of land use and development control, such as planning approvals, building and occupancy permits, in many Canadian municipalities 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, thereby effectively blocking redevelopment projects unless and until cleanups are performed.

In addition, as a condition to the issuance of provincial licenses or other environmental or development permits, use restrictions may be imposed at the provincial or municipal level in connection with contaminated land. 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 twenty-five 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*, 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.

4. 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 an "inspector" has such authority to issue the orders. In some cases however, the authority rests with the "minister", which has implications as to how frequent 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, chances are that the authority is not often utilized.

The various potentially responsible parties who typically can receive such orders always include those persons responsible for causing the pollution, which is generally in accordance with the fundamental principle of fairness in regulation (ie. "polluter pays").

These provisions, however, also 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" (ie. does not depend upon a causal connection between the party ordered and the event which triggers the order).

Also, the government authorities may issue the orders to one or more of the potentially responsible parties as identified in such provisions, or all of them, at its option. 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 cleanup of the site.

The premise underlying the "extended" and "joint and several" liability aspects of this category of provisions is the public interest in 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 due to 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 the recent case law in Ontario and is codified in "liability allocation factors" in statutory enactments in British Columbia, Alberta, Manitoba 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.

Cleanup criteria are either contained in the legislation (typically in a regulation) or in supporting policies. Where possible, the discussion of the actual provisions in Appendix A identifies where the criteria can be found in each jurisdiction. Any discussion of supporting policies in Appendix B is restricted to matters of a "legal nature" in the policy (ie. the registration of notices on the title to the property etc.) and the technical discussion of the policy is contained in Appendix B.

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 cleanup of a contaminated site in the courts, or both. Where failure to comply is an offence, it constitutes a strict liability offence.

3.4.4 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 as follows:

- The costs of site remediation or management are often exorbitant, and can quickly render an urban development project uneconomical to develop;
- In some instances, lands will remain undeveloped without some form of economic incentive. Cleanup funds such as 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;
- 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 of the real estate asset in retaining its value;
- With contaminated lands, lenders may fail to realize their security (ie. assume possession of the asset when the mortgagor defaults) due to fear of exposure to liability, and sites become orphaned;
- Financing of projects on contaminated sites often comes at a premium as institutions perceive greater risk;
- Even minor cost over-runs in contamination management or treatment plans can bankrupt the developer, when profit margins are slim;
- 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 will not provide mortgage insurance until contamination issues are resolved;
- 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;
- Negative market values can lead to the "orphaning" of sites, and municipalities and school boards then go without realty tax revenues;
- The value of adjacent properties may also depreciate due to fear of the unknown and perceived exposure to risk;
- The costs of site remediation or management usually yields housing that is more expensive, and when the market is for more affordable housing, projects may not be viable;

- Because contaminated sites often exist in areas that already have municipal services (water, sewer, etc.), these areas may be more economical to service than outward expansions to urban boundaries. This cost benefit is not often factored into calculations of the "net costs" of remediation;
- Where contaminated sites are under more than one ownership, it can be difficult to allocate costs and confirm participation in development projects;
- Insurance industry products such as those providing a cleanup cost cap, environmental wrap-up, spills insurance, and future funding policies, are relatively unknown and possibly under used; and,
- Across Canada, there are few or possibly no levels of government that offer any financial incentive to private sector developers to develop contaminated sites.

3.4.5 Urban Planning Issues

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

- 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;
- Given the choice, land developers will select *greenfields for development,* as 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;
- 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 the redevelopment of industrial sites which 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;
- High cleanup costs can force developers to pursue higher cost housing (Munson, 1990), which runs contrary to many planning policies that encourage the development of more affordable housing;
- Municipalities should recognize that it can be less expensive to redevelop sites in already-serviced areas (which contaminated sites often are), and should consider development incentives and favourable planning policies; and,
- Site designers such as planners, architects, and civil engineers seldom work with contaminated soils specialists in an integrated manner early in the site design process to create plans that minimize exposure pathways and the subsequent need for soil remediation.

3.4.6 Communication Issues

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

- Many misconceptions and fears by all participants stem from a lack of fact-based knowledge of the topic;

- Fear of contamination at a former industrial site may discourage potential site purchasers and create a lasting stigma. Since it is difficult for the public to understand contaminant impacts and transport, they fear a potential threat to their health. A site registry, as implemented in B.C., reduces historical uncertainty associated with a site; and,
- Any former industrial site has 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. The barrier is simply the fear of the unknown;
- Participants are not well-educated on the topic of developing contaminated sites because knowledge is primarily in the hands of engineers, scientists, and regulators;
- There are few educational tools, particularly with regard to 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;
- The media often exacerbates the problem by continually referring to the most heralded and consequential contamination cases, thereby raising more anxiety; and,
- The processes within which the development of contaminated sites occurs are often not open and consultative in terms of the general public. This can breed fear and misconception.

4.0 CASE STUDIES

4.1 OVERVIEW

Eight case studies that highlight lessons learned from recent brownfield development projects across Canada are presented in Appendix C. Examples are provided from British Columbia, Ontario and Quebec. Each case study is summarized in a table in Appendix C which presents vital data on the project such as project location, historic and existing land use, urban context, land area, ownership, contaminant type, and development plans. Key issues are also presented. These issues are organized as regulatory, legal/liability, technical/scientific, urban planning, and communications, consistent with the main issue groups discussed in Section 3 of this report.

Figure 5 on the following page provides a comparative overview of key aspects of each case study. This table illustrates that the eight case studies capture a range of conditions in terms of previous site use and history, current site context, redevelopment uses, proponents, and redevelopment status.

4.2 KEY LESSONS LEARNED

As the eight case studies represent a wide range of situations, it follows that the redevelopment experience differed in each case. A summary of each case and the key lessons learned is provided below. These lessons include both positive and negative experiences.

1. Lachine Canal

This district, near the heart of the City of Montreal in the Province of Quebec, had hosted traditional industries, steelworks, railway activities, coal storage, and other uses for more than 150 years. As part of the historic Lachine Canal, the lands were owned by the federal government through Parks Canada. A risk assessment approach was employed to remediate the 1.3 ha site in order to accommodate a linear park. Key lessons learned include:

- clean-up costs were reduced to less than $2.5 million from $9 million, by employing RA/RM, modelled after the US EPA approach, as opposed to a full clean-up to meet CCME numeric criteria; and,
- an effective public consultation program was implemented which led to acceptance by the adjacent residential community.

Figure 5
Case Study Overview - General Information

Site Data		Site #							
		1	2	3	4	5	6	7	8
Previous Site Use or Constraint:	Manufacturing	✓		✓		✓	✓		✓
	Petro-chemical				✓	✓	✓		
	Fuel Storage & Spills	✓						✓	
	Landfill/ Waste Disposal		✓	✓	✓		✓		
Era of Contamination:	1950 to present	✓	✓	✓	✓	✓	✓	✓	✓
	1900 to 1950	✓	✓		✓	✓	✓		✓
	Pre-1900	✓				✓	✓		
Number of Years Idle:	Less than 10	✓	✓	✓				✓	✓
	10 to 30				✓	✓	✓		
Current Urban Context:	Residential / Suburban		✓		✓	✓			
	Inner City	✓		✓					✓
	Downtown						✓		
	Waterfront	✓				✓	✓		
Redevelopment Uses:	New Residential	✓						✓	✓
	New Industrial/ Commercial				✓				
	New Mixed Use			✓		✓	✓		
	Existing Development		✓						
Proponent:	Private			✓	✓		✓	✓	✓
	Public	✓	✓			✓			
	Private & Public								
Clean-up and Development Status:	Completed	✓	✓					✓	
	Ongoing				✓		✓		✓
	In Design or Approval Process			✓		✓			

Source: Golder Associates, Compiled by Delcan Corporation

2. City of LaSalle Landfill

The City of LaSalle is a suburban area of the greater Montreal area in the Province of Quebec. In the 1960's, new urban development was constructed on the site of a former municipal landfill which had been levelled. Subsequently, high levels of contaminants including a complex mix of organic compounds were detected and deemed of risk to occupants of site dwellings. In the end, in 1985, the provincial government intervened and cleaned up portions of the site at a cost of approximately $10 million to taxpayers. This case was instrumental in shaping the contaminated land policies of the province. The key lessons learned from this experience include:

- contaminated sites need to be earmarked by urban planners and prevented from developing until studies and/or clean-up is completed;
- the application of generic contaminant criteria, based on the Dutch approach, enabled rapid action and clean-up;
- open and clear communication of the problem to affected citizens, and an effective decision-making structure, helped facilitate action; and,
- the ability of a senior level of government to quickly mobilize and offer resources remedied an urgent health risk situation.

3. Cooksville Quarry

This project involves the redevelopment of an approximately 75 ha site located within a mixed residential and industrial/commercial area in the City of Mississauga, Province of Ontario. The site was formerly host to a shale quarry, brick manufacturing facilities, and an approved coal fly-ash disposal area. A developer proposed a redevelopment of the site for high density residential land uses on the cleaner areas, with passive recreation uses on the fly-ash disposal area. Key lessons learned include:

- a planning and design process in which knowledge of site contamination levels strongly influenced the site development concept in order to reduce clean-up costs; and,
- regulators and stakeholder groups were involved in the remediation and planning processes to keep lines of communication open.

4. Port Credit Refinery Site

This is an approximately 80 ha former oil refinery site located within an established residential area in the City of Mississauga, Province of Ontario. The operation, owned by a multi-national oil company, was closed in 1985 when decommissioning began. Key site contaminants including 43 organic compounds relating to refinery-related wastes were identified. Portions of the site have been remediated and approved for commercial development which is ongoing, as part of a phased plan. Residential uses will follow. Key lessons learned in this case study include:

- the development and regulator endorsement of site-specific clean-up criteria permitted a focussed clean-up which advanced the project;
- the owner/polluter took responsibility to decommission and clean-up its own site;
- the proponent adopted the user-pay principle and hired their own consultants to unite with the regulators, to fast-track approvals to the degree possible; and,
- effective public communications by the proponent helped gain community buy-in to the remediation effort.

5. Ataritiri Site

This 32 ha site, located in the City of Toronto, Province of Ontario, has been proposed for commercial and residential redevelopment since 1988. It is located on the west shore of the Don River and had hosted traditional industrial uses and a coal gasification plant. Significant clean-up or redevelopment have not yet occurred, primarily due to the previous absence of provincial guidelines endorsing the use of risk

assessment. With new provincial guidelines issued in 1996, the project may be facilitated. Key lessons learned include:

- the implementation of rigid, numeric clean-up criteria, notwithstanding the lack of human exposure pathways and risk, can lead to prohibitively high remediation costs; and,
- site development planning and design should be an integrated effort between planners and contaminated land practitioners.

6. Pacific Place

This site involved the clean-up and redevelopment of a prime 66 ha site which had been orphaned in the heart of the City of Vancouver, Province of British Columbia. The same site had hosted the Expo'86 event as a temporary use. This waterfront location, parts of which had been idle for up to 30 years, was the site of former traditional industrial uses, a harbour, railway station, land filling, and coal gasification plants over a 100 year period. An impressive redevelopment project commenced in 1992, and the site will eventually accommodate 13,500 persons, plus parks, schools, offices, and retail space. Key lessons learned in this project include:

- innovative site remediation and development can lead to rejuvenation of otherwise stagnant urban areas;
- site remediation and redevelopment is occurring on a coordinated, staged basis to spread the high cost over the life of the construction project;
- the principle of RA/RM were implemented which helped avoid the need for a prohibitively costly soil excavation process;
- pollution hot spots have been managed and integrated into an overall land use plan as urban parks to minimize clean-up costs;
- covenants on land title stated that some contaminated materials have been left in place flags the site history to prospective purchasers; and,
- the Province retained future liability, thereby addressing lender concerns.

7. Canadian Legion Seniors Housing Site

This site involved a classic leaky fuel tank situation on a small lot in an urban setting in the City of Vancouver, Province of British Columbia. The lot, owned by the Canadian Legion, was proposed to be redeveloped for a seniors apartment housing project. Heating oil had contaminated underlying soils to a depth of 10 m, which presented a health risk only if building occupants would be exposed to related soil vapours. After employing a sub-footing ventilation system supported by a risk assessment, the project was completed, in 1995. Key lessons learned include:

- the RA/RM approach assured that costly, unnecessary remediation works were avoided;
- a cost-effective, technical engineering solution was entrusted to mitigate the risk to human health; and,
- the proponent accepted future liability through a covenant on title and lenders were protected under provincial law.

8. Arbutus Lands

This is another example of the benefits of adopting a risk assessment approach to the redevelopment of contaminated lands, in this case for higher density infill housing. The site, located in the expensive and trendy Kitsilano district of the City of Vancouver, Province of British Columbia, was formerly used as a brewery, ironworks, warehousing, and other traditional industrial uses. Key lessons include:

- the risk assessment approach reduced clean-up costs by a factor of ten, by minimizing excavation and closing human access to an exposure risk area on-site; and,

- through education and awareness of consumers and the real estate industry, contaminated sites have yielded a successful high-end ownership housing development.

5.0 BEST PRACTICES

5.1 OVERVIEW

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

The thirteen CCME principles are undoubtedly a good starting point for a consistent and sound approach to regulating contaminated sites across Canada and elsewhere, particularly from the liability perspective. They can be adapted in Canada to suit provincial and territorial sensitivities. The best practices highlighted in this section 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 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. These issues are the principal barriers to site development.

From Section 3.0, it is apparent that many regulatory guidelines that may facilitate urban development have recently been adopted or are currently under development. Guidelines and regulatory policy in British Columbia are the most advanced relative to the other jurisdictions and are currently encouraging the development of inner city sites. Many provinces tend to focus on removal/treatment of contamination and consequently lag behind the capabilities of current technology, and understanding and mitigating the potential risks.

Regulatory changes that are evolving in Canada 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.

5.2 TWENTY-TWO BEST PRACTICES

Twenty-two "best practices" are recommended to augment the CCME principles. These are listed on Figure 6 and are articulated in this section, together with suggested initiatives for their implementation.

Figure 6
Best Practices towards Removing Barriers to the Redevelopment of Contaminated Sites

#	STATEMENT OF BEST PRACTICE
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/ risk management (RA/RM) 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	All levels of government should collaborate 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 subsections 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 for review services allows fast tracking of approvals through the regulatory agency. "Users" normally means the landowner or developer. In many jurisdictions the review process for large projects is variable and can take up to several years, resulting in higher costs and developer uncertainty.

One option is to provide proponents the option of fast tracking review time with service fees. The service fee, such as implemented in B.C., supports the use of independent consultants to perform part of the agency review function, or to augment agency staffing levels. This helps to ensure that the proponent has one more controllable factor in their 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); and,*
✔ *assess the benefit of user pay versus a regulatory agency commitment to fast tracking.*

2. Numeric Cleanup 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 where soil quality met generic residential criteria. To achieve compliance these excavations have no depth limitation.

A better practice is to establish depth restrictions of site remediation to numeric criteria, and stratified remediation criteria. Migration pathways and receptors, and how they influence the corresponding risks, should be considered. Site remediation to residential criteria will then proceed to a specified depth to protect surface receptors. Beyond this, other criteria such as protection of groundwater for drinking or aquatic use would apply. Stratified remediation can be registered on title to ensure that future land owners and users are aware of the condition and extent of remedial work. Such registration is implemented under a Certificate of Prohibition which is implemented through the *Environmental Protection Act* (EPA), and is practised in Ontario.

To pursue this best practice, the following initiatives should be undertaken:
✔ *implementation of generic risk based criteria should be considered; and,*
✔ *mechanisms should be researched which allow the communication of exposure pathway considerations to future landowners.*

3. The Future Clause
This clause enables a regulator to initiate future additional study of a previously remediated site, despite the issuance of a confirmation of acceptance of site remediation. The "future clause" can typically be triggered by items such as changes in contaminant toxicity, available data, standards, site activity, or improper care of the known contamination. Although the intent of the clause protects the public interest, its application and trigger mechanisms need to be examined to reduce uncertainty to 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; and,*
✔ *research the procedures by which future liability is reduced to 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 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.

An alternative practice is to relocate and reuse the soil. This is based on the consideration that excavated soil which may not meet residential use criteria may be relocated and reused on an industrial site. Through a soil relocation agreement, transport of the soil for reuse can be an acceptable practice provided that the materials and the receiving site are well-studied. This is now permitted in B.C.

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; and,*
✔ *find solutions to the associated residual liability issues.*

5. Regulatory sign-off
Mechanisms for regulators to issue certificates of compliance for cleaned-up sites or approvals in principle for remediation plans can provide confidence to prospective buyers, investors, lenders and insurers, even if liability is not accepted by the regulator.

✔ *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. A great concern to investors and insurers is the possibility of more stringent future remediation criteria which could reduce development potential or render remediated sites 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 differentially interpreted between different jurisdictions, which leads to confusion and eventual delays in the site development process.

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; and,*
✔ *improve regulator education and communication between offices.*

7. Integration of Land Use Planning with Other Approvals
Because the redevelopment of contaminated sites 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; and,*
✔ *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 spills or airborne emissions can spread and cause a low level yet regional impact to groundwater or surface water. Point source contamination which impacts adjacent lands can halt development on such lands. In response, wide area designations can be initiated wherein regional contamination is addressed by the regulators from a regional perspective, encompassing multiple properties.

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; and,*

✔ *research the potential for cumulative impacts of contaminants from a number of sources.*

9. Registration/Certification of Qualified Practitioners

Currently, professionals with a wide variety of backgrounds and experience undertake site investigations leading to site remediation and 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

Risk Assessment / Risk Management (RA/RM), as discussed in Section 2.3, represents a contemporary approach to site redevelopment and is generally preferred to the generic numeric approach which typically leads to large site remediation costs to meet compliance with the remediation values. RA/RM 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 targeted, site specific assessment of exposure and migration pathways allows for better definition and communication of the contaminant problem.

RA/RM can be implemented on a tiered basis, where the first tier establishes 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 soil depth above the contamination and soil type. Tier Three is a detailed assessment of risk, and may include measures for control of exposure pathways such as isolation of contamination.

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

✔ *develop generic criteria related to exposure pathways for site screening purposes;*

✔ *implement RA/RM as an acceptable approach, in new legislation, policies, and guidelines across Canada.*

11. Statistical Evaluation of Contamination

Classification of soil and groundwater impacts can be established based on one exceedance, without regard for the significance of exceedance. 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 exceedance of a criterion. A statistical evaluation typically leads to a more appropriate interpretation for the potential impact of the guideline exceedance.

✔ *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

The development of improved and new technologies to overcome the current lack of acceptance by regulators and the public for treatment and/or destruction of certain contaminants, such as PCBs, could lead to more cost-effective remediation. Alternative, local solutions to soil treatment and disposal can be pioneered.

✔ *To pursue this best practice, the development of remedial technologies should be supported by government programs and resources, and private sector environmental firms.*

14. Limited Liability Agreements

Lenders may fail to realize their security when mortgagors default, due to 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 A). 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, ie. take 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; and,*
✔ *recognise 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, financial incentives, or tax incentives, such lands may remain vacant, idle, orphaned, and contaminated indefinitely. Also, governments and the private sector may be able to pursue joint ventures, where both risk and profit potential are shared. Collaborative government assistance is especially important now that the NCSRP has been abandoned.

To pursue these objectives, the following initiatives should be pursued:
✔ *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 regard; and,*
✔ *local and provincial governments should explore the use of incentives, including elimination of lot levies (development charges) for buildings 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. "Cleanup 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 $1,000,000, 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 from a future spill, or the detection of existing yet unknown contamination. Also, some insurance companies can provide policies that act as a future cleanup 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

Development applicants can be required to submit a site profile in the form of a checklist or questionnaire that reports on site history and related contaminant concerns, such as is practised in B.C.. This site profile can allow regulators to rapidly identify 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 routine exposure of all potential concerns.

To pursue this best practice, the following initiatives should be undertaken:
✔ *develop a standardized site profile template;*
✔ *encourage preliminary site screening in transactions and applications.*

18. Contaminated Site Registry

A current and reliable database of known contaminated sites can help avoid costly mistakes. This practice has been embraced by B.C. and Quebec, and some municipalities in Ontario. The knowledge gives comfort to regulators, future site owners, and communities. The site registry may depress the value of a property, but deters unwary purchases and helps eliminate the shroud of uncertainty regarding land contamination. 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 taken:
✔ *the requirement of municipalities to maintain a registry of known contaminated sites should be contemplated in new legislation and policies;*

✔ *the concept of requiring site specific investigations being put on the public record should be explored;*
✔ *research should be undertaken to show how these registries, where in place, have contributed to due diligence property transactions.*

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), (Campbell et al, 1994). 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 notice to interested parties, promote awareness, and facilitate land use planning.

To pursue this best practice, the following initiatives should be taken:
✔ *through provincial land use planning policy, encourage or even require municipalities to maintain mapping of potentially contaminated sites; and,*
✔ *develop and make available a model computer-assisted database for coding sites, possibly using Geographic Information Systems (GIS) technology.*

20. Notice of Site Remediation

A useful tool in promoting public awareness of conatimination and remediation efforts is a registered notice on land title. This is practised in B.C.. However, the current practice often brings a stigma to the property. More appropriate methods of communicating the site history may be possible, in conjunction with better public education on risk mitigation.

✔ *To pursue this best practice, more positive methods of communicating remediation efforts and risks to prospective buyers or lenders, along with better public education, should be pursued.*

21. Information Tools and Accessibility

Accessible information and the opportunity for public input should be included in all approval processes, as is required in B.C.. 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 (CEAA) under certain circumstances; and,*
✔ *publish more explanatory material, written in plain language, that can educate the public and all participants in the process, of potential risks and benefits of site clean-ups.*

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 (see Figure 1), ongoing education is required.

✔ *To pursue this best practice, those involved in regulating and developing contaminated sites should*

promote, as often as possible, the significant advances and success stories, as well as the environmental benefits in terms of economic development, community health and sustainability.

6.0 CONCLUSION

This section summarizes the main study conclusions, and recommends initiatives in pursuit of sustainable economic development of contaminated sites:

- The development of contaminated lands in Canada is an important issue, considering that there is an opportunity to produce tens of thousands of dwellings for Canadians, or substantial urban renewal, on lands in areas already serviced with urban infrastructure;

- The key areas of public interest regarding contaminated sites include protection of human health, ecosystem health, and the overall health of our urban areas. These interests are 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 contaminated sites;

- There has been some recent progress across Canada in implementing the thirteen principles established by the CCME, although there is much work to do;

- There are six key issues regarding the development of contaminated sites in Canada: Regulatory, Technical/Scientific, Legal/Liability, Financial, Urban Planning, and Communications;

- There are at least twenty-two "best practices" that can be pursued in combination with the thirteen CCME principles, to assist in removing barriers to the development of contaminated sites. The majority of these relate to regulatory issues;

- The single most important best practice is RA/RM. The Risk Assessment / Risk Management (RA/RM) approach is a model which can be used as a building block for a preferred policy model for Canada and elsewhere; This should be pursued in all jurisdictions, and acknowledged in legislation, policies, and guidelines; and,

- Various initiatives can be taken to pursue the suggested 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 pursued by governments as a package where possible.

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APPENDIX A

REVIEW OF LEGISLATION

FEDERAL GOVERNMENT

***Relevant Acts*:**

- **Canadian Environmental Protection Act, R.S.C. 1985, Chap. 16 (4th Supp.), as amended.**

***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 6 months, or both, or on indictment, to a fine not exceeding $1,000,000 or to a term not exceeding 3 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 5 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 3 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 (s.36(2)(a)), s.57(2)(a)); and
- persons who cause or contribute to the initial release or increases the likelihood of the initial release (s.36(2)(b), s.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)); and
- 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, The Companies' Creditors Arrangement Act and, The Income Tax Act.**

***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 trustees, 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 environmental 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 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 claims by federal or provincial governments against the debtor in a bankruptcy, proposal or receivership for costs of remedying any environmental condition or environmental damage affecting real property is enforceable in accordance with the law of the jurisdiction in which the real property is located and 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 (14.06(7)).

Civil recovery of public costs: N/A

Remediation criteria:

***Certificates of compliance*:**

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. Conservation & Reclamation Regulation Reg.115/93, as amended.**

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) or a remediation certificate 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 (s.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 2 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 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 under s.169, 170, 171 or 173 is liable for a fine not exceeding $250 for individuals, and a fine not exceeding $1000 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)); and
- 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 sales price less the purchaser's costs (s.231(2)); and
- If the identity of the purchaser to whom an order could be issued cannot be ascertained, the Minister may issue the order, and make take steps to ensure compliance if the identity of the person becomes known (s.231(2.1)).

***Remediation criteria*:**
The levels of remediation and restoration guidelines are to be set by regulation (s.107(1)(a)). Regulation may also prohibit the use of contaminated sites or any product from a contaminated site (s.117).

***Certificates of compliance*:** Reclamation certificates may be issued for specific (non-residential) projects, but do not apply to remediated sites generally (s.123 and Reg. s.14 and s.15)

Is the remediation certificate final and binding?
The Director may issue a remediation certificate in respect of land where:
- a release of a substance into the environment has occurred;
- the release is causing or has the potential to cause an adverse effect; and
- remediation of the land has been carried out in accordance with the terms and conditions of any applicable approval, environmental protection order, directions of an inspector or the Director, and the Act (s.105.1(1)).

An application for a remediation certificate may be made by the registered owner of the land or the person responsible for the substance to the Director. The Director may issue or refuse to issue a remediation certificate or make the remediation certificate subject to any terms and conditions the Director considers appropriate (s.105.1). Where a remediation certificate is issued, no environmental protection order may be issued with respect to the release of the same substance (s.105.2). A remediation certificate does not affect a person's obligation to obtain a reclamation certificate under the Act (s.105.3).

Notices: N/A

BRITISH COLUMBIA

***Relevant Acts*:**

- **Waste Management Act, R.S.B.C. 1996 , c.482, as amended**
- **Contaminated Sites Fees Regulation Reg 269/95 superseded by Contaminated Sites Regulation Reg 375/96.**

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, groundwater, or water, including the sediment and the bed below it, contains a special waste or another prescribed substance in quantities or concentrations exceeding established criteria, standards or conditions (s.26 (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.31(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.31(3)).
- 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.31(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.35).
- An order may be amended or cancelled (s.31(3)).

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.27.5);
- implementation of a remediation plan;
- monitoring, verification and confirmation;
- other action that the Lieutenant Governor in Council may prescribe (s.1(1))
- Following a preliminary determination and a commentary period (Reg. Part 12), a Manager may make a final determination as to whether the site is contaminated (s.26.4(1)).
- 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.26(1) def'n - also see Reg. s.11(1)).
- A Manager may issue a remediation order to any responsible person (s.27.1(1).
- Voluntary remediation agreements may provide for contributions to remediation, a schedule for remediation and remediation requirements, with the Manager's agreement (s.27.4). Independent remediation may also take place with written notification to the Manager within 90 days of completion of the task (s.28).
- 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.28.1(1)), unless the landfill is authorized by a valid permit or approval, an order, or an approved waste management plan (s.28.1(5), (6) and (7)).
- A Manager may also carry out remediation for orphan sites (s.28.4).
- 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.27(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.12(5)).

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 demolition permit for a structure that has been used for commercial or industrial purposes, or an activity prescribed by regulation (s.26.1).
- 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 in accordance with the regulations (s.26.1(7)).
- Trustees, receivers and liquidators, as well as persons commencing foreclosure proceedings who take possession or control of real property for the benefit of one or more creditors shall submit a site profile to the Manager if the property has been used for industrial or commercial purposes or for purposes or activities (s.26.1(8)).
- Other obligations exist on owners under the *Petroleum and Natural Gas Act* and the *Mines Act* or municipalities in certain circumstances (s.26.1(3), (4) and (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. Part 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, the site is within a "wide area site" approved by the Manager, or the site is contaminated pursuant to s.26.4 and there is no new or additional contamination (Reg. s.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 or the environment, the Manager may order a site investigation (s.26.2).
- When the Manager receives the report of the site investigation, the Manager must determine if the report complies with applicable regulations and orders and gives notice of the determination. If the site is determined not to be contaminated, the Manager is not liable for any cost incurred (s.26.2(2), (3)).
- 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 (s.26.4(3)).

Prohibitions and Offences - Site Profiles

- 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.54(20)).

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 under this section or by regulation or any waste which is produced by a prescribed activity or operation (s.3).
- No person who produces, stores, transports, handles, treats, deals with, processes or owns a special waste shall release a special waste, as defined in the Act except as expressly authorized (s.4)
- No person shall introduce waste into the environment in such a manner or quantity as to cause pollution (s.4).

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.54(6)).
- 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.54(7)).
- 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.55(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 3 years imprisonment (s.56).
- 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.54(14).

***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.31(1)).

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.27.1(1), (2)).

Responsible persons include:

- current owner or operator of the site;
- a previous owner or operator of a site;
- a person who produced 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 (but that person is not responsible if ownership and responsibility for managing the substance was transferred to a transporter under prescribed circumstances -Reg. s.19);
- 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 for remediation by regulation (s.26.5(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.26.5(2));

A secured creditor if the secured creditor at any time exercised control over or imposed requirements on any person regarding the manner, treatment, disposal or handling of a substance which in whole or in part caused the contamination or if the secured creditor becomes the registered owner in fee simple of the real property (s.26.5(3)).

***Considerations the Ministry will take into account*:**
Persons who establish the following on a balance of probabilities are *not* responsible (s.26.6):

- persons who become responsible only because of an act of God or act of war, if they exercised due diligence with respect to any substance that, in whole or in part, caused the site to become a contaminated site;
- persons who become responsible person only because of an act or omission of a third party, other than an employee, an agent, or a party 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 become 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. s.28];
- an owner or operator if the person disclosed any known contamination when an interest in the site was transferred [not applicable to situations where owner leased, rented or allowed use of real property by another person and knew or had a reasonable basis for knowing the lessor intended to use the property to handle or treat substances that would cause the site to become contaminated (Reg. s.29)].
- 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, handle or treat 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 at the time of its deposit, 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. s.19)].
- an insurer or insurance broker who undertakes risk evaluation (Reg. s.20).
- 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, highway or right of way for sewer or water 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 or right of way it possesses, owns or operates (Reg s.26.6(1));
- a secured creditor who acts primarily to protect a secured interest. Without limitation, the secured creditor may only participate in purely financial matters of the borrower to protect a security interest, has 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. s.25);
- a responsible person who received a conditional or full certificate of compliance, for which another person subsequently proposes or undertakes 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 Title Act*, a lien, a judgement or an interest exclusively of subsurface rights - Reg. s.22];
- a person who is in a class designated by regulation as not being responsible.
- 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. s.20).

- a person providing contracting or consulting services related to the construction of buildings and facilities at a contaminated site (Reg. s.24).
- 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. s.26 and s.27].
- lessors who provide surface access for subsurface use (Reg. s.30).
- transporters of contaminated soil [further defined under Reg. s.32].

***Apportionment of remediation costs*:**

- Persons responsible are absolutely, retroactively and 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.27(1)).
- When allocating liability, the Manager may take into account private agreements respecting liability for remediation among the 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.27(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.27.3).

At the request of any person and at his or her cost, an allocation panel, consisting of 3 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.27.2). 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.27.3 (also see Reg. s.38).
- other factors relevant to the panel (s.27.2(3) and above);

The opinion of the allocation panel is not binding on the Manager (s.27.2(4)).

Civil Recovery of Public Costs:

- The Manager, may pursue an action for reasonably incurred costs of remediation from responsible persons during or after remediation, (s.28.5). 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.28.5(5)).

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 set out by regulation. The remediation standards are set forth in Reg. Part 6.

Regulations provide for both numerical standards (Reg. s.17) and risk-based standards (Reg. s.18). 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. s.17). Risk based standards must be approved by the Manager, be supported by evidence and be subject to a public consultation process (Reg. s.18).

In selecting remediation options, consideration must be given to:

- 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; and
- other factors, prescribed by regulation (s.27.1(3)).

The applicable fees are set out in Schedule 3 of the Regulations.

***Certificates of compliance*:**

Certificates of compliance or conditional certificates of compliance may be issued for a contaminated site or part of the contaminated site by a Manager where the site has been remediated to the Manager's satisfaction (s.27.6(6) and Reg. s.49 - s.52).

- A manager may issue an approval in principle, a certificate of compliance or a conditional certificate of compliance for part of a contaminated site (s.27.6(6)).
- Upon application by a responsible person, an 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.27.6(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 relative to the management of substances remaining on the site (s.27.6(2)).
- Conditional certificates of compliance may be issued if the contaminated site has been remediated in accordance with prescribed risk based standards and prescribed environmental impact requirements, any orders issued under the Act, any approved remediation plans, and any Manager's requirements (s.27.6(3)).
- For conditional certificates of compliance, information about remediation and the substances remaining on the site must be recorded in 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 section 219 of the *Land Title Act* (s.27.6(3)).

Is the certificate of compliance 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; and
- a responsible person directly or indirectly contributes to contamination after the previous action (s.28.7).

Notices:

Information about remediation and the substances remaining on the site must be recorded with the site registry (s.26.3, Reg. s.8).

BRITISH COLUMBIA

***Relevant Acts*:**
- Land Title 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 5 clear days, unless the period is extended by the director (s.24(1)).
- If the Director is of the opinion that the situations 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, licenses 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 6 months for a first offence, and not exceeding $100,000 and/or imprisonment for up to 1 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 licenses 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 S.M. 1996, c.40**
  Contaminated Sites Remediation Reg. 105/97

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.3(1)).

***What triggers liability*:**
Designation of contaminated sites:

- If director suspects that 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.4(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.4(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.6), 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.5).
- The director may authorize or require any person who is or may be responsible for remediation to investigate any lands or premises that include or form part of the site (s.8).
- 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.7(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.7(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 so 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, and 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.18).
- 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 30 days of the order (s.15(2)). The plan may be referred to the Clean Environment Commission for its advice and approval, who may conduct a public hearing, and who shall report within 90 days (s.16).
- 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.17). The director may also carry out remediation without assuming responsibility for the site (s.17(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.53(1)). Similarly, every director, officer or agent of a corporation who authorizes or acquiesces or participates in an offence is guilty of an offence (s.53(2)).

Penalties:

- Noncompliance penalties for corporate offenders range from $500,000 for first violations to $1,000,000 for subsequent violations (s.53(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.53(3)).

***Parties to whom an order may be directed*:**

- Orders to have a site investigated are against a property owner or occupier (s.4(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, charge or control 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 if the director believes on reasonable grounds the creditor contaminated 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, receiver or receiver manager of any of the above;
- any other prescribed person(s.9(1)).

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 who exercised due diligence in advocating safe waste handling and prevention of contamination, undertook investigation or remediation, participated in loan workout actions, took steps to protect the value of a security interest or migration or minimized future contamination;
- 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.9(2)).

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.9(3)).

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.21).

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 person who would not otherwise be responsible, proposes to become an owner or occupier or result in responsibility of the site, the Director may enter into an agreement with the person subject to any Director's terms and conditions, which may include 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)).

An authority may acquire land by expropriation or otherwise without becoming potentially responsible for remediation, for the purposes of s.9(2)(c) of the Act and for purposes of certain other Acts as set forth in Reg. s.8(1).

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 (s.21 and s.22(1)). If persons will not negotiate or no agreement is reached, the Director may refer the matter to the Commission for hearing (s.23).

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; and
- 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.22(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.30(1)). Notwithstanding s.30(1), 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(2)).

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 participant's 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 participant's 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 (s.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 (s.35, s.36 and s.37).
- 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.57).

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.19(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.19(2)).

A person who undertakes or participates in remediation of a contaminated site without being required under the Act to do so, may obtain a certificate from the Director (s.19(3)).

Notices:
Once a site is designated as contaminated, the Director must file a notice under the certificate of title in respect of the contamination, to be sent to each registered owner, each municipality in the jurisdiction, and filed with a publicly accessible site registry, created under the legislation. The site registry shall have a copy of each notice or certificate issued or order made under the Act. Where there is a notice of site designation a summary of the nature and extent of contamination shall also be included by the director. The information, where possible, will also be available in electronic form (s.6(1)) and (Reg. ss.2-7). 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.55(1)).

NEW BRUNSWICK

Relevant Acts:

- **Clean Environment Act, R.S.N.B. 1973, c. C-6 ("CEA"), as amended.**
- **Clean Water Act, S.N.B. 1989, c. C-6.1. Contains corresponding provisions to the CEA. Water Quality Regulation, 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 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 & 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 is 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 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 cleanup, 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 6 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, 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:
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

NORTH WEST 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 licenses, 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 6 months, or both for first offences, and to a fine not exceeding $1,000,000 or to imprisonment for a term of less than 2 years or to both for subsequent offences (s.12(1)).
- Every person who fails to comply with an order under s.4, s.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 & 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 (f);
- to carry out clean-up, site rehabilitation or management, site security and protection and other remedial actions (h);
- to restrict or prohibit the use of a contaminated site or any product from that site (q);
- to take precautions with respect to treatment or decontamination of an affected area (o);
- to take precautions with respect to future use of an affected area (p);
- to provide security during a cleanup and afterwards for monitoring purposes (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, 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 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 2 years, or both.
- A person who commits an offence under sections 67(2), 68(2), 69, 71 and 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 judgement 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, as amended.**

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 section 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 is $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 subsection 14(1) or 130(1) is liable, in addition to or in substitution for the penalty set out in subsection 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 (s.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 each other and pay contribution to the degree each person caused the damage(s.99(8)).

[Amendment to EPA not yet in force 1997, c.7, s.2, All the rights of recovery of compensation and liabilities of the Environmental Compensation Corporation are transferred to Her Majesty in right of Ontario (s.102). The Environmental Compensation Corporation is dissolved (s.105). A person who received payment pursuant to a certificate of the Environmental Compensation Corporation for loss or damage as a result of a spill and recovers compensation from another person for the same loss shall repay the Minister of Finance (s.103(2)).]

Remediation criteria: N/A

Certificates of compliance: N/A

Is the remediation certificate final and binding? N/A

Notice:

- 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 (see Guideline for Use at Contaminated Sites in Ontario, February, 1997).
- 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 twenty-five 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 available 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 (s.7(2)/s.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, and
- to take action to prevent or avoid danger to human life or health or damage to property
- to submit a report (s.7(3))/s.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 (s.7/s.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 Acts 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 Acts 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 (s.7(1)/s.7.1(1); and
- natural persons/corporations whose act or omission is a threat to the environment or environmental health (s.7(2)/s.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 (s.31.42, s.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 in greater quantity or concentration than permitted exists, 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 nor more than $20,000 for 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 $2000 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 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 is insufficient to establish that it has been committed by the other unless the person 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. 1983-4, 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, to 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 section 4 and to issue written directives relating to measures required by these orders (s.6).
- Orders may also be issued against the owner of 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 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, as amended.**
  Contaminated Sites Regulation OIC 1996/92.

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)).
- Before designating a contaminated site under s.114(2), the Minister may make a preliminary determination on the site and give written notice of the preliminary determination to any responsible party, the municipality, any local community organization who may have an interest in the site, the Yukon First Nation in whose Traditional Territory the site is located, any person with a registered interest in the site, any agency or government body and the public registry. The Minister shall provide the opportunity for any person to comment on the preliminary determination and give a final determination respecting whether the site is a contaminated site (Reg. s.4).
- Any person who owns or occupies the land where a notice has been registered shall before changing the use of the soil or groundwater, undertaking excavation or construction, or dismantling equipment or buildings, shall provide a site assessment (Reg. s.8), a description of the proposed change and a plan of restoration (s.114(6) and Reg. s.9).
- 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))(See Reg. s.6 and 9).

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 reasons 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 any part of the natural environment (s.8). The court can also direct the Minister to monitor compliance with such an order (s.12).

Penalties:

A person who fails to give an environmental protection officer reasonable assistance under s.154(4)(a)

and s.154(4)(b), or contravenes s.113 or s.133, or fails to provide information under a permit issued under this Act faces a fine not exceeding $200,000 or jail for up to six months or both (s.171 and s.172).

***Parties to whom an order may be directed*:** to persons in control of the development or conducting the activity (s.159).

***Considerations the Ministry will take into account in assessing liability*:** Before the Minister issues an order requiring a person to restore or rehabilitate a contaminated site, the Minister may appoint a person to give an opinion as to whether a party is a responsible party and the share of the liability of that party. The criteria of the factors to be considered are set out in the regulation but the Minister is not bound to accept the opinion of the party appointed to do the review (Reg. s.12).

***Apportionment of remediation costs*:** The Minister may also appoint a person to mediate among the responsible parties to apportion their respective liabilities (Reg. s.13).

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).

Civil recovery of public costs: N/A

***Remediation criteria*:**
Regulations provide for numerical soil and water standards (Reg. Schedule I). 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. Schedule 2).

***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)). The certificate does not warrant that the land is free of contamination (s.116(4)).

Is the remediation certificate final and binding? N/A

Notices: The Minister has established a public registry of contaminated sites (s.114(1)) and (Reg. art.15).

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 B

REVIEW OF POLICIES AND GUIDELINES

CANADIAN FEDERAL

GUIDANCE	KEY FEATURES
CCME EPC-CS34 Interim Canadian Environmental Quality Criteria for Contaminated Sites - Remediation Criteria for Soil and Groundwater, 1991	- specifies soil and groundwater 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
The Recommended Canadian Soil Quality Guideline, March, 1997	- replaces interim guidelines (1991) for specific contaminants only
CCME - National Guidelines for Decommissioning Industrial Sites, 1991	- outlines approach for decommissioning contaminated sites
CCME - Guidance Manual for Developing Site Specific Soil Quality Remediation Objectives for Contaminated Sites in Canada, 1996	- outlines approach for the development of SSRA 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 contract, 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 groundwater, 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 groundwater 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 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 methods, 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
Bill 26 - Contaminated Sites Regulations, April 1, 1997.	The Contaminated Sites Regulation (CSR) specifies standards for priority chemicals applicable to both assessment and remediation of contaminated sites. The CSR has four tier: * Tier 1 include generic numerical concentration standards from the "old" criteria for managing contaminated sites based on planned land use including agricultural, residential, parkland, commercial, and industrial; * Tier 2 is new risk based standards for selected chemicals based several exposure scenarios, in addition to the land uses considered in Tier 1. These standards are referred to as the matrix standards. * Tier 3 is site specific numerical standards, which are derived by adjusting the Tier 2 standards for site specific conditions within acceptable ranges. * Tier 4 involves risk assessment and risk management. The Criteria are in force under the Waste Management Act as of July 1995. The site investigation and remediation process is triggered by property transaction, rezoning, redevelopment or decommissioning. The CSR provides a process for determining who is responsible, and for allocation of remediation costs if there are more than one party involved (joint, several and retroactive liability). The remediation may follow the "official" of review and approval by the Ministry; or it can be carried out independently only requiring notification of the planned works to the Ministry; or it may be ordered by the Ministry. A cost recovery fee structure is included in the CSR, with fees being charged for review and approval of reports. The regulation also provides for external review of reports at a higher cost, but more definite time frame, than a BC 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. While the fee regulation makes some of the services that can be provided by BC Environment clear, it also adds an additional cost to site investigations which need to be approved by BC Environment. Many municipalities require receiving an Approval in Principle from BC Environment prior to issuing a development permit. The cost and timing for such approval must be included in the overall development schedule. The 3 year review process for Bill 26 has been extensive and has involved the industry, municipalities and other interest groups.

BRITISH COLUMBIA, CONTINUED ...

GUIDANCE	KEY FEATURES
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 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 that 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.
BC Fire Code Regulation	The BC 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 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
Contaminated Sites Remediation Regulation 105-97	- implemented under the Contaminated Sites Remediation Act. - explains how a site is designated as contaminated. - implements CCME Codes of Practice and Criteria

PROVINCE OF NEW BRUNSWICK

GUIDANCE	KEY FEATURES
Guidelines for the Assessment and Remediation of Contaminated Sites, 1992, New Brunswick DOE	- 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.
Draft Policy, expected by April, 1998.	- new policy for Atlantic provinces on soil and ground water contamination will be "Risk Based Approach", as per RBCA - some specific differences are: inclusion of TPH (13 fraction groups), model in 3-D instead of horizontal modelling - no changes expected to existing provincial laws and regulations

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.
Draft Policy, expected by April, 1998.	- new policy for Atlantic provinces on soil and ground water contamination will be "Risk Based Approach", as per RBCA - some specific differences are: inclusion of TPH (13 fraction groups), model in 3-D instead of horizontal modelling - no changes expected to existing provincial laws and regulations

NORTHWEST TERRITORIES

GUIDANCE	KEY FEATURES
In the 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.
Hazardous Waste Policy, 1997	- controls and classifies hazardous wastes
Other	In the absence of provincial policy, CCME guidelines are used.

PROVINCE OF ONTARIO

GUIDANCE	KEY FEATURES
Guidelines for Use at Contaminated Sites in Ontario MOEE, Revised, February, 1997.	- outlines an approach on the remediation 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
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 Regulation 347	- outlines classification of hazardous and non hazardous waste for disposal purposes

PROVINCE OF PRINCE EDWARD ISLAND

GUIDANCE	KEY FEATURES
Draft Policy, expected by April, 1998.	- new policy for Atlantic provinces on soil and ground water contamination will be "Risk Based Approach", as per RBCA - some specific differences are: inclusion of TPH (13 fraction groups), model in 3-D instead of horizontal modelling - no changes expected to existing provincial laws and regulations

PROVINCE OF QUEBEC

GUIDANCE	KEY FEATURES
Politique de rehabilitation des terrains contaminés. (Ministere de L'Environnement, 1988, revised 1994)	- classifies contaminants following a modified Dutch classification scheme, with regard to permissible land use - outlines cleanup approach - outlines soils management <u>Guidelines and Directives related to the Contaminated sites Rehabilitation Policy</u>: - Technical guidance manual concerning recommended control measures during excavation of contaminated soils, 1988. - Guidance manual for conception and management of contaminated soils disposal cells, 1988. - Guidelines for contaminated soils treatment projects pertaining to stabilization/fixation/solidification processes, 1991. - Guidelines for the removal of petroleum underground tanks, 1994. - Groundwater sampling guide, 1994. - Soil sampling guide, 1995
Politique de protection des sols et de rehabilitation des terrain contaminés. (Ministere de L'Environnement et de la Faune, January 1998)	- policy approved and will be issued shortly. - contains similar concepts as 1994 policy. - aims to clean up all contaminated sites. - encourages preservation of soils and groundwater. - provides for risk analysis (human health and ecosystems).
Lignes directrices d'analyse de risque toxicologique, 1991	- guidelines to perform human health risk assessment. - a technical guide of 240 pages is related to these guidelines, outlining methodologies and calculations.
Lignes directrices pour la réalisation des analyses des risques toxicologiques, June 1996. (To be revised and re-issued Spring 1998)	- revised guidelines to perform human health risk assessment - a technical guide of 700 pages is related to these guidelines. - Note: The responsibility to evaluate and approve human health risk assessment has been transferred to the Ministry of Health who will issue by Spring 1998 its guidance document on how to use the guidelines. At the same time, a technical guide will be issued jointly by the Ministry of Environment and the Ministry of Health.
Procédure d'évaluation du risque écotoxicologique, October 1996 (to be issued Spring 1998)	- guidelines and framework to perform ecotoxicological risk assessment to be used within the Policy for the protection of soils and contaminated sites rehabilitation.

Projet de Politique de protection et de conservation des eaux souterraines, April 1996	- draft policy for groundwater protection and conservation, undergoing consultation. - two related documents have been issued at the same time: • a description of the situation and main problem to be tacked; • a plan of action, including regulations to be issued to support the policy. These proposed regulations deal with agricultural pollution reduction, and groundwater controls, and other matters. Amendments to other laws and regulations concerning urban and rural planning and those related to mining activities are proposed.
Directive sur les industries miniéres, no. 019, 1988 - revisée en 1993.	- provides directives on mining industries.
Hazardous Waste Regulation (Under the Environment Quality Act - EQA)	The Ministry of Environment: - considers a soil contaminated by a hazardous waste as a hazardous waste itself; - prescribes that the occupant or the owner of a site where there is a hazardous waste shall ensure the shipment thereof in compliance with the Regulation. This could include contaminated soil. - This regulation will be replaced by a new one, effective on December 1, 1997 (see below).
Hazardous Materials Regulation (under the EQA)	- this new regulation will come into force December 1, 1997 and will replace the existing Hazardous Waste Regulation. The most important change concerning contaminated soils is that these will not constitute hazardous materials under the Regulation unless these contain more than 50 ppm of PCBs (mg/kg of soil). In that case, the new regulations forbid the deposit of such materials in disposal sites which means they have to be treated.
Regulation respecting solid waste (under the EQA)	- a maximum of 100 m^3 of contaminated soil, with less than 5% by weight of hydrocarbons, per period of 4 consecutive months are acceptable at a sanitary landfill. - common practice is to interpret this limitation as applicable to contamination levels exceeding B criteria of the "Politique de réhabilitation des terrains contaminés" (maximum acceptable levels for residential or recreative use of land).
Petroleum Products Regulation (under an Act respecting the use of petroleum products)	- prescribes that the owner or user of storage tank (UST or AST) shall clean the site of a contamination caused by a leak of a storage tank (replacement or removal) - requires notification of the Ministry of Environment of any contamination.

PROVINCE OF SASKATCHEWAN

GUIDANCE	KEY FEATURES
Risk Based Corrective Actions for Petroleum Contaminated Sites, Guide, 1995 Saskatchewan Guidelines	This policy outlines the risk assessment protocol for hydrocarbon contaminated sites.
Draft Guidelines for the Remediation of Above/ Underground Petroleum Storage Sites and Disposal of Petroleum Contaminated Soils in Saskatchewan	The draft policy provides specific protocol and criteria for hydrocarbon contaminated sites.
Othe CCME criteria are used in the absence of provincial policy/criteria.	

YUKON TERRITORY

GUIDANCE	KEY FEATURES
Contaminated Site Regulations (1997)	The purpose of these regulations is to protect human health and the environment from harmful contaminants
In the absence of provincial policy, BC and CCME guidelines are followed.	

APPENDIX C

CASE STUDIES

CASE STUDY #1
LACHINE CANAL, QUEBEC

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 1980's.
Site land area (ha) 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 north-west limit of the site. Other statistics: population surrounding the site (19,250 persons in a radius of 1 km); further users of the parkland area (500,000 yearly).
Ownership and development value	Federal property under the responsibility of Patrimoine 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 (restauration of the site). Type of contamination; benzene, copper, lead, oil and mineral greases, PAHs, xylene and zinc.
Exposure pathways	For different population groups, the three (3) 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. Groundwater was not considered on the basis that people are serviced by the Montreal aqueduct.
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 US EPA 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 neighbor" issues was judged as of paramount importance and, consequently, a free hydrocarbon phase had to be removed along with the top 1 metre contaminated soil layer. The 1 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 STALL*
(a) Regulatory Various legislation, policies, regulation and practices	Without the use of risk-based management and remediation approach, the project might have been stalled.
(b) Legal / Liability Future liability	There is still unanswered questions about future liabilities if contaminants are found in the future near the residential construction nearby.
(c) Financial (i) Cost of remediation (ii) Effect on property value (iii) Lender / insurer concerns	(i) The cost was $2.4 million instead of $9 million. (ii) No effects on properties value have been recorded. (iii) No specific concerns from lender / insurers have been recorded.
(d) 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.
(e) Urban Planning (i) Residential intensification (ii) Cost-effective development (iii) Zoning by-laws	(i) Extension of the recreational area without health risk will help the residential development. (ii) Cost effective remediation made the project possible. (iii) Approved rezoning from industrial to residential parkland area.
(f) 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 Associes Ltee.

Daniel Morin, Congrès annuel de l'Association Professionnelle de Géologues et Géophysiciens du Québec, Laval, 1995, 15 pages.

CASE STUDY #2
CITY OF LASALLE LANDFILL, QUEBEC

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 1940's to 1959 (closing date). In the 1960's, 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 (ha) and housing potential	7,000 cubic metres of industrial wastes located largely in trenches. 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 1960's. 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 for the health of the residents / users of the site and represented a possible threat for the nearby aqueduct 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 (3) levels of contamination (A, B and C). The rehabilitation of the site has lead to the excavation of 100,000 cubic metres of contaminated soils and wastes, the demolition of eight (8) houses and the temporary relocation of sixty-five (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 concerns 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 STALL*
(a) Regulatory Various legislation, policies, regulation and practices	Without the application of the generic criteria from the Dutch approach, rapid actions 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 Quebec.
(b) 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.
(c) Financial (i) Cost of remediation (ii) Effect on property value	(i) Impossible to evaluate if a risk assessment done at that time would have reduced the cost of remediation. (ii) Without excavating the main sources of contamination, properties may have lost 50 percent of their value at that time (1985).
(d) Technical / Scientific Development of generic criteria and related guidelines	The application of the generic criteria from the Dutch approach lead 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.
(e) Urban Planning (i) Residential intensification (ii) Cost-effective development (iii) Zoning by-laws	(i) Residential / commercial development continued. (ii) At the time, the remediation was considered expensive but necessary. (iii) Still residential / commercial.
(f) 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, 20 pages

Caractérisation de l'ancien dépotoir de la ville de LaSalle, Septembre 1985, 91 pages

Dix ans de restauration des terrains contaminés - Bilan de 1983 à 1993, Septembre 1994, 34 pages

CASE STUDY #3
COOKSVILLE QUARRY, 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 (3) 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 (2) 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 (ha) and housing potential	75 ha. 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 (year)	Private owner: Jannock Ltd. Servicing Developer: Jannock Properties
Number of years idle and type of contamination	Two (2) years. 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 extensive whole and broken brick.
Exposure pathways	Mainly direct contact with soil containing heavy metals. Possible groundwater 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 which 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 to allow for a pragmatic management of fly-ash area.

KEY ISSUES	*SUCCESSFUL RESOLUTION OR REASON FOR STALL*
(a) Regulatory (i) Various legislation, policies, regulations, and practices (ii) Roles and responsibilities of various agencies (iii) Time frames for approvals (iv) Duplication (v) Institutional policy variability (vi) Acceptance of new procedures by agencies (vii) Long term of consistency of regulatory process / approvals	(i) Ontario Environmental Protect Act. (ii) Ontario Regulation 347. (iii) Ontario Water Resources Act. (iv) Policy 07-07 Development Adjacent to Landfills. (v) MOEE Guidelines which include site specific risk assessment approach currently under review. (vi) 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 Regional Peel to provide approvals for potential sanitary sewer discharge. (vii) Approvals anticipated to take six (6) months to one (1) year.
(b) Legal / Liability (i) Who pays for past contamination?	Fly-ash disposal area is currently the responsibility of Ontario Hydro.
(c) Technical / Scientific	Not available.
(d) Urban Planning	Not available.
(e) Communications	Not available.

SOURCE: Golder Associates Ltd.

CASE STUDY #4
PORT CREDIT REFINERY SITE, 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 previous use	Former oil refinery site (approx. 80 ha.) including refinery 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 (ha) and housing potential	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 1980's included complete extraction of chemically and aesthetically impacted soils.
Estimated remediation costs	Confidential.
Status of project	Currently 8 ha area of site remediated, site received Statement of Completion from MOEE and is currently under development for commercial uses. North portion of property (52 ha) will be remediated in 1996 for residential development. South portion of property on hold.
Key to project completion.	Interactive working relationship developed with MOEE that lead to the smooth progression of approvals. However, some approvals for major issues to years to obtain. In 1989 development of site specific health based clean-up criteria for 43 organic compounds relating to refinery related wastes facilitated the project. Active public consultation program initiated and maintained by Imperial Oil.

KEY ISSUES	*SUCCESSFUL RESOLUTION OR REASON FOR STALL*
(a) Regulatory	
(i) Various legislation, policies, regulations, and practices	(i) Good interactive working relationship with the local office of the MOEE facilitated approval process.
(ii) Roles and responsibilities of various agencies	(ii) Development of site specific clean-up criteria made the project possible.
(iii) Time frames for approvals	(iii) Lack of suitable organic. Aesthetic and chemical clean-up criteria would have stopped project.
(b) Legal / Liability	
(i) Who pays for past contamination?	Soil Contamination created during refinery operation is being remediated at cost to Imperial Oil the property owners.
(c) Financial	
(i) Costs of addressing the issue	Property value is maximized by achieving compliance with approved clean-up criteria and a Statement of clean-up will be issued when completed works are approved by MOEE.

(d) Technical/ Scientific	
(iii) Traditional remediation philosophies and techniques (iv) Acceptance of risk-based site (v) Remediation/ management (vi) Site specific clean-up parameter site remediation (vii) Subsurface migration	Site remediation was achieved by soil extraction, segregation and on 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 some aspects of the project.
(e) Urban Planning	
(i) Sustainable development	Sustainable development achieved by the restoration of industrial land for use as residential and commercial properties.
(f) Communications	
Developer education and government awareness	Imperial Oil developed an actively maintained a good public communications plan which included; on-site owner representative, regular public meetings, and newsletters.

SOURCE: Golder Associates Ltd.

CASE STUDY #5
ATARITIRI SITE, 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 (ha) and proposed development	32 ha. 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 the site ten (10) to thirty (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. Groundwater 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 in
KEY ISSUES	***SUCCESSFUL RESOLUTION OR REASON FOR STALL***
(a) Regulatory Clean up Requirements	Clean up costs to generic clean up criteria, was one of the reasons for stall 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.
(b) Financial Costs of remediation	Adopting a risk-based approach to remediation gives new impetus for the project to proceed, as the associated cost were about an order of magnitude lower than those of traditional site remediation.
(c) Technical / Scientific (i) 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.
(d) Urban Planning (i) Remove Use Restrictions (ii) Cost effective development	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 remediation renews interest in redevelopment.
(e) Communications (i) Public awareness (ii) 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

CASE STUDY #6
PACIFIC PLACE, 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 (ha) and housing potential	66 ha. 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 (10) to thirty (30) years. Mixture of heavy metals, creosote, and coal tar. Contamination is limited to the historic fill zone.
Exposure pathways	Mainly direct contact with soil containing heavy metals and coal tar. Also soil vapour in zones of coal tar contamination. Groundwater 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 groundwater 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 (2) levels of underground parking. Most of the site requires only a cover of surficial 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 ten (10) times higher for numerical criteria approach.
Status of project	Development started in 1992, and is now about 1/3 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 STALL*
(a) Regulatory Acceptance of new procedures by agencies	Without the development and application of new risk-based remediation approach, this project may have been stalled or reduced in scope.
(b) Legal / Liability Future liability	Covenant on legal land title addressing leaving contaminated soils in place. Future liabilities remain with "historic owner", i.e., the Province as it is considered to be an orphan site.
(c) Financial (i) Costs of remediation (ii) Effect on property value (iii) Lender / insurer concerns	(i) 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 (ii) Covenant of legal title to address contamination left in place appeared to have little effect on property value as the Province retained future liability. (iii) Lender concerns were also addressed by the Province retaining liability.
(d) 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.
(e) Urban Planning (i) Residential intensification (ii) Cost effective development (iii) Zoning by-laws	(i) Rejuvenation and expansion of Vancouver's downtown core. (ii) Cost effective remediation made the project possible. (iii) Approved re-zoning from industrial to residential land use.
(f) Communications (i) Public awareness (ii) 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.

SOURCE: Golder Associates Ltd.

CASE STUDY #7
CANADIAN LEGION SENIORS HOUSING SITE, BRITISH COLUMBIA

VITAL DATA	*INFORMATION*
Urban context and previous use	A former Canadian Legion was redeveloped for "care" apartments.
Site land area (ha) and housing potential	City corner lot, 0.2 ha. The development involved apartments for senior citizen members of the Canadian Legion.
Ownership and development value (or purchase price)	Canadian Legion Development value: $0.5 million
Number of years idle and type of contamination	one (1) to two (2) 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. Groundwater 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 ten (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 STALL*
(a) Regulatory (i) 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.
(b) 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.
(c) Financial (i) Costs of remediation (ii) Effect on property value (iii) Lender / insurer concerns	(i) 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 (ii) Covenant of legal title to address contamination left in place have little effect on property value given the type of housing development. (iii) Lender concerns are addressed by British Columbia regulations.
(d) 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.

KEY ISSUES	*SUCCESSFUL RESOLUTION OR REASON FOR STALL*
(e) Urban Planning (i) Residential intensification (ii) Cost effective development (iii) Zoning by-laws	(i) Rejuvenation of a commercially zoned lot. (ii) Cost effective remediation made the project possible. (iii) Approved re-zoning from commercial to residential land use.
(f) Communications (i) Public awareness (ii) 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.

SOURCE: Golder Associates Ltd.

CASE STUDY #8
ARTUBUS, BRITISH COLUMBIA

VITAL DATA	*INFORMATION*
Urban context and previous use	The former site for Molson Brewery was redeveloped for a large condominium and apartment subdivision. Other previous uses included ironworks, warehousing, and various industrial activities.
Site land area (ha) and housing potential	One City block corner lot, 2 ha. The development has been staged with the later stages of development still under progress. The development involved high-end apartments and condominiums located in Kitsilano of the West side of Vancouver.
Ownership and development value	Greystone Developers Development value: More than 20 million
Number of years idle and type of contamination	About 5 years. Former landuse had contaminated the fill soils with metals and tar/oil derived hydrocarbons (polycyclic aromatic hydrocarbons, PAH). The contamination exceeded the landuse criteria for residential use, and was widespread throughout the site.
Exposure pathways	Dust and direct contact with soil containing metals and PAH. Groundwater was not considered a potential pathway because of the city setting and the several kilometres distance to the nearest surface water body.
Site remediation plan	A risk assessment was conducted to assess risks associated with leaving the contaminated soil in-place. Soil excavated for foundation purposes was segregated and disposed off-site. A potential risk to neighbours using undeveloped parts of the site was identified. The management options included fencing off the undeveloped parts of the site, to limit site access.
Estimated remediation costs	$250,000 for risk-based approach. At least ten (10) times higher for numerical criteria approach.
Status of the project	Development was started in 1997, and Stage of the apartments is now being 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 STALL***
(a) Regulatory Various legislation, policies, regulation 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.
(b) Legal / Liability Future liability	Covenant on legal land title addressing leaving contaminated soils in place. Future liabilities remain with Site Developer (Greystone). The lenders are protected through the Contaminated Sites Legislation.
(c)Financial (i)Cost of remediation (ii) Effect on property value (iii) Lender / insurer concerns	(i)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 (ii)Covenant of legal title to address contamination left in place has little effect on property value given the type of housing development. (iii)Lender concerns are addressed by Contaminated Sites Legislation (Bill 26)
(d) Technical / Scientific Development of generic criteria and related guidelines	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.

(e) Urban Planning (i) Residential intensification (ii) Cost-effective development (iii) Zoning by-laws	(i)Rejuvenation of a commercially zoned lot. (ii)Cost effective remediation made the project possible. (iii)Approved re-zoning from commercial to residential land use.
(f) Communications (i) Public 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.

SOURCE: Golder Associates Ltd.